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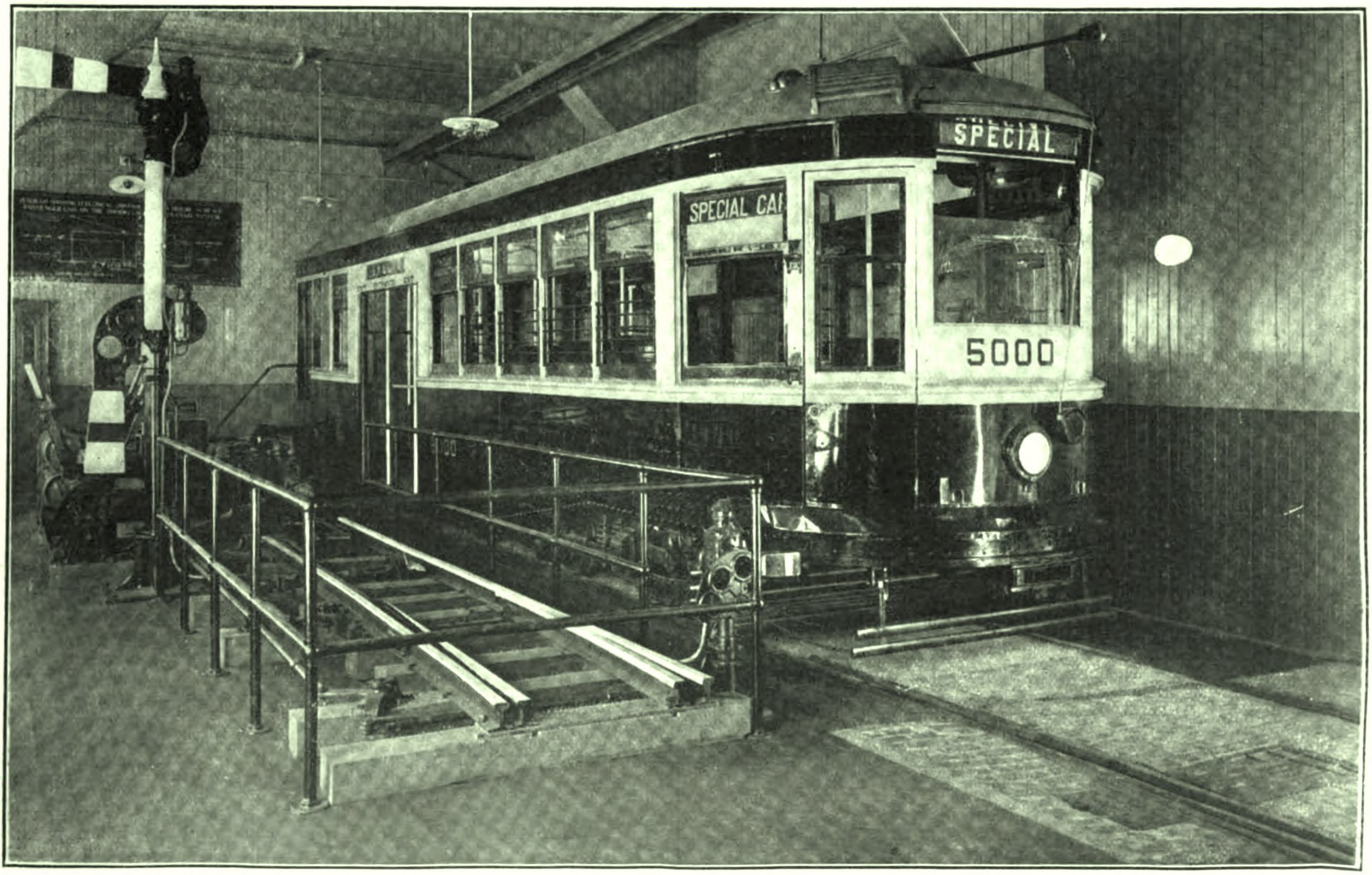
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Electric Railway Journal

Volume XLVI

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Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each subject. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the State matters of any particular State. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or State to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or State affairs appear direct under the names of the city or State involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the more common keywords used in the index. This list has been subdivided for convenience into sixteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index. As an example, if a reader wished to locate an article on power-driven motor trucks he would obviously look in the list under the general subject "vehicles," and of the four keywords that appear under this only "Commercial Vehicles" could apply to the article in question. The reader would therefore refer to this keyword under "C" in the body of the index.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND LEGAL

Accidents (including wrecks)
Accident claim department
Legislation
Legal
Public service and regulative commissions.
Public service corporations
Safety-first movement

CARS

Car design
Cars (descriptive)
Cleaning of cars
Gasoline cars
Lubrication
Heating of cars
Lighting of cars
Storage battery cars
Tower cars
Ventilation of cars
Work cars
Wrecking cars

CAR EQUIPMENT

Axles
Bearings
Brakes, air
Controllers and wiring
Couplers
Current-collecting devices
Doors, seats and windows
Fenders and wheel guards
Gears and pinions
Headlights
Journals
Motors
Trucks, car
Wheels

EMPLOYEES

Employees
Strikes and arbitrations

FARES

Fare collection (including apparatus)
Fares
Freight rates
Through routes and joint rates
Tickets
Transfers

FINANCIAL AND STATISTICS

Accounting
Appraisal of railway property
Financial
Franchises
Maps
Operating records and costs
Statistics
Traffic investigations, cities

HEAVY ELECTRIC TRACTION

Heavy electric traction (general)
High tension d.c. railways
Interurban railways (general)
Locomotives
Low-tension d.c. railways
Single-phase railways

MAINTENANCE OF EQUIPMENT

Cleaning of cars
Inspection of cars
Maintenance records and costs
Paints and painting
Repair shop equipment
Repair shop practice
Repair shops
Tests of equipment
Washing of cars
Welding, special methods

OPERATION

Dispatching trains
Multiple-unit trains
Operating records and costs
Passenger handling records
Rules
Schedules and time tables
Signals
Stopping of cars
Telephones
Trailer operation
Yards

POWER

Boilers and equipment
Cables
Energy consumption
Feeders
Overhead contact system
Poles
Power distribution
Power generation
Power stations and equipment
Purchased power
Storage batteries
Substations and equipment
Third-rail contact system
Transmission lines
Turbo-generators and equipment

RECORDS

Maintenance records and costs
Operating records and costs
Passenger handling records
Record forms

STRUCTURES

Bridges
Carhouses
Freight stations
Power stations
Repair shops
Terminal stations and terminals
Waiting stations

TRACK

Pavement
Rail joints and bonds
Rails
Special work
Ties
Track construction
Track maintenance

TRAFFIC

Freight and express
Parks and pleasure resorts
Public, relations with
Publicity
Routing of cars
Signs on cars
Traffic investigations

VEHICLES (not on tracks)

Commercial vehicles
Motor buses
Service and tower wagons
Trackless trolleys

MISCELLANEOUS

Advertising on cars
Fire protection and insurance
Lightning
Loading limits for cars
Municipal ownership
Organization charts
Public, relations with
Standardization
Storerooms
Timber preservation

In addition to the groups of articles covered by these headings the papers and reports from railway associations and technical societies are grouped under the names of the various organizations. Proceedings of other associations are indexed only in accordance with the subject discussed. The heading "Cars" includes all extended descriptions of individual types of cars, but short accounts of cars displaying no important innovations appear only under the name of the railway to which they apply. Under the headings "Financial" and "Statistics" appear the articles relating generally to capitalization, earnings and operating costs, as distinguished from the detailed and highly subdivided figures that are entered under "Operating Records and Costs." Short descriptions of machine tools appear only under the heading "Repair Shop Equipment" and are not indexed alphabetically, because of the wide choice in most cases of the proper keyword.

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A GOOD EXAMPLE OF CO-OPERATION

The National Fire Protection Association is a body whose interests might seem to conflict with those of electric railways and other sources of insurance risks. The insurance people naturally want to get the largest possible premiums for insuring property involving the least possible fire hazards. The larger the premiums and the fewer and slighter the fires the more the insurance profits. While, of course, electric railways do not desire to have their structures unduly hazardous from the fire standpoint, yet they do not enjoy dictation from the underwriters. There is, therefore, a constant possibility of difference of opinion as to what constitutes a reasonable risk and what payments should be made for carrying it. The Fire Protection Association is under no obligation even to consult the railways in this matter and it is all the more gratifying, therefore, that they not only do call representative electric railway men into conference, but they accept the suggestions of these men. Such conferences as those held in New York and Boston within the last two months achieve results which could not possibly come from conflict and produce benefits far beyond those originally contemplated. So conspicuous has been the success of co-operation in this instance that the following words appeared in a recent N. F. P. A. committee report: "The association (A. E. R. E. A.) has displayed a spirit of strong co-operation in harmony with the National Fire Protection Association in all matters affecting mutual interest, and friendly relations exist at the present time."

ENGINEERS NEED WAY COST RECORDS

Maintenance cost records founded on a standard unit should form the basis for analyzing the relative values of way materials and types of construction. The records of most way departments indicate that information about materials, the types of construction and the track locations are carefully and accurately kept. Beyond this point most engineers have hesitated to go. They are prone to look upon analytical statistics as a prodigious task, which reveal only what comes more quickly from experience. However, we wish only to call attention to the wonderful improvements that have been made possible by the performance records and costs of generating stations and repair shops. It is only by analyzing costs on a common unit basis that results may be compared on different properties. What is still more important, definite knowledge is available which shows whether the new materials or the new types of construction used have produced the expected results. Information of this kind would be especially valuable in analyzing the merits of different types of construction and materials used in track in paved streets. Generally speaking, the track cost represents approximately 40 per cent of the total plant cost, therefore the way engineer must exercise most careful judgment in adopting new types of construction and new kinds of materials. So many years are required on most properties to obtain definite results that some basis of generally adopted comparison is all the more important. If this were done, track worn out under dense and heavy traffic would serve as an index of what might be expected of track where comparatively light traffic obtains. To what length way-department cost records could be extended we do not care even to suggest. We do believe, however, that cost records on a unit basis of the total tonnage passing over the track would be of incalculable value in making comparisons between the different types of materials and construction. It would permit engineers to analyze their maintenance methods and particularly to criticise their own work. Where the same type of track construction is under similar traffic, maintenance costs on different properties could be compared.

GREATER PROTECTION FOR COMMISSIONERS

We hope that the New York Constitutional Convention will adopt the recommendation made by representatives of public utility companies who appeared before the members last week and urged that the term of office of public service commissioners be extended from five to ten years and that the holders of such offices have constitutional protection. We have often emphasized the fact that the tenure of office of commissioners is too short for them to become properly acquainted with the questions to be solved and the precedence and the economic laws governing these public utility problems. A term of fifteen years would not be too long, but a practical fulfillment of the ten-year term for New York would be a step in the right direction. As to the other point, up to the present there has been very little advocacy of constitutional protection for commissioners. The reason for this has been the comparative newness of the idea of commission regulation. Changes in constitutions come slowly in this country, and it is well that it is so. Public sentiment has gradually been crystallizing, however, in favor of commission form of government, but so separated from politics as to keep it free from the spoils system. We would approve, therefore, any means for giving commissioners the same security of office as the higher judges, and would advocate a requirement of a concurrent resolution of both legislative houses by a two-thirds vote for removal. To be sure, the character of commissioners must

ultimately depend upon the Governor's appointive power, but under the above plan the individual commissioner would be much more secure in office, and so better able to act in an unbiased way with the cases which come before him. For the same reason, also, a better class of men would be attracted to such work.

JITNEY-BUS COMPETITION

We are wholly unable to agree with the expression of belief in the importance of the motor-bus as a competitor to the electric railway, which appears on another page of this issue, notwithstanding our respect for the opinions of its author. Undoubtedly the itinerant jitney has made serious holes in the gross earnings of a number of properties, but that fact certainly does not constitute a valid reason why the electric railway should enter the bus business with a view to recouping its losses. We have followed with the utmost care—even with a certain amount of natural anxiety—the whole of the short history of the motor-bus movement in this country, and as it stands at present the situation may be summed up in one sentence: Nowhere have there been given out any authentic records of the actual operation of motor-buses which show them to be nearly as efficient, including all costs and all factors, as are electric cars.

The author expresses fear that organized capital might engage in the business and make greater inroads into the trolley receipts than the unorganized jitney competition, but there is even less danger of this, we believe, than from the itinerant jitney. The regular bus is at a disadvantage in some respects as a traffic getter, compared with the second-hand touring car. In the first place, with the increased number of passengers more stops have to be made, and the bus cannot compete in speed with the smaller vehicle. Again, the bus does not appeal so strongly to the man who does not own an automobile as does the touring car. We have always maintained that one of the reasons which impelled some people to use the jitneys was the appearance of affluence which it gave, and this is shown by the requests often made by passengers to the driver to remove his route sign. Finally, there is no such supply of second-hand motor-buses as there is of second-hand touring cars, so that the investment required to establish a line of buses is very much greater.

Organized capital has attempted to establish 5-cent motor-bus lines in various cities, but we know of no place where they have proved at all successful. In both Pittsburgh and Los Angeles the service has been abandoned, and last week the news came from Washington that a receiver had been appointed for the Metropolitan Coach Company of that city. Of these installations it is hard to imagine any two cities in the country where the natural conditions in the way of climate, low grades and good paving are more favorable to the operation of motor-bus lines than Los Angeles and Washington.

The sale of the Los Angeles buses was mentioned in this paper several months ago. In reply to a creditor's petition for a receiver in the Washington case the company admitted its insolvency. It has never made expenses at any time during three years of operation. It was not a fly-by-night undertaking equipped with second-hand cars. It was a company operating six eighteen-passenger buses of good design over a route from Fifteenth Street and Pennsylvania Avenue (a departmental, business and hotel center) to Sixteenth and U Streets, traversing one of the best residence districts of the city. The maximum haul for a 5-cent or six-for-a-quarter fare was 1½ miles. The traffic has amounted to as many as 65,000 cash passengers a month. But the line could not be made to pay even with the most economical, not to say parsimonious, management. There is no mystery about the outcome of this experiment. It is due simply to the fact that it cost more to carry passengers than was collected for the service. What makes the Washington bus failure especially impressive is the fact that the enterprise was well backed financially and had a particularly good route. If success could not be achieved under these circumstances it would be hard to find a situation that would justify the hope of profit in jitney operation.

There is a profitable bus line in New York City. But this charges a 10-cent fare in a restricted and highly-profitable territory, and if there is another successful city bus company of reasonable size elsewhere in the country, the fact of its existence has never been published. Indeed, until someone is able to make actual, not paper, profits with buses at the 5-cent fare charged by city railways, or to serve rural districts at the same speeds and at the same fares that have been established by the interurbans, we refuse absolutely to be stampeded by the spectacular features of the motor-bus. When its advocates can point to definite results that show it to be cheaper to operate than the electric car there may be some grounds for the consideration of bus operation in general by electric railways. Until that time arrives, however, we can only reiterate a warning against taking up this over-exploited and apparently extravagant method of transporting passengers.

THE JITNEY AND THE ONE-MAN CAR

It is perhaps more than a coincidence that we printed in last week's issue two letters from railway operators advocating the use of light one-man cars as a means for dealing with the jitney problem in small cities. The jitney has certainly shown the general demand for frequent service, and in emphasizing this fact it may prove to be a blessing in disguise. As a common carrier, it has no place on the streets of the city unless it assumes the duties which pertain to all common carriers, but that it may also direct attention to ways in which electric railway service may be improved, there is no question.

Two plans have been suggested for changes in electric railway practice to meet the competition brought by the jitney. One is the adoption of the short car which, in many cities, would be the one-man car. The second, mentioned in one of the letters last week, is the establishment of a zone system with a reduced rate of fare for a restricted zone in the center of the city. The British Columbia Electric Railway is the only company we now recall as having taken this latter step. This line, preferring to apply the "aut scissors aut nullus" policy to its fares rather than to its service, recently offered as alternative to its ordinary straight 5-cent fare a special non-transfer ticket, good only within the city limits of Vancouver and Victoria, at the rate of eight tickets for 25 cents. In the recent report of R. B. Stearns on the Milwaukee zone system the suggestion was also made, though not yet put into practice, that a reduced rate for a smaller central zone would further increase riding through the stimulation of short-haul business and through the competition with the jitney and walking. Such a step would undoubtedly be revolutionary, but these suggestions show the way in which a number of railway operators are thinking.

The one-man car, especially the light car, is not so radical a departure from existing standards, and in one of the letters mentioned actual figures were given of the low injuries and damages account on two lines using one-man cars, as well as estimated annual net savings possible with one-man over two-man service. Operators and public officials inclined to regard the accident hazard of the one-man car as prohibitory will find a revelation in these figures, and general publicity of similar statistics would do much to remove prejudice from this type of equipment. So far as its inherent profitableness is concerned, the fact that a number of engineers are now engaged in designing experimental one-man cars of exceptionally light weight bids fair to promise for the future a considerable reduction in operating expenses, even as compared with the roseate yet conservative estimates already presented.

THE CALL OF THE RAIL

To graduates of engineering schools this year who are considering electric railway work as a chosen field, we unhesitatingly say that never in the history of the industry have opportunities been better for men with a real bent toward a transportation career, backed by staying power and a determination to do every job so well that it forms a stepping stone toward the next responsibility. The day has gone when a "favorite son" with a fat allowance and an easygoing disposition can expect to go into electric railway work and hold down a man's position on a banking hours' schedule; but the time will never come when a man willing to devote practically his whole time out of bed to mastering the problems of transportation in the early years of his career on the basis of aptitude for the work and of absolute fidelity to every commission cannot advance in the traction world once he is fortunate enough to get a start.

Once the 1915 graduate becomes an employee of an operating company, let him realize that his future largely depends upon himself. The exact line of work which is first taken up is relatively unimportant. Students sometimes hesitate to enter platform service for fear that they will be swallowed up in the organization, but it is fair to say that this anxiety is largely unnecessary. A period of service at the controller and among passengers affords a trained engineer opportunity to enter into the problems of the transportation department which may be extremely valuable in comparison with the rather academic ideas often gained otherwise. The methods of handling runs, of filling in traffic blanks, day cards, and accident reports, of "signing up" for work, the close observation possible of the way in which subordinate officials perform their tasks—these and a hundred other details afford experience which may be extremely suggestive, however loath a man may be to pass more than a few months in routine duty. In years to come, when the executive of 1925 goes under cross-examination in an arbitration or court case, the mere fact of having had actual experience on the platform or as a helper in the shop may give his evidence a value which could never be the result of purely theoretical knowledge. Work in the ranks of an operating company may not in itself call for the practice of principles learned on the hidden side of the college wall, but it gives a sense of proportion and a knowledge of men that come into play exceedingly well sooner or later.

However a technically trained man may enter the service of the modern street railway, he is bound to become acquainted with the engineering and executive staff in due course and, in fact, will do well to let the employment department know his full hopes and desires when he goes into the work. Attendance at meetings of company sections of the national association, the gradual extension of friendship and continued study are likely to bring their reward in due course. Where one can enter a student course or as a recognized apprentice, so much the better. Finally, if things go too slowly after a reasonable trial, it may be possible to apply for a transfer to another department with some show of success. Sooner or later the opportunity coveted is almost sure to come to the technically trained man whose qualifications are known to his superiors, and if they are not, either the system of employment and management is wrong or the man himself must be at fault.

Sooner or later the true cost of electric transportation must be met by the communities which it supplies. This means that as long as such service is rendered, scientific work in it will be rewarded. We need not enumerate the unsolved problems of the industry. There will always be such before it, and to those of the future the young men of to-day will have to address themselves. Public relations, scientific management, the conduct of labor affairs,—these and many other questions are coming to the front more and more as the industry grows. Methods may change with the years, but the fundamental problem of economically transporting men and things will always be with us, and in no small degree the success with which its variables are evaluated in the years to come will depend upon the graduates of the present period, upon their eagerness to master details before they attempt to generalize, and upon their appreciation of the meaning of opportunity in the humblest task which is placed upon them in the drab weeks which so often follow the fall of the academic curtain.

Improvements in the Low-Floor Car

Four Years of Development Have Brought the Pittsburgh Design into Its Probable Final Form—A Description is Published, Including Consideration of the Details of Construction of the Low-Floor Motors and the Control Without Resistance

Since the low-floor car was brought out in Pittsburgh, somewhat less than four years ago, certain changes have been made from time to time with the idea of improving the operating efficiency. The first cars of this general type were trailers and were placed in service in 1911. One of these, equipped with motors, has been in regular operation since the summer of 1912, but the first cars designed especially for use as motor cars have been in use about two years. The changes in the car body, although important, are very naturally overshadowed by those made in the control system that practically eliminates the use of resistance, as well as by the motors which have made possible such an astonishing reduction in weight by permitting the use of 24-in. wheels. As these features have, in all probability, reached the commercial form in which they will remain for some time to come, detailed descriptions are given in the following paragraphs. These include also a comparison between the design of the low-floor motor and a standard motor of the same rating, which shows for the first time some of the reasons for the ability of the former to do its work in spite of its small size.

The latest developments in the low-floor car design appear in the 100 cars which were ordered some time ago by the Pittsburgh Railways Company and are being received from the builders at the present time. In general appearance the new cars are like their predecessors which were described in the ELECTRIC RAILWAY JOURNAL for April 11, 1914. However, they have lower steps because of a greater ramp in the floor, and in addition a greater proportion of the car is built from steel, the latter feature, together with other refinements in design, making it possible to reduce the weight of the car body by approximately 2500 lb.

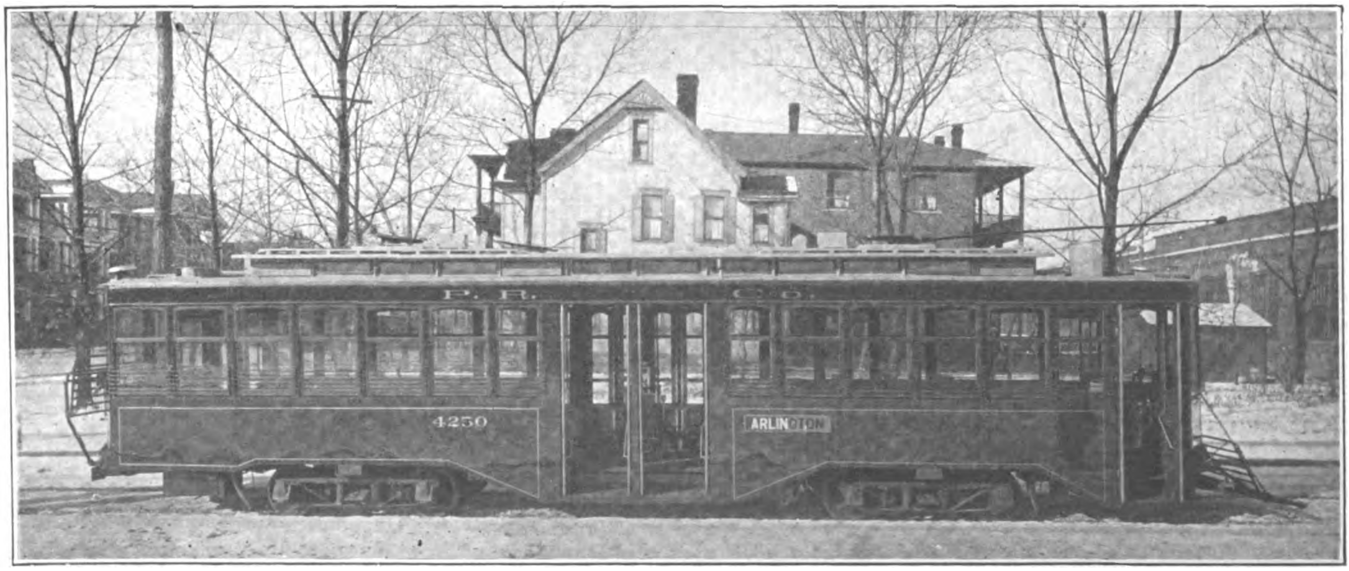
In the center-entrance motor cars first used in Pittsburgh the top of the center door is reinforced by heavy rolled channels. In the new cars, however, the whole side of the car becomes a girder, the depth of which is from the top of the letterboard to the bottom of the side sheathing. Previously the side girder extended from the bottom of the side sheathing to the bottom of the window only, and it was necessary to reinforce heavily the parts around the center doors in order to carry the strains across this portion of the car side.

The seating capacity is sixty. By combining longitudinal and transverse seats the company has returned to a plan that was very widely used in Pittsburgh before the advent of the first center-entrance cars. Permanent seats extend around the ends of the car, the control and brake handles being mounted on pipe railings that serve as seat separators. A plan is shown on page 7.

The ramp at the center of the car is 5 in. high and 5 ft. long. This reduces the two center-entrance steps to heights of 14 in. and 9½ in. Three steps respectively 12½ in., 8½ in. and 8½ in. are provided at the front exit, the first-mentioned one being the height from the rail to the lowest step tread.

In common with the earlier designs the new cars have a front exit door and two doors at the center. The door mechanism is made up of levers, and all doors are mechanically controlled by the trainmen without the use of compressed air or electricity, it being believed that a manually-operated door is much more easily kept in order than one opened by power. The center doors are separately controlled by the conductor, so that either one or both of these doors may be used as an entrance. If a passenger sitting in the rear part of the car signals that he wants to get off, the conductor keeps the rear center door closed until he is ready to alight. The entering passengers then divide into two streams, part coming in one door and part in another. The front exit door is supposed to be used by all of the passengers in the front half of the car, although it has been found in practice that only about two-thirds of them do so.

Some remarkable results have been obtained through having two streams of passengers board simultaneously and pass on opposite sides of the fare box. The loading time per passenger at certain corners is less than one second, the average at the heavy loading points (including the time of the fellow "who never has change")



LOW-FLOOR CAR—VIEW SHOWING CENTER ENTRANCE AND FRONT EXIT being only slightly more than one second. In general, the separate control of the center doors has been found to be an excellent feature since it permits the conductor, without saying anything to any of the passengers, to guide their movements. Also it is possible in cold weather, when only one or two people want to board the car at a certain point, to open only a small part of the car to the outside atmosphere.

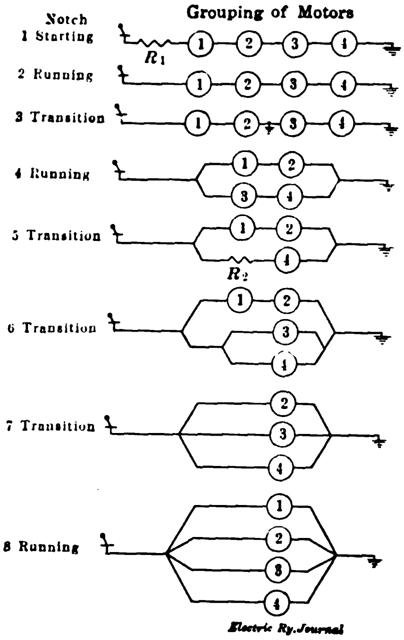
The exact weight of the new cars, fully equipped for double-end operation, with two fenders, two couplers, two controllers, etc., is 35,600 lb. If the car should be arranged for single-end operation, with only one set of doors, one controller, etc., the weight would be 33,000 lb. Car-body and equipment weights are as follows:

Weight of car body, conduit, wiring and air-brake piping	18,000 lb.
Weight of air brakes	950 lb.
Weight of motors	7,000 lb.
Weight of other electrical equipment	1,250 lb.
Weight of trucks	8,400 lb.
Total weight	35,600 lb.

The car-body weight includes all accessories as well as the air-brake piping and the wire and conduit for the motors and control. The weight of steel in the car framing is 6800 lb. The over-all length of the body is 45 ft. and the width is approximately 8 ft.

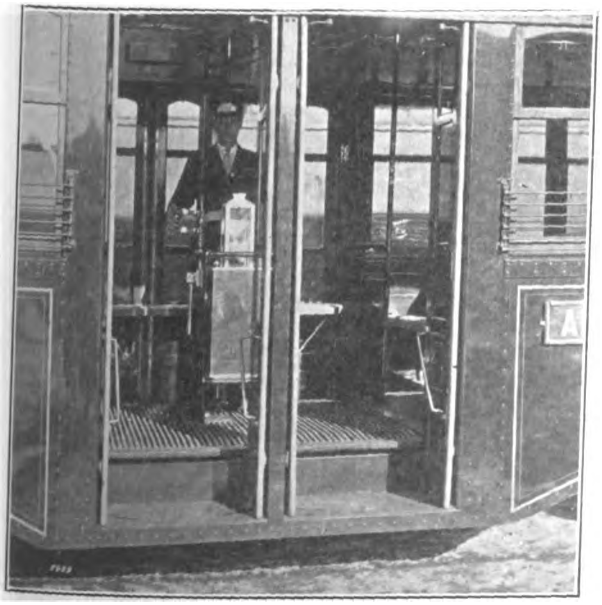
From the above table it is manifest that the low total weight of the car is brought about in great measure by the reduction in weight of the apparatus under the car rather than in the car body itself. The small wheel, in itself, reduces the weight by approximately 1200 lb. per car, and to its use can be traced almost all the other weight reductions. The axles of the trucks are lighter because of reduced strains, and the truck itself, in all its members, is lighter than with the larger wheel. In practice the lighter weights of the members are found to have ample strength. Theoretically the closer the center of gravity is to the track, the harder the impact from side motion, but in practice, in slow-speed city service, the distance that the car body travels in a side "slap" seems to be the controlling factor, since the low-floor car rides much better over rough track than the high-wheeled car. The details of the truck were worked out under the supervision of F. R. Phillips, superintendent of equipment.

The prominent feature of the truck is the elimination of end frames, the truck being held square by gussets that connect the transoms and the arch-bar-type side frames. The weight of 4200 lb. for the truck indirectly enables a total saving of 3400 lb. to be made over the standard type with large wheels, 740 lb. of this saving being in the smaller axles and 1200 lb. being due to the smaller wheels. Elliptic springs are used, these resting on a spring plank supported by 15-deg. swing links from the transoms, and it is reported that the arrangement makes the low-floor car actually ride more easily than the standard types, even in high-speed suburban service, where several of the cars of low-floor design are used.

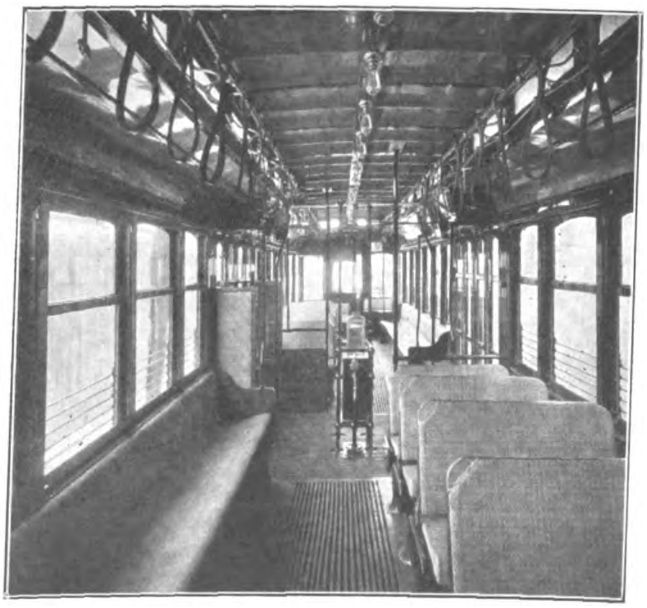


LOW-FLOOR CAR—GROUPING OF MOTORS FOR CONTROL

The electrical equipment consists of four GE-247-A, 35-hp motors with Jones control built by the General Electric Company under the Jones-Welsh patents. The control differs from that used on the earlier low-floor cars in having a new type of unit switch, this being of the armature type instead of the plunger type. The contactors are arranged in two switch-group cases, the reduced size making it easy to find a place for the groups beneath the low floor of the car. The combinations and connections provide for the use of interlocks on the contactors to establish holding circuits whereby the motors are maintained in parallel groups while the control handle is being thrown off, thus affording a closed path of low resistance for the discharge of magnetic energy. In this way burning of the contactor tips is greatly reduced since the contactors act as commutating switches, and with the exception of one or two units have very little actual rupturing of the current to do.

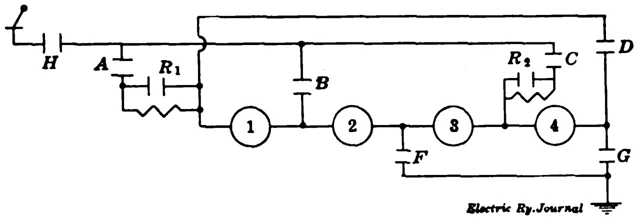


LOW-FLOOR CAR—VIEW AT CENTER ENTRANCE, SHOWING DOUBLE-DOOR ARRANGEMENT



LOW-FLOOR CAR—INTERIOR VIEW, SHOWING CENTRAL LOCATION OF FARE BOX

Contactor Sequeuce									
Step	*A*	*B*	*C*	*D*	*F*	*G*	*H*	R_1	R_2
1	●					●	●		
2 ○	●					●	●	●	
3	●				●		●	●	
4 ○	●			●	●		●	●	
5	●		●		●		●	●	
6	●		●		●	●	●	●	●
7		●	●		●	●	●		●
8 ○		●	●	●	●	●	●		●
○ Running Points									



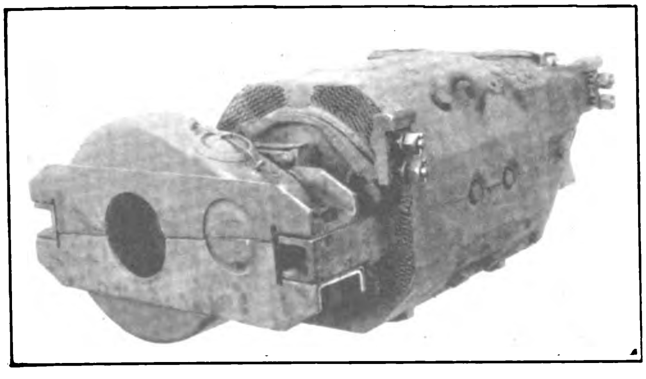
LOW-FLOOR CAR—SCHEMATIC DIAGRAM FOR CONTROL AND SEQUENCE OF SWITCHES

There is also provided a method of cutting out damaged motors by use of the control circuits which simplifies the car wiring.

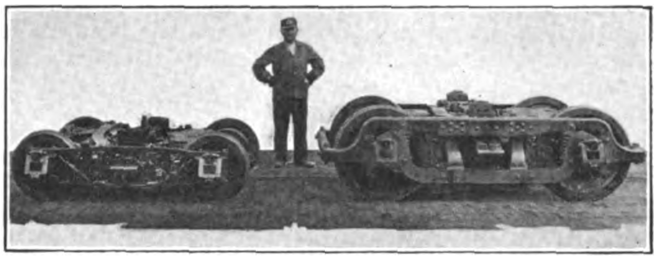
In this control system resistance is used only on two transition points or when all four motors are in series and when the first motor is thrown in parallel across the line. In the original control system only two motors worked on the transition points, whereas the above plan shows never less than three from the series-parallel position to the final position. By the use of an additional contactor, three or more motors can be used throughout the entire range, but in practice this has been found unnecessary for the first part of the accelerating period. It should be said that a few of the controllers with the original connections are still in service and work very well except that the acceleration is not as rapid as with the new scheme.

Since there are three running notches, the transition points are used only for very short intervals. It is found that the motormen make frequent use of the first running notch with all the motors in series, when behind slow-moving wagons, and the power, therefore, is not continually thrown on and off. This saves controller fingers, brakeshoes, wheels, current, and last but not least, nerve force of the passengers.

Three extremely hilly routes in Pittsburgh have been equipped with the low-floor cars, and it is found that the current consumption is approximately the same as when the same number of small-capacity single-truck cars were in operation on these lines. Tests lasting for about two and one-half months show that this control takes from 8 per cent to 15 per cent less power than with the standard, resistance-type, series-parallel control when used on cars of the same weight. The amount of saving, of course, depends largely upon the number of stops per mile. The design of the resistance and the smaller capacity of the motors, it may be said, help to reduce the car weight.



LOW-FLOOR CAR—VIEW OF MOTOR FOR 24-IN. WHEELS



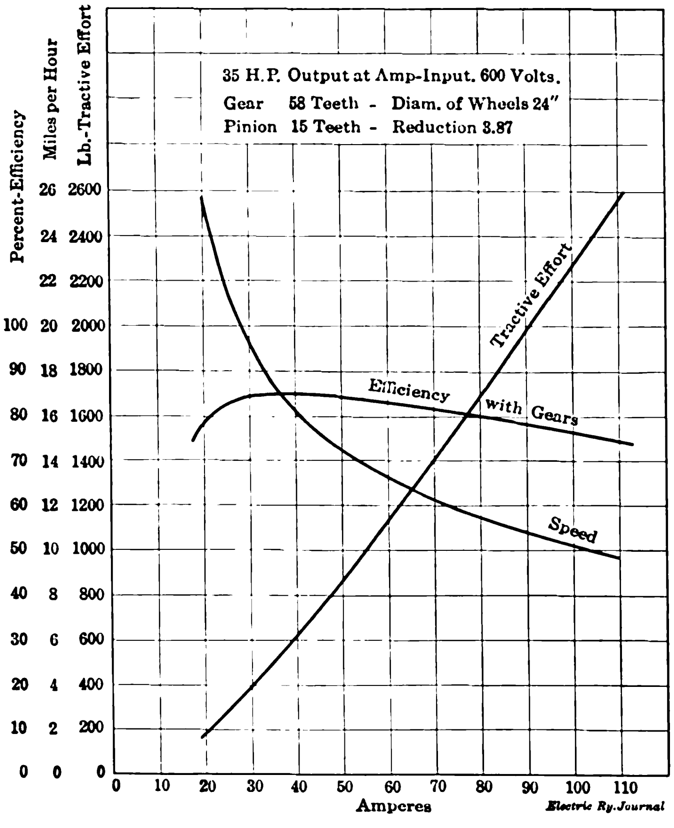
LOW-FLOOR CAR—RELATIVE SIZE OF LOW-FLOOR AND STANDARD TRUCKS

One other feature of the car is a new type of compressor which was specially designed by the Westinghouse Air Brake Company to fit the available space and to reduce the vertical height occupied to the absolute minimum.

DESIGN OF LOW-FLOOR MOTOR

Naturally, the development of motors small enough for use with 24-in. wheels has raised some question as to the methods by which this most important step toward efficient operation has been made. As a matter of fact, in the design of the low-floor motors nothing has been skimped to save weight, and the construction has been worked out along normal lines, the designers utilizing all of the latest available knowledge about railway equipment to produce the best results consistent with generally accepted practice.

This is indicated in the following table, which shows that there is nothing in the new design that is greatly

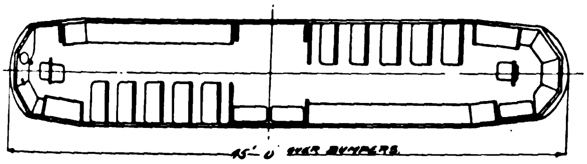


LOW-FLOOR CAR—CHARACTERISTIC CURVES OF MOTOR FOR 24-IN. WHEELS different from the electrical and mechanical features of the older types of motors. The new type, which is known as the GE-247 motor, is of the same rating as the old standard GE-81, and on this basis may be compared with it. The field windings of the two motors cannot, of course, be compared because the GE-81 motor is a non-commutating-pole machine while the GE-247 motor has commutating poles. The armatures, however, are wound with exactly the same number of turns per coil. In both cases the air gaps are normal, being eccentric, and they should not vary from each other more than 1/64 in. The new motor, also, is ventilated, whereas the older one is not. This feature has naturally increased its relative hourly rating and has given it as well a high continuous ampere capacity.

Comparison Between Low-Floor Motor and Standard Motor

	GE-247	GE-81
Rating 600 volts	35 hp	35 hp
Rating 500 volts	30 hp	30 hp
Clearance under frame:		
30-in. wheels	....	4⅜ in.
24-in. wheels	3 5/16 in.	....
Speed (500 volts, 55 amp)	605 r.p.m.	610 r.p.m.
Diameter of armature	10½ in.	11½ in.
Number of slots	27	29
Turns per coil	3	3
Length of commutator	2¾ in.	3 in.
Thickness of shell	7/16 in.-1⅛ in.	½ in.-1¼ in.
Diameter of armature shaft	2¾ in.	2¾ in.
Weight with gears and case	1750 lb.	2020 lb.

Summed up it may be said that the 24-in. wheel, with all of its inherent advantages in reduced weight, has been made possible mainly by the adaptation of commutating poles and ventilation to a small-size motor, together with a reduction of 1 in. in clearance under the motor frame. Aside from these features the considerable saving in weight and size has been effected without departing in the least from the substantial mechanical design of standard motors. The efficiency tractive effort and speed curves are shown in an accompanying diagram.



LOW-FLOOR CAR—PLAN SHOWING NEW SEATING ARRANGEMENT

Details of Construction

It should be said also that part of the saving in weight has been obtained by the use of the box type of frame. This has for long been considered necessary for large motors, and its adoption for a motor of this size is a perfectly logical step. The box frame of the new motor is approximately octagon in transverse section, and has the four main exciting poles located at angles of 45 deg. to the vertical. Bails are cast on the frame for handling the motor, and brackets are provided for bar suspension. A large opening is provided over the commutator, this being closed by a pressed-steel cover held in place by a cam locking device. The frame heads have auxiliary oil wells, and drain pockets for oil thrown off by the oil deflectors on the armature shaft. All covers on the axle and armature-bearing oil boxes have deep lips and are lined with thick felt held in place by rivets and washers, a sheet steel dustguard inclosing the axle between the axle caps. Provision is made for a 4-in. diameter of axle in the axle linings and for linings 7 in. in length. The gear case is made of sheet steel, each half being pressed from a single sheet, and it is supported by a horn cast on the axle cap at the pinion end.

The exciting pole pieces are built up of laminations assembled on keys which are bolted to the frame by tapped bolts inserted from the outside. The commutating pole pieces are drop forgings. The mummified type of coil is used for both main and commutating field coils, the insulation following standard General Electric practice in all respects. The exciting coils are held against steel pads by spring angle flanges, and the commutating coils against finished seats in the frame in a similar manner.

The armature, of course, is built up of laminations assembled on and keyed to the armature shaft, longitudinal ventilating ducts extending through it and through the commutator shell and armature heads. The commutator is 9⅛ in. in diameter and is built up of hard-drawn copper, insulated with mica grooved out to a depth of 3/64 in. below the surface of the commutator. The bars are insulated from the shell by cones of mica pressed to shape, the whole being pressed together hydraulically before the locking nut is tightened up. The insulation of the armature coils, hot banding, etc., and the brush-holder design also follows standard General Electric practice.

Ventilation is effected by a double or multiple fan which is made integral with the pinion-end armature head and which draws air into the motor through hooded openings provided in the commutator-end frame head. The air divides into two streams, one passing over and around the armature and field coils, the other taking a parallel path through the ventilating ducts in the commutator shell and armature core. After passing through the double fan the streams unite and are exhausted to the atmosphere through screened openings in the frame. By this means a positive circulation of air is maintained through the motor, cool air coming in contact with all parts of the motor.

In designing this motor no effort has been made to reduce the weight below limits that are consistent with sufficient strength and rigidity; therefore, it is well suited to handle loads within its range of capacity. This has been demonstrated by the fact that the original motors of this general type have been in hard service for nearly two years with a low maintenance cost. In fact, approximately 500 of the GE-247 motors have already been supplied for cars with 24-in. wheels, and all of them at the present time are giving very satisfactory results in operation.

Congresses at San Francisco

Eight hundred and twenty-two conventions and congresses, whose subjects cover the activities of the world along industrial, commercial, professional and scientific lines, will meet in San Francisco and the bay cities in connection with the Panama-Pacific International Exposition during the 288 days of its existence. This is more than double the number at any previous world exposition, and to secure them practically all organizations of importance in the civilized nations of the world were thoroughly canvassed by the exposition authorities.

The attendance at each of the conventions and congresses will range from 100 to possibly 30,000 delegates and visitors. There will be an average of nine exposition conventions per day throughout the entire period. But few days are blank, and on certain days during the summer months as many as thirty or forty meetings of various kinds will be held.

Following are the classifications geographically and the popular months: national conventions, 525; international congresses, 57; Pacific Coast conventions, 68; California conventions, 172. August is the month during which the largest number will be held, namely 249. July follows with 133, and September with eighty-six.

Pacific Claim Agents' Convention

Abstracts Are Given of Six of the Papers Presented at the Annual Meeting of the Pacific Coast Claim Agents' Association—Result of the Election of Officers

The seventh annual meeting of the Pacific Coast Claim Agents' Association was held in San Francisco on June 24-26. There was a full representation from member companies. The sessions were notable for the number of very able addresses and papers presented. One of these was published in abstract in the issue of this paper for last week, and abstracts of others appear this week.

At the meeting on June 26 officers were elected as follows:

President, Thomas G. Aston, claim agent Washington Water Power Company, Spokane, Wash.

First vice-president, Thomas A. Cole, claim agent Los Angeles Railway Corporation, Los Angeles, Cal.

Second vice-president, W. H. Moore, San Diego Electric Railway Company.

Third vice-president, J. S. Mills, assistant superintendent Key Route, Oakland, Cal.

Secretary and treasurer, H. G. Winsor, claim agent Tacoma Railway & Power Company, Tacoma, Wash.

Executive committee: J. H. Handlon, claim agent United Railroads, San Francisco, Cal.; A. M. Lee, assistant general claim agent Northern Pacific Railway, Seattle, Wash.; B. F. Boynton, claim agent Portland Railway, Light & Power Company, Portland, Ore.; George Carson, claim agent Puget Sound Traction, Light & Power Company; H. K. Relf, general claim agent Spokane, Portland & Seattle Railway, and S. A. Bishop, general claim agent Pacific Electric Railway, Los Angeles, Cal.

Tacoma was chosen as the place for next year's convention.

THE INVESTIGATOR AND HIS WORK

BY C. F. YOUNG, ADJUSTER PUGET SOUND TRACTION, LIGHT & POWER COMPANY

The investigator, to my mind, is next in importance to the claim agent or adjuster. Loyalty, of course, is one of his first requirements. He should be above the average degree of intelligence and come within the most critical definition of the term gentleman. Then his personality should be pleasing, and he should approach people in a manner to inspire confidence. He should also be a good listener, be able at once to impress upon the witness his fairness in the case in question, and fairly to influence an obstinate or prejudiced person. He should be honest in all things, clean morally, dress neatly but not overdress, as his work requires him to meet all classes. He should be particular when calling upon people below him in rank not to talk over their heads. He should hold his temper always, but by so doing not let the other fellow imagine he is afraid.

He will find cranks and critics in many places, as well as scores of people with complaints, real or fancied, and to these he must be able to make answer without provoking an argument. Many times, the fact of calling attention to the difficulties of operation or the tribulations of the trainmen in dealing with the public and endeavoring to please all, will be of material help in effacing prejudice and creating a friendly attitude. A good way out of many such incidents is for the investigator to explain that the claim department has nothing whatever to do with the operating end but that he will be pleased to call attention to the complaint or suggestion, and in this way many timely suggestions have been so made and reported to the proper department.

The investigator should be sufficiently acquainted with the subject under investigation to know what he is seeking and recognize it when he sees it, thus cutting out all suppositions and embodying in his statement positive facts to which the witness could testify if called upon the stand later. A reasonably short, clear statement covering the facts will help to save much of the time of the witnesses, most of whom are disinterested and conferring a favor upon him.

The investigator should be on the best of terms with all other employees, so far as is possible, and especially with heads of departments. His treatment of trainmen should be such that they may look upon him as a friend trying to build up a defense not only for the company but for the man or men who have had the accidents. If he has established this feeling he will secure many good tips from them.

He should be able to use a camera to secure pictures of conditions at crossings, landings, steps and platforms as well as street intersections, thus having evidence which is hard to refute months or years later in a suit, when conditions may have changed.

THE ORGANIZATION OF PUBLIC SAFETY COMMITTEES

BY B. F. BOYNTON, CLAIM AGENT PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

After years of work along safety educational lines with our trainmen in Portland in the public schools, and in various other ways, we began to receive letters from all over this country and foreign countries inquiring about the methods and results of our work. We began to feel we had really accomplished some good in eliminating accidents, as we had reduced the number of accidents on our own property about thirty a day. One day I called on the Mayor and showing him the documents we had received from the various cities and countries, I told him I thought that a public safety committee, backed up by prominent men in our city, could accomplish a great deal toward making Portland the safest city in the world. The Mayor thought the suggestion a good one and appointed a committee consisting of nine bureaus, as follows:

Bureau of public safety—John T. Moore, captain of police.

Bureau of fire prevention—A. M. Churchill, lawyer and chairman of fire prevention bureau of Civic League; E. F. Dowell, chief of fire department, and Jay Stevens, fire marshal.

Bureau of traffic—H. P. Coffin, chairman public safety committee of Portland Automobile Club, and A. S. Kirkpatrick, city traffic engineer.

Bureau of schools—L. R. Alderman, superintendent of schools.

Bureau of transportation—F. L. Burckhalter, general superintendent Southern Pacific Railway.

Bureau of electric transportation—B. F. Boynton, general claim agent Portland Railway, Light & Power Company.

Bureau of industrials—M. N. Dana, *Evening Journal.*

Bureau of buildings—R. L. Withrow, *Evening Telegram.*

Bureau of publicity—H. E. Thomas, city editor *The Oregonian.*

Advisory board—G. W. Talbot, president Pacific Power & Light Company; F. C. Knapp, Peninsula Lumber Company, and A. H. Averill, Averill Machinery Company.

These men, you will see by the positions they hold, are representative men in representative positions. Each man has his branch of work to cover.

The first public step, after our organization, was to get our fire marshal, Jay Stevens, to go in full firemen's uniform, with H. P. Coffin, chairman of our public safety committee at the present time, and myself, to our various public schools throughout the city and talk to the children on fire prevention. Mr. Stevens, being a very interesting and entertaining talker, was received at all the schools with great enthusiasm, and we have a record at the present time of having saved two schools and a great many lives as the result of Mr. Steven's talks. At the time he started his school lectures many false fire alarms were being rung in every day, which not only cost about $25 each to answer, but introduced an element of danger from the heavy fire apparatus plunging through the streets at breakneck speed. He showed in his talk to the school boys that the fire engines, in answering one of these false alarms might collide with a street car, injuring the firemen and possibly the boy's own mother in the street car. This caused all the boys to think. They stopped turning in false alarms, and to-day a false alarm is a rarity in the city of Portland.

For a number of years I have been gathering different safety data and safety propaganda of every description from all over the world; in fact, I have quite a large room in our building given over entirely to a safety-first exhibit. To impress the members of the Commercial Club and Portland's citizens with what was being done along safety lines, I had this entire exhibit moved to the dining room of the club, and on the occasion of our first general meeting there we invited a number of representative employers to attend. The enthusiasm and interest displayed at that meeting has ever since been growing. We held other meetings at the Commercial Club, which was then Portland's representative business organization. Every meeting has been largely attended.

Within the past few months our Commercial Club and Chamber of Commerce and other large clubs have combined into one organization, namely, the Chamber of Commerce, thus making an organization of approximately 5000 members. The new Portland Chamber of Commerce in its budget just prepared, has made a very liberal allowance for carrying on the safety work.

Since the establishment of the public safety committee, our city has appointed a public-safety man. This gentleman, A. S. Kirkpatrick, has installed between 300 and 400 caution signs at dangerous points all over the city. They are steel disks 18 in. in diameter, mounted on steel tubing 6 ft. high, painted red with a green center, and are set in concrete just inside the curbing on the right-hand side of the street at various distances from danger zones, warning the drivers of teams and machines of the condition ahead. "Sharp Turn," "Steep Grade," "Railroad Crossing," "School, Drive Slow," "Fire Station," "Reverse Curve," "Hospital," and other warnings are painted on these little disks.

Up to May 1 our public safety committee had 153 automobile drivers arrested (and most of them were fined) for disobeying the traffic ordinance in passing street cars while the latter were discharging passengers. Before the organization of the public safety committee many passengers were knocked down and injured in this manner, but now, when a street car stops, no matter how many machines there are behind it, they all throw in the reverse and come to an immediate stop.

Our fire marshal has appointed a number of deputies, who all wear regulation fire inspector's uniforms. Every building in the city of Portland is being examined by him or his deputies for fire hazards, and we expect to carry out just as thorough work through every branch of industry, and in so doing solve through education the greater portion of the accident problem. I find that by being liberal enough to take an interest in the other phases of safety work than that which directly affects the company I represent, a feeling of desire to reciprocate and help us is created among all classes of people in a way that could not possibly have been done in any other manner.

THE EMPLOYMENT BUREAU

BY H. G. WINSOR, GENERAL CLAIM AGENT PUGET SOUND ELECTRIC RAILWAY AND TACOMA RAILWAY & POWER COMPANY

There are many types of applicants for employment but comparatively few can be classed as eligible. The process of elimination quickly disposes of such as the man who cannot afford time for proper instruction; or the one who is always financially embarrassed; or the man who is a "globe trotter" and has a pocket full of service letters; or the man who can tell his instructors just how the work should be done. We have no use for the man who is dissipated or naturally uncouth in appearance, and above all, we should shun the man who expects to secure a position through political influence.

On the other hand, the employment official of experience and mature judgment will quickly recognize probable merit in the following types:

1. The man who presents a desire to undertake the work without condition, depending entirely on his personality for favorable consideration.
2. The man who presents himself at an hour which he selects as being most convenient for the employment official and enters the office in a respectful manner.
3. Those having seen honorable service in the army and navy. Such men usually make satisfactory trainmen as their experience teaches discipline and loyalty.

The employment of men should be undertaken by one who is a good judge of human nature. If so, he can find out many of the defects of an applicant at a single interview. "Make haste slowly" is a splendid maxim for adoption by employment officials. Many an applicant who has the ability and personality to "make good" and a spirit of loyalty which would recommend him after deliberation has been disheartened and lost to the service through an abrupt, indifferent or discourteous reception of his application for employment.

Two important essentials for employment are character and physical fitness for the duties required. The investigation of an applicant's history is usually obtained through references and is often incomplete so that the employer's ability to judge finds its value in this regard. Physical fitness is determined by a medical examination, and such examinations should be thorough and complete.

A man who has had experience in public service work requires fully as close scrutiny as others, and it is a mistake to assume that his record is a passport to employment. Courtesy should be an absolute requirement. If a man applying for employment walks into your office unannounced, if he fails to remove his hat, places his feet on the table or other furniture, he should be courteously told why he cannot have a trial. When you are engaged in a personal interview with an applicant, and he volunteers the information that at the last place he worked he could have remained had he approved of the methods or systems used by his former employer, you may reasonably question his loyalty. Men under twenty-five and over forty-five years should not, as a rule, be considered, although there are exceptions. Trainmen under twenty-five lack experience and are likely to assume too great risk, while the man over forty-five, unless he has had previous experience, is hardly likely to make a satisfactory record.

Nearly all electric railways employ one or more experienced officials whose special duty it is to prepare the motorman student by instruction and demonstration for his work at the controller. To facilitate this work a dummy car fitted with the necessary appliances is often provided. When the instructor is satisfied that the student is competent he is sent out on the different lines for instruction by experienced trainmen in the actual operation of cars. From ten to fifteen days is usually consumed in this preparatory work. When the student is employed as a conductor he is instructed in practically the same manner, although along somewhat different lines. Oral examinations are always necessary to determine the advancement made by students and to satisfy the operating department of their growing efficiency.

From the information at hand it has been rather surprising that very few companies require a written examination. In our organization the conductor's examination blank contains eight-four questions pertaining to operation and thirty-two pertaining to accidents and accident prevention; the motorman's blank has 123 questions on operation and thirty-seven on accidents. So far as the effect of this system concerns our claim department it has been of material assistance in reducing the number of accidents as well as assuring complete and satisfactory reports.

SERVICE RECORD OF TACOMA RAILWAY & POWER COMPANY

Trainmen Entering Service

	Conductors	Motormen	Total	Experienced	Re-employed
1912	189	109	298	41	No record
1913	155	82	237	49	8
1914	69	39	108	18	22

Trainmen Leaving Service

	Resigned		Discharged		
	Conductors	Motormen	Conductors	Motormen	Total
1912	108	59	80	24	271
1913	98	59	50	21	228
1914	53	42	32	11	138

Final instructions should be given by the employment official who selects and employs the applicant, and when this important duty is performed he should have before him a complete history of the man, gathered from the various sources at his command. Any criticism of his work or examination should be pointed out in a kindly but impressive manner.

Employees who remain in the service for a number of years are usually those who are interested in and have a liking for the work. These are the most desirable men, and every effort consistent with good policy should be made to encourage them. Employees should have as much recreation as possible consistent with their duties and the condition under which they are employed. Comfortable quarters with good light, good ventilation and toilet facilities should be provided, as should also reading matter of the right character. Good reading matter is always appreciated and easily furnished. Frequent visits by the company officials to the quarters of the men will likely result beneficially. An employee desiring to make complaint should be courteously received and his request promptly considered. The report of an employee's sickness or death should mean prompt action on the part of his immediate superior. Occasional entertainments for the benefit of the employees and brief discussions are sometimes used as a means of keeping up an interest in certain parts of the work. The organization of benefit associations has worked satisfactorily in some cities and much good results to both employee and employer if such an association is properly organized and managed. We believe that through welfare work many valuable men have been retained in our services. To support that contention, a record of trainmen entering and leaving the services of the Tacoma Railway & Power Company for the years 1912-1913-1914 is presented in the accompanying table.

The profit and loss account of a company is affected materially by necessary settlement of claims brought by reason of the acts of its employees. In the organizations which I represent the claim department is not only consulted and its approval required before a student is assigned to regular duty, but no trainmen is discharged without a conference of the superintendent of transportation and the claim agent. All examination papers and other records are submitted for the guidance and the assistance of the claim department, and all students are sent by the superintendent to receive advice and instructions in safety and accident work from the claim agent.

INVESTIGATION AND HANDLING OF COLLISIONS WITH PEDESTRIANS AND VEHICLES OTHER THAN AUTOMOBILES

BY THOMAS G. ASTON, CLAIM AGENT WASHINGTON WATER POWER COMPANY, SPOKANE, WASH.

All accidents should be investigated carefully. For example, in a recent damage case on our road two persons were sitting in cars going in opposite directions. Each had a left arm projecting from a window, and as the cars passed the arms were interlocked, causing both to be broken. The contention was that the cars scraped together while passing in a curve. One of the witnesses asked at the time of the accident to have the cars backed up together and made a measurement which proved that there was plenty of space between, and the investigation at the time showed that there were no marks on either car.

The car men should be instructed to make note of the exact place on the street where an accident occurs and should call it to the attention of witnesses, who should be placed on record as to the exact point. Witnesses should be asked to mark the point at which an accident occurs by some immovable object. This may assist in proving that the driver was on the wrong side of the street, or in the act of turning the corner in violation of the traffic ordinance, or that the accident occurred between blocks instead of on a crosswalk or at an intersection.

Measurements should always be made and photographs should be taken of the scene of the accident as soon as possible. The car and vehicle involved should also be photographed, bringing out all marks. This will establish the amount of damage and show the parts which came in contact, thus helping to prove whether the vehicle had just pulled onto the track or had partly crossed. I recall several cases where photographs were of considerable value to us.

If an accident is serious it is our policy forthwith to have an engineer's map made of the location and vicinity, showing all houses from which any person could have viewed the accident. The grade and height of rail should also be shown. After the map is made an investigator should canvass every house shown thereon and take statements from at least one person in each house to ascertain whether or not anyone in the house claims to have seen the accident. That this is a good practice was taught to us in a very serious case involving the death of a driver of a vehicle. Two persons living about half a block from the scene of the accident testified to having seen the accident, and that no warning was given. To my mind they did not see the accident or car until after everything was over, and I believe that they would have made a statement to that effect had they been interviewed at the time of the accident or shortly afterwards.

THE MEDICAL DEPARTMENT

BY GEORGE CARSON, GENERAL CLAIM AGENT PUGET SOUND TRACTION, LIGHT & POWER COMPANY

The value of the medical department to the claim department is derived from the aid rendered, in handling the situation properly, after the accident has occurred, although the medical department sometimes may be able to offer suggestions of a kind that might tend to prevent accidents. The physician of a railroad should regard himself and his department as an exceedingly large and important factor in the work of the claim department, and should aid whenever possible in the saving of expense of that department in a proper way.

In so far as the handling of accidents is concerned, prior to the time the claim is adjusted or rejected, the medical department should act under the general direction of the claim department in regard to calls on the injured person, examinations, reports, etc. This, of course, in no way refers to matters of a strictly medical nature, as, for example, medical treatment of injured persons, such not being within the province of the claim department. Neither should the medical department interfere in any way in that which is strictly claim department work, such as legal investigations, adjustments, etc.

The physician representing a railroad as the head of the medical department and his assistants should be gentlemen of the highest standing and ability in their profession. Their ability should be such as to enable them to detect the accident faker and malingerer, making it impossible for them or unfair physicians to "pull the wool over their eyes." The company physician and his assistants should be of pleasing personality and should be capable of inspiring confidence in injured parties when first visiting. They should be within call at all hours of the day and night, to respond promptly to emergency calls and render first aid when necessary.

As thorough an examination of the injured party as may be consistent with the conditions should be made at the first visit, and under no circumstances should the injury be minimized. If there is any element of doubt as to the extent of the injury, it would be better to resolve such doubt in favor of the injured party. Any departure from this policy might result most disastrously to the company. Since medical reports are the basis upon which settlement is made, particularly in cases of liability, failure to discover a bad condition of the claimant, if such existed, would easily bring about failure to reach a settlement and result in a costly lawsuit. In making an examination of an injured person it is exceedingly important that the examination be thorough, if only for the purpose of satisfying the party of its thoroughness, otherwise the claimant will say to me that our physician had not made a thorough examination and therefore could not tell how he was suffering.

At the time of making the examination, if the condition of the patient will permit, the company physician should get, so far as is possible without offending or antagonizing the injured party, his complete history, including details relating to any accidents he might have previously incurred. Promptly after the examination has been made, a full and complete report should be sent to the claim department. Better reports, I think, can be made on blank sheets than on printed forms.

If at the time of the call of the company's physician on the injured party the family physician has not been called, the company's physician should ask the party whether treatment is desired by him or if the family physician would be preferred. If the injured party desires continued treatment by the company physician, such treatment should be rendered, but no effort whatever should be made to induce the injured party to continue treatment with the company physician, and such treatment should be rendered only when entirely agreeable to the injured party. If the family physician or an outside physician should be called in a case, pending its disposition, the company physician should keep in close touch with the injured party, either by consulting with the attending physician, or by examinations, keeping the claim department continually advised of the situation from every possible angle within his observation, including information as to whether or not the attending physician of the injured party is disposed to be fair, etc.

When visiting the injured party, the company physician, if tactful and diplomatic, can do a great deal toward paving the way later for the claim agent or adjuster to make a reasonable settlement. This many times is of great benefit both to the injured party and to the company.

When persons are injured in connection with our cars to an extent making it necessary for them to have hospital treatment, no particular hospital should be selected. The injured person should be taken to the nearest hospital where proper attention may be secured, or to any hospital that he might prefer. In a case of no liability and the injured person has no preference, then he should be sent to the city hospital for the purpose of saving expense to the company. The latter, however, would be a matter to be passed upon by the claim or operating departments, as the company physician is not supposed to know anything about liability.

When it becomes necessary from the viewpoint of the company physician to employ a specialist, who as a rule is not on a regular salary, the company physician should first ascertain whether the claim department is desirous of incurring the expense, as many cases might arise in which the company would not derive any benefit from a specialist's examination.

THE INVESTIGATING AND HANDLING OF AUTOMOBILE ACCIDENTS

BY H. H. BENTON, DISTRICT CLAIM AGENT NORTHERN PACIFIC RAILWAY, SEATTLE, WASH.

The phrase "Stop, look and listen," when applied to vehicles at grade crossings, can hardly be considered a safe rule of law for the claim agent. The true rule is this: the driver of the vehicle "must act with such care and caution for his own safety as a reasonably prudent man would be likely to do under like conditions."

For example, if a driver's machine is comparatively noiseless and does not materially interfere with his power to hear an oncoming train he may fail to stop and yet not necessarily be negligent. He should look and listen, but if looking and listening could avail nothing, his failure to do the useless thing would not necessarily bar his right of recovery if a negligently operated train collided with his automobile.

With these rules of law affecting the possible liability of the railway company firmly fixed in his mind the claim agent, in the investigation of such a collision, should obtain all available evidence as to the negligence or carefulness on the part of the railway company, either as to the safe or dangerous character of the location and construction of its road, and the crossing itself.

The speed of the automobile and of the train should be investigated in order clearly to demonstrate where each one was at successive intervals preceding the moment of the collision. This opens the way for the application of the rule of law closely held by the courts that if the driver could plainly see he will be held negligent if he did not see. Again, it is important to note the location of the railway line near the crossing, to determine whether the roar of an approaching train would be likely to be muffled or lessened. The condition of the weather at the time of the accident is always important. Storms may impede sight, wind may smother sound; either may tend to make some acts negligent, or tend to excuse other acts which would under other conditions be negligent.

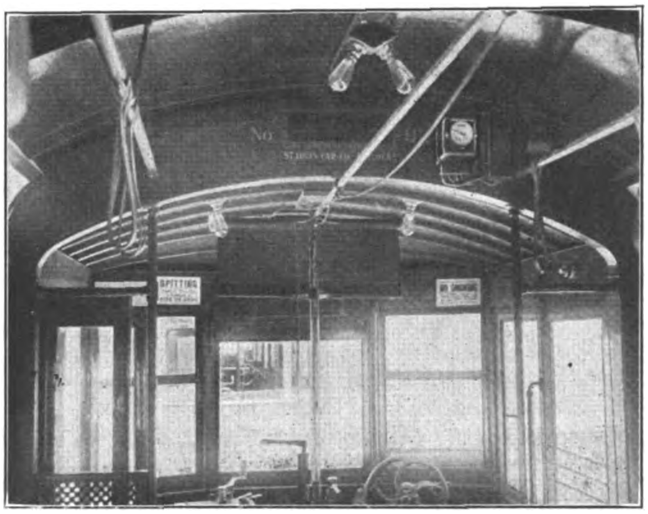
The average chauffeur boldly claims that he can stop his machine, when running at 12 m.p.h., within a distance of 4 ft. This is absolutely untrue when applied to conditions under which collisions occur. At a speed of 12 m.p.h. his machine travels 17½ ft. in one second, so that while descending into a cut at a grade crossing where the view of an approaching train might be obstructed, the chauffeur, when 25 ft. from the track, suddenly beholds the rushing train, he only has one and a half seconds to come to a stop. He imagines that 25 ft. is all that he needs, but he is mistaken.

Following Up Watt-Hour Meter Records at El Paso

Both Meters and Methods Have Stood Up Well After Nearly Four Years of Service

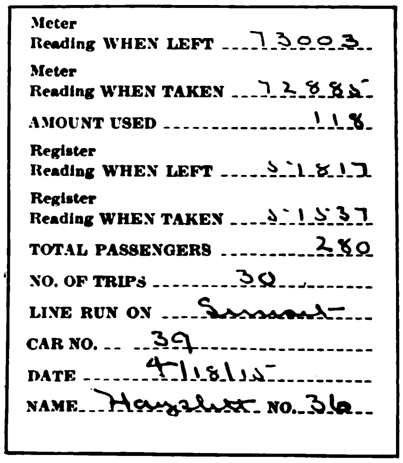
The El Paso (Tex.) Electric Railway began the use of Sangamo watt-hour meters in December, 1911, equipping at that time every one of its fifty motor cars. Since then fifteen meters have been added to new equipment, making a total of sixty-five motor cars.

The energy consumption savings were first presented by George G. Morse, superintendent railway department, before the Southwestern Electrical & Gas Association at its 1914 meeting (see the ELECTRIC RAILWAY JOURNAL for May 30, 1914, page 1,206). Mr. Morse showed that an average energy consumption of 2.61 kw-hr. per car-mile in 1911, without meters, had been reduced to 2.39 kw-hr. shortly after the installation of the meters. These averages, it should be stated, were readings taken at the d.c. busbars, therefore including all low-tension distribution losses. As the result of continued competition and the follow-up system, the energy consumption for the entire system is still (April, 1915) at 2.39 kw-hr. per car-mile, despite the addition of fifteen double-truck cars, which, of course, are heavier than the single-truck cars which formerly carried most of the business. In fact since the meters were first installed, the proportion of double-truck mileage has risen from 43.2 per cent in 1911 to about 54 per cent in 1915.



EL PASO CAR METERS—INSTALLATION OF WATT-HOUR METERS ON INSIDE ARCHWAY

As stated in Mr. Morse's original paper, a bogey or standard was set up, after test, for each of the four classes of cars. This bogey plan still forms the basis of the follow-up system. In Mr. Morse's opinion, faithful adherence to the follow-up system is much more important than the type of checking device used on the car.



Meter Reading WHEN LEFT 73003

Meter Reading WHEN TAKEN 72885

AMOUNT USED 118

Register Reading WHEN LEFT 521817

Register Reading WHEN TAKEN 521537

TOTAL PASSENGERS 280

NO. OF TRIPS 30

LINE RUN ON Sunset

CAR NO. 39

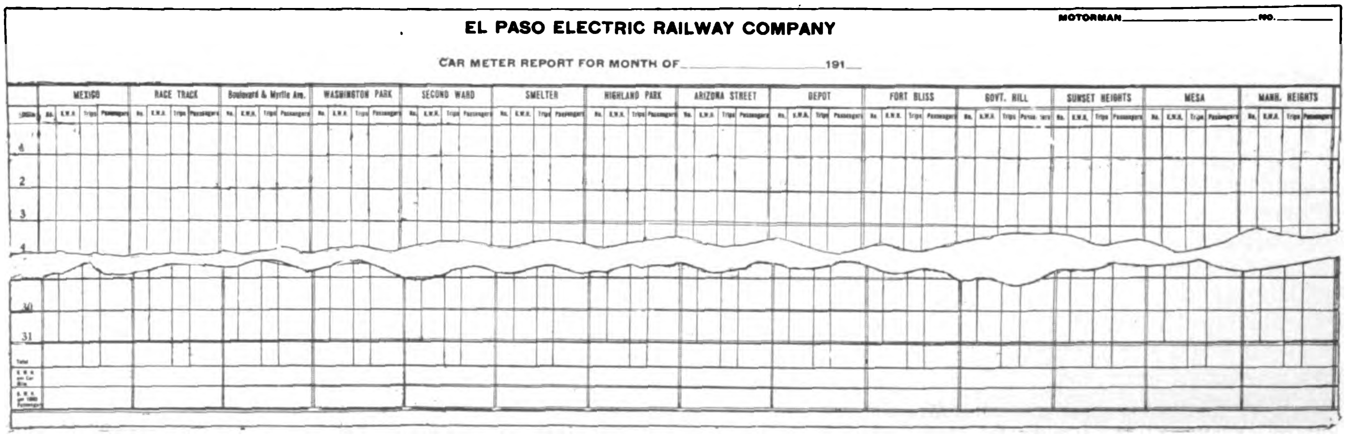
DATE 4/18/15

NAME Hazzlett NO. 36

MOTORMAN'S METER SLIP; A DUPLICATE STUB IS RETAINED IN HIS BOOK

Follow-Up Records

The records begin with the meter slip made out by the motorman. On taking a car out, he takes and records his first meter reading. At the end of his work on that particular line he gets from his conductor the number of passengers handled. This record also shows the line on which he ran, the number of trips made (the mileage being figured later by the mileage clerk) and the car number. These motorman's slips are padded in a



EL PASO ELECTRIC RAILWAY COMPANY

MOTORMAN__________ NO._____

CAR METER REPORT FOR MONTH OF__________191__

	MEXICO				RACE TRACK				Boulevard & Myrtle Ave.				WASHINGTON PARK				SECOND WARD				SMELTER				HIGHLAND PARK				ARIZONA STREET				DEPOT				FORT BLISS				GOVT. HILL				SUNSET HEIGHTS				MESA				MANH. HEIGHTS			
[illegible]	No.	K.W.H.	Trips	Passengers	No.	K.W.H.	Trips	Passengers	No.	K.W.H.	Trips	Passengers	No.	K.W.H.	Trips	Passengers	No.	K.W.H.	Trips	Passengers	No.	K.W.H.	Trips	Passengers	No.	K.W.H.	Trips	Passengers	No.	K.W.H.	Trips	Passengers	No.	K.W.H.	Trips	Passengers	No.	K.W.H.	Trips	Passengers	No.	K.W.H.	Trips	Passengers	No.	K.W.H.	Trips	Passengers	No.	K.W.H.	Trips	Passengers	No.	K.W.H.	Trips	Passengers
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EL PASO CAR METERS—MONTHLY COMPARATIVE RECORD OF METER PERFORMANCE ON A SPECIFIC TYPE CAR AND ROUTE

EL PASO ELECTRIC RAILWAY COMPANY

INSPECTOR'S METER DATA

Your attention is called to the performance of the following men, made on April 29, 1915.

Line	Name	No.	Car	Performance		Notes
				Actual	Bogey	
Mexico	Broderson	66	80	12.20	7.25	
	Reynolds	78	79	8.05	7.25	
	Scrivenor	184	71	8.05	7.25	
	Dieterich	80	81	9.00	7.25	
	Weaver	114	79	8.20	7.25	
Park	Heard	132	93	12.40	10.50	
	Wilcox	84	92	11.70	10.50	
	Glaves	126	88	12.00	11.50	

Remarks:

EL PASO CAR METERS—RECORD OF DELINQUENTS SENT TO INSPECTORS ON THE DAY FOLLOWING THE PERFORMANCES NOTED

book in duplicate, so that the user can keep the stub for his own information and check.

The meter slips are first examined by the meter clerk for those men who have fallen below the bogey for their class of car. These delinquents are listed as shown on a sheet called "Inspector's Meter Data." Copies of this report are in the hands of all road inspectors by 11 a.m. the next day. Therefore, the inspectors are prepared to ride and correct the operating faults of the delinquents while all concerned still have in mind all the conditions of the preceding day. For example, a heavy sand storm, as is common in the vicinity of El Paso, will clog the rails and so increase energy consumption. Another cause of increased energy is found in heavy rains which leave much sand on the track. The inspectors, naturally, exercise their judgment under conditions of this character.

Records from all slips, regardless of delinquents, are also posted on a monthly sheet which is divided horizontally by days and vertically by routes. Each route is also subdivided vertically for the car number, kilowatt-hours, trips and passengers. The total kilowatt-hours per car-mile and kilowatt-hours per 1000 passengers are written at the top. This monthly record is made out in four colors, one for each type of car.

In order to make comparisons as fair as possible, the number of passengers handled is noted, as above stated. To avoid too much clerical work, however, the comparisons are made on the basis of 1000 passengers carried with any given type of car. The factor of schedule speed does not enter, as this is the same on any given line for any given period of the day, no comparisons being made between different lines. The average schedule speed of the system is 8.1 m.p.h.

The recapitulation of the monthly record for each type of car is prepared in typewritten form, as shown, for posting at the carhouses. This report presents each motorman's name, number, kilowatt-hours per car-mile, kilowatt-hours per 1000 passengers and his relative rating. This rating is obtained by dividing each man's average kilowatt-hours per car-mile by the grand average of all men on the same line and type of car. The reference to passengers carried is used only where two men have the same rating on a kilowatt-hours per car-mile basis.

METER PERFORMANCE—SUNSET HEIGHTS

Class D Cars April, 1915

Name	No.	Kw-hr. per car-mile	Kw-hr. per 1000 passengers	Rating
Shearer............	154	1.76	388	95
Baker............	196	1.83	570	98
Werner............	108	1.86	445	100
Bloxom............	34	1.90	585	102
Hayalett............	36	2.00	420	108
Average............		1.86	465	

Ratings are given on car-mile performance.
No ratings given unless the equivalent of a full day's mileage has been made.

....
Superintendent Transportation

APPROVED:

....
Superintendent Railway Department

EL PASO CAR METERS—MONTHLY RECAPITULATION OF DAILY METER PERFORMANCES

The interest of the men has been maintained chiefly by publishing their records, but their run privileges are sometimes modified by the nature of their performance. Before the men began to use meters they had no conception of the value of electric energy. The use of the meter has given them an entirely new point of view. Although the kilowatt-hour was an unfamiliar unit to the men, they soon became accustomed to it among themselves. However, they refer to the readings as so many "points" rather than so many "kilowatt-hours."

MAINTENANCE

The fact that these meters have now been in service for nearly four years makes the question of their maintenance cost a matter of special interest. Until recently the meters were maintained by the general meter shop of the lighting department, but they are now cared for directly by the railway department. For the year 1914, the cost of maintaining sixty-five meters was only $159.33, or $2.44 per meter. This total includes the cost of repairing six meters burned out by lightning. Outside of these repairs, the chief expense was the removal and straining of oxidized mercury through cheesecloth, the replacement of the mercury and reassembling of the meters. This purification is carried out about once in five months. The total cost mentioned also covers the expense of testing. The special calibration meter used for such testing was purchased from W. T. Mobray, Providence, R. I., at $150.

Illinois Association Trip to Milwaukee

Outing and entertainment features comprised the entire program of the Illinois Electric Railways' Association on June 25.

About eighty members and guests under the guidance of F. E. Fisher, president, and W. V. Griffin, secretary, left Chicago at 9.30 a. m. on the steamer Christopher Columbus and arrived in Milwaukee at 2.30 p. m. where they were entertained by the Milwaukee Railway & Light Company. They returned to Chicago over The Chicago & Milwaukee Electric Railway and the Northwestern Elevated Railway line.

En route to Milwaukee dinner was served in the main dining room of the steamer. After dinner, President Fisher called the members to order and impromptu remarks were made by several speakers. A vote of thanks was tendered Mr. Griffin in appreciation of his work in planning the trip.

On arrival at Milwaukee, R. B. Stearns, vice-president The Milwaukee Electric Railway & Light Company, conducted the party through the large Cold Springs shops and then through the Public Service terminal and office building of his company.

At 5 p. m. the party under the guidance of G. S. Henry, superintendent, and F. E. Low, traffic agent, left Milwaukee on a two-car train of the Chicago & Milwaukee Electric Railroad, arriving at Chicago via the Northwestern Elevated Railway at 7.45 p. m.

Ground was recently broken and the tunnel work begun on the projected electric mountain railway from the city of Bergen, Norway, to the summit of Mount Floien, the construction of which is estimated to cost $160,000. Bids for its construction and equipment were issued in January, 1915.

New York Electric Railway Association Meets

The Subjects Discussed Were Center-Entrance City and Suburban Cars, Financial Conditions, Jitneys and Interurban Highway Crossings, while Public Relations Were Considered at the Banquet

The thirty-third annual convention of the New York Electric Railway Association was held at the Oriental Hotel, Manhattan Beach, New York, on June 29 and 30. There was an attendance of between sixty and seventy at the technical sessions.

The convention was opened on Tuesday at 11.15 a. m. by President Hamilton, who delivered an annual address dealing with the present needs of the electric railways.

Mr. Hamilton referred to the extremely trying year through which the electric railway companies had passed during the past twelve months. He said that they had suffered financially along with industry generally as a result of the European war, and far more so than many industries on account of their inability to retrench to the same extent and counteract in various ways the effect of business depression. In addition, the companies had received another set-back in the form of jitney-bus competition, which has been and is still a serious menace to the industry. The electric railways are being compelled to sell transportation at a price based on service and under conditions of production of years ago. Although the traveling distance has increased vastly and the cost of production has advanced with leaps and bounds, the rate of fare has remained stationary. Jitney-bus competition and the business depression have reduced the earnings of the companies to an alarming extent, while expenses have increased to a degree which makes the 5-cent fare more and more inadequate for the actual needs of the companies. What the industry needs at this time is not "watchful waiting" but helpful action. It is all very well to theorize and discuss the many problems with which the industry is confronted and to sympathize with each other. But far more can be achieved if the companies assemble their best efforts and actively pursue fearlessly and honestly an organized campaign that will bring about the result and relief desired.

An example of effective and honorable activity is illustrated in the methods used by the association in advocating the enactment of the so-called jitney-bus bill. Thorough publicity was given to the railway side of the question, and a large number of representatives of various street railways appeared in a body at the public hearing on the bill and stated why the companies favored the legislation under consideration, in justice to all. It is gratifying to state that the bill is now a law of the State of New York. This fact indicates that the legislatures have been awakened to the fact that the interests of public service corporations must be protected to some extent, for the reason that these corporations do not exist by themselves alone but are necessary to the communities which they serve.

The report of the secretary and treasurer was then read. It stated that two companies had recently joined the association, namely, the New York & Stamford Railway Company of Portchester, N. Y., and the International Railway Company of Buffalo.

REPORT OF SAFETY RULES COMMITTEE

The president then called for the report of the committee on safety rules, of which John J. Dempsey is chairman. This report was presented verbally by Mr. Dempsey. He said that the committee of the association had met at Albany with the committee of the Empire State Gas & Electric Association. Subsequently, the bureau of standards at Washington had announced that it was preparing a set of safety rules, and the committee had decided not to take any further action until a report had been rendered on the proposed rules by the committee that had been appointed by the American Electric Railway Association.

On motion of Mr. Peck the association decided to continue the committee on safety rules with instructions to review and criticise the proposed National Electric Safety Code promulgated by the bureau of standards and to act, subject to the approval of the executive committee, with the committee of the American Electric Railway Association on this subject.

CENTER-ENTRANCE CAR FOR CITY AND SUBURBAN SERVICE

The paper by W. G. Gove, superintendent of equipment Transit Development Company, Brooklyn, was then presented. An abstract of this paper appears elsewhere in this issue. After Mr. Gove had read this paper he showed on the screen a very interesting collection of views of different types of cars used in Brooklyn from early days.

In referring to his paper Mr. Gove explained that the car described was designed by the company's own force and also went through the hands of others interested. Mr. Menden, chief engineer of the company, was the first to think of it and was largely responsible for its design as well as that of the new subway cars of the company. Mr. Menden had had a long experience in the transportation side of the industry as well as in the engineering side, and this was of great help to him in the design of the car. A sample car was built before the final plans were finished.

At the close of Mr. Gove's paper various questions were asked him, and the following information, among other points, was brought out: The ball-bearing center plates are kept clean by blowing them out and by using a light lubricant. They have proved very successful. Although the cars were built largely in the shops of the company, Mr. Gove does not recommend this plan as a rule, believing that better satisfaction will be obtained when cars are purchased from regular manufacturers. The plan was adopted in this case owing to a combination of unusually favorable circumstances. The cost of the car complete was about $6800 and the company is adding this year on capital account about $100, making the total cost per car about $6900. Mr. Gove estimated the life at thirty years. No trouble had been experienced with the concrete flooring breaking due to oscillation or weaving of the car. At the point where passengers enter there is a great deal of wear, and Mr. Gove thought that the entire floor of the pit of the car would have to be renewed probably each year.

INSUFFICIENCY OF 5-CENT FARE

On Tuesday afternoon President Hamilton first called upon Z. K. Graham, secretary of the Utilities Publication Committee, to explain the plan of issuing the public utilities reports, annotated, as arranged with a firm of law publishers. A paper by E. G. Connette, president International Railway, on "What Can We Give for a Nickel?" was then read by Secretary C. C. Dietz. Mr. Connette's paper is abstracted elsewhere in this issue.

In the discussion on this subject the following points were brought out:

W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad, said that as the 5-cent fare is prescribed within the confines of cities, legislation will be needed to increase the fare. The commission can be appealed to for relief, but the problem is how to find a remedy for the present difficulty.

C. G. Young, consulting engineer, New York, stated that the present conditions must be met somehow. The passenger wants more for the "jitney," and the company has to pay out more. One solution is to let the cities participate in the net earnings. The cities, being partners, would be interested in increasing these earnings. In the direction of economy rides could be shortened and transfers cut out in some cases. The large amounts spent for taxicab service show that the public is willing to pay for service.

R. L. Rand, vice-president Richmond Light & Railroad Company, described the experience of his company in drafting and pressing a bill exempting it from paving requirements for a period of ten years. There was no opposition, but the bill was side-tracked. Mr. Rand said that the paving requirement is antiquated and outworn.

E. F. Peck of Allen & Peck, Inc., Syracuse, recommended the appointment of a committee to study the subjects discussed in Mr. Connette's paper.

H. W. Blake, ELECTRIC RAILWAY JOURNAL, said that while it will be difficult to increase fares there would probably be less public opposition to doing so because of the precedent of higher steam railroad passenger fares, and the principal thing now was to decide upon the best plan for each locality and work toward that end. There were three ways of raising fares and each had a precedent. They were: (1) Raise the unit fare to 6 cents as in Massachusetts. (2) Retain a 5-cent unit fare for a restricted district and charge additional 2-cent fares for exterior zones. While railway managers may consider this system complicated the experience in Milwaukee had shown that the problems of collection could be satisfactorily solved both as regards the company and the public. (3) Charge for transfers as in Cleveland. For this also there is an operating precedent. While these reforms seem revolutionary and may be difficult to secure, each is not seriously difficult from an operating standpoint.

James E. Hewes, general manager Albany Southern Railroad, described the tax-reducing campaign which his company had been conducting in the suburban territory served by it. Previous experience was with rising assessments, but after two years' effort the taxes have come down from 9 per cent of the income to 5 per cent, and the assessment 25 per cent each year. The company demanded meetings of the assessors one month before the preparation of tax budgets and presented evidence of assessment inequalities.

E. S. Fassett, New York Switch & Crossing Company, New York, thought that the publication of information in recent years should make tax reduction easier. If tax commissioners can be made aware of conditions, then reductions would be made by the franchise tax board.

C. Gordon Reel, consulting engineer, Kingston, N. Y., contended that the companies were often to blame for inequalities in assessments as their reports were not properly prepared.

After the close of the discussion a letter was read from the Brooklyn Rapid Transit Company inviting members to visit the new instruction school and to ride on the new subway cars.

A vote was also taken passing a resolution for the appointment of a committee to report at a later meeting on Mr. Connette's suggestions. President Hamilton announced that he would appoint this committee later.

Messrs. E. S. Fassett, W. H. Collins and E. F. Peck were appointed as the nominating committee.

JITNEY-BUS COMPETITION

At the session on Wednesday morning James E. Hewes, general manager Albany Southern Railroad, presented a paper entitled "Jitney-Bus Competition" which is abstracted on another page. He emphasized the difference between the real jitney bus that consisted of an old automobile driven by its owner and the high-grade, large-capacity motor-bus, saying that the former was not a menace to the electric railway industry but that the latter could be used to good advantage, especially on new routes, to test and to build up the traffic with possible installation of an electric line later.

The discussion was opened by Joseph K. Choate of J. G. White & Company who had had a wholly contrary experience to that outlined by Mr. Hewes. If the motor-bus should become permanent it would eventually have to pay for its use of the highways which had been constructed at an even higher cost than railways. In New Jersey he had established a short bus line to form a physical connection between two separated sections of a trolley road. The traffic conditions were excellent but the line lost 100 per cent in six months and had to be abandoned. The repairs were excessive. Depreciation of all gasoline-driven vehicles also was impossibly high when compared to those on electric railways. As for the buses in London, these were put on years before the electric railways and had never competed with them, as implied by Mr. Hewes. He had investigated motor-bus operation for New York City and had found that any fare less than 10 cents was impossible.

Paul Smith, Westinghouse Electric & Manufacturing Company, then spoke in support of the makers of electric railway equipment, saying that the demand for low weights had arisen and endeavors had been made to meet it long before the advent of the jitney bus.

William H. Collins, Fonda, Johnstown & Gloversville Railroad, outlined his experiences with interurban bus competition, which in one instance consisted of a bus line operating 4 miles for a 5-cent fare in direct competition with the railway. A campaign of education including daily statements published in the local papers had been efficacious in producing refusals to grant franchises to motor-bus lines because there was no real necessity for the new service. Climatic conditions, he said, constituted the strongest argument against the motor-bus in central New York, as buses could not maintain service in heavy snow. However, there might be conditions where the bus could be used satisfactorily for supplementary service.

J. P. Barnes, Buffalo, Lockport & Rochester Railway, considered that publicity had been a major cause of the jitney's success, and that the railways should talk more about the railways in public and less about the jitneys. It was not necessary to have local holders of railway securities in order to hold the public's friendship.

H. W. Blake, ELECTRIC RAILWAY JOURNAL, disagreed with some of Mr. Hewes' figures. He believed that the figures quoted for gasoline consumption of motor-buses was low, but even on the basis mentioned in the paper the cost of power would be less for an electric car than for the motor-bus when figured on the seat-mile. The same basis should also be used in estimating the investment. He thought that the figure of 10 per cent for depreciation on the electric railway was much too high.

but a sixty-passenger car would have nearly three times the number of seats of a twenty-two passenger bus and more than three times the carrying capacity. Hence the annual depreciation, even on the basis given in the paper, would be one-third higher for the bus than for the car if the relative carrying capacities of the two vehicles were taken into consideration. The same ratio of comparison ought to be applied also to the figures on operating cost of 21.8 cents per mile quoted for the twenty-two-passenger bus. Two such buses would be equal in seating capacity to a single city forty-four-passenger car and the cost of operating two such buses, or 43.6 cents, ought to be more than ample to operate one such car to advantage. He also believed that the public would require, for its own protection, regulations for motor-buses similar to those required of other common carriers.

In answer, Mr. Hewes admitted the importance of considering the relative size of the average bus and the average railway car in making cost comparisons but cited the case of a successful interurban bus line at Pittsfield, Mass., which charged 2 cents per mile and was reported to have cleared 100 per cent in six months. The speed, however, was only 12 m.p.h.

W. B. Rockwell, Eastern Pennsylvania Railways, Pottsville, Pa., spoke of the real economy of electric power notwithstanding the large investment required, on account of the facility of distribution. The jitney from every moral aspect was thoroughly bad. In Reading the local civic society had voluntarily taken up the matter of suppressing the business. It would soon be considered a public disgrace to ride in a jitney bus.

W. O. Wood, New York & Queens County Railway, said that the railways ought to try to put themselves on the same taxation basis as the jitney and not try to put the jitneys on the railway basis.

PROTECTION OF HIGHWAY CROSSINGS

William H. Hyland, claim agent Fonda, Johnstown & Gloversville Railroad, then read a paper on highway crossings which is abstracted on another page in this issue.

In the discussion J. P. Barnes read some remarks prepared by C. R. Barnes, who in his official connection with the Public Service Commission of New York, Second District, made a special point of the fact that automobile drivers paid more attention to crossing signs put up by automobile organizations than to those put up by railway companies. He asked therefore for the appointment of a committee to co-operate with the automobile clubs of the State and with the Public Service Commission in regard to crossing protection. In response to this it was decided that the association would gladly confer on the matter whenever the Public Service Commission would call for such a meeting. Mr. Barnes also asked for co-operation in regard to existing discrepancies in the railway rules on carrying explosives, and this matter was referred to the executive committee.

Owing to the lateness of the hour the question box was omitted and the association proceeded to the election of officers, the following being unanimously elected:

President—John J. Dempsey, Brooklyn, N. Y.

First vice-president—James P. Barnes, Rochester, N. Y.

Second vice-president—Wilbur C. Fisk, New York, N. Y.

Secretary-treasurer—W. S. Stanton, Schenectady, N. Y.

Executive committee members were elected as follows: J. S. Doyle, New York, N. Y.; C. F. Hewitt, Albany, N. Y.; James E. Hewes, Albany, N. Y., and E. J. Dickson, Buffalo, N. Y.

President Dempsey was then escorted to the chair, responding with a few well-chosen words. After resolutions of thanks to the retiring president and secretary-treasurer the meeting adjourned.

THE SOCIAL FEATURES

The social features included automobile trips for the ladies, an auction bridge tournament on Tuesday afternoon, dancing after the banquet Tuesday evening, and a baseball game following the Tuesday afternoon session between the "managers" and the "peddlers." In this baseball game the managers won with a score of 15 to 10, if the official score is to be believed. The highest batting average was made by C. F. Banghart, general manager Binghamton Railway, who, in addition to making many base hits, scored a run every time that he came to the plate, which was five times during the five innings. In consequence of this achievement, he received a statue of Charlie Chaplin, which was the prize offered for the largest number of runs made by any individual player.

THE BANQUET

The banquet held on Tuesday evening was remarkable from the fact that at the speakers' table there sat four members of the New York State Public Service Commission, namely, Judge Edward E. McCall, chairman, George V. S. Williams and Robert C. Wood of the first district commission and William Temple Emmet of the second district commission. Of these, addresses were delivered by Messrs. McCall and Emmet. The banquet was attended by upwards of 200 persons and was marked by evidences of a co-operative spirit in the matter of public utility regulation. President James F. Hamilton presided as toastmaster and was very happy in his introduction of the speakers.

Commissioner Emmet discussed the regulatory situation in New York State, frankly admitting its shortcomings but expressing an expectation of fuller understanding between the utilities and the commissions. He said that regulation is not such a sore subject as it once was. While the regulatory program outlined by Governor Hughes was viewed with some apprehension it would be unthinkable now to go back to the old order. The apprehension was based upon the fear of the intrusion of politics into a field where expert knowledge was needed. There are still annoying features in regulation, but sensible men do not let these bother them. The "black horse cavalry" no longer disturbs the sleep of public utility men. Old-fashioned strike legislation has, through regulation, become a thing of the past. While regulation is not perfect its imperfections are being remedied, and the public utility men of the State and the commissioners are good friends, and friends of the principle of governmental regulation. The principal source of irritation has been due to the impossibility of staking out definitely the line of demarcation between regulation and government ownership and operation. For example, in the matter of supervision of service of street railways the commissions have sweeping powers, going into many matters of operating detail. Under the law they must give hearings on matters of this kind. It is a question whether this feature of the work should not be considered a part of the principle of government operation rather than regulation. A large section of the public expects the commissions to look after all operating details. Mr. Emmet raised the question as to whether this is a proper function for a public service commission.

In regard to the friction which has occurred in matters of regulation, all parties concerned are to blame. The sensible course for public utility men to take is that which has been taken by the New York Electric Railway Association in the line of co-operation. Such co-operation is necessary in the solution of the problems involved. Public utility men should accept the principle of regulation, which is still in the experimental stage. While it is in this stage, inconsistencies must be overlooked. When the public comes to realize the attitude of public utility men toward regulation, many of the present problems will be solved. The public utility industry needs business men who are also statesmen. Mr. Emmet expressed the belief that regulation has seen its worst day and that a period of understanding is here.

Mr. Emmet was followed by Nathan C. Kingsbury, vice-president American Telephone & Telegraph Company, whose central thought was the need for co-operation among public utilities. He called attention to the fact that one-fifth of the wealth of the country is invested in public utilities which form a stable business necessary for the people. The margin of profit in this business is small and the problem of operating at a profit is a difficult one. Favorable conditions are necessary. A public utility corporation which is not now making money but which is serving the public faithfully can look forward with hope. On the contrary, one which is making money but which is not giving good service is doomed to failure. The men who started utilities were far-sighted, even considered visionary by some. After launching the utilities many of them stepped out, leaving difficult problems for their successors to solve. The day of these promoters has now passed but they did a good work. The speculative methods necessary in the early days are not needed now. All that is expected is a fair return. In the early days investors thought that they were investing in private business when they put their money into public utilities. It is now realized that this is not the case.

In order to improve conditions the public service corporations should get together on a co-operative basis. They have many interests in common and the public does not discriminate among them. In a community where one utility is successful others are apt to be so also, whereas the reverse of this is at the same time true. In the past public service corporations have not known each other. Now they are getting together. An example of this is seen in the co-operation which has been brought about in the use of transmission pole lines. Utilities could get together on the matter of valuation and in promoting an interest in public service commission decisions, many of which reach several utilities. The managements of the utilities must work to make the work of the commissions successful. Failure of the valuation commission work of the Interstate Commerce Commission, for example, would spell disaster to some corporations.

Mr. Kingsbury emphasized the value of the publicity clause of the code of principles of the American Association. The utilities must control public opinion through publicity. An example of large appreciation of this fact is shown by the activity of the warring governments of Europe in publishing the facts regarding the beginnings of the war. All that the war can do is to force the countries into a state of mind wherein they will give and take. When this time comes public opinion will be all powerful. Secret methods cannot be successful in public utility matters. New capital is constantly needed and if a company is not making money it cannot get capital. This fact tends to secrecy as to financial conditions, but such secrecy is not warranted. Much adverse legislation might have been prevented if the railways had practised publicity earlier.

Regulation can be overdone, and the commissions should realize the conditions under which public utility operations must be conducted. For example, the European war has made inroads on capital, the warring countries paying high rates of interest. This will make it more difficult to get capital for utilities and also for municipal and other public improvements. This is indicated by the fact that at the New York bond sale this week the city has to pay nearly 4½ per cent for its money. While the utilities do not ask for a high rate of return, they do ask for stability and such a rate as will attract capital.

Referring again to the subject of publicity Mr. Kingsbury pointed out that the railways must have a desire to serve, and that if there is some policy which cannot be made public that policy should be abandoned. Public utility securities are widely distributed and this fact should be made known. Further, the utilities are not ashamed of the men who promoted, developed and now manage them. The public service corporations have had much to do with the beneficent development of this country. They have added great wealth to the country and have fostered a homogeneous development. They make for prosperity and peace.

Judge McCall began his address by emphasizing the magnitude of the task of operating the properties in the metropolitan district. This task he said is unprecedented. New York City is spending $366,000,000 on rapid transit because of a realization of the tremendous growth in the demand for service. The service is not perfect, but the public insists that it should be so. Judge McCall agreed with Commissioner Emmet in regard to the separation of regulation and supervision of operation, expressing his belief that the former is the function of the commissions. He has stood for conservatism and the conservation of property rights, and has not and will not allow public clamor to trespass upon these. He had asked himself and his visitors many times why public utilities should not give good service when they have every cause to do so. He stated that much of the hostility to public service corporations does not come from the public but from interested persons. In closing he invited the association to co-operate with the commission in team work in bringing about a better understanding of the problems of regulation.

Before calling upon Charles C. Peirce, vice-president of the Manufacturers' Association, the last speaker on the program, Toastmaster Hamilton read telegrams from C. Loomis Allen and J. H. Pardee, expressing regret that they could not be present and sending good wishes for the meeting.

Mr. Peirce's plea was for appreciation of the supply men. The manufacturer occupies no small position in the public utility business. He has worked shoulder to shoulder with the pioneers in building it up. This is evident from the importance of the work done by such men as Sprague, Edison, Westinghouse and other great inventors. He also said a good word for technical journalism and the work that the ELECTRIC RAILWAY JOURNAL has done in furthering the electric railway cause. He said that the name of James H. McGraw will stand with that of other pioneers for the work that he has accomplished in developing his side of the industry. As a further illustration of the identity of the manufacturer with the electric railway, he said that while the manufacturer has worked with the railway he has also suffered with it.

After a rising vote of thanks to the distinguished speakers of the evening the banquet gathering broke up about midnight and adjourned to the dancing floor of the hotel.

WHAT CAN WE GIVE FOR A NICKEL?

With this question as the point of departure, E. G. Connette, president International Railway, suggested several of the problems involved in the furnishing of urban transportation at the 5-cent rate. The nickel was adopted as a convenient unit of exchange in carrying passengers, the distances in the beginning being very short and no transfers being issued. In the progress of time lines were extended and transfers were issued so that the payment of a 5-cent piece entitled a passenger to ride from city line to city line, in many instances from 5 to 20 miles.

"As the necessities arose for the extension of lines and franchises were sought by companies, the public authorities have been from time to time imposing additional conditions. One that is now very burdensome arose out of the conditions existing during horse-car times because the horses, traveling between the rails, wore out the roadway. The reason for this requirement has long since passed, but the burden of the expense remains. The cost of paving the so-called 'railroad strip' is represented in the 5-cent fare, while the abutting property owner receives the benefit besides an appreciation of the value of the property by reason of the street railway service. Patrons of the street railway should not be required to contribute even indirectly toward charges of this kind."

Mr. Connette also explained how the payment of percentages of gross receipts and franchise taxes, the original continuing expense due to change from horse cars to electrical propulsion, the cost of eliminating grade crossings, the advance in the costs of labor and materials; the carrying of firemen and policemen free in many communities, etc., have added to the burdens of the street railway until it now faces a crisis.

"Public service companies are now face to face with the necessity for considering seriously the question resulting from the foregoing conditions and discovering, if possible, some way in which they can either increase their return or decrease their expenditures. The problem can be approached from two points of view: (1) Should and can the unit of fare be increased? (2) Can the expenses and burdens of transportation companies be lightened so that they may continue to carry passengers for the same unit of fare and still earn a reasonable return upon the capital invested? I think it will be conceded by all that the last suggestion, if practicable, would be the most desirable.

"It seems to me that the traveling public and the company are entitled to have the rights of the parties readjusted on a more equitable basis. If the companies were permitted to receive a reasonable return upon the capital invested and then have everything over and above that expended for real transportation service for the benefit of the traveling public, eliminating and removing from the companies the burdens of tax which they now bear, which go toward purposes other than transportation, it might still be possible to continue to charge not more than 5 cents and at the same time pay a reasonable return upon the capital invested. The other alternative is to raise the unit of fare from time to time to cover the increasing expenses.

"The time has arrived to center attention on this question and evolve some plan by which relief can be secured. Under the public service commission's law as it now stands the commission has the power to regulate rates and can do much to relieve the situation if it is deemed wise to exercise that authority. The efforts of the public service companies should first be employed either to procure legislation directly relieving our properties of other burdens and costs not actually involved in transportation problems or, as an alternative, endeavor to have the powers of the commission enlarged so that it may relieve the companies of these burdens in every proper case. In any event we should endeavor to make the commissioners constitutional officers so that they may fearlessly perform their duty."

JITNEY BUS COMPETITION

On the subject of the jitney bus, James E. Hewes, general manager Albany Southern Railroad, said substantially as follows:

I take the radical position that the gasoline-driven vehicle has come to stay, and that its great potentialities can be, to a certain extent, used for our own benefits. I also take the radical position that, if this new form of transportation has come to stay, we must make use of it or else compel the electrical companies, the car builders and the truck builders to give us an electrical vehicle that will compete on equal terms with this new form of competition.

One of the best types of auto-buses with which I am acquainted is a convertible twenty-two-seat, 5-ton car (loaded), having a solid tire and a pneumatic tire on each wheel. The engine is four-cylinder, 30-hp. capacity. The weight of the car is 10,000 lb., or 455 lb. of car weight per seated passenger. A first-class interurban car, seating sixty passengers, weighs 60,000 lb., or 1000 lb. per passenger.

A horsepower can be delivered to the wheel of this gasoline car, with gasoline at 15 cents per gallon, at less cost than can be done by the average trolley company that makes electric current in a power house situated, say, approximately 20 miles from the trolley car, with coal at \$3.25 per ton delivered to the boilers. A first-class auto-bus can do a car-mile at a power cost of 1½ cents. The type of auto-bus I speak of makes 10 miles on a gallon of gasoline, and the gasoline costs approximately 15 cents per gallon. Therefore, our competitor can operate a mile, can produce a horsepower where he wants it, can operate a ton-mile or a seat-mile at less cost than we can, and can carry a passenger in his auto-bus with one-half the weight that we can.

Let us now consider the item of investment and make a comparison between our competitor and ourselves, taking the item of investment as one unit, and comparing a trolley car with an auto-bus.

We pay \$9,000 for a 30-ton interurban car, with a seating capacity of sixty, equipped with four 75-hp. motors, type "M" control air brakes, lighting circuits, two trolleys, registers, etc.

A first-class auto-bus of twenty-two seating capacity costs \$4,500 complete, or just half the cost of our trolley car of sixty seating capacity, but the seat cost of the jitney is \$205, whereas the seat cost of the interurban car is \$150. The \$205 per seat cost of the jitney is all the investment that our competitor has, but our \$150 seat cost is only the smallest portion of our real net seat cost, because, after we buy our trolley car, we must build power houses, lay tracks, erect poles, pave streets, bond our tracks, equip trolley lines, construct and equip transformer stations and substations, until we have a total investment of approximately the following:

Power house cost per car	\$3,000
Substation cost per car	1,200
Trolley line cost per car	2,000
Track cost per car	20,000
Cost per car	9,000
Total cost of trolley car before it can run	\$35,200

I submit these figures only as a basis for comparison of first cost, and primarily to draw attention to the fact that our first cost, reduced to a seat basis, is vastly greater than that of the first-class auto-bus. If the depreciation of the bus were at the rate of 33 per cent and the depreciation of a complete trolley system were but 10 per cent per annum, including obsolescence, the bus would, nevertheless, show a total depreciation less than ours, because 33 per cent of $4,500 is $1,485, whereas 10 per cent of $35,000 is $3,500.

Now, the bus has been made possible only by reason of the improved roads, built at the expense of the state and county. It has also been made primarily possible by the great economic development of the gasoline motor and the remarkable development of the automobile chassis. And we are confronted with the fact to-day that the average automobile is a higher development of mechanical principles than the trolley car. The tendency of our electrical engineers is to make our equipments of greater capacity and greater weight. The tendency of the automobile manufacturers is to reduce the amount of horsepower and lighten the weight of their automobiles. We must look to the electrical engineers to help us solve our problem. Our car builders must create a revolution in the car if they wish to stay in the game. Otherwise the electrical engineers and the car builders will be in the same position as we will be, namely, looking for other jobs.

I believe, as I have stated before, that gasoline transportation has come to stay, and that we should make use of it at first, or experimentally, as an auxiliary or aid in the development of our traffic. Where we seriously consider extensions to our lines, we can well use the gasoline vehicle, not paralleling our traffic, but beginning at the ends of our lines and transferring passengers to the extension territory, until the traffic becomes sufficiently reliable and congested to warrant the installation of tracks and trolley.

Other uses for the auto-bus by trolley companies would be in locations where there is considerable distance between our parallel tracks in congested districts that invite the jitney. In such districts it is well to consider the possibilities of the auto-bus, because in such localities the jitneys take away a permanent form of traffic.

By using the auto-bus to the extent cited, we will immediately win back the nickels we have lost and will do more than anything else to discourage jitney-bus competition and to prevent capital entering this field, because the jitney thrives best in a field originating in a congested district and paralleling our lines, and by carrying passengers to points beyond our track limits.

Few of our passengers would take a jitney-bus to points beyond our lines if they could ride in comfortable cars to our track limits and then be carried to points beyond in a comfortable, well-equipped auto-bus operating on a regular schedule. One such bus, by making frequent short trips, would replace many buses making a long trip.

Generally speaking, an electric traction company, if it used an auto-bus as an auxiliary, would discourage competition on any extensive scale, and would prevent organized incorporated capital from entering the field, which is the most dangerous feature of this form of competition. Most of the jitney competition is now in the hands of "shoe-string" capitalists, but when organized capital enters the field we will have to fear the worst. If, however, we make use of the gasoline auto-bus as an auxiliary, organized capital will be slow to enter the jitney-bus field.

We have, indeed, a serious problem to consider. There never was a time in our history when we were confonted with a problem that required us to make greater efforts to accomplish economies, and to combine our great capital to prevent further inroads into the field. We must organize our capital to prevent organized capital from entering the field of competition; we must combine our legal talent to have enacted such laws as will place our competitors on an equal basis with us; and we must enlist the combined talent of the electrical engineers and the car builders to give us a vehicle that will place us on an even footing with the jitney-bus competition.

I will say, in conclusion, that the total cost, including fixed charges, for operating an auto-bus-mile for a bus having twenty-two seats, based upon an annual bus-mileage of 30,000, is 21.8 cents per mile. There are few electric roads that can equal this. For over ten years more passengers have been carried by buses in London than have been carried by trolley lines. The service is just as good and as regular. When London got the bus habit, and the buses became popular, the capitalists owning surface trolley lines promptly unloaded them on the city and obtained exclusive franchises to operate the bus lines.

THE CENTER-ENTRANCE CAR FOR CITY AND SUBURBAN SERVICE

An account of the center-entrance car for city and suburban service was given by W. G. Gove, superintendent of equipment Transit Development Company, Brooklyn, N. Y., but as this car has been fully described in these pages, the technical features of this paper will not be furnished here. Mr. Gove concluded his remarks as follows:

One hundred and one cars of the center-entrance type have now been in service on the Brooklyn Rapid Transit system for over two years, and the results obtained have been very satisfactory. The principal advantage of this car is the reduction in boarding and alighting accidents, due to the doors being closed at all times when the car is in motion.

The following table gives a comparison of boarding and alighting accidents per 1000 car-miles for three different types of cars, operated on the same lines during the last calendar year:

Type of Car	Accidents per 1000 Car-Miles
Closed, semi-convertible and convertible	0.11
Open	0.26
Center-entrance	0.03

Another operating advantage of this car is its ability to carry an increased number of passengers with a decreased number of cars. This is accomplished by the shorter stops required, as passengers are entering and leaving at the same time, and by the increased seating capacity. On one line it was possible to make a reduction of seven cars per day on the schedule, or 190 trips and 24,142 ton-miles, with an increase in seat-miles of 45,022.

When the cars were first placed in service it was thought there might be some slight delay at terminals in loading and unloading passengers and in collecting fares as passengers entered. This has not been the case. At the Park Row terminal of the Brooklyn Bridge the passengers are allowed to board through both entrances and exits on one side of car, after all passengers have alighted from the opposite side. Fares are collected as the car is crossing the bridge.

At Borough Hall and Atlantic Avenue, the only two heavily congested points in Brooklyn, passengers are prevented from entering by way of the exits by two inspectors, one located at each exit, who also assist passengers to board the car. Fares are collected as passengers enter, but transfers are not issued until after the car starts. By this arrangement no delays are occasioned and schedules are easily maintained.

The light weight per passenger-seat is also an item not to be overlooked. This is saving money, not only in power consumption, but in wear and tear on equipment and roadbed.

THE PROTECTION OF INTERURBAN RAILWAY HIGHWAY CROSSINGS

In introducing this subject for discussion William H. Hyland, claim agent Fonda, Johnstown & Gloversville Railroad, first outlined the relation of the growth in automobile traffic during seventeen years, in which period the number operating in New York State has increased from forty-five to 150,000. At the same time the possible speed has increased from 25 m.p.h. to very high values. He stated further in substance as follows:

The qualifications necessary for operating an automobile in the State of New York do not include that of normal vision. Any person who can purchase an automobile, or any member of his or her family, even though partly deaf and with impaired vision, is allowed to operate automobiles upon the highway. There is a striking contrast between the requirements for driving an automobile and an interurban car. The motorman of today must not only be sound of body, but he must have perfect vision and hearing, tested by a competent physician every two years and after any severe illness. Much responsibility naturally rests upon the motorman, and for this reason the greatest care is exercised in selecting him. It should be quite comforting to nervous people to know that out of every 100 men who enter the train service only twenty become motormen, and only five of this number become motormen of interurban cars. The motorman is thoroughly trained to meet every emergency, and his efficiency is as carefully looked after as that of anything upon the railroad.

There are differences of brain power, taste, aptitude, physical power, mental strength, moral force and vision. With these inherent differences there must be different results. These great differences among men are the causes of many accidents at highway grade crossings. Whichever way we turn we find signs safeguarding the grade crossings. It is, however, impossible to get away from the personal equation. Frequently an eye fails to locate and measure correctly the position and speed of an approaching car; an ear fails to hear the warning bell or whistle; a hand fails to stop the horse or slow down the automobile, a mind goes "wool gathering" for a moment, and here we have, I believe, the cause of 95 per cent of our grade-crossing accidents.

With the advent of the automobile, railway companies caused signs to be erected facing the highway at points well back from crossings. These signs urged drivers of automobiles to slow down and look out for the cars. Crossing signs were illuminated so that they who ran, even in the dark, could read. Wherever possible, trees and buildings which in any interfered with a clear view of the tracks from the highway were purchased by railroad companies and removed. Of course, all highway grade crossings are dangerous places, but some crossings are safe as compared with other crossings. At the more dangerous crossings—that is, where people, on the highway, by looking cannot see and by listening cannot hear approaching cars—cars are stopped before crossing the highway. The whistle is sounded and the bell is rung. In fact, everything that railroad companies can do to safeguard the lives of people on grade crossings is done, but all the precautions in the world will not save the lives of those who drive vehicles recklessly over railroad crossings.

Acquiring definite information is, of course, the chief reward of all systematic reading and thinking, and in these days, when knowledge means much, this is important. It is especially important when the knowledge gained is on a practical subject, like the one in question. However, I really believe that if the managers of railroad companies should withdraw their attention from all other matters and center it upon the subject of the protection of highway grade crossings, they could learn nothing that they do not already know. The need of the railroad manager is not more information from the claim department upon this subject, but, on the contrary, it is money with which to eliminate these dangerous places. To obtain the money with which to do this most important work will depend largely, I believe, upon the attitude of the public toward railroad corporations.

The railroad is the partner of the business man. Partnership implies working together for a common end, and when the partners shall have viewed this subject from the same angle, railroad managers will have money with which to eliminate these dangerous crossings, and not before. Railroad companies are doing everything in their power to safeguard crossings, through men and machinery and by the posting of large signs, warning automobilists to look before crossing the track. They are doing their part and should at least receive due credit for their efforts and improvements.

A Remedy for Dusting Concrete Floors

At a recent meeting of the American Concrete Institute the question of eliminating the dusting of concrete floors was brought up for discussion. This problem is of particular interest to electric railways because of the generally adopted practice of using concrete floors in shops, carhouses and power stations. In this discussion it was brought out that more than thirty different methods had been attempted to eliminate this undesirable characteristic, but only two or three had been found at all satisfactory. Silicate of soda was included among those proprietary remedies which had given fair results. A better remedy, however, was discovered twelve years ago when the dust on the floor of a generating station damaged the bearings of some of the machines. A coating of linseed oil was applied to eliminate the cause of the trouble. In this case raw oil was used and the excess wiped off with waste, but later developments have demonstrated that boiled oil was better than raw oil, since it dried more quickly. One objection to the oil was that it produced a mottled appearance due to unequal absorption, but this undesirable feature has been overcome by the inclusion of lamp black, which gave the floors so treated a uniform slate color.

It was generally agreed that dusting of concrete floors was the result of using a mixture too rich in cement, or sand of too fine grain. Both of these causes are readily obviated by the use of a coarser and harder sand, or even crushed granite screenings in the wearing surface, and by a reduction in the quantity of cement. The more recent introduction, however, of fine iron and steel filings into the cement used in the wearing surfaces of floors is meant to attain the same end, and logically there is no reason why it should not. Another precaution employed to improve the wearing quality of concrete floors is to use only enough water to make the surface trowel without undue effort. It should also be allowed to cure for at least ten days, during which time it should be sprinkled frequently to complete the hydration of the cement.

The Cleveland, Southwestern & Columbus Railway, which adopted Eastern time shortly after Cleveland made the change, has returned to the use of Central standard time. None of the other towns and cities on its line used Eastern time.

COMMUNICATIONS

The New York Jitney Law

INTERNATIONAL RAILWAY COMPANY,
BUFFALO, N. Y., June 28, 1915.

To the Editors:

I notice a statement in the table on page 1224 in the ELECTRICAL RAILWAY JOURNAL for June 26, that the New York law regarding jitneys provides "that no jitney shall operate until the owner has procured the consent of the local authorities and has executed a bond in an amount fixed by said local authorities."

The law goes further than this. It also provides that they cannot operate until they have secured a certificate of convenience and necessity from the Public Service Commission, and in order to get this it will be necessary for any jitney operator to show by testimony under oath at a regular hearing before the Public Service Commission that the service is a public necessity and convenience.

E. G. CONNETTE, President.

Rating of Railway Substation Machinery

NEW YORK, N. Y., June 30, 1915.

To the Editors:

Your editorials on "Continuous vs. Normal Rating of Railway Substation Machinery," with their advocacy of continuous instead of nominal rating, suggest the desirability of introducing another factor into the rating of duty-cycle machines, or those whose cycle of load repeats itself with more or less regularity.

The heat generated in an electrical machine is primarily expended in raising its temperature. The greater the heat capacity of the machine, the more heat will be required to raise its temperature a given number of degrees, or, to put it another way, the greater the heat capacity, the less will be the temperature rise with a given expenditure of heat. As soon as the temperature begins to rise, however, the heat no longer confines itself to raising the temperature of the machine, as part of it is dissipated in the air by radiation and convection. At first the heat dissipation will be unimportant compared to the heat absorption, but as the temperature rises, it assumes increasing importance until, at a certain temperature, the rate of dissipation equals that of absorption. This is the temperature at which the machine will run continuously with the energy losses assumed. The greater the heat-dissipating ability of the machine, the less the temperature rise in continuous operation or, to put it another way, the greater the dissipation the greater may be the energy losses for a given temperature rise. It is therefore obvious that the fundamental characteristics of a machine, from the point of view of heating, are its thermal capacity and its thermal dissipation quality.

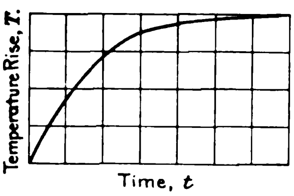
The continuous rating of a machine, being a measure of its thermal dissipation, is a perfectly satisfactory measure of its capabilities under practically constant load conditions, such as occur in lighting stations. In railway substations, however, the fluctuating character of the load renders the continuous rating less complete as a measure of capability, and necessitates an additional rating which will measure the capability of the machine to absorb the heat generated by heavy loads of short duration. The rating which accomplishes this is the thermal capacity.

Unfortunately, the thermal capacity has not been standardized as a rating. True, it is mentioned in an appendix to the 1914 Standardization Rules (Section 447), but only in connection with railway motors.

The nominal rating is a rather abortive attempt to combine the thermal dissipation and thermal capacity in one figure. Such an attempt is like trying to define a parallelogram by giving its area only, without reference to its shape. In either case the combination of the two quantities into one makes the rating fit innumerable cases. For example, a machine of high thermal capacity and low thermal dissipation may have the same nominal rating as a machine of low thermal capacity and high thermal dissipation. The two machines will be of radically different design, suited to entirely different services, but will have the same rating.

The thermal capacity depends upon the amount, disposition and specific heat of the materials of which the machine is composed. The thermal dissipation depends upon the ventilation, the areas of heat-dissipating surfaces and the specific radiation of these surfaces. How can these two distinct properties of a machine be put into the rating?

An answer to this question is suggested by a consideration of the curve of temperature rise of a machine operating at any constant load. The form of such a curve is shown by the accompanying sketch, from which it will be observed that during the early stages of the run, the temperature rise follows an almost straight line law due to the fact that practically all the heat generated is used in raising the temperature of the machine. Later the curve bends over due to the increase of heat dissipation as a machine becomes hot. The thermal capacity of the machine is proportioned to the slope of the straight line part of the heating curve with respect to the vertical axis. Thus if the mean temperature rise in t hours is T degrees with a constant load, giving a loss of P kilowatts, the thermal capacity will be Pt/T kilowatt-hours per degree rise. The ratio t/T which gives the slope of the curve with respect to the vertical axis, may be determined by stopping the heat run after, say, fifteen minutes and taking temperature readings. Assuming that this plan is practicable, we would be equipped with a measure of the thermal capacity of the machine which may then be used to determine its capability for carrying overloads for short periods. It is unnecessary to enter into the details of how this is done, but let it suffice to say that if we are provided with a load diagram and the thermal characteristics of the machine, it is an easy matter to plot a curve of temperature rise, no matter how complicated the diagram.



RATE OF TEMPERATURE RISE IN ELECTRICAL MACHINERY

The practicability of determining the thermal capacity as here outlined is, perhaps, open to doubt, due to the uncertainty of the temperature rise, which will probably be a small quantity and due to the uneven distribution of heat in the machine. There is, however, sufficient promise in the plan to warrant careful investigation. The standards committee of the A. I. E. E. has given the matter considerable thought, but received little or no encouragement from the railway men. I wish to commend the subject to the attention of electric railway engineers in the hope that a demand will arise for the rating of railway machinery in accordance with its thermal characteristics. The adoption of the continuous rating will supply one of the two necessary ratings. Is it not time for us to talk for the other?

WILLIAM L. DEL MAR.

The Chicago (Ill.) Tunnel Company has issued an elaborate folder entitled "Lifting the Lid in the Loop" for the purpose of acquainting the public with the property and the benefits derived by shippers and the city at large through the tunnel.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 to 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

Under the Auspices of the A. E. R. A. and N. E. L. A. a Meeting Is Held in Manila at Which Public and Private Ownership of Utilities Is Discussed—Committee and Section Activity

COMMITTEE ON UNIFORM DEFINITIONS

The committee to develop uniform definitions of the American Electric Railway Transportation & Traffic Association met at the headquarters in New York on June 25. The following were present: H. C. Donecker, chairman; William C. Greenough and Frederic Nicholas. The committee went over in detail the definitions reported by the 1913 committee on the same subject and definitions contained in the 1911 report of the committee on construction of schedules and time-tables, and also considered suggested changes and additions.

The definitions, which have been reported to the association but not yet adopted formally, will be considered carefully by the members of the committee in comparison with definitions contained in the reports of the committees on rules and construction of schedules and time-tables and the joint committee of the Engineering and the Transportation & Traffic Associations on block signals for electric railways. Several of the terms which have been defined tentatively are of equal interest to allied associations and in order that the definitions may be satisfactory to each department of operation concerned, the committee will ask for the appointment of joint committees to act on these matters. Several additional terms were suggested for definition. The committee will hold another meeting on July 13.

GOVERNMENT OWNERSHIP DISCUSSED IN MANILA

As announced in the issue of the ELECTRIC RAILWAY JOURNAL for June 26, page 1211, the May meeting of the joint Manila Electric Railroad & Light Company section of the American Electric Railway Association and the National Electric Light Association was devoted to the subject of the relative advantages and disadvantages of private and government-owned public utilities. A paper with this title was presented by W. R. McGeachin, manager of the railway department of the company.

Mr. McGeachin's paper was based upon quotations from a number of important articles and reports. He first stated that while theoretically government ownership of all public utilities is the ideal condition, the principal argument against the public ownership of certain utilities is that the basic political and social conditions under which these utilities have existed and do exist are not ideal. This is not a theoretical reason but, being based on practical results and existing conditions, furnishes an all-powerful and irrefutable argument. Mr. McGeachin quoted from the National Civic Federation report giving the results of the investigation conducted by that body during 1905 and 1906, from the report of W. D. Mahon and L. D. Bland to the Amalgamated Association of Street & Electric Railway Employees of America in 1914, from an address on European public-utility conditions by W. J. Clark of the General Electric Company, from the proceedings of the conference of mayors held in Philadelphia last year and from the code of principles of the American Electric Railway Association. Abstracts of these various statements can be found in the file of the ELECTRIC RAILWAY JOURNAL.

In the discussion of Mr. McGeachin's paper L. L. Vincent, superintendent of electric testing of the company, expressed the belief that in America the people are willing to give private owners of public utilities a chance to earn a reasonable return on their investment, provided satisfactory service is furnished and that the code of principles of the association, when applied, will have the effect of educating the people generally and preventing hostile agitation. He considered the American Telephone & Telegraph Company's experience with publicity to be typical of the effects of frank publicity.

Clifford H. French, auditor for the Philippine Islands, referred to the fact that the incentive of profit is absent in public operation of utilities. Recent inquiries in China showed him that the operation of the railways by the government was more or less of a failure because the government could not pay suitable salaries to keep employees in a contented state of mind. He believed that no present government is organized on a basis of efficiency as compared with great representative corporations.

M. F. Loewenstein, president Pacific Commercial Company, referred to the difference between a Canadian Pacific train and an Inter-Colonial train as they stood side by side in the station at Montreal. As a result of the comparison he did not favor government ownership of railroads as much as he had done previously. He instanced the government ownership and operation of steam railroads in Australia where on one trip he was obliged to ride on three different trains, as one road had a narrow gage, one a standard gage and one a broad gage. He considered that the public ownership and operation of street railways in Sydney was satisfactory and noted that a long ride was given for a penny. Comparatively unsatisfactory conditions in Melbourne were explained by the fact that the company's franchise was about to expire and for that reason needed improvements were not attempted.

H. M. Pitt, president of the Manila Merchants' Association, stated that government at best is a cumbersome affair, and if it is possible to relieve it in any way of its multifarious duties it is good for the government and the public to do so. He stated that the government operated the ice plant in Manila under compulsion as the plant was built by the military government and was turned over to the civil government. For years the ice plant maintained a price for ice that was out of all reason, and it never reduced the price until the private companies did so after getting into a fight among themselves. Governmental ownership and operation of the ice plant in Manila is hardly a criterion of the success of such ownership of utilities.

The political aspect of the question was pointed out by M. D. Royer, traffic manager of the Manila Railroad Company, a steam railroad. He referred to the differences in conditions with regard to government ownership in European countries and the United States, and especially with regard to the possibilities of political control under government ownership. Conditions in the United States at this time do not warrant such ownership.

The experience of Japan in government ownership was outlined by Y. Mikami, manager of the Mitsui Bussan Kaisha. He said that the cumbersomeness of governments had been proved, and therefore the less the governments do the better for the people. In Japan it was necessary in many cases for the government to inaugurate public utilities in order to have them, and principally for this reason the people of Japan advocated such ownership, but this does not prove anything. It is not surprising that in the United States, where the people are more practical than any other people in the world, public utilities are generally privately owned.

George H. Fairchild of Welch, Fairchild & Company, sugar planters, in referring to his experiences on government-owned railroads in Europe said that the service given by them was inferior to that furnished by the American railroads.

In closing the discussion C. N. Duffy, vice-president of the company, said that the people who advocate government ownership and operation are usually non-taxpayers. Speaking as a taxpayer he felt that whenever a government can or does operate public utilities as efficiently and as economically as a private company can and does, then and not until then is it time to take up the question for consideration. The men engaged in the public-utility business are performing a public service and are doing presumably what the government could not, or would not, undertake to do. He instanced the local electric railway, light and power system. The real reason for the success of privately-owned public utilities, and for the failure of government-owned public utilities, lies in the fact that in the latter there is no hope of individual financial reward, the personality of the man is lost sight of, and the individual's right to assume authority and discharge responsibility is hopelessly entangled in masses of red tape.

Referring to the advocacy of government ownership and operation of telephone and telegraph lines by the Postmaster-General of the United States, he called attention to the fact that the Postmaster-General also advocated the operation of rural free delivery postal service privately, as it had cost the government during the last fiscal year $56,000,000 whereas the service could have been performed privately for $20,000,000.

Mr. Duffy did not favor limited franchises for privately-owned utilities but preferred the indeterminate permit. He said that the franchise granted by the Philippine Legislature, recommended by the Board of Public Utility Commissioners for the Philippine Islands, for a hydroelectric plant on the Caliraya River was for a term of ninety-nine years. The government reserved the rights under certain conditions to purchase the property within twenty years after the plant began operation provided that the actual cost should be paid, plus 10 per cent, and plus such additional amounts as would equal the return in cash equivalent to an average of not less than 10 per cent on such actual cost for each year during the period of operation after adequately providing for maintenance and depreciation of the property and safeguarding the investment.

Referring to Mr. Loewenstein's impressions of railway service in Sydney, Mr. Duffy remarked that if the speaker had been called upon to pay in taxes his share of the deficit resulting from the operation of the street railway system his impressions might be different. In conclusion, he said that no privately-owned public-utility company, no investor in any such company and no employee in any such company objects to regulation that means fair treatment and protection to the interests regulated; that such regulation makes a privately-owned public utility stronger and better in every way and is best for the public; that the advanced and progressive privately-owned public-utility company knows full well that if it does not conduct its business according to business principles it cannot, will not and should not succeed and that the privately-owned public utility that gives the best service practicable at the least cost and that serves the public best, serves itself best.

CHICAGO ELEVATED SECTION

Financing electric railways, signals and interlocking were the subjects discussed at the meeting of the Chicago Elevated Railroad Section of the American Electric Railway Association held on June 22. When President Johnson called the meeting to order there were 110 members and guests in attendance and Secretary Smith reported sixteen new applications, which made the total membership 169. In the business session before beginning the regular program, it was suggested that an official pin cheaper than the one adopted should be available for those who could not afford to buy a gold one. This matter will be taken up with the parent association for action.

E. A. Brion, comptroller of the Chicago Elevated Railways, spoke on "How Funds Are Provided for Electric Railway Development." He described the different classes of securities employed, the manner in which they are marketed and the desirability of the various classes. It was shown by concrete example how the return on the various classes of securities varies with their safety and how the demanded return on all securities is steadily advancing. Mr. Brion also spoke of the holding company and its purpose, as well as the various factors which affect the marketing of the securities.

A talk on "Signals and Interlocking" was given by J. W. Stephenson, signal engineer of the company. The history of signal development was outlined beginning with the installation of the red ball at the crossing of the New York, New Haven & Hartford and the New England Railroads at Hartford, Conn., in 1852. Various types of interlocking machines installed on the Chicago Elevated Railroads were described, and the members were informed of several features which were developed on the company's lines, such as the "hesitation" frogs and the detector route locking.

"The Life of Treated Gears and Pinions" was the principal subject brought out by the Question Box and this was discussed at length. It was decided that this would be the last meeting before the summer adjournment. It is believed the section will be kept very much alive during the summer by the activities of the members who desire to be elected as delegates to the national convention at San Francisco.

The Anthony N. Brady Memorial Medals

The American Museum of Safety is sending to electric railways accident report forms for use in the competition for the Brady memorial medals which were awarded last year for the first time to the Boston Elevated Railway, Russel A. Sears and Henry V. Neal. The committee for formulating the conditions of competition comprise Arthur W. Brady, president Union Traction Company of Indiana, chairman; Wilbur C. Fisk, president Hudson & Manhattan Railroad; C. S. Sergeant, vice-president Boston Elevated Railway and W. H. Tolman, secretary, director American Museum of Safety. The committee on awards consists of Bion J. Arnold, chairman Board of Supervising Engineers, Chicago Traction; Hon. W. J. French, commissioner Industrial Accident Commission, State of California; James H. McGraw, president McGraw Publishing Company; Frank J. Sprague, New York; Prof. George F. Swain, chairman Boston Transit Commission, and Dr. W. H. Tolman, secretary.

The conditions of the competition are substantially the same as last year, but they have been improved in detail in accordance with suggestions received by the committee. They are contained in a circular published by the American Museum of Safety, 14 West Twenty-fourth Street, New York.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

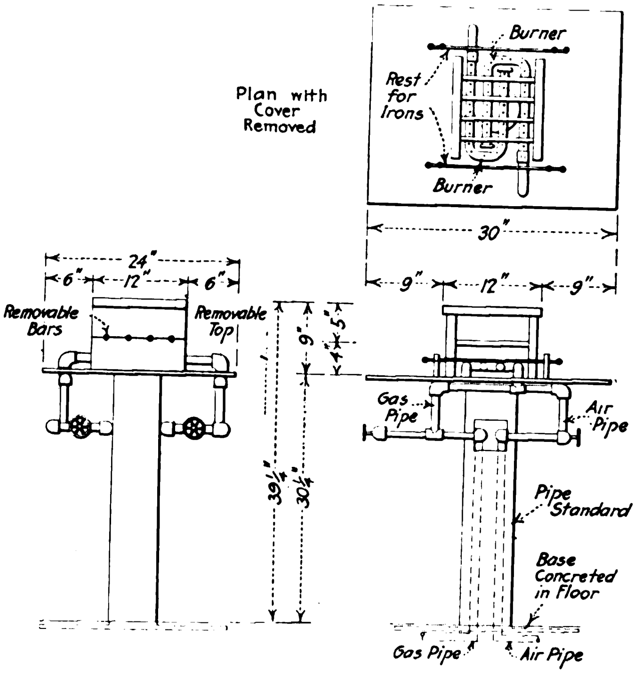
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Furnace for Heating Soldering Irons

BY R. H. PARSONS, ELECTRICAL FOREMAN

The gas furnace illustrated in the accompanying drawing was designed for use in heating soldering irons and solder pots in shops where a number of men, say from six to ten, are winding, repairing and bending armatures. It is a home-made furnace set up in the following manner:

The stand consists of a piece of 6-in. pipe, 30 in. long, with a table welded on the top and a base welded on the bottom. The table is 30 in. long, 24 in. wide and ½ in. thick. The base is somewhat smaller and is imbedded in the concrete floor a few inches below the surface.



FURNACE FOR HEATING SOLDERING IRONS

On the table is a cast-iron box, housing the burners, and consisting simply of two sides with a heavy, removable top, the whole box being in two parts held together by dowel pins. The top may thus be lifted off to expose the burners. The division of the box into two sections also gives a convenient means for replacing the small bars which are provided over the burner to support the irons. As these are in the flame they warp and have to be changed occasionally. The provision of the removable top also makes the furnace available for heating solder pots, boiling water, heating irons for light blacksmith work, etc.

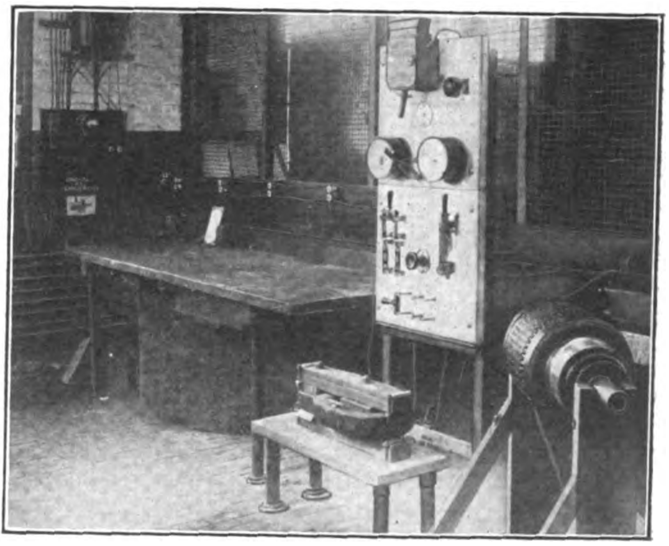
The burners are U-shaped loops of half-inch pipe perforated with ⅛-in. holes. They are laid together in the overlapping position shown in the diagram. Two ¾-in. pipes, one each for air and gas, are brought up from below the floor through the stem to a large opening near the top whence they lead to the burners. A valve is inserted in each pipe just below the table. Fastened to the flat iron top on each side of the burner is a bar, shaped to form a rest for the soldering-iron handles.

In designing this furnace, economy, neatness, convenience and safety were the considerations. The use of one central furnace does away with numerous individual fires, thus economizing fuel and insuring more nearly continuous use of the one fire. The inclosing of the pipes in the stem conduces to neatness, and the furnace is adapted to be centrally located for easy access by the users. The elimination of many small fires is conducive to safety and as this outfit is entirely of iron it is inherently fire proof.

Testing Corner in Atlantic City Shops

BY GEORGE F. FABER, GENERAL SUPERINTENDENT ATLANTIC CITY & SHORE RAILROAD

For the purpose of making the standard as well as special tests of electrical equipment, the arrangement of apparatus shown in the accompanying illustration has been adopted. At the left is shown an 1100-volt transformer used for break-down tests and beneath it a transformer and wattmeter board on which is an a.c. watt-hour meter and alongside it a switch in the low-voltage a.c. circuit leading to the transformer, by opening which the a.c. line to the main switchboard is killed.



TESTING CORNER IN ATLANTIC CITY & SHORE RAILROAD SHOPS

The principal instruments and switches are grouped on a small home-made switchboard consisting of two marble panels, which happened to be on hand, mounted on an angle-iron frame.

At the top of the board is a d.c. circuit breaker, to the right of which is a snap switch and pair of terminals for the d.c. voltmeter. In the center at the right is a d.c. ammeter arranged with shunts for reading either

100 or 1000 amperes. The range is controlled by two single-pole switches which short-circuit the respective shunts. The low-amperage switch is to the left of the ammeter and the high-amperage switch below it. To the left of the d.c. ammeter is a 60-amp. a.c. ammeter with a short-circuiting switch immediately beside it. Below the a.c. ammeter is the main a.c. circuit switch with fuses, and at the bottom of the board is a double-pole double-throw switch, connected in one direction for the field test and in the other for the armature test. Connections to the equipment under test are made from behind the board.

Immediately below the board is a water rheostat, consisting of an iron terminal plate suspended in an oil barrel concreted in for permanency. The barrel is provided with a drain pipe at the bottom so that the standing water may be changed as often as desired. The position of the terminal plate is controlled by a rope running over a drum on the back of the board. The drum is rotated by means of a small hand wheel on the front of the board. A weight is used to counterbalance the plate.

On the stand in front of the switchboard is a transformer for testing field coils for short circuits, consisting of a laminated iron core with a primary winding, the coil under test forming the secondary. The illustration shows the field coil of a Westinghouse No. 68 motor ready for short-circuit test, while the armature of the same motor is on the stand at the right ready for current and insulation tests. In addition to the test set described we have a K-36 controller mounted with circuit breaker and resistances for complete test of motors before they are installed on the trucks.

The testing equipment described above is used for making the following routine and special tests: 1100-volt a.c. insulation tests on armatures and other apparatus; a.c. field tests for "shorts"; a.c. armature tests for "shorts"; d.c. circuit-breaker tests; ohmic resistance tests of any apparatus, and in general any other a.c. or d.c. tests requiring large or small current. While I am aware that test sets are installed in most of the larger electric railway shops throughout the country, I believe that the arrangement of this one will be of interest as it is quite complete.

Ventilation Holes in Motor Frames

BY F. A. MILLER, SUPERINTENDENT POWER AND EQUIPMENT OAKLAND, ANTIOCH & EASTERN RAILWAY

R. H. Parsons' article in the issue of the ELECTRIC RAILWAY JOURNAL for June 19, on "A Simple Ventilating Scheme for Increasing Motor Output" recalls to the mind of the writer similar work which was carried out when he was with the Puget Sound Electric Railway in 1911.

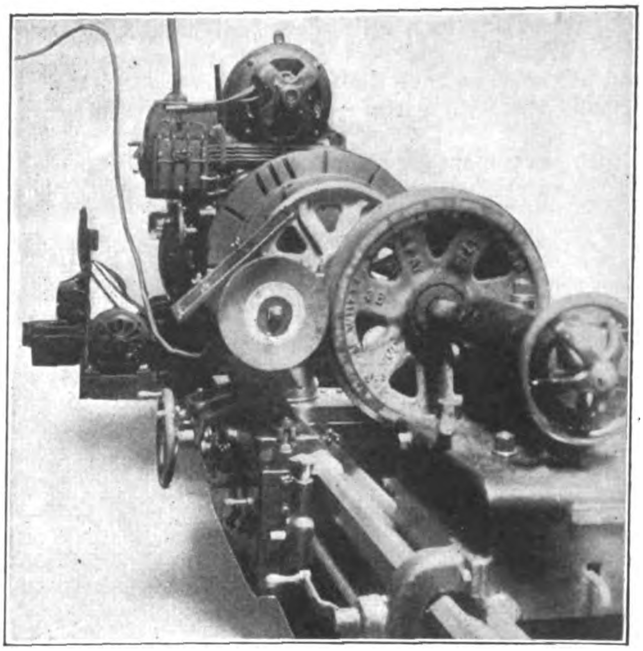
The company had in service a number of GE-66 motors geared 47:37. The operating conditions of these motors were so severe that with an outside temperature of 34 deg. C. the internal temperature of the motors ran as high as 105 deg. between the field poles. These high temperatures caused the melting of the solder in the rear-end clips of the two-piece armature coils, necessitating rewinding.

We therefore removed the standard handhole covers and replaced them with pieces of sheet iron in which 9/16-in. holes had been perforated at about the same distance between the edges of the holes. With the perforated covers substituted for the top handhole covers alone, the maximum temperature dropped to 77 deg.; and with the top, back and bottom handhole covers perforated, the temperature fell to 60 deg. and even to 55 deg. C.

A Home-Made Wheel Grinder

BY GEORGE G. MORSE, SUPERINTENDENT OF RAILWAYS, EL PASO (TEX.) ELECTRIC RAILWAY COMPANY

The accompanying photograph shows a device made in our shops for grinding wheels. This consists of a 1-hp. motor, with an emery wheel attached, fitted to the tool holder of our 36-in. wheel lathe. This attachment is secured to the tool holder by four bolts so that it can be removed quickly when necessary. We are, of course, able to grind but one wheel at a time with this device.

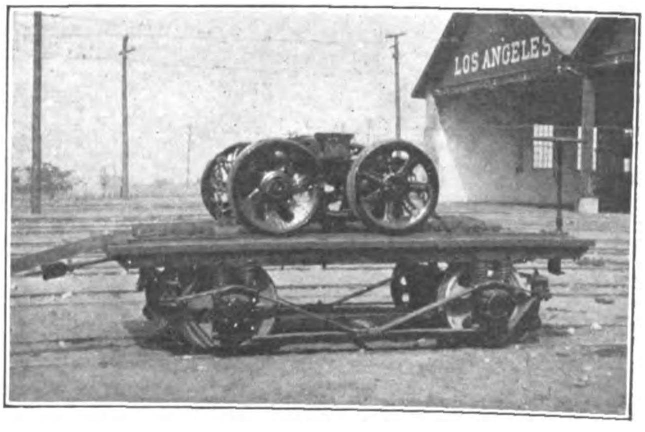


EL PASO RAILWAY HOME-MADE WHEEL GRINDER

The average time required to grind a pair of wheels is from two to three hours, depending on how badly they are skidded. We have been using this device since January, 1914, grinding from one to four pairs of wheels per month. We have lately used it for truing up steel wheels where there was a slight difference in diameter and in case the flanges did not require turning. The entire cost of this installation was $50, including the cost of a second-hand motor.

Emergency Truck Changing at Los Angeles

The accompanying cut shows a vehicle used by the shop forces of the Los Angeles Railway. This is used to carry a completely-equipped motor truck which is always ready for emergency replacements at the call

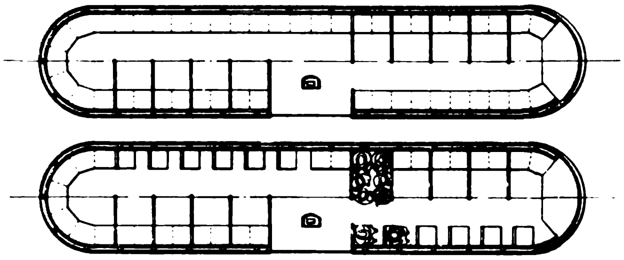


DOLLY WITH COMPLETELY EQUIPPED MOTOR TRUCK FOR EMERGENCY REPLACEMENTS of the chief dispatcher. The dolly is supplied with a skidby means of which the replacing truck is readily lowered and the defective truck raised to the platform for return to the shops.

Making the Standee Comfortable

A patent, No. 1,142,867, has been issued by the United States Patent Office under date of June 15, 1915, which proposes the separation of surface-car interiors into small sections or units each providing standing space for a limited number of passengers. By segregating each unit every individual within such a space has a place from which he cannot be crowded and at the same time the railings surrounding the unit provide him with a firm and natural support during his ride.

The accompanying Figs. 1 and 2 show plans of a center-entrance motor car having an aisle which is off the center line of the car and thus provides room for the series of units along one side of the car. The units are separated from each other by horizontal pipe railings which are set about waist high and which may take either the form of an attachment to a vertical stanchion at the seat line or else continuous railing running horizontally from the car side to the center line. Wooden partitions are suggested for use in some cases.



FIGS. 1 AND 2—PLANS OF TYPICAL CENTER-ENTRANCE CARS SHOWING LOCATION OF RAILWAYS BETWEEN COMPARTMENTS

The plan shown in Fig. 2 differs from that shown in Fig. 1 only in having the single seats arranged in tandem. The latter feature, by locating the foot space for seated passengers between the cross-seats, makes available for standing passengers a corresponding space in the aisle, and in addition insures those who occupy the cross-seats from close contact with those who stand. In Fig. 1 the plan provides for two seated passengers and four standing passengers in each unit.

The inventors believe that this arrangement will prove superior to the use of both hand straps and stanchions because the horizontal partitions between the units will provide definite support for standing passengers at the proper position. It is also believed that the race for vacant seats which is a conspicuous and unpleasant feature of modern rush-hour travel will be eliminated, because passengers who have once gained a standing place within a given compartment acquire a natural right to vacancies within their compartment.

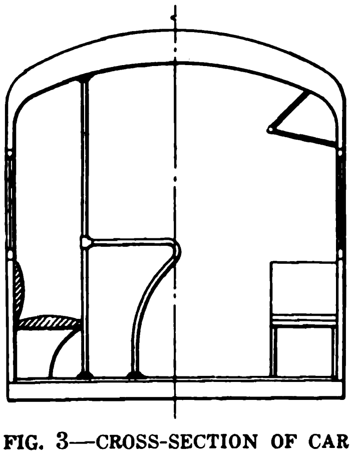
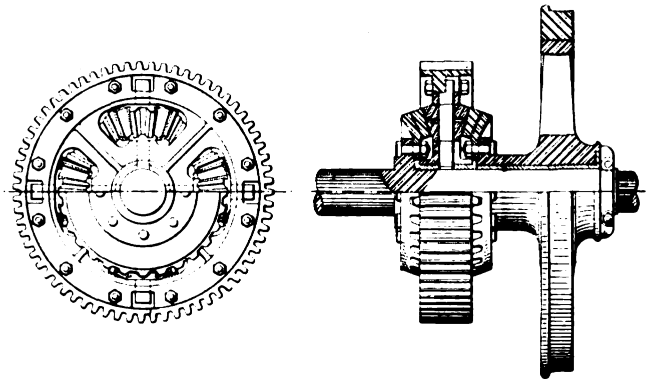


FIG. 3—CROSS-SECTION OF CAR SHOWING ARRANGEMENT OF RAILINGS

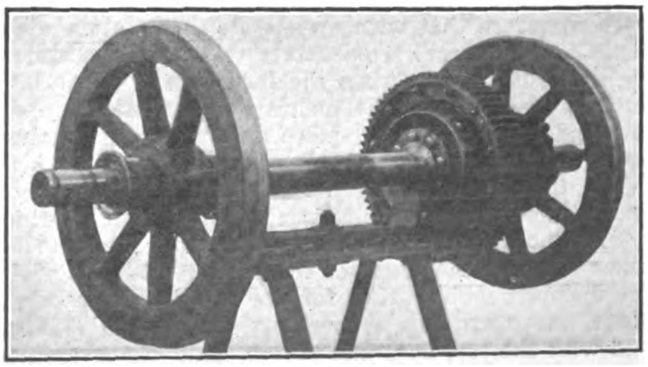
Differential Gears to Eliminate Rail Corrugation

For a number of months the Huddersfield Corporation Tramways, Huddersfield, England, has had in operation eleven cars fitted with differential driving gears. These cars have been operated on track which was formerly subject to corrugation, to the exclusion of other cars, to determine primarily the effect of eliminating wheel slippage. Incidentally information was desired upon the subject of energy consumption and life of tires with wheel slippage eliminated. It was the theory of R. H. Wilkinson, general manager and engineer of the tramways, that corrugations are caused by skidding and slipping of the wheels due to unequal diameter. If this theory is correct the elimination of slipping should have beneficial effects in the three directions indicated. Experience thus far has shown very satisfactory results as regards corrugation and tire wear, although there have been no appreciable energy savings. The cars are running on rails which were corrugated by cars of the ordinary fixed wheel and axle type. For the purpose of the experiment the corrugations were carefully ground out.



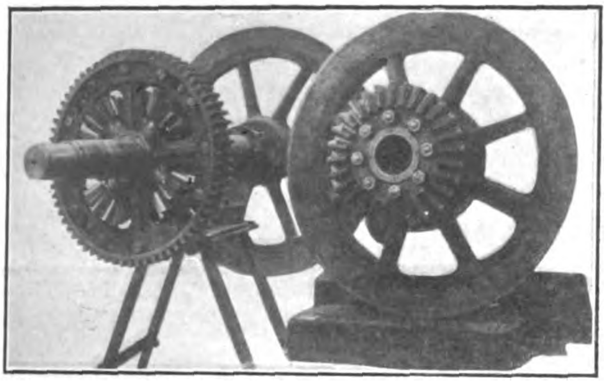
DIFFERENTIAL GEARS—SECTION SHOWING DETAILS OF CONSTRUCTION

The construction of the differential gear can be seen from the illustrations. Referring to the line cut it will be noted that a differential driving axle gear is substituted for the ordinary gear one side driving the near wheel through a bevel gear mounted on the extension of its hub, while the other side drives the far wheel through the axle, which carries a similar bevel gear mounted on a collar forming an integral part of the axle. By this drive each wheel takes a speed determined by its circumference. The axle is carried in ordinary bearings. The wheels differ from the standard wheels in that they are straight rather than dished, in order to bring the tread and point of support more directly under the center of the length of the wheel boss and bearings,



DIFFERENTIAL GEARS—COMPLETE GEAR ON CAR AXLE the better to support the axle equally over the full length of the boss bearings, giving parallel wear of bush and axle by approaching center running.

It will be noted that the wheel near the differential gear is mounted loose on the axle, the hub being bushed with a bronze bearing, while an extension of the hub carries the bevel gear. The appearance of the gear as attached to the wheel is shown clearly in one of the half-tones. The main spur axle gear is also loose on the axle and is similarly bushed. It consists of a cast-steel rim with machine cut teeth mounted on a cast-steel center which carries four bevel pinions meshing with the aforesaid bevel gear. The second bevel driving gear is bolted to a collar which is forged on the axle. All of these parts are securely bolted together with driving-fit bolts.



DIFFERENTIAL GEARS—SPUR GEAR WITH BEVEL PINIONS, AND BEVEL GEAR ON WHEEL HUB

A thrust collar, made in halves bolted together, fits snugly into a groove in the axle on the outer side of the wheel, to take the thrust of the bevel gears. This construction permits the easy removal of the gears so that they may be lined up in case of wear.

The experiments which are being made with these differential gear drives should be of great value in settling questions as to the causes of corrugation, the effects of wheel slippage on curves, etc., and the effect on tire wear of inequalities in wheel diameter.

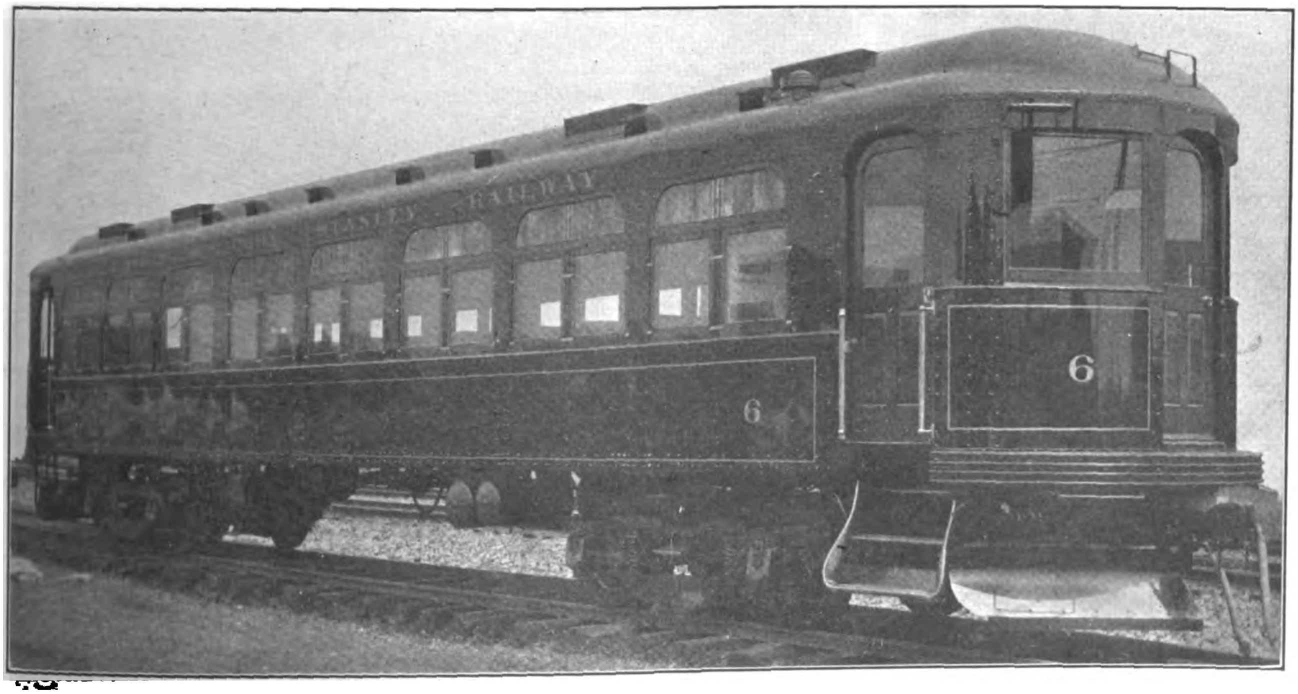
All-Steel Cars for London & Port Stanley Railway

Five cars for the London & Port Stanley Railway have recently been completed by the Jewett Car Company, the design providing for service in accordance with the highest interurban standards. The railway, which is a 1500-volt electrification of an old steam road between the cities of London and Port Stanley in the province of Ontario, Canada, really constitutes a first step in the extensive general plans of the Ontario Municipal Railways, and the service includes locomotive-hauled freight trains and multiple-unit passenger car trains of both limited and local classes.

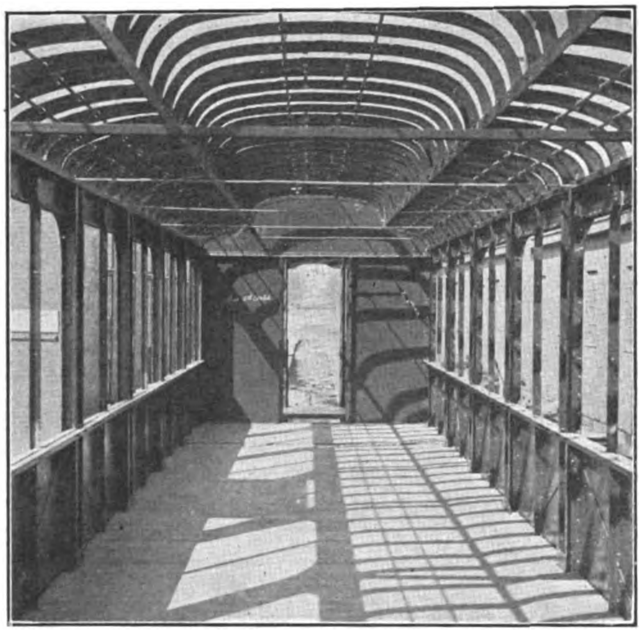
The recently completed cars are to be used in motor service at the head ends of the two-car trains. They are 61 ft. 1¾ in. long over buffers and are exceptionally wide, being 9 ft. 6 in. over posts. This makes possible seats that are 40 in. long, with an aisle 26 in. wide. The car body is divided into baggage, smoking and general passenger compartments, respectively 9 ft., 12 ft. and 25 ft. in approximate length. In the main compartment there are two saloons with metal tile walls and a tile floor set in cement. The seats in the main and smoking compartments are on 34-in. centers, and the total seating capacity is fifty-six.

The bottom framing of the car is made up of structural sills with pressed-steel cross-bridging, plate bolsters with pressed-steel fillers being used. Side posts are alternately of double channels and tees of light section, with angle-iron corner posts. The posts at the bulkheads and partitions are also of channels, with a channel header across between side plates. All of these posts have light wood fillers. The entire outside of the car and the bulkheads are composed of steel plates, the side girder plates and letter boards being of ⅛-in. steel and the pier-post panels, etc., being 3/32 in. thick. The carlines are of pressed steel, and the roof is sheathed with steel plates laid across the full width of the car.

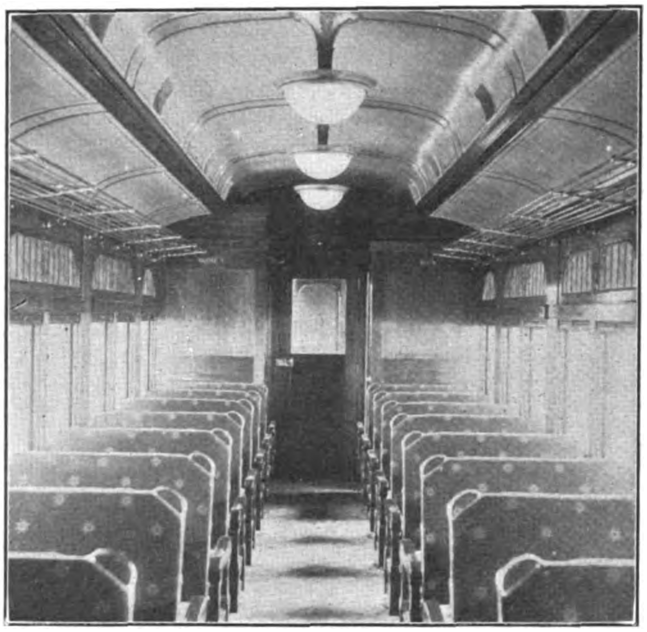
The cars are fitted with extra heavy steel pilots and Tomlinson M. C. B. drawbars. The interior finish is mahogany, inlaid with inside and outside Gothic sash and cathedral glass, and storm sash are fitted to all body windows. The ceiling is of agasote, while the



PORT STANLEY CARS—VIEW AT VESTIBULE END, SHOWING DOOR ARRANGEMENT



PORT STANLEY CARS—VIEW SHOWING SIDE FRAMING AND METHOD OF ATTACHING CARLINES TO DECK SILL



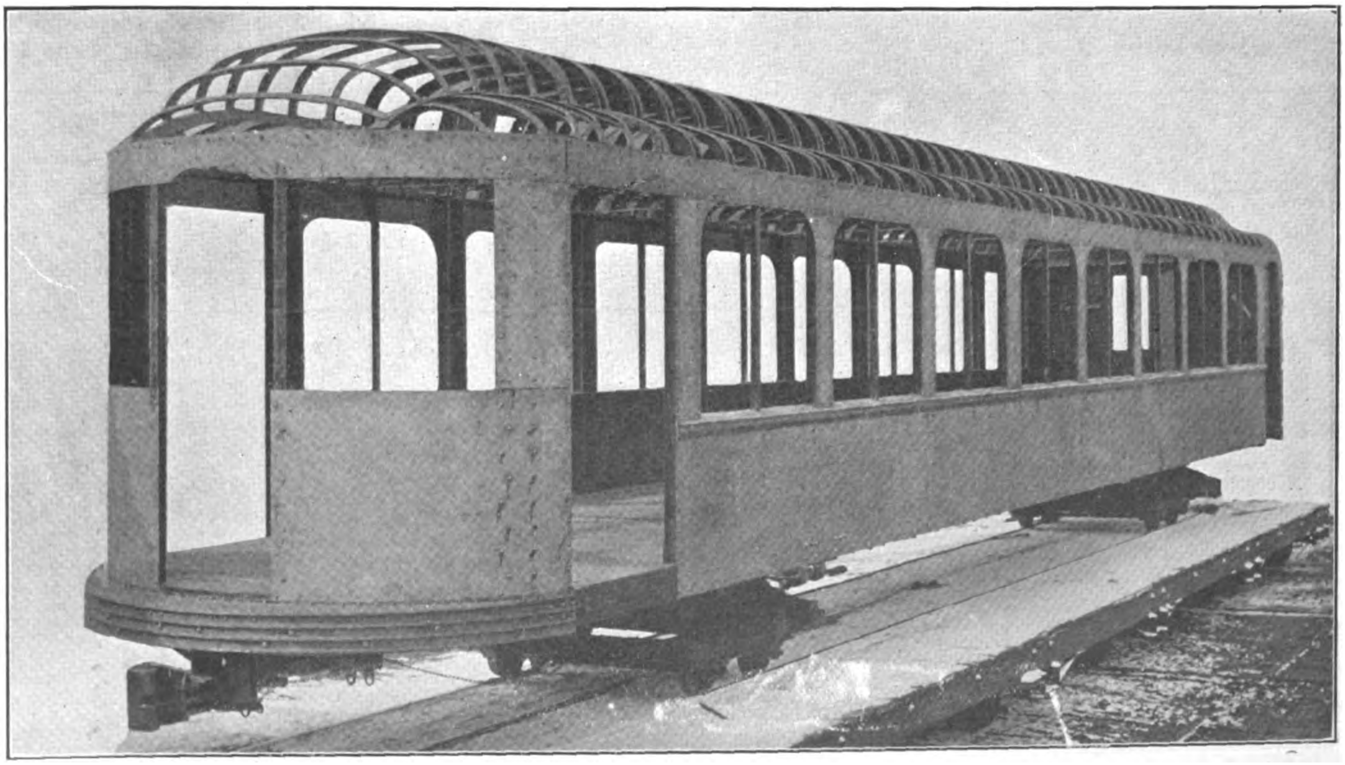
PORT STANLEY CARS—INTERIOR VIEW, SHOWING STYLE OF FINISH IN PASSENGER COMPARTMENT

floor, which is of wood, is covered with linoleum. The car is lighted by semi-indirect system with pendant fixtures, light wiring being in concealed conduit. The heater wiring is also concealed.

There is a vestibule only on the rear end, and this has triple steps covered with Edward's steel trapdoors. Both saloons are very completely equipped with flush hoppers, wash stands with liquid soap holders, towel racks, etc., all toilet-room fixtures being nickelplated. The interior of the car presents an exceptionally tasteful appearance, the mahogany being finished in a rather light tone, and great care has been exercised in selecting soft harmonizing colors both for ceiling and for stained glass.

Nothing in the way of incidental equipment, such as buzzers, air sanders, fire extinguishers, etc., has been omitted, while a large switch cabinet with a slate back extends from floor to ceiling, this containing all electrical switches. The roof is a compromise arch design having an ogee curve on each side, making a very good lines especially in the hood.

The electrical equipment for each car consists of four General Electric ventilated motors of 125-hp. hourly rating, connected permanently in series groups of two. The insulation, however, is designed for 1500 volts. The control is double end and energy for this is derived from a 1500-600-volt dynamotor which will have a sufficient capacity also to light the motor car and its trailer as well. Pantographs will be used for current collection. Each car will carry a combined straight and automatic air-brake outfit of the variable release type supplied by 1500-volt air compressors.

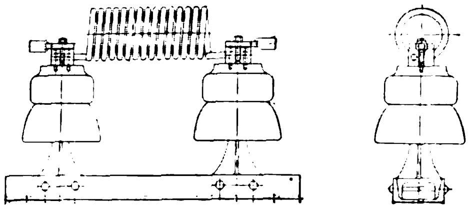


PORT STANLEY CARS—CAR BODY PRIOR TO INSTALLATION OF ROOF SHEATHING

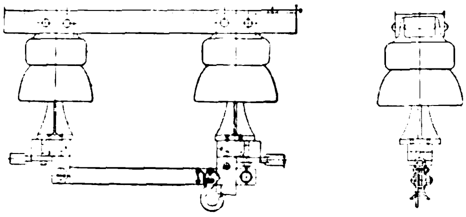
Choke Coils and Disconnecting Switches

The choke coil, disconnecting switch and fittings illustrated herewith are typical of the new and more complete line of such apparatus recently brought out by the Electric Service Supplies Company, Philadelphia, Pa. The fittings which accompany this line are all of new designs and especially noteworthy.

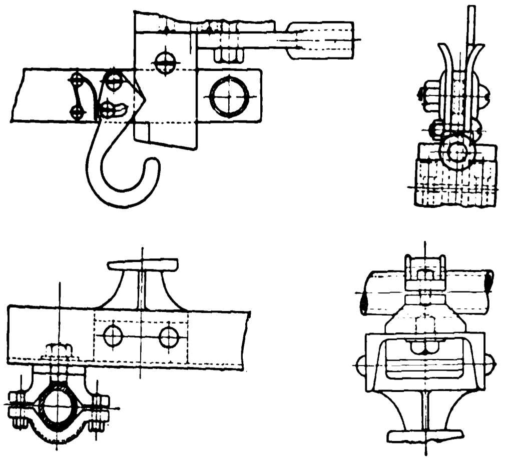
Both choke coils and disconnecting switches are made for standard and underhung mounting, as well as for voltages up to 35,000 and all standard ampere capacities. They are made with a base of channel iron, either 3-in. or 4-in., depending on the size of the coil or switch. Iron pins are riveted into this channel, and insulators cemented to these pins support iron caps, which in turn support the terminal blocks, terminals and coil or switch proper. All channel bases are drilled with 9/16-in. holes in each end and, therefore, may be mounted on any flat supporting member by bolts or lags. These coils and switches are very rugged in construction and possess great electrical and mechanical strength. The switches are designed for disconnecting and controlling high-voltage lines, branch feeders, emergency feeders, etc., as well as for lightning arrester disconnecting switches that are installed to disconnect arresters from the line for the purpose of inspection or repair. The manufacturers claim that these devices are so designed that when they are used in conjunction with Garton-Daniels lightning arresters, a maximum of protection may be expected.



CHOKE COIL—STANDARD MOUNTING



UNDERHUNG DISCONNECTING SWITCH



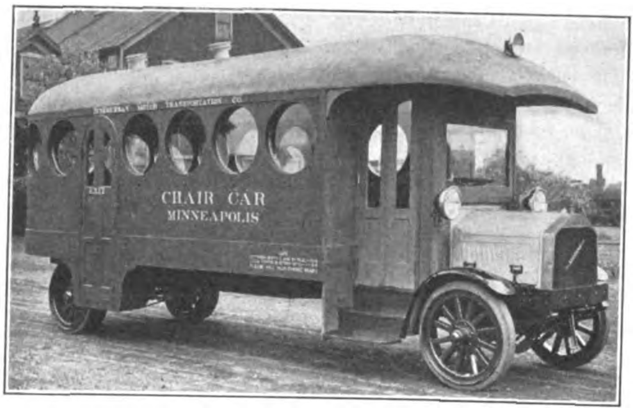
SWITCH LOCK AND PIPE CLAMP

The line of fittings referred to consists of malleable iron pipe clamps for mounting switches or coils on either parallel or transverse piping, disconnecting switch locks for use particularly on underhung types as assurance against any tendency for the blade to be blown open, disconnecting switch stops which prevent the blade from opening beyond a given angle, switch blade operating attachments which provide an extra large hole in the switch blade to facilitate the quick opening of the switch in an emergency, and disconnecting switch hooks in lengths from 4 ft. to 12 ft. for operating the switches from a distance.

A Novel Form of Motor Bus for Interurban Service

There will soon be placed in service between St. Paul and Minneapolis a novel transportation unit that is called a "highway coach" by its builders, the McKeen Motor Car Company, Omaha, Neb. This is stated to be not an omnibus, not a street car and not a jitney bus, but the most comfortable, luxurious, exclusive and up-to-date means of transportation in urban or interurban passenger service. It will compete for the Twin City Rapid Transit Company's intercity traffic at twice the fare charged heretofore, the rate between cities being 20 cents and the local rides costing 10 cents.

The highway coach is equipped with individual chairs of a new, steel-spiral-spring, pneumatic shock-absorbing cushioned type. This embodies all the cushioning effects of a 2-ft. spiral spring, and it has four air cushions operating in conjunction with it and differentiated on each other, the combination acting both as a cushion and shock absorber. The car is guaranteed by its builders to afford the most easy-riding method of transportation known to man.



HIGHWAY COACH FOR MINNEAPOLIS

Plate-glass, air-tight, round windows afford an almost uninterrupted panoramic view in all directions, the window when open being hinged to the ceiling and giving a full opening of 24½ in. in diameter. Exhaust suction ventilators on the roof maintain constant circulation and removal of the air. The car is electrically lighted, and between each two windows is an electric push button for convenience of passengers in signaling the driver, who controls the two door-operating mechanisms.

Entrance to the car is gained through a two-leaf outward folding door beside the driver's position, the prepayment fare collection being under his supervision. Exit is through double-leaf outward folding door in the side near the rear. Instead of a high step from the mud, the passengers take this car at the curb, the coach entrance being only 15 in. from the ground and the initial step about 7 in. high.

Adequate heating facilities for the car are obtained from the waste products of the gasoline engine, there being twice the necessary heat units available for maintaining the proper temperature of the interior of this car in the coldest of winter days, and with this large supply of waste heat there is no additional expense in providing the passengers with plenty of moderately heated fresh air.

The chassis is a 3½-ton gasoline truck, having a wheelbase of 216 in. The length of the frame behind driver's seat is 22 ft. The coach may be equipped either with rubber tired wheels for road service or with flanged wheels for use on urban rail lines.

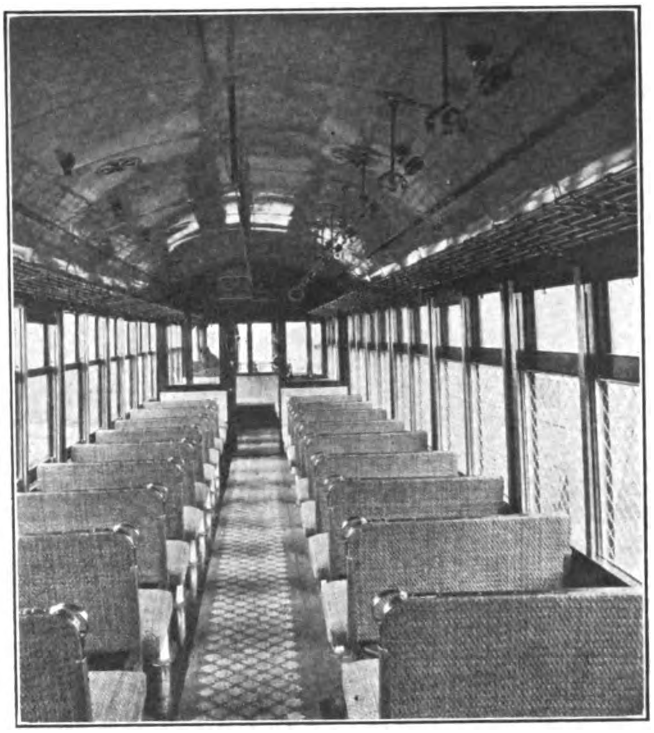
Light-Weight Car for Cleveland & Eastern Traction Company

A car that has just been completed by the G. C. Kuhlman Car Company for the Cleveland & Eastern Traction Company, possesses to an exceptional degree the feature of light weight that has recently become prominent in interurban car design. The railway company's lines extend east from Cleveland to Middlefield, with a branch to Chardon, a town of 1400 population. The land in this region is somewhat hilly, but lends itself to general farming, the principal industry which supports a population of 15,500, and the new car will be operated between the interurban terminal at the Public Square of Cleveland and Chardon, a run of 32 miles. It will make an average number of stops of four per mile, the maximum grade encountered being 11 per cent.

In the design of the car the utmost attention was given to the elimination of all unnecessary weight, and, in view of the fact that no sacrifice of strength or omission of equipment for obtaining the most efficient and safe operation was made, the result is extremely interesting, as is shown in the accompanying table, in which for comparative purposes is included a table of dimensions and weights published in a recent issue of Electric Railway Journal.

Steel Construction

The underframe is composed of angle side sills with eleven light I-beam crossings between the bolsters; the end sills are made in the form of a trussed frame, with angles at the top and channels at the bottom. Diagonals at each end are arranged to serve as center knees, and are brought well back of the bolster. They are strongly reinforced with angle gussets at the trussed end sills. A powerful construction for the attachment of the drawbars and anchors consists of angles and plates riveted to I-beams extending from the bolster to the end sill. The bolsters are made up of pressed steel diaphragms with 10-in. top and bottom members. At the rear platform the outside knees are omitted to provide an opening for the steps, and the angle forming the roof framing and the angle at the top chord of the side frame extend through to the corner post and aid to support the outer portion of the platform by means of structural steel connections.

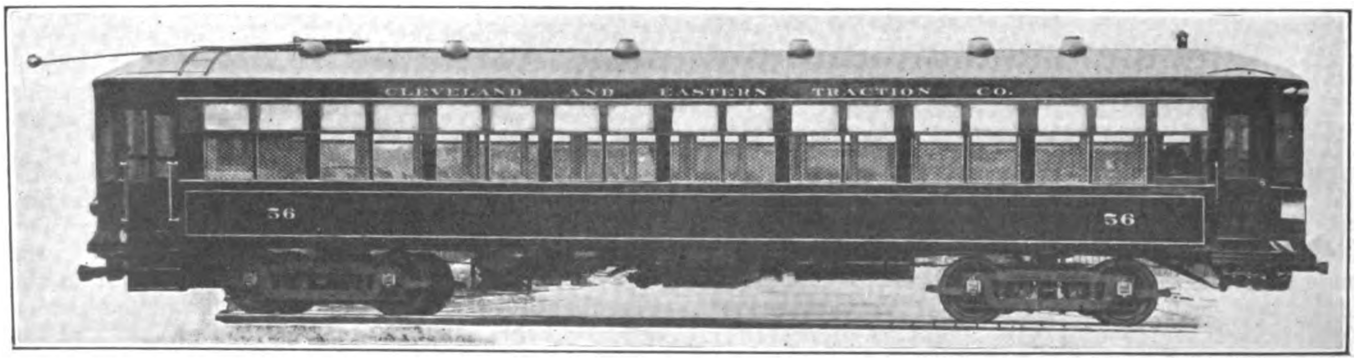


CLEVELAND & EASTERN CAR—INTERIOR VIEW LOOKING TOWARD FRONT PLATFORM

Each side of the car, from the side sill of the underframe to the top plate, is constructed to form a girder, of which the principal member is a continuous plate of 3/32-in. steel riveted to the side sill angle, steel belt rail and the posts. The posts are of tee-section, and are alternately single and double, on account of the twin-window arrangement. The top chord of the girder consists of an angle riveted to all post heads. Additional stiffness is imparted to the girder by means of a continuous sash rail at the bottom of the top sash which is dadoed over each side post.

	Cleve. & East	Fostoria	Union Trac.	Chicago
Over-all length	54 ft. 6 in.	56 ft. 9½ in.	61 ft. 0 in.	48 ft. 0 in.
Over-all width	8 ft. 6 in.	8 ft. 6½ in.	8 ft. 0½ in.	8 ft. 8 3/16 in.
Weight of body	23,186 lb.	29,550 lb.	45,200 lb.	35,600 lb.
Weight of trucks and equipment	36,214 lb.	38,450 lb.	40,400 lb.	34,900 lb.
Total weight	59,400 lb.	68,000 lb.	85,600 lb.	70,500 lb.

The roof framing consists of an angle on each side, with the horizontal web turned in, and steel carlines riveted to the vertical web. Wooden nailing strips are bolted to the carlines, and canvas nailing strips are bolted to the angle roof sills. After the roof was placed on the carbody, the side angles were riveted to the angle top chord of the side girder.



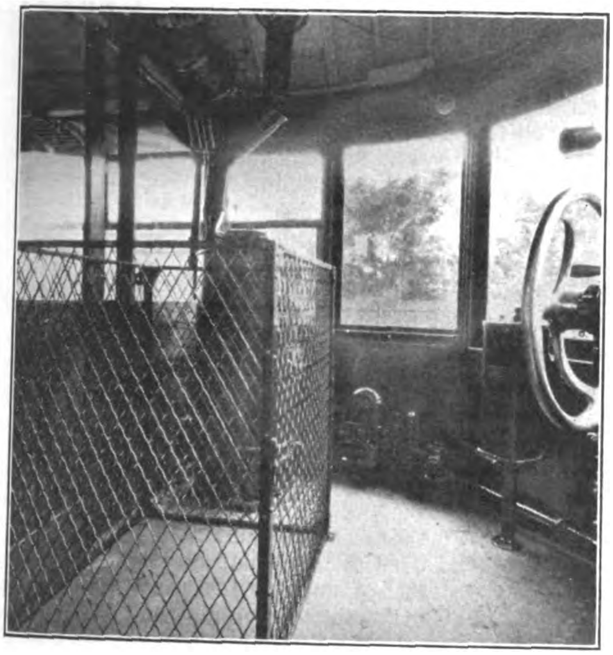
CLEVELAND & EASTERN CAR—SIDE VIEW SHOWING WINDOW AND DOOR ARRANGEMENT

The front and rear vestiblues are framed alike; the sheathing around the front end is of the same thickness as the side plates, while at the rear end it is composed of No. 14 sheet steel. The letterboards are made of sheet steel, and continue in line with the side letter panels.

INTERIOR DETAILS

There is a double flooring, the bottom layer of yellow pine and the top of maple, except at the aisle, where interlocking tiling extends the full length of the carbody proper. The tops of the trap doors over the steps and the floor between the steps and the rear platform are also covered with interlociking tiling, cemented to maple flooring.

The headlinings are composed of sheet steel and installed in a continuous piece from the curtain box molding on one side to the same point on the opposite side, and are the length of two windows, except at the center, where they are cut to suit the partition. The only longitudinal moldings are those for the curtain boxes and advertising signs, and for covering the joints of the headlining; the latter are painted the same color as the headlining.



CLEVELAND & EASTERN CAR—INCLOSURE FOR PACKAGES AND MAIL ON FRONT PLATFORM

The lower side sashes have brass sash stiles, and are capable of being raised their full height. The upper sashes, as has been already stated, are made in a continuous section and are glazed with pressed prism Gothic glass. An interesting feature of the windows is a novel type of window guard, which is made of strongly framed diamond mesh wire screens. The window guards are attached to the bottom of the lower sashes and slide into pockets in the side walls when the sashes are lowered. When a sash with its screen guard is raised, the lower part of the screen guard covers the pocket opening, and thus prevents rubbish from being forced into the pocket. The inside lining below the windows consists of sheet steel.

The partitions between the motorman's compartment and smoking compartment, and between the smoking compartment and main compartment are of African mahogany. They are glazed in the upper part and have single sliding doors. On the left side of the car, next to the rear platform, is a toilet room with standard appointments and with a flooring consisting of a single slab of marble.

SEATING ARRANGEMENT

All of the seats are placed transversely, with the exception of the one opposite the toilet room. The type used is a non-reversible, light-weight seat, made without seat rails and having the pedestal and seat back support of pressed steel in one piece. The wall plate is pressed in one piece to form the back support at the wall end. The seats are upholstered in twill-woven rattan, and are of Brill manufacture. The total seating capacity is sixty-three, seventeen seats being located in the smoking compartment which has a transverse seat along the front bulkhead with a folding seat opposite the space at the door to the motorman's compartment. Continuous parcel racks are provided in both compartments, and a package and mail cage is located at the rear of the motorman's platform.

Twelve Brill "Exhaust" ventilators, six on each side of the roof, are installed and these have regulating registers attached to the headlining. The equipment includes hot-water heating system, air brakes, automatic air couplers, fender, sand boxes, trolley retriever, anti-climber bumpers, registers, signal lamps, air whistle, etc., and the car is mounted on Brill 27-MCB-2X trucks, which have a wheel base of 6 ft. 9 in., 34-in. wheels, and are suitable for a speed of 50 m.p.h. They are equipped with four 65-hp. motors per car. The bolster centers are 31 ft. 9⅛ in., and the trucks are arranged to radiate on a curve of 37 ft. 6 in.

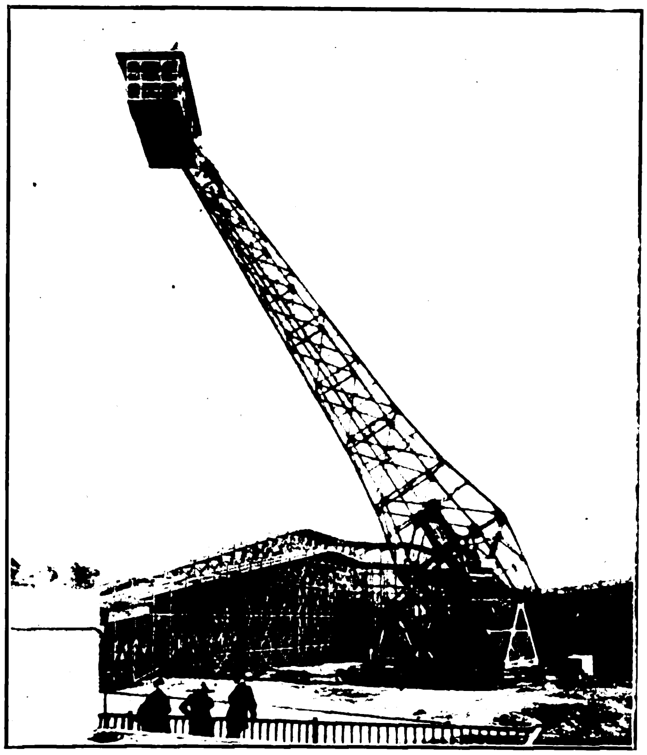
The Aeroscope at the Panama-Pacific Exposition

One of the most astonishing of the amusement devices installed at the Panama-Pacific Exposition at San Francisco is one which raises its passengers to an elevation of 330 ft. above sea level and provides a sea horizon of 200 miles. This is called the Strauss Aeroscope and it is reported to be the largest passenger-carrying machine ever built. However, on a smaller scale it would be peculiarly adaptable to ordinary amusement parks.

The device is fundamentally a Strauss trunnion bascule bridge mounted on a revolvable tower. The tower in turn is mounted on a series of eight trucks which travel on a circular railway track 60 ft. in diameter, four of the trucks being provided with 15-hp motors and trains of gears to drive them in either direction. At the apex of the tower, 48 ft. above ground, are mounted two 15-in. shafts, or trunnions, and upon them the huge arm of the structure is mounted. This projects 200 ft. in front of the trunnions and 38½ ft. behind them, the rear end carrying a 380-ton counter weight that is made of reinforced concrete. The rear end of the arm is provided with two circular racks which are engaged by pinions driven by two 11-hp motors, and these raise or lower the arm as desired. The arm is provided also with two air propellers mounted near the end. These propellers are driven by a 3-hp motor and they assist in raising the arm and in steadying its motion.

As an amusement device pure and simple, the Aeroscope is unique. The tower and its car are brilliantly illuminated at night and as the lines of the structure are graceful throughout it is particularly inspiring after dark. It moves majestically, each trip consuming ten minutes, and the view afforded from the car is unparalleled. The total capacity per day approximates 6000 passengers, and during the first four weeks of the exposition the Aeroscope carried 65,000 patrons.

The importance of the bascule bridge principle, as applied in the aeroscope, has even been recognized by the United States government which, it is reported, has arranged with the constructors for the application of the principle to military searchlight towers to be erected at the various coast-line fortifications.



AEROSCOPE IN REVOLVABLE POSITION

Absolute safety for the passenger is guaranteed by the provision of both power and handbrakes under the control of an operator who travels with the car, provision having been made in the design for a wind velocity of 60 m.p.h.

Self-Lubricating Brushes

The "No-Spark" carbon brush manufactured by the Calebaugh Self-Lubricating Carbon Company has been making a remarkably successful record on several electric railways, the principal feature being an ability to run without chipping, splitting, or breaking. This has been demonstrated on the lines of the Lehigh Valley Traction Company where a number of test sets of the brushes have been installed.

Harry Branson, superintendent of equipment of this system, states that a test set of brushes recently removed from a car on the Bethlehem Division had made a mileage of 24,957 and had given excellent results, having been installed in Westinghouse 101-B motors. Other brushes of the same type are in service on Westinghouse 303 and 38-B motors, used elsewhere on the system, but these have not yet been removed because their condition is good. The commutators are all in excellent shape.

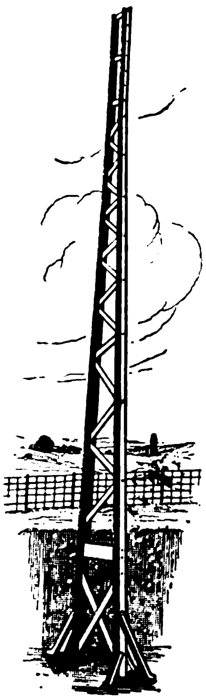
The makers claim that the "No-Spark" brush makes a frictionless contact because of its self-lubricating qualities and that it reduces the commutator wear 90 per cent, giving a dark-brown gloss on the commutator surface in a very short time after application. It will, in consequence, carry some 50 per cent more load than that normally allowed per brush and is moisture-proof as well as fracture-proof. Naturally, the sparking is reduced to the absolute minimum.

New Type of Steel Pole

A novelty in poles recently brought out by the Carbo Steel Post Company, Chicago, makes use of the revolutionary but logical principle that pole legs should be anchored under ground (thus putting the legs in straight tension or compression when a transverse force is applied) instead of being set in concrete to form a cantilever with the bending stresses localized at the ground line.

The makers believe that rigidity in a direction parellel to the wires on a pole line is undesirable, because if a wire should break the load is concentrated on the two poles at the break. If flexibility is provided the poles bend until the unbalanced force exerted by the wires is transmitted back from the break to a large number of the other poles, thus preventing actual failure of any pole. In consequence both the transmission line poles and the trolley poles designed by the company are of a modified A-frame type with the long dimension transverse with the line.

The poles are buried about 4 ft. or more in the ground, and each leg is provided with anchor plates to hold the feet of the pole firmly in place through the weight of earth resting on them. At the ground line is a sway plate that extends between the legs, giving a certain amount of longitudinal resistance to pull. Rusting at or below the ground line is prevented by a special finish which is stated to be proof against moisture and alkaline soils.



ANCHORED POLE

The material used in the construction of the poles is a high-carbon steel of uniform texture with an elastic limit over 50,000 lb., thus providing the desired lightness. It is stated that this metal will not pit even if left unpainted, and on this account the life is long in comparison to the ten or twelve years' use to be expected from wooden poles. The first cost, pole for pole, is reported to be about the same for wooden poles and for the new design, but owing to the superior strength of the latter only about half as many poles per mile are required. The total cost of a light transmission line with the new poles is estimated to be about three-fourths of the cost involved when wooden poles are used.

Effects of Heat Treatment on Nickel and Manganese Steel

In a paper presented before the American Society of Mechanical Engineers at Buffalo recently, Robert R. Abbott stated that for a heat-treated 1½ per cent plain manganese steel, the manganese in excess of that contained in a nickel-manganese steel of a corresponding carbon content (about 0.34 per cent) exerts a strengthening effect equivalent to that of about three times the same amount of nickel. While the effect of manganese on a steel which has not been heat-treated is to increase the toughness slightly, its effect upon a heat-treated steel is decidedly the reverse. In the case of nickel the effect upon an untreated steel is practically zero, while in a heat-treated steel nickel increases the toughness decidedly. An untreated steel containing about 1½ per cent of manganese is fully as tough and is stronger than a nickel steel of about 3¼ per cent nickel.

LONDON LETTER

Women Fast Taking the Places in Tramway Service of Men Needed at the Front

(From Our Regular Correspondent)

Fifty additional women have started training as car conductors in the service of the Glasgow Corporation Tramways Department, bringing the total number of their sex on active duty or in training to 250. The places of so many men have to be filled that it is expected the number of women appointed will soon reach 500. The list of women applicants now contains about 1400 names.

The traffic receipts on the Glasgow Tramways during the last financial year amounted to £1,070,353, being £8,083 less than in the preceding year. The count of the actual number of passengers carried during the year has not yet been completed, but up till May 29, which leaves only two days short in the year, the figures were 334,584,216, as compared with 334,676,627 in the corresponding period of the preceding year. Taking into account the exception of these two days' statistics and the circumstances of the war during the past ten months, the total number of passengers carried during the year which began on June 1, 1914, compares very favorably with the preceding year's total of 336,654,624..

The Coventry City Council has decided to employ a dozen women conductors. The women are to be between thirty and forty years of age, to work forty-eight hours a week, receive 6½d. an hour wages and wear uniforms.

The trolley scheme of the Hove Town Council has been abandoned until after the war. The project has been a source of controversy from its inception in 1911. After a bitter Parliamentary campaign in 1912 the plan received legislative sanction in such a form that both Hove and Brighton were left to pursue their own course, and complications ensued, from which the only escape seemed to be a costly arbitration. Brighton, in fact, was about to apply for the appointment of an arbitrator when the war prevented further proceedings.

The Corporation of Birmingham has decided to increase all the tramcar fares in the aggregate 10 per cent. Assuming that the volume of traffic remains constant, this will result in a gain in the takings of £60,000 per annum. The present rates were fixed in February, 1912, and the proposed alterations will in the main be a reversion to those in operation prior to that date. At present the average penny fare carries a passenger 2 miles 600 yards. When the new scale comes into operation the distance for the same money will be reduced to 1 mile 1200 yards. Outside this radius there will be an increase of a halfpenny on the present rates. As regards workmen's fares, they will go up ½d. on each return ticket. Though passengers in the penny zone will find all the distances curtailed, an increase in the number of overlapping stages will help slightly to improve matters.

At a meeting of the tramways committee of the Newcastle Corporation the general manager reported that since the last meeting of the committee forty-eight women conductors had been trained; that twenty-four were in full charge of cars on the Osborne Road route, and that the rest were in training on the Jesmond route. The general manager expressed his appreciation of the help given by the public to the women conductors, as well as of the services of the inspectors and motormen. Application for further women conductors are desired. The committee has decided to abolish halfpenny workmen's fares, the minimum in future to be 1d.

The Edinburgh & District Tramway is employing on its cars twenty women conductors, who received preliminary training at the depot. The manager has expressed himself as highly satisfied with the manner in which they are performing their duties. The employment of women conductors in Edinburgh, however, is opposed by the tramwaymen. The management has agreed that their employment shall not exceed the period of the war; that efforts will be made by the company to obtain male labor, and that old employees discharged from military service will be replaced in their positions. An amicable settlement has therefore been arrived at, and it is likely that Edinburgh will have many women on the tramways in the very near future.

The Manchester Ratepayers' Association has addressed a letter to the treasury urging it to refuse sanction at present to the carrying out of the Manchester electricity scheme for new works at Barton. It is pointed out that the great amount of skilled labor required for the construction and manning of the new works would cause a serious drain upon the already weakened labor market and tend to draw men away from work immediately necessary for the prosecution of the war, and that there is not likely to be any overwhelming pressure upon the Manchester electricity department for some time.

Owing to the fact that 2000 tramwaymen in Manchester have enlisted, the Manchester Corporation is considering the advisability of engaging women conductors to fill some of the places.

The Salford Corporation tramway workers have accepted the terms offered by the borough tramway committee of a war bonus similar to that recently awarded by arbitration at Newcastle-on-Tyne. The terms are a bonus of 2s. 6d. a week for married men and householders, 1s. 6d. a week for single men, and 1s. a week for youths under the age of eighteen years. The question of the employment of women conductors was discussed at a recent meeting of the men, and a resolution was proposed asking the management to withdraw the women and offering the support of the Salford branch of the men's union and of the Trades and Labor Council in finding suitable male labor for the cars. If these efforts are not successful, however, the resolution provides that the men shall work with the women on certain conditions. The women conductors, of whom sixteen have been trained, are to work on cars running from Weaste to the Cliff and from Irlams-o'-th'-Height to the Market Place, Broughton.

The strike on the London County Council Tramways has now definitely collapsed though it seemed that it would be renewed when the tramways manager's decision to reinstate only men over military age became known. The Council has taken a very firm position as regards this, all men of military age being refused, unless they can show special reasons for exemption from the rule. Mr. Fell has stated that every effort will be made to deal sympathetically with the cases of the men of military age who have good reasons for not enlisting. During the week ended May 12—that before the strike began—the total traffic receipts were £50,891, as compared with £42,779 for the corresponding week in 1914, but for the following three weeks the figures were only £22,460, as against £44,961; £12,610, as against £44,961; and £23,586, as compared with £47,346. No official notification has yet been received from the men's joint strike committee or their unions that the strike is at an end. While before the dispute great difficulty was experienced in maintaining full service, it is estimated that at least 90 per cent of the normal number of cars are now in operation.

Reporting upon recent proceedings before the House of Commons committee regarding new tramway schemes, the London County Council mentions the important fact that, in connection with the proposal for extending the Farrington Road tramways, the chairman of the select committee declared that the committee would very much like to see a scheme to carry the tramways through to South London. So keen, however, was the opposition to many of the schemes that Parliamentary sanction has been granted only in the case of the less important ones—those involving little change and small expense.

Adverse comments were made at a recent meeting of the Birmingham watch committee on the action of tramway conductors who refused to work with a number of women and sent the authorities an ultimatum that if the women were not withdrawn there would be a strike. The committee has been reluctantly compelled to accede to the demand, because the cars are carrying so many munition workers that it cannot run the risk of having them stopped.

The Portsmouth Town Council has decided to engage women conductors to take the place of men who have joined the forces. Of 330 motormen and conductors in the corporation service 137 have enlisted and thirty entered other government service. The women conductors will be paid 5d. an hour, and will be supplied with a uniform.

A. C. S.

News of Electric Railways

THE CHICAGO ARBITRATION

Proceedings Begun on June 28 With the Presentation of Case of the Men

Arbitration of the differences between the Chicago surface and elevated railway companies and their employees was begun on June 28, with Mayor Thompson as umpire, State's Attorney Maclay Hoyne, arbitrator for the employees, and James M. Sheean, representing the railway companies. Eight questions are to be arbitrated and each side has the right to present evidence through counsel. The following are the questions:

1. Percentage of straight runs and consecutive hours in which swing runs shall be completed.
2. Maximum time covered by straight runs on Sundays.
3. Allowances for fall-backs for meals and reliefs, if any, on the streets for meals.
4. Hours of service, including weekdays, Sundays and holidays for employees other than trainmen provided for in this agreement.
5. Number of years to receive maximum wage scale and wages for all trainmen, including trainmen on cinder, sprinkler, supply and other cars.
6. Hours of service and wages paid car repairers, motor repairers, inspectors, dopers, car placers, car cleaners, janitors, terminal men, or other men around carhouses.
7. Allowance for turning-in time.
8. Seniority and efficiency with men outside of train service.
9. Night car hours and wages.
10. With reference to employees outside of the train service the company recognizes seniority of service, but in connection therewith efficiency shall be taken into consideration.

William Quinlan, president of the local union, was the first witness. He gave evidence regarding the methods of employing men in the early days and at the present time, and also outlined the existing working conditions and what he believed should be done to improve them. He claimed that the large and heavier cars, refinements in their equipment and increased vehicular congestion made the work of the motorman increasingly more difficult. Regarding the idle time of extra men between swings, Mr. Quinlan claimed that the men could not engage in other business without obtaining a permit from the company. He said that the present allowance of five minutes for turning-in time should be increased to ten minutes. According to Mr. Quinlan it at one time required only one month to reach the maximum wage scale, whereas it now required six years. This was brought about by the union conceding increased time to reach the maximum whenever a new wage agreement was negotiated.

Mr. Quinlan claimed that the graded scale had discouraged the men and offered an opportunity for abuse, but stated specifically that the present management of the companies had not taken advantage of this. No more accidents were charged against the new men than the old when working conditions were taken into consideration. The fact that the hours of the new men were longer and their runs undesirable as compared with those of the old men accounted largely for the increased number of accidents recorded against them. It was Mr. Quinlan's opinion that a man is as proficient a conductor or a motorman at the end of one year as he ever will be. Questioned regarding wages and working conditions of the employees outside of the train service, Mr. Quinlan said they were paid less than ordinary building laborers while they performed duties requiring much more skill. He also contended that the duties of motormen on sprinklers, cinder, supply and other utility cars were identical with those of the motormen on passenger cars, and he said that the men on these runs should be included in the regular train service.

George W. Miller, attorney for the railway companies, in cross-examination of Mr. Quinlan, brought out that present working conditions were much better than those of the past. He also showed how improvements in car equipment and design had aided in reducing accidents and in decreasing the responsibilities of both motormen and conductors. Prior to 1912 eighteen different transfers were used by the surface lines, whereas only four have been in use since 1912. Regarding swing and split runs, Attorney Miller in his examination of Mr. Quinlan, emphasized the importance of furnishing a service to meet the riding habits of the public and by bringing out that the speed varied with the conditions on the street he refuted the argument regarding the alleged increase in speed. Although Mr. Quinlan claimed the speed had increased he did not know it to be a fact. Mr. Quinlan also acknowledged that long service with the company tended to increase the feeling of responsibility and interest and that high wages added to this increase. Concerning the rotating and standing list of extra men, he claimed that the company preferred the former and the men preferred the latter or standing list. This completed Mr. Quinlan's testimony.

On Tuesday morning, June 29, John Ernst, a cabinetmaker, was examined. Inquiry showed that he was getting 33 cents an hour for steady work, but he believed that he was not being paid enough. On cross-examination it was brought out that he based his idea of the wage he should received upon that received by workers in other shops. M. C. Boyle, a conductor, was examined next. He had been in the service for twenty-seven years and was receiving the maximum wage of 32 cents an hour. This was insufficient. When he entered the service he had $1,000 in the bank. Of this only about $600 was left. He had used about $125 to make up his deficiency in living expenses. He was also examined regarding the transfer system, trip sheets and car loadings.

James M. Sheean, the arbiter selected by the Chicago surface and elevated railways, served as attorney for the Western Railroads in the arbitration of wages and working conditions for the locomotive engineers and firemen. Mr. Sheean was born in November, 1866, at Galena, Ill., was graduated at Beloit College in 1887 and studied law under his father. He was admitted to the bar in 1889, in which year he was taken into partnership with his father and uncle. He moved to Chicago in 1901 and for three years was with the firm of Pan, Calhoun & Glennon. In 1904 the law firm of Calhoun, Lyford & Sheean was organized, and as a member of this firm Mr. Sheean is serving as arbiter for the railway companies. For a number of years he has served as a trial attorney for steam railroads.

Maclay Hoyne, the arbitrator selected by the employees, is State's attorney of Cook County. He was born in Chicago in October, 1872, and was graduated from Williams College in 1895 and Northwestern Law School in 1897. In July, 1913, Mr. Hoyne was appointed assistant corporation counsel of Chicago and two years later was made first assistant corporation counsel. He resigned from this office in June, 1907, to engage in private practice and four years later again was appointed first assistant corporation counsel. In this capacity he served as counsel for the Subway & Harbor Commission and was in immediate charge of the litigation between Chicago and the Peoples Gas, Light & Coke Company regarding gas rates. Mr. Hoyne is also credited with drafting the Chicago 70-cent gas ordinance, upon which issue former Mayor Harrison was elected to his last term of office. Mr. Hoyne was elected State's attorney of Cook County in November, 1912, on the Democratic ticket.

SPRINGFIELD-WORCESTER LABOR AGREEMENT

A new working agreement has been signed by officials of the New England Investment & Security Company and by representatives of the employees' unions on the Springfield (Mass.) Street Railway and the Worcester (Mass.) Consolidated Street Railway to continue in effect from May 31, 1915, to May 31, 1916, taking the place of a three-year agreement which expired on the former date. According to advance reports no increase will be granted the employees of the Springfield company, but there will be an increase on the Worcester lines to a maximum scale of 31 cents an hour, the minimum being 25 cents. The day rate at Springfield will range from $2.30 to $2.85. The agreement practically equalizes the wages on the system under the "nine-hour-in-eleven" law. The full agreement will be made public after ratification by the local unions.

CHICAGO LINES ISSUE STATEMENT

Questions Involved in the Recent Strike Explained by the Companies

On June 18 the Chicago (Ill.) Surface Lines carried in the daily newspapers an advertisement explaining the issues in the controversy that resulted in the suspension of railway service in that city for two days. Its termination was referred to as a victory for arbitration. The statement was concerned with correlated subjects of arbitration, labor and capital and dealt with all three features. The company said in part:

"The question settled in this crisis was not one of wages, hours or other conditions of employment, and was not, we repeat, a question as to whether Chicago should have a strike lasting two days or two months; but the much more fundamental question as to whether men in a twentieth century democracy should settle their differences in accordance with twentieth century ideals and standards, or by recourse to the methods of primitive man and feudal government. The issue was rather as to whether civic progress could be set back, even temporarily, by any group of men, either capitalists or working men, in the second largest city of the most progressive democracy in the world. The result was a victory for the principle that civilized men either should settle their differences face to face and man to man or should leave those differences to an impartial body of their fellow men.

"There was a time when large employers were inclined to reject arbitration and when public service corporations were operated by men who looked upon them as purely private corporations, but that time has passed. There is something to be said, if not in justification, at least in explanation, of the old type of railway builder and corporation operator. Trained in the individualistic school of his time, he believed that he was entitled to the fruits of his labor, and he resented interference with what he considered his private business. His time has passed and a new type of man has taken his place. But the fight which oftentimes is made upon his successors is based upon the belief that the old type still exists.

"The worst that can be said of the type that has passed is that these men held the point of view of their time. Their time has passed never to return; the public has a new point of view and the management of great properties to-day is vested in men whose point of view has changed with the times. All that the men in charge of public corporations ask to-day is that the public realize the change that has come in the ownership and management of such properties; that the men in charge of them are endeavoring—and are succeeding up to the limit of their capacity as men—to put into their business a spirit and practice in accordance with the newer ideals and standards of to-day. They expect no special consideration from the public; they want only fairness, and expect to give it.

"There have been signs in recent controversies between labor and capital that labor itself, after having long ago won capital to the principle of arbitration, was beginning to question, and possibly would reject altogether, this great principle, because it had not at all times resulted favorably, or perhaps even fairly, to the workers.

"As we have stated heretofore, we believe that the principle of arbitration frequently has been misused and misunderstood; but we do not believe that these errors should be charged to the principle itself; nor do we believe that, on account of such errors, the enormous victory of labor in first establishing the principle of arbitration as a means of settling disputes should be lost or forgotten.

"If it be admitted that the older and outworn methods of capital constituted a tyranny, it must be admitted also that a resort to force on the part of labor in these enlightened times would constitute no less a tyranny, not only over the interests of the employer, but over the public interest as well. It is obvious that there can be no gain in the substitution of one tyranny for another, and that the efforts of labor men and employers alike should be directed toward the elimination of all tyranny and the substitution of sound principle, safeguarded by honest men, as we believe the great principle of arbitration has been safeguarded in the agreement under which the present differences are to be adjusted."

CLEVELAND'S FREIGHT TERMINAL

The special committee of the City Council, to which was referred the proposed franchise of the Cleveland & Youngstown Railroad for a freight terminal in Cleveland, was to meet on July 2 to hear arguments on the disputed points between the company and the city. Electrification of the freight yards and the streets to be vacated in the Broadway-Orange Street district are the principal points in contention.

Attorney S. V. McMahon informed the committee on June 24 that the Broadway Improvement Association had employed an engineer to make plans for subways under the proposed terminals at East Twenty-third Street and Pittsburgh Avenue. The company's engineers declared that such plans would be impractical and Mayor Baker expressed the opinion that neither grade crossings nor subways would answer the purpose. He suggested that the city reserve the right to require the construction of overhead bridges. Director of Public Service Sidlo is preparing a report on the proposition. He will probably recommend electrification of the terminals.

THE NEW YORK PUBLIC SERVICE INVESTIGATION

The Thompson committee appointed by the last New York Legislature to inquire into the workings of the New York Public Service Commissions will resume its hearing in New York City on July 15. The new chairman of the committee is Merton S. Lewis, first deputy attorney general. He succeeds Col. William Hayward, now a member of the Public Service Commission for the First District. It will be recalled that Governor Whitman failed to agree with the report of the majority of the committee with respect to the commission for the First District and that he appointed Mr. Hayward to succeed Mr. Maltbie, whose term of office had expired, and vindicated the commissioners. The investigating committee will now concern itself with the public service commission law and with the rapid transit contract in Greater New York and will report its findings to the next Legislature.

ARBITRATION LIKELY AT ALBANY

On the afternoon of June 29 Harry C. Weatherwax, vice-president of the Delaware & Hudson Company, controlling the United Traction Company, Albany, N. Y., and Charles F. Hewitt, general manager of the United Traction Company, agreed to take up again on July 1 the consideration of the questions at issue between the traction company and its employees. The principal question involved is in regard to jurisdiction over all the lines of the United Traction Company by the Amalgamated Association, which objects to the operation into Albany of cars of the Hudson Valley Railway manned by members of the Brotherhood of Locomotive Engineers.

The United Traction Company has issued a statement reviewing this question. The contract between the Hudson Valley Railway and the United Traction Company, both controlled by the same interests, for the operation of through cars from points on the Hudson Valley Railway into Troy, via Waterford, was entered into on June 7, 1901. Under the terms of this agreement the Hudson Valley Railway furnished at its own expense the men to run its cars over the tracks of the United Traction Company. The Amalgamated Association contends that its contract covers this run and that the cars operated into Troy by the Hudson Valley Railway should be manned by members of the Troy division of the Amalgamated Association.

For the first ten years of the contract between the companies the men operating the cars of the Hudson Valley Railway into Troy over the lines of the United Traction Company belonged to the Amalgamated Association. Subsequently they seceded and joined the Brotherhood of Locomotive Engineers and the Order of Railway Conductors. In its statement the United Traction Company says that as far as it is concerned it feels that these organizations should settle the matter between themselves and should not involve the company or the public. While both the United Traction Company and the Hudson Valley Railway feel that they cannot undertake to settle the differences between the two organizations, they are willing, if it is desirable, to be a party to arbitration proceedings.

INFORMAL TOLEDO CONFERENCE

Henry L. Doherty, chairman of the board of the Toledo Railways & Light Company, Toledo, Ohio, met with a few members of the franchise committee of the Toledo City Council on the afternoon of June 29 and discussed informally a number of points in the new draft for a franchise made by that committee. President Frank Coates and Attorneys Tracy and Rathbun Fuller of the company also were present.

Mr. Doherty and Attorneys Thomas H. Tracy and Rathbun Fuller told the franchise committee that they must refuse to accept the clause in the tentative franchise which provides that the company recognize the initiated municipal ownership ordinance as legal. Mr. Tracy suggested that a clause be inserted saying that the franchise under consideration shall not affect or be affected by the municipal ownership ordinance. Mr. Doherty objected to the clause in the proposed franchise which would require the company, in case the city purchased the property, to accept at least half the bonds issued against the property for the purchase. The bonds would be a lien against the property only and not against the tax duplicate. Mr. Doherty said the company preferred a cash settlement. The committee was informed that the company would insist on a rate of fare that would yield 6 per cent on the investment; a guarantee that it would be reimbursed for any loss during the year's try-out of the 3-cent fare; assurance that the property will be purchased at its appraised value if a franchise is granted any other company, and that it should not be required to begin again if the try-out period is interrupted.

At the conference on June 30 agreements were reached on a number of points, but several others were still in dispute at the close. One of these pertains to the return on the investment during the try-out period, and another is the proportion of bonds the company shall take in case the city purchases the property. Mr. Doherty wanted a stipulation that the company accept one-third of the bonds at a fair market value. Chairman Dotson insisted that they should be taken at par and accrued interest.

Mr. Doherty expressed surprise when informed of the Mayor's assertion some time ago that he would veto any franchise agreement reached by the committee and the company representatives, but Chairman Dotson expressed the belief that Council will approve the franchise under consideration. It was agreed between the parties that the franchise should be submitted to a vote of the people at the primary election on Sept. 14, instead of the regular November election. Mr. Doherty asked the committee to have the tentative draft of the franchise printed, leaving blanks for the portions upon which an agreement has not been reached, and that another conference be held the afternoon of July 2. He desired to reach an agreement on the entire franchise, if possible, before he returned to New York on July 3.

CONTROVERSY IN TORONTO

Toronto Railway and City in Contest for Short Line Desired by the City for Its Civic Railway

At noon on June 29 the Board of Control of Toronto, Ontario, issued instructions to Works Commissioner Harris to tear up the remainder of the tracks of the Toronto & York Radial Railway's Metropolitan division on Yonge Street south of Farnham Avenue, and this has been done. Shortly after the order was issued by the controllers the Toronto Railway opened the legal battle over the franchise question at Osgoode Hall. The company through its solicitors issued a writ against the city "for an injunction to prevent the defendants, the Corporation of the city of Toronto, from removing the tracks on 1320 ft. of Yonge Street south of Farnham Avenue, and for a mandatory order to replace so much of the said tracks as have already been taken up." This injunction is pending.

At the Board of Control meeting Controller Spence opposed the action of the board on the ground that it might prejudice the city's interests before the Ontario Railway Board, when the members consider the railway application for an order to operate. Mayor Church claimed that the alleged sale of tracks by the Metropolitan to the Toronto Railway was not carried out according to the requirements of the railway act.

Mayor Church issued a statement in which he said:

"The franchise has elapsed, and no one can renew it but the people. The sale of the Metropolitan to the Toronto Railway means nothing, as the Metropolitan had nothing to sell after midnight last Friday except the rails and overhead fixtures. The district south of Farnham Avenue to the Canadian Pacific Railway crossing is the most important in Toronto and is the funnel for Sir Adam Beck's radial railways. The 1891 agreement of the Toronto Railway does not give it the right to operate this service, as the Beck act is to be read into the section requiring the vote of the people. The subway at the head of Yonge Street will not be finished for some time. Before the Toronto Railway can operate, it will have to secure an order from the Dominion Railway Board."

The Mayor proposes that the city lay a permanent pavement on the street and a double line of tracks and find a way to link up with the St. Clair Avenue line of the Toronto Civic Railway operated by the city.

The Toronto Railway's answer to the action of the city officials in tearing up the tracks was heard by the Ontario Railway Board on June 29. H. S. Osler, counsel for the company, appealed to the board for an order compelling the city to relay the tracks and affirming the right of the company to give a service over that section. Mr. Osler declared that the work of tearing up the tracks had been continued in contempt of the board after the company had appealed to the board. He held that under its agreement with the city the Toronto Railway had the right to operate upon all streets with the exception of the portion of Yonge Street where the York Radial Railway had a franchise. When the radial company no longer had that right it fell to the Toronto Railway. A remark by the chairman of the railway board that the line was better than nothing and that the city had apparently treated with indifference the efforts of the company to accommodate the public brought a vigorous objection from Mr. Fairty for the city. In reserving judgment Mr. McIntyre of the Railway Board expressed the opinion that some interim arrangements should be made for the convenience of the public.

Amalgamated to Meet in Rochester. — The fourteenth convention of the Amalgamated Association of Street & Electric Railway Employees of America will be held in Rochester, N. Y., in September. The Boston *News Bureau* says that a concerted effort may be made by New England car men at the meeting to have the arbitration clause stricken from their constitution as a result of the Bay State Street Railway arbitration award.

New Stone & Webster Offices in Texas.—A suite of offices in the Scanlan Building at Houston, Tex., has been engaged for the district office of the Stone & Webster Management Association. L. C. Bradley, assistant district manager of the association, will occupy the new quarters with his office force on July 10. Mr. Bradley formerly had supervision over the Dallas properties controlled by Stone & Webster, which work has now been assumed by Charles F. Wallace.

Commissions as Constitutional Bodies.—Representatives of many public utility corporations which are under the jurisdiction of the Public Service Commissions of New York State joined on June 23 in urging a Constitutional Convention committee to make the commissions constitutional bodies. At present they have only legislative authority for their existence. It was urged that the change would add dignity to the commissions, tend to take them out of politics and add force and weight to their rulings.

The Philadelphia Transit Ordinance.—By unanimous vote the Common Council of Philadelphia, Pa., has passed the ordinance authorizing the $6,000,000 transit loan. The finance committee's plan is to have the loan ordinance transmitted to the Mayor as soon as it is concurred in by Select Council. Immediately upon being advised that the ordinance has been approved by Mayor Blankenburg, the finance committee will report the appropriation ordinance, which will be passed by both chambers. The committee proposes to allot $3,000,000 for preliminary work on the Broad Street subway and $3,000,000 to the Frankford Elevated line.

Financial and Corporate

ANNUAL REPORT

Middle West Utilities Company

The comparative statement of income, profit and loss of the Middle West Utilities Company, Chicago, Ill., for the fiscal years ended April 30, 1914 and 1915, follows:

	1915.	1914.
Total income	$1,528,855	$1,466,760
Expenditures	168,855	165,068
Balance	$1,360,000	$1,301,702
Interest	378,684	227,516
Net income	$981,316	$1,074,186
Preferred stock dividend	598,048	566,925
Balance	$383,268	$507,261
Written off	80,000	75,000
Balance	$303,268	$432,261
Due from subsidiary companies	78,504	147,416
Total surplus	$381,772	$579,677

The report shows total income of $1,528,855, comparing with $1,466,760 in the previous year, an increase of $62,095. Interest charges were increased $151,168 and preferred stock dividends were increased $31,123, but in spite of this the company surplus for the year, after all deductions, stood at $303,268.

The report states that owing to the unsettled conditions the increase in gross business of the subsidiary operating companies was not equal to what might have been expected under normal conditions. The combined earnings of the subsidiary companies for the last two fiscal years follow:

	1915.	1914.
Gross earnings	$7,634,745	$7,345,350
Operating expenses	4,877,016	5,036,696
Net	$2,757,729	$2,308,654
Fixed charges (paid outside holders)	$1,307,629	$908,032
Dividends (paid outside holders)	310,428	474,816
Total	$1,618,057	$1,382,848
Earnings accruing to Middle West Utilities Company	$1,139,672	$925,806

Of the foregoing earnings $437,123 come into the company's treasury as interest on bonds and debentures, $269,774 as interest and brokerage on money advanced and $354,270 as dividends on stocks, leaving a balance of $78,504. This is the company's proportion of the surplus carried in the aggregate surplus accounts of the subsidiary companies on their own books.

THE KANSAS CITY REORGANIZATION

At the meeting of the committee of the upper house of the City Council of Kansas City, Mo., to which the ordinance extending the time limit for the acceptance of the street railway franchise was referred, Frank Hagerman, attorney for the receivers of the Metropolitan Street Railway, outlined the history of the negotiations under the terms of the franchise. He suggested that the only hope for agreement lay in the proposal of Judge Hook of the Federal Court to present a plan of reorganization for the adoption of the stockholders and bondholders. Mr. Hagerman had no idea what would happen if the franchise was returned.

The participation of the city in the management of the street railways under the new franchise was indicated at the session by the questions and remarks of Aldermen. Under the court's sanction the receivers have employed P. J. Kealy, suggested by the street railway interests, and Robert P. Woods, suggested by the city, to perform practically the duties which will be performed by the board of control provided for in the new franchise. In response to questions by Aldermen, it was pointed out that these gentlemen are actually performing such duties, especially in reference to schedules and service. Judge Evans urged that since Judge Hood had so plainly indicated his conviction that service to the public was the first consideration of any settlement, the Council should accede to his request for an extension of four months in the time limit for acceptance of the franchise.

The City Council of Kansas City has granted an extension to Nov. 7, four mouths, to the time within which the Kansas City Railways must accept the franchise voted by the city. The action was in response to a request of Judge Hook of the federal court, who said he would prepare a plan for the acceptance or rejection of the interested parties, and would recommend final cancellation of the franchise if this plan was not adopted. The Council has also extended to Nov. 20 the opportunity for the interurbans to accept the conditions of the franchise bearing on a union station.

WASHINGTON MERGER STORY DENIED

In a letter to the ELECTRIC RAILWAY JOURNAL George E. Hamilton, president of the Capital Traction Company, Washington, D. C., asks that a denial be published of the item which appeared in the issue of this paper for June 26, page 1223, to the effect that negotiations were being conducted for the merger of that company with the Washington Railway & Electric Company. Mr. Hamilton says:

"Permit me to state that the Capital Traction Company, its officers and directors, have no knowledge whatever of any such negotiations and that the article referred to is entirely without foundation in fact."

OAKLAND, ANTIOCH & EASTERN FINANCING

The Oakland, Antioch & Eastern Railway, Oakland, Cal., has asked the Railroad Commission of California to approve its new plan of financing. This plan embraces two agreements, one with the bondholders and the other with the stockholders of the company. The agreement between the Oakland, Antioch & Eastern Railway and the bondholders of the Oakland & Antioch Railway and the San Ramon Valley Railway was originally executed on Nov. 19, 1914, and was amended on Jan. 1, 1915. The agreement provides that the bondholders shall deposit with the Union Trust Company, San Francisco, those coupons which will mature in the years 1915, 1916 and 1917. As security for these it is provided that the Oakland, Antioch & Eastern Railway shall deposit with the trustee prior to Jan. 1, 1918, first mortgage bonds in an amount which, at 80 per cent of their face value, will equal the par value of the coupons deposited and unpaid on Jan. 1, 1918. A further provision is made that the Oakland, Antioch & Eastern Railway shall cancel the unsold portion of the note issue authorized by the Railroad Commission on Feb. 3, 1914. The stockholders' agreement, dated Nov. 19, 1914, provides that each subscriber thereto shall pay to the trustee, as a loan to the railway company, the sum of $3 on each share of stock held by him. These payments are to be made according to the following schedule: Jan. 1, 1915, $1 per share; July 1, 1915, $1 per share; Jan. 1, 1916, 50 cents per share, and July 1, 1916, 50 cents per share. As security for those advances the railway agrees to deposit with the trustee its promissory notes in equal amount. These notes are to be secured by first mortgage bonds in the ratio of two to one.

RECEIVERSHIP AVOIDED

By the payment of a portion of two judgments at once and agreeing to pay the remainder on Dec. 24, 1915, the Cincinnati, Dayton & Toledo Traction Company prevented the appointment of a receiver to collect its rental, in the Federal District Court at Cincinnati on June 24. Edna Wilson et al, executors and trustees of George B. Wilson, deceased, and Julius C. Levi and Samuel Leopold, executors of Marks Leopold, Philadelphia, each secured judgment in the Federal Court on Dec. 24, 1914, for $5,479.17, representing the principle and interest on five debenture bonds of the Dayton Traction Company, a subsidiary of the defendant company.

Both plaintiffs had asked for a receiver for the rents, and a temporary restraining order had been issued to prevent either the Ohio Electric Railway, which operates the property under lease, or the Cincinnati, Dayton & Toledo Traction Company from disposing of the property or money belonging to the defendant, except on order of the court, and the hearing was set for June 24. Attorneys, however, informed the court that a settlement had been arranged and asked for a continuance. This was granted. The company is to pay $3,125 on each claim at once and the remainder on Dec. 24, when it receives an installment of rental from the Ohio Electric Railway.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—The July dividends will not be paid on the common and preferred stocks of the Birmingham Railway, Light & Power Company. This decision was reached on account of the general business depression. An initial dividend of 3 per cent was paid on the preferred stock in January, 1902, and 3 per cent has been paid since then to and including December, 1914. In 1903, 3 per cent was paid on the common stock; in 1904 and 1905, 4 per cent; in 1906, 5 per cent; in 1907 and 1908; none; in 1909, 2 per cent; in 1910, 5 per cent; in 1911, 7 per cent; in 1912, 8 per cent, and in 1913 and 1914, 6 per cent.

Chicago (Ill.) Elevated Railways.—The investigation conducted by the Illinois Public Utilities Commission on the complaint of J. B. Hogarth against the Chicago Elevated Railways collateral trust has resulted in the dismissal of the case. The commission found that the collateral trust, against which the complaint was filed, was not a public utility, and that therefore the commission had no jurisdiction in the case. The answer of the company to the alleged violation of the utilities act by the trust was referred to in the ELECTRIC RAILWAY JOURNAL of March 20, page 599.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—The Public Utilities Commission of Ohio has authorized the Cleveland, Painesville & Eastern Railroad to issue $20,000 of its 5 per cent bonds, to be disposed of at not less than 80, the proceeds to be used to reimburse the income for improvements paid out of the earnings in 1914. The Cleveland, Painesville & Ashtabula Railroad has been authorized to issue $10,000 of bonds on the same basis and for a similar purpose. The latter company is owned by the former.

Empire United Railways, Syracuse, N. Y.—The Public Service Commission for the Second District has authorized the issue of $42,400 of car trust certificates by the Empire United Railways to pay in part for twelve new pay-as-you-enter cars to cost $52,980, the company paying $10,580 in cash. The certificates are placed with the Guaranty Trust Company, New York, N. Y., bear interest at 6 per cent, and mature in three yearly installments from 1916 to 1919.

Kanawha Traction & Electric Company, Parkersburg, W. Va.—The Fidelity Trust Company, Baltimore, Md., as trustee is offering at 98¼ and interest, to yield about 6 per cent, the unsold portion of the authorized issue of $1,100,000 of two-year 5 per cent mortgage gold notes of the Kanawha Traction & Electric Company referred to in the ELECTRIC RAILWAY JOURNAL of June 19, page 1180. The notes are dated June 15, 1915, and are due on June 15, 1917. The interest is payable on June 15 and Dec. 15 in Baltimore. The notes are in the denomination of $1,000 and $500. The Kanawha Traction & Electric Company was incorporated in April, 1915, and on June 7, 1915, absorbed by consolidation the Parkersburg, Marietta & Interurban Railway, which was incorporated in 1902, and purchased the properties of the Parkersburg Gas, Electric Light & Street Railway Company, the Parkersburg Interurban Railway and the Marietta Electric Company and leased the property of the Muskingum Traction Company. There are outstanding $150,000 of first mortgage 5's of 1938 of the Parkersburg Gas, Electric Light & Street Railway, $550,000 of consolidated 5's of 1942 of the Parkersburg, Marietta & Interurban Railway, $150,000 of first mortgage 6 per cent bonds of the Marietta Electric Company due in 1942 and $1,100,000 of two-year 5 per cent notes of the Kanawha Traction & Electric Company due on June 15, 1917. The Kanawha Traction & Electric Company has authorized $1.500,000 of common stock and $1,500,000 of 6 per cent preferred stock, cumulative after July 1, 1916. Of the common stock $1,100,000 has been issued and of the 6 per cent cumulative preferred stock $1,078,500 has been issued.

Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.—On June 25 Judge Killits of the Federal District Court at Toledo granted a decree for the sale of the Lake Erie, Bowling Green & Napoleon Railway. The action was taken in the case of the Union Trust Company against the railroad.

Lima & Honeoye Light & Railroad Company, Lima, N. Y.—The Public Service Commission of the Second District of New York has refused to allow the Lima & Honeoye Electric Light & Railroad Company and the Lima-Honeoye Light & Railroad Company to separate their electric light from their railway business, on the ground that this would result in a default under the lease between companies approved by the commission in 1910, to the disadvantage of the public, as the operation of the railroad would be ultimately abandoned because it is unprofitable.

New Orleans Railway & Light Company, New Orleans, La.—E. H. Rollins & Sons, Boston, Mass., are offering at 100 and interest a block of 6 per cent debentures of the New Orleans Railway & Light Company of 1913 due on June 1, 1916.

New York (N. Y.) Railways.—An additional $500,000 of first consolidated mortgage 5 per cent fifty-year bonds of the Broadway & Seventh Avenue Railroad due in 1943 has been listed on the New York Stock Exchange. This makes the total of this issue listed to date $8,150,000. The bonds are issued from escrow to refund the same amount of second mortgage 5's due in 1914.

Northern Ohio Traction & Light Company, Akron, Ohio.—Hayden, Miller & Company, Cleveland, Ohio, are offering at par and interest the unsold portion of $500,000 of 6 per cent secured gold bonds of the Northern Ohio Traction & Light Company of 1915.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—A quarterly dividend of 1 per cent on the $10,000,000 of common stock of the Omaha & Council Bluffs Street Railway has been declared payable on July 1 to holders of record of June 30, contrasting with 1¼ per cent paid quarterly from Jan. 1, 1912, to April 1, 1915.

Public Service Corporation of New Jersey, Newark, N. J.—There has been listed on the Philadelphia Stock Exchange $261,000 of additional general mortgage 5 per cent sinking fund gold bonds of the Public Service Corporation of New Jersey due on Oct. 1, 1959. This makes the total amount listed to date $35,998,000.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—The Puget Sound Traction, Light & Power Company has declared a quarterly dividend of three-fourths of 1 per cent on its preferred stock, payable on July 15 to stock of record of July 2. This is a reduction of three-fourths of 1 per cent from the regular quarterly dividend of 1½ per cent, the dividend paid on April 15 having been at the latter rate.

DIVIDENDS DECLARED

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., quarterly, 1½ per cent, preferred.

Chicago City & Connecting Railways, Chicago, Ill., quarterly, 1½ per cent, preferred participating certificates.

Chicago (Ill.) City Railway, quarterly, 2 per cent.

Columbus, Newark & Zanesville Electric Railway, Cincinnati, Ohio, quarterly, 1½ per cent, preferred.

Elmira Water, Light & Railroad Company, Elmira, N. Y., quarterly, 1¾ per cent, first preferred; quarterly, 1¼ per cent, second preferred; quarterly, 1 per cent, common.

Interstate Railways, Philadelphia, Pa., 30 cents, preferred.

Little Rock Railway & Electric Company, Little Rock, Ark., 3 per cent, preferred; 5 per cent, common.

London (Ont.) Street Railway, 3 per cent.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred.

New England Investment & Security Company, Springfield, Mass., 2 per cent, preferred.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Philadelphia Company, Pittsburgh, Pa., quarterly, 1½ per cent, common.

Porto Rico Railways, Ponce, Porto Rico, quarterly, 1¾ per cent, preferred.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred; quarterly, 1¼ per cent, preferred.

Western Ohio Railway, Lima, Ohio, quarterly, 1¾ per cent, first preferred.

Winnipeg (Man.) Electric Railway, quarterly, 2½ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.					
1m., Apr., '15	$237,747	*$149,664	$88,083	$56,808	‡$31,269
1 " " '14	252,461	*152,176	100,285	56,050	‡44,291
4 " " '15	962,584	*606,509	356,075	227,441	‡128,894
4 " " '14	991,579	*618,246	373,333	222,733	‡150,877
INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.					
1m., May, '15	$2,904,773	*$1,280,115	$1,624,658	$911,861	‡$786,463
1 " " '14	2,948,937	*1,292,504	1,656,433	911,861	‡810,296
11 " " '15	30,744,300	*12,836,463	16,907,837	10,003,551	‡7,470,966
11 " " '14	30,800,728	*13,764,780	17,035,948	10,211,703	‡7,391,442
CITIES SERVICE COMPANY, NEW YORK, N. Y.					
1m., May, '15	$287,365	$14,358	$273,007	$40,833	$232,174
1 " " '14	281,104	8,870	272,234	29,167	243,067
12 " " '15	3,952,800	143,095	3,809,705	478,333	3,331,372
12 " " '14	3,245,045	93,824	3,151,221	268,896	2,882,325
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.					
1m., May, '15	$789,118	$499,383	$289,735	$137,153	‡$154,937
1 " " '14	806,123	472,114	334,009	133,979	‡200,522
5 " " '15	3,821,110	2,544,657	1,276,453	668,218	‡620,944
5 " " '14	3,722,869	2,388,582	1,334,287	651,183	‡687,454
EL PASO (TEX.) ELECTRC COMPANY					
1m., Apr., '15	$76,698	*$43,293	$33,405	$4,201	$29,204
1 " " '14	81,419	*47,940	33,479	4,522	28,957
12 " " '15	1,016,196	*555,052	461,144	50,350	410,794
12 " " '14	937,340	*513,504	423,836	51,268	‡379,567
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.					
1m., Apr., '15	$22,193	*$14,866	$7,327	$7,750	†$423
1 " " '14	23,941	*16,677	7,264	7,666	†402
12 " " '15	297,982	*190,135	107,847	91,767	16,080
12 " " '14	308,257	*198,023	110,234	91,302	18,932
PENSACOLA (FLA.) ELECTRIC COMPANY					
1m., Apr., '15	$20,472	*$11,433	$9,039	$7,200	$1,839
1 " " '14	22,323	*14,470	7,853	7,170	683
12 " " '15	253,354	*159,168	94,186	86,982	7,204
12 " " '14	285,373	*180,072	105,301	84,079	20,822
SAVANNAH (GA.) ELECTRIC COMPANY					
1m., Apr., '15	$65,689	*$40,959	$24,730	$23,225	$1,505
1 " " '14	70,841	*47,761	23,080	22,875	205
12 " " '15	829,427	*538,954	290,474	276,816	13,658
12 " " '14	843,082	*559,719	283,363	273,522	9,841
PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.					
1m., Apr., '15	$605,180	*$394,582	$210,598	$181,325	$29,273
1 " " '14	702,770	*427,455	275,315	175,267	100,048
12 " " '15	8,072,022	*4,905,546	3,166,476	2,141,107	1,025,369
12 " " '14	8,726,264	*5,028,377	3,697,887	2,088,304	1,609,583
NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.					
1m., Apr., '15	$123,465	*$79,250	$44,215	$27,215	$17,000
1 " " '14	171,411	*97,861	73,550	29,354	44,196
12 " " '15	1,910,801	*1,077,722	833,079	321,636	511,443
12 " " '14	2,159,227	*1,207,272	951,955	292,732	659,223
JACKSONVILLE (FLA.) TRACTION COMPANY					
1m., Apr., '15	$52,076	*$36,425	$15,651	$16,255	†$604
1 " " '14	62,836	*40,239	22,597	12,734	9,863
12 " " '15	677,608	*459,907	217,701	160,143	57,558
12 " " '14	711,162	*452,308	258,854	151,148	107,706
HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.					
1m., Apr., '15	$21,850	*$11,812	$10,038	$5,580	$4,458
1 " " '14	24,344	*15,357	8,987	5,660	3,327
12 " " '15	267,497	*173,886	93,611	66,805	26,806
12 " " '14	290,491	176,943	113,548	67,491	46,057
GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.					
1m., Apr., '15	$152,211	*$98,241	$53,970	$36,058	$17,912
1 " " '14	196,149	*109,759	86,390	35,669	50,721
12 " " '15	2,283,457	*1,256,641	1,026,816	434,963	591,853
12 " " '14	2,434,215	*1,375,662	1,058,553	432,240	626,313
DALLAS (TEX.) ELECTRIC COMPANY					
1m., Apr., '15	$131,945	*$85,308	$46,637	$33,394	$13,243
1 " " '14	179,086	*106,896	72,190	27,334	44,856
12 " " '15	2,062,880	*1,182,824	880,055	396,994	483,061
12 " " '14	2,270,136	*1,339,920	930,216	312,062	618,154
COLUMBUS (GA.) ELECTRIC COMPANY					
1m., Apr., '15	$56,409	*$25,431	$30,978	$28,791	$2,187
1 " " '14	55,234	*22,660	32,574	24,827	7,747
12 " " '15	691,648	*309,939	382,009	340,043	41,966
12 " " '14	636,108	*281,014	355,094	292,288	‡70,071
CAPE BRETON ELECTRIC COMPANY, SYDNEY, CANADA					
1m., Apr., '15	$25,164	*$15,337	$9,827	$6,449	$3,378
1 " " '14	26,505	*16,695	9,810	6,427	3,383
12 " " '15	342,908	*207,650	135,258	76,146	57,112
12 " " '14	375,098	*210,677	164,421	74,560	89,861
BATON ROUGE (LA.) ELECTRIC COMPANY					
1m., Apr., '15	$14,517	*$8,998	$5,519	$2,146	$3,373
1 " " '14	13,589	*9,256	4,333	2,109	2,224
12 " " '15	181,151	*112,335	68,816	25,070	43,746
12 " " '14	169,899	*110,502	59,397	25,258	34,139

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*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

THE JITNEY BUS

Washington Bus Line in Receiver's Hands — Regulatory Ordinances in Philadelphia, Rochester, Flint, Taunton and Newport

H. S. Wilson has been appointed receiver of the Metropolitan Coach Company, Washington, D. C., by Judge Gould of the District Court. It is announced that the company will continue to operate its herdic line in Sixteenth Street N. W., between Pennsylvania Avenue and U Street under the direct supervision and management of Mr. Wilson. Officials of the company consented to the appointment of the receivers to take over its business following the filing of a suit in the District Supreme Court against the company in which it was alleged that James O'Donnell had been unable to collect on a judgment against the company in March, 1915, for the sum of approximately $500.

The Metropolitan Coach Company has had an application pending before the Board of Public Utility Commissioners of the District of Columbia to authorize an issue of $150,000 in bonds. The commission would allow only $118,000 to cover necessary expenditures. In a letter to the Public Utilities Commission. S. Dana Lincoln, president of the company, said in part:

"Referring to your letter of April 14 and with reference to the previously declared attitude of the commission with respect to our application for permission to issue $150,000 of bonds, we must repeat that the position taken by the commission is such as to make it impossible for us to finance our needs and therefore impossible to continue the operation of the Metropolitan Coach Company. As we have heretofore pointed out, the proposed issue of bonds would not, except as to the amount specified for new vehicles and garage, have increased the indebtedness of the company. It would, however, have enabled us to put an existing debt (which was incurred in establishing and equipping the motor vehicle service) in such form that it could have been carried at the same time to the company's improvement plans that were being executed. We have also expressed the opinion that in applying to the case of this company rules formulated with reference to the utilities of a wholly different character the commission takes the position that makes a further attempt to continue operation unprofitable and impossible."

The report of the company to the Public Utilities Commission of Washington for 1913, the latest available, contains the following operating figures: gross receipts, $24,734; operating expenses, $23,654, or 95.63 per cent of gross receipts; interest and taxes, $4,381; loss for the year, $3,301. At the beginning of 1913 the deficit was $119,121, making the deficit at the close of 1913 $122,422. The cost of equipment is given as $22,997, and current assets $1,181. Funded debt at the close of 1913 was $95,600, and current liabilities $26,001. In 1913 the line carried 577,539 passengers paying regular fare, and it carried 243,068 passengers on transfers from the Washington Railway & Electric Company's H Street line.

A measure to regulate the operation of the jitney has been passed by the Common Council of Rochester, N. Y., and is now before the Mayor for signature. Vehicles carrying five passengers are to pay a license fee of $50. Vehicles carrying more than five passengers and not more than ten are to pay a tax fee of $60. Vehicles carrying more than ten passengers are to pay a license fee of $75. The bond required is $3,000 for each car carrying not more than ten passengers and $5,000 for each car carrying more than ten passengers. If an owner operates more than 100 jitneys he may give a blanket bond for $25,000. A number of owners operating more than 500 jitneys may unite in one blanket bond of $50,000. The fare by jitney is to be not more than 5 cents within the city. Jitneys are to be inspected once a month under the direction of the Commissioner of Public Safety, who is also authorized to designate hours and routes of service. The ordinance will not revoke any of the licenses granted previous to its adoption.

The Council of Flint, Mich., has passed an ordinance regulating the jitney, effective on July 15. The measure provides for a license fee ranging from $25 for five-passenger buses upwards and for a bond of $5,000 to $10,000 for buses of five to seven-passenger capacity and of $20,000 for those over ten-passenger capacity. The regular seating capacity of the buses must not be exceeded.

The ordinance committee of the City Council of Richmond, Va., has recommended to the Council for passage an amended ordinance designed to regulate the jitney in that city. The proposed ordinance requires an indemnity bond, fixes certain routes and limits the carrying capacity of the vehicles. The committee after voting down several amendments adopted a motion fixing the bond of the first car at $2,000, and $500 for each additional car. The license fees for cars are fixed according to the route and the number of passengers carried. The minimum license for a four-passenger car is $30 and the maximum license for a nine-passenger car is $75.

A jitney regulatory ordinance has been passed in Taunton, Mass. The measure provides that no vehicles shall be operated for hire in Taunton until a license in the sum of $100 has been obtained and that a bond in the sum of $5,000 shall be taken out for the first vehicle and one of $1,000 for each additional vehicle. The drivers of vehicles licensed under the measure are not to carry in their vehicles any passengers in excess of the designed seating capacity.

The police commissioners of Kansas City have rejected the proposal of the Kansas City Jitney Association that one of their members be made a special officer to help regulate traffic at the downtown jitney station, Twelfth Street and Grand Avenue. The starter of the association said he had been assisting in traffic regulations, and that if he had a commission he could work more effectively. The police board was averse to granting any special interest in transportation any authority over traffic, and the conclusion was that the police would continue to be the official regulators of traffic.

The City Commissioners of Austin, Tex., have passed an ordinance regulating the jitneys, the principal features of which are provision for a license fee of $50 for five-passenger cars, $75 for six-passenger cars and $100 for seven-passenger cars; a bond of $2,500 for the injury of one person in accidents and a bond of $5,000 for the maximum damages which can be demanded by several persons who may be injured in a single accident. School children must be carried for not more than 3 cents when going to or from school. The ordinance prohibits the jitneys from operating on Congress Avenue between Fifth and Ninth Streets.

A jitney ordinance will go into effect at Newport, R. I., on July 5, 1915. The ordinance requires the operator to procure a special annual license from the Board of Aldermen. Six months' residence preceding the date of application is required. The license is fixed at $2 per seat at the manufacturer's rating, with a maximum fee of $50 per bus. The specification of stands is well covered in the ordinance. No license is to be issued until there is filed with the board an amount computed at the rate of $250 per seat, with approved surety, conditioned in substance to pay all damages sustained in the conduct of the business. Violation of the ordinance is punishable by a fine not exceeding $50.

On June 30 City Councils of Philadelphia, Pa., passed an ordinance establishing a 5-cent fare zone which the jitneys must traverse, extending on the north to Olney Avenue and on the south to League Island, with Thirty-third and Diamond Streets as an alternative northern terminus. On baseball days the jitneys may operate to Shibe Park. A license fee of $50 must be paid for each machine and each driver must be bonded in the sum of $2,500. The provision of the ordinance requiring cars to traverse the entire zone system caused a storm of protests from the jitney operators, and it is said that they will petition the mayor to veto the ordinance. On the same day that the regulatory ordinance was passed by Councils the June Grand Jury made its final presentment to Judge Patterson in the Court of Quarter Sessions. The jury recommended fixed regulation of jitneys and held it to be to the city's interest to protect the earnings of the Philadelphia Rapid Transit Company, inasmuch as the municipality is interested financially in that corporation. Dr. Ziegler of the Department of Public Health and Charities of the city has recommended that the drivers be forced to pass a rigid examination before being permitted to run automobiles. He reports that from April 1 to June 12 there were 112 jitney accidents, causing injury to twenty-nine pedestrians and two deaths.

JITNEYS IN THE TEXAS COURTS

Judge Edward R. Meek of the United States Court for the Northern District of Texas, at Dallas, Tex., on June 19, dismissed the bill in the cause of the Forth Worth Auto Association vs. the City of Fort Worth. The judge held that he had no jurisdiction in the matter as there was no federal question involved. From this decision it follows that, in the opinion of Judge Meek, the original jitney ordinance was not a contract and the passage of the amended ordinance, which made the first ordinance inoperative, did not result in confiscation of property and did not violate the fourteenth amendment of the federal constitution.

Before the hearing Judge Meek said that he had grave doubts as to his jurisdiction in the matter, but in order that partiality might not be shown he decided to listen to the argument of the counsel. City Attorney Altman argued that the first ordinance was not a contract but a franchise and that the city had the right absolutely to terminate any license granted under the ordinance and should be permitted to make additional terms under which the jitneys should operate. He denied that any discrimination had been shown or that the men would be unable to make the bond as claimed. At the conclusion of the arguments, Judge Meek requested that the ordinance, which was to have gone into effect on June 17, be suspended until he had time to determine whether a federal question were involved. This suspension was granted by Mayor Tyra. On June 19, Mays & Mays, attorneys for the jitney union, received a brief letter from Judge Meek in which he stated:

"After careful consideration I have reached the conclusion that the United States District Court is without jurisdiction to entertain the application for the injunction."

When informed of the decision, Police Commissioner Hurdleston said:

"The ordinance is now in effect and the police will proceed to enforce it without further instructions."

The jitney attorneys announced that an appeal would be made to the Supreme Court of the United States.

No decision has as yet been handed down by the Fifth Court of Civil Appeals on the hearing of the application for an injunction sought by the jitney union to restrain the enforcement of the jitney ordinance by the city of Dallas, Tex. The case was taken under advisement on June 12. The Court of Appeals remains in session until July 3, and it is expected that a decision will be rendered on June 26. In any case the ordinance, by agreement, will not go into effect until July 15.

Judge Marvin Brown of the Sixty-Seventh District Court at Fort Worth, Tex., declined to release I. W. Sullivan, the jitney driver, on his application for habeas corpus which was heard June 14. Sullivan was found guilty in the County Court of violating the first jitney ordinance and the decision was affirmed by the Court of Criminal Appeals. When the mandate of the Appellate Court was received by the County Court, attorneys for the defendant applied for a writ of habeas corpus on the grounds that the second ordinance had repealed the first and that the defendant should not be punished for violation of an ordinance which no longer existed. After hearing the case Judge Brown decided against the contention of the defendant. The case was promptly appealed to the Court of Criminal Appeals.

A temporary injunction restraining the enforcement of the Fort Worth jitney ordinance has been granted by Judge Marvin H. Brown of the Sixty-seventh District Court on an application filed by the Auto Transit Company, a private corporation chartered for fifty years. Members of the jitney union who have offered resistance to the ordinance in the courts without effect, joined as intervenors with the Auto Transit Company after the injunction suit was filed. The petition holds that both the original ordinance and the amended one are unreasonable, discriminatory, and void and in violation of the Constitution of the United States and of the State of Texas. It is argued that the Northern Texas Traction Company is operating street cars for hire and is not required to pay any license fee or occupation tax, nor is it required to execute any sort of bond. A bond of $500 was required by the court of the plaintiff.

SEATTLE COMPANY TO RUN JITNEYS

According to A. L. Kempster, general manager of the Puget Sound Traction, Light & Power Company, Seattle, Wash., the company will engage in the jitney business in that city. In discussing the plans of the company, Mr. Kempster said:

"Experience is showing us that the public demands faster service. The time for romance and platonic consideration of conditions is past. We will fight fire with fire. If the public demands that we give fast service in small units, with correspondingly few stops, we shall do so. Not only does the jitney cost us less to operate but it gives us a certain amount of freedom from franchise and public service regulation. How soon the new plan will go into effect is problematical, but we are ready to protect our property by giving the public exactly what it wants. As a matter of fact, the saving in our rail upkeep and in the care of overhead wire and in carhouse costs will pay the cost of upkeep and repairs, and go a long way toward the primary cost of such machines as we may be compelled to purchase.

"The problem of whether the public wants motor service is answered by decreased receipts. The company feels that it can go further toward giving reliable service to the public through the jitney bus as a medium than can any individual. It goes without saying that we are responsible. That is a big feature. There cannot be speed without an occasional smash-up. If we are willing to let our claim department settle with real cash for any accident directly attributable to our service, we are doing the riding public a service. Under the present bonding system, a month, two months, three months may elapse before a claim is settled. With us, the presentation of proofs that we are blameworthy is sufficient basis on which to establish negotiations for a cash settlement.

"Great, big motor-propelled cars will never be run by the Puget Sound Traction, Light & Power Company as mediums of transportation. The minute this is done the automobile is put into the class of the street car, with as many stops and consequent loss of time. Neither will the heavy freight business pass to the automobiles. The package-carrying business was dropped by us many months ago, and nothing is left now but the heavy freight and the straight passenger-carrying business. Conditions at present are unusual, 'unordinary,' or remarkable, according to the viewpoint, but the fact remains that if the public demands the automobile, we shall furnish it and it will be a service no citizen need be ashamed to patronize."

At present the electric railway pays Seattle 2 per cent of its gross earnings, but this will not be required of the subsidiary jitney company. The present revenue of $70,000 a year to the city from this source will be reduced materially, and other obligations, including that of building and maintaining street paving, will be removed in a large measure. It is stated that the company's receipts have fallen off about $2,000 a month on account of the jitney, which pays only a vehicle license to the city. The new jitney service of the company will cover only short runs, as it is unnecessary to enter long-haul traffic, which is unprofitable to the street cars and to the jitneys. It is even intimated that the suburban service of the company will be curtailed on account of its unprofitable character.

JITNEY ORDINANCE VALID

An important decision has just been handed down by the Supreme Court of Appeals of West Virginia upholding the rights of cities of that State to regulate the jitney. The city of Huntington had passed an ordinance on the jitney bus with the usual restrictive provisions, requiring among other things from owners of jitneys the filing of a $5,000 bond and a statement from the applicant as to the terminals and routes over which the cars were to operate and the hours of their operation. The case was brought to the Supreme Court on a writ of habeas corpus charging illegality of the ordinance for a violation of which the relator was held in restraint of his liberty.

In its opinion denying this writ the court showed at length that every city in West Virginia had the power to limit and regulate the use of vehicles kept for hire and that it might classify them for purposes of regulation, and an ordinance dealing with one class of such vehicles, as determined by the nature of their business and the prices they charge, is not discriminative because of its lack of provision for the regulation of other distinct classes of vehicles kept for hire. The case was entitled No. 2906 ex parte M. T. Dickey, and it is said to be the first decision by the highest court of any State on the legality of jitney regulation in cities.

THE TENNESSEE JITNEY DECISION

Abstract of Decision Rendered by Circuit Court Judge Holding the State Law Unconstitutional

In a decision holding the Tennessee jitney law to be unconstitutional rendered by Judge A. B. Pittman of the Third Division of the Circuit Court at Memphis and referred to briefly in the ELECTRIC RAILWAY JOURNAL of June 26, page 1225, the court said in part:

"It is not open to debate or doubt that the Legislature may define and declare what constitutes a common carrier; that it may define and declare privileges; that it may classify different privileges for purposes of taxation, and also for other purposes; that municipalities may regulate the use of its streets and impose such reasonable terms and conditions upon the users as it may deem wise. The only restriction under the constitution is that the classifications must be natural and reasonable and not arbitrary and discriminatory.

"The act under examination in this case declares the jitney bus to be a common carrier, and provides among other things that such common carrier shall give a bond conditioned that such carrier will pay any damage that may be adjudged finally against such carrier as compensation for loss of life or injury to person or property inflicted by such carrier or caused by his negligence.

"Passing the question of the right to classify the jitney so as to compel it to protect its passengers, what possible justification is there for classifying it so as to compel it to afford protection to the street-using public in general, when no such burden is placed upon owners of private automobiles? Whatever might be said of the Legislature's power to regulate the jitney as a carrier of passengers and to require bond for the protection of such passengers the law leaves no room for doubt that the Legislature may not impose upon the jitney a burden as to street using pure and simple not imposed on others using the streets in identically the same manner.

"I hold the act in question (being chapter 60 of the acts of 1915) unconstitutional, and void, in that it is class legislation of the most glaring character, is arbitrary and discriminatory, and violative of the constitution of Tennessee. The relator herein will be discharged and the costs of this proceeding taxed against the city of Memphis."

DETROIT PURCHASE ULTIMATUM

The Board of Street Railway Commissioners of Detroit, Mich., has sent an ultimatum to the Detroit United Railway to the effect that unless the company accepts the terms of a purchase contract by July 6 all negotiations for the purchase of the lines of the company within the one-fare zone will be called off. For several weeks attorneys representing the city and the company have been holding conferences with a view to drafting an agreement to provide for submitting the purchase proposition to the electors, the understanding being that the price of the property was to be fixed by the Circuit Court of Wayne County. The Street Railway Commission has issued a statement to the effect that the company has sought to get language into the agreement which would tie the hands of the court and be prejudicial to the interests of the city, and in its ultimatum it gives notice that the company must accept the contract as the city wants it or the commission will "proceed immediately to acquire a railway by other ways and means." The ultimatum came as a surprise, inasmuch as frequent statements have been forthcoming from the commission indicating that the differences between the attorneys were largely with respect to details. The company has not indicated what course it will pursue in dealing with the latest phase of the purchase negotiations, but it is highly improbable that the company will accept any agreement which it does not believe protects its interests properly.

Wages Restored.—The Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., which reduced the wages of its employees last October, has restored them to the former scale.

One-Man Cars in San Antonio.—The City Commissioners of San Antonio, Tex., have granted permission to the San Antonio Traction Company to use one employee on the cars of several of its local lines.

Toilet Facilities Ordered.—The Public Utilities Commission of Kansas has ordered the Joplin & Pittsburg Railway to provide toilet facilities on all of its cars. The order is based upon an act of the Legislature of 1915.

Accident in Brooklyn.—Slippery rails, due to a storm, caused a rear-end collision on the night of June 27 between a Vanderbilt Avenue surface car and a Culver line train, at Neptune Avenue near Van Siclen station, Coney Island, in which fourteen persons were injured.

Fare Increase Suspensions.—The Public Service Commission of Massachusetts has suspended until Aug. 1 the proposed increase in passenger fares and fare limits on the Norfolk & Bristol Street Railway, and proposed increase in fares on the New Bedford & Onset Street Railway.

Traffic Interchange in Illinois.—An interchange of freight has been arranged between the Illinois Traction System, Peoria, and the Kankakee & Urbana Traction Company, Urbana, Ill., intrastate tariffs being effective on June 12 and interstate rates effective on July 10. All shipments are routed via Urbana, Ill.

Traction Lines to Feature the Liberty Bell.—The Fort Wayne & Northern Indiana Traction Company and other interurban lines entering Fort Wayne, Ind., will run excursions into that city on July 6, when the Liberty Bell, en route to the Panama-Pacific Exposition in San Francisco, will be exhibited in Fort Wayne.

High Speed Camden-Newark Service.—Fast through service to New York every hour has been inaugurated by the Public Service Railway from Camden, opposite Philadelphia, by way of Trenton and New Brunswick, to Newark, where connection is made with the Hudson & Manhattan Railroad. The running time is five hours, and the fare is $1.45 for one way, and $2.60 for the round trip.

Seattle Service Case.—Federal Judge Neterer at Seattle, Wash., has signed an order allowing the Puget Sound Traction, Light & Power Company to perfect an appeal to the United States Supreme Court on the order of the State Public Service Commission requiring the company to furnish a seat for every passenger, as well as to run its Alki Point, Fauntleroy Park, and Ballard Beach lines beyond the downtown termini provided by the company's charter.

The Memphis Fare Case.—The case involving the efforts of the city of Memphis, Tenn., to compel the Memphis Street Railway to issue transfers on tickets sold at the rate of eleven for 50 cents, has been argued before the State Supreme Court sitting at Jackson. A writ of mandamus issued by the lower court was taken to the Appellate Court by the railway and went in favor of the company. The city is aggressor in the present review of the case in the highest court of the State.

The St. Louis Skip-Stop Hearing.—Additional testimony was taken before the Public Service Commission of Missouri in St. Louis on Jan. 26 in regard to the petition of the United Railways for permission to eliminate 770 stops in the city. Application has been made to the commission by the company for a rehearing in regard to the order of the commission requiring the company to construct certain extensions and install loops. The requirements of the commission with respect to extensions and loops was referred to in the decision of the commission abstracted in the ELECTRIC RAILWAY JOURNAL of May 15, page 961.

The Free Transportation Menace.—A tentative clause in a franchise for the construction of an extension in Los Angeles, Cal., has resulted in a statement from the Los Angeles Railway Corporation with respect to free transportation. The clause in question sought to extend the courtesy of free transportation on all lines of the company to all nurses of the health department. The company objected to this. S. M. Haskins of counsel for the company said: "The history of free transportation in Los Angeles is written in the ordinances of the city. It began with the Mayor and members of the fire department, and it has been increased gradually until the amount of free transportation furnished by the Los Angeles Railway to the city of Los Angeles amounts to more than $200,000 annually."

Operating Trailers in Washington.—As a result of observations made of the operation of trains of two small open cars of the Capital Traction Company, Washington, D. C., and of records kept by the commission and the company of accidents occurring on these cars, the Public Utilities Commission of the District of Columbia is of the opinion that the operation of the small single truck open cars in trains of two cars each with a single conductor in charge of the train is not a menace to public safety. It has therefore ordered that Section 13 of Order No. 21 of the commission be amended to read as follows: "No trailer car shall be operated for the purpose of carrying passengers unless there be a separate conductor or employee acting as such for each car of the train; provided, that trains of small single-truck open cars not exceeding two cars each may be operated with a single conductor in charge of the train."

The Albany Service Case.—A conference was held at Albany, N. Y., on June 23 between officers of the United Traction Company of that city and the members of the Public Service Commission of the Second District of New York with respect to the order of the commission calling for the purchase of forty cars, each with a minimum seating capacity of forty passengers. Chairman Van Santvoord said that the commission felt that conditions were correctly set forth in the data the commission already had, and that the order of the commission must be complied with or the company, in accordance with the decision of the Appelate Division of the Supreme Court, must show that it cannot comply with it. It was finally agreed that the company should submit to the commission not later than July 6 an alternative plan for improving the equipment. This plan may involve either the purchase of new cars or the rebuilding of the old ones, provided this can be done in a satisfactory manner.

The Shore Line Wage Agreement.—As stated in the ELECTRIC RAILWAY JOURNAL of June 26, page 1226, the Shore Line Electric Railway, Norwich, Conn., has agreed with its trainmen to an advance of wages from a minimum of 22 cents and a maximum of 28½ cents an hour to a minimum of 23 cents and a maximum of 29 cents an hour. While it is a fact that the company has increased its wage rates practically one-half cent in each grade, it has at the same time eliminated the overtime payment of 10 cents an hour and the lunch checks. The original purpose of the lunch checks was to protect the men who were detained from their homes or regular eating places, and as a consequence were put to an expense. Under the former agreement the men twice a year elected whether they would take box lunches or 25 cents. For the past year the company has not been asked for a lunch box, and the management felt that it would be fairer to all the men if the money represented by the lunch boxes was distributed among all the men rather than to a favored few. The change in the rate of pay, as frankly stated to the men, will not add materially to the cost of operation of the company, as the increase is very largely offset by the saving which results from the changes previously mentioned.

The Value of Action.—A preachment to railway men that carries a valuable lesson was contained, no doubt unconsciously but none the less effectively, in an item published recently in Louisville. Around it could be woven a second "Message to Garcia." It illustrates strikingly the value of independent action. On account of the lesson which it contains the Louisville (Ky.) Railway is calling the attention of its trainmen to the item, which follows: ". . . On Main Street, between Fifth and Sixth Streets (a busy section of the street, traversed by cars of five important lines, three of which loop there), a wheel came off a wagon and blocked the line. In a very few minutes several cars were tied up by the blockade. One man called the wreck car and then they all stood around trying to talk that wheel back on the wagon. Then something happened —a man came along who could see things. He asked the driver to take out the wagon tongue, which they used as a pry pole, chocked the wheels with a brick, and raised the axle slightly and put the rim of the wheel under it; got a new bight, raised it again, and put the hub under it, then with another effort the wheel was on and the blockade relieved in just two minutes after the 'live wire' got there. The wreck car found a clear track."

Question of Authority in Canada.—The First Appellate Court at Toronto, Ont., has granted the petition of the Hamilton, Grimsby & Beamsville Electric Railway, Hamilton, Ont., for an appeal against the decision of the Ontario Railway Board made some time ago to compel the company to place certain conveniences in the cars and stations, also on the question as to whether the Dominion of Canada, once having declared a railway for the general advantage of Canada, can subsequently withdraw that declaration. The company claimed that it was outside the jurisdiction of the Ontario Board to require the company to install the conveniences, and that under a section of the railway act of 1888 the railway was placed under the Dominion Railway Board, which alone could exercise authority over it. Counsel for the company pointed out that the dominion by the railway act of 1888 declared all railways crossed by the Grand Trunk and the Canadian Pacific Railways to be works for the general advantage of Canada. By an enactment of 1903, which counsel for the compny challenges as *ultra vires*, the dominion purported to limit this declaration to the crossings only. For twenty years his clients had considered themselves under the Dominican Railway Board, and still did so. The question will be argued later on appeal.

Lexington Arbitration Award.—The board of arbitration which has been handling the case of Motorman Robert E. Walker, discharged last summer by the Kentucky Traction & Terminal Company, Lexington, Ky., has reported, reinstating the motorman and awarding him $200 of back pay. The proposition was referred to the board as a means of compromising the strike which followed Walker's discharge. The union men in the company's employ contended that Walker was dismissed through discrimination against the union. The company urged that the dismissal was purely for carelessness, which resulted in the wreck of an interurban car. C. C. Bagby, a Danville attorney, was named umpire, the union chose its president, Robert Goss, and the company its own superintendent, George McLeod. The decision was a majority finding, holding that the company acted in part from "unconscious prejudice" and that the case did not merit such severe treatment. Supplemental charges that the company discriminated against union employees were dismissed by the board of arbitration as not sustained by the evidence. The minority report, by Mr. McLeod, pointed out that Walker had been dismissed in good faith, "the opinion of the umpire to the contrary notwithstanding," and that he would be reinstated in equally good faith.

Peninsula Railway Fare Case.—F. E. Chapin, general manager of the Peninsula Railway, San José, Cal., has issued a statement in regard to the recent fare decision of the Railroad Commission of California, referred to in the ELECTRIC RAILWAY JOURNAL of May 8 on page 911. Mr. Chapin said in part: "The published reports in relation to the decision of the State Railroad Commission as to the complaint of Palo Alto and Mayfield complaining of discrimination in favor of San José, have been in error and have led to much confusion in the minds of our patrons. Briefly, the decision of the commission is, first, that night excursion rates, which have been so lightly availed of by the traveling public, can be withdrawn by the Peninsular Railway; second, that the Sunday excursion rate from Mayfield and Palo Alto to Congress Springs cannot be raised without discrimination in favor of San José, as it is now; third, that after allowing for the influence of 5-cent street railway fares which ordinarily should not influence interurban fares, but which sometimes cannot be avoided, discrimination in favor of San José against Palo Alto and sometimes in favor of Los Gatos as against Palo Alto, is found, and exists to an extent that demands the revision of existing rates. The present tariffs, which have developed just as the road has grown are being revised accordingly, but it should be apparent to all that the decision does not in itself direct reduction in rates."

Personal Mention

Mr. R. H. Smith, formerly engineer of the Ogden, Logan & Idaho Railway, Ogden, Utah, has been appointed manager of the Goldsboro (N. C.) Electric Railway.

Mr. John H. Adams, formerly chief engineer of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., has been appointed general manager of the Blue Ridge Light & Power Company, Staunton, Va.

Mr. Timothy E. Byrnes, formerly vice-president of the New York, New Haven & Hartford Railroad, has established himself in Boston in his former business as legal adviser concerning railroad rates and transportation.

Mr. John W. Wagner president of the German-American Bank, Kansas City, Mo., and not Mr. John W. Brown, as previously reported, has been reappointed as a member of the board of the Kansas City Railways to represent the city.

Mr. R. B. Stichter, vice-president of the Southern Traction Company, Dallas, Tex., has been granted a six months' leave of absence. Mr. Stichter will leave at once for Colorado and expects to spend the greater part of his vacation in the mountain resorts of that State.

Mr. R. F. Blanchard has resigned as chief engineer of the power station of the Holyoke (Mass.) Street Railway to become associated with Mr. William Butler, formerly construction engineer of the Economy Fuel Company, Matteawan, N. Y., in the firm of Blanchard & Butler, Boston, Mass., dealers in engineers' supplies. The employees of the Holyoke Street Railway presented Mr. Blanchard with a traveling bag and toilet set as a token of esteem. He has been connected with the company for more than five years.

Mr. John J. Dempsey, who was elected president of the New York Electric Railway Association at the meeting at Manhattan Beach on June 29 and 30, is superintendent of transportation of the New York Consolidated Railroad (Brooklyn Rapid Transit System). Mr. Dempsey started his railroad career as a boy with the Lehigh Valley Railroad. In 1894 he severed his connection as telegraph operator with that company to take a position as telegraph operator with the Brooklyn (N. Y.) Union Elevated Railroad. He remained with this company until June, 1897, when he resigned to return to the Lehigh Valley Railroad as telegraph operator, from from which position he was promoted to yardmaster. In 1900 he left the Lehigh Valley Road and re-entered the employ of the Brooklyn Rapid Transit Company as assistant dispatcher, from which position he was successively advanced to dispatcher, trainmaster, chief dispatcher, assistant superintendent and finally superintendent of transportation.

J. J. DEMPSEY

Mr. W. S. Stanton, the newly-elected secretary-treasurer of the New York Electric Railway Association, is exceptionally well qualified for the responsibilities of his office, as during the past few years he has been secretary to two of the presidents of the association, Messrs. Peck and Hamilton. Mr. Stanton was born in 1882, and his railway experience began eleven years ago when he entered the service of the Schenectady Railway. He has remained with that system without interruption since that time, being engaged in various positions in the clerical department of the company. For the past eight years he has held the title of secretary to the general manager, Schenectady Railway, and he will retain that position in addition to his secretaryship of the New York associations, as his central location and familiarity with association affairs will enable him readily to combine the duties of both.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

New Britain, Conn.—The Connecticut Company has asked the Council for a franchise to extend its lines from Main Street to Myrtle Street, Grove Street, Broad Street, Washington Street, Farmington Avenue, and Commonwealth Avenue to a point 100 ft. beyond Farmington Avenue, New Britain.

***Lakeland, Fla.**—Application is being made to the Council for a franchise to construct a line in Lakeland in connection with a railway to extend to and through surrounding towns, providing a similar franchise is obtained through and along the principal business and residence thoroughfares. A committee of the Chamber of Commerce is working out the details and has been assured of the necessary capital as soon as the franchises and rights-of-way have been secured. Among those interested are G. C. Rogan, M. F. Hetherington, Dr. S. F. Smith, W. F. Sneed, and A. J. Holworthy.

Newport, Ky.—Bids will be received until Aug. 2 by the City Commissioner of Newport for an electric railway franchise. August Helmbold, Mayor.

Springfield, Mass.—The Springfield Street Railway has asked the Council for a franchise to construct a line along Page Boulevard to East Street in Chicopee.

Woburn, Mass.—The Bay State Street Railway has asked the Council for a franchise to alter and relocate its tracks on Washington Street, Woburn.

Farrell, Pa.—The Farrell & Mercer Railway has received a franchise from the Council to construct an electric line in Mercer. This is part of a plan to build an electric railway from Farrell to Mercer and New Castle.

Lynchburg, Va.—The Lynchburg Traction & Light Company has received from the Council a franchise to extend its line from the Fair Grounds to Fort Hill. Work will be begun at once on the extension.

TRACK AND ROADWAY

Fresno (Cal.) Interurban Railway.—Construction of the overhead work has been begun by this company on its line on Belmont Avenue from Fresno Avenue to Valeria Avenue, extending on Valeria Avenue to Merced Avenue and thence to J Street.

Pacific Electric Railway, Los Angeles, Cal.—Plans for the construction of four viaducts to span Macy Street, First Street, Fourth Street and Seventh Street to eliminate the dangerous grade crossings are being prepared by the Board of Public Utilities for presentation to the Council. The plans tentatively worked out by the Board of Public Utilities provide that the cost shall be borne one-half by the steam roads and one-half by the city, the county and the Pacific Electric Railway. The total cost of the four viaducts will be $3,500,000.

San Diego, Cal.—Lewis R. Kirby reports that, owing to the failure of the El Centro trustees to concede a satisfactory route and conditions of operation for the proposed electric railway between El Centro and Imperial, and because of general business conditions, the plan of constructing the railway has been abandoned, at least temporarily. [May 2, '14.]

Municipal Railways, San Francisco, Cal.—The Mission Promotion Association has asked the Board of Supervisors to extend some of its lines in San Francisco. The line which the association urges most strongly is the extension of the Potrero Avenue branch from Tenth Street and Potrero Avenue along Division Street and thence to the Southern Pacific station at Third Street and Townsend Street. From this point the extension would continue to the Pacific Mail docks and to the waterfront.

Mount Carmel Railway, Hamden, Conn.—Willis M. Cook advises that the project to build an electric line from the terminal of the Connecticut Company's line to the top of Mount Carmel has been abandoned. [Oct. 4, '13.]

***Pocatello, Idaho.**—Plans are being considered to build an electric railway from Arbon, Oneida County, to Pocatello. George Williams, Mayor of Pocatello, is interested.

Peoria, Ill.—The immediate construction of the interurban line between Chillicothe and Peoria, which has been in the course of negotiation for some time, was assured at a meeting of the stockholders held in Chillicothe on June 15, at which the engineers who have been making the preliminary survey were present. From the end of the tracks of the Peoria Railway at Riverview Park to the Santa Fé station in North Chillicothe will require the construction of 15.26 miles of track, which, together with the necessary poles, wires, power house and stations, will cost approximately $500,000. E. F. Hunter, Peoria, is interested. [Dec. 25, '14.]

St. Joseph Valley Traction Company, Elkhart, Ind.—In connection with the paving of East Jackson Street this company plans to replace its present tracks, turnouts and switches with new material. The track will be relaid with new open-hearth steel rails not less than 60 ft. long and weighing not less than 90 lb. to the yard. The ties will be 6 in. x 8 in. and 7 ft. long.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—Citizens of Newcastle have filed a petition with this company asking that the company extend its city lines in Newcastle.

Southwestern Interurban Railway, Coffeyville, Kan.—Plans are being considered by this company to extend its line from Winfield to the Albright Gardens near Oxford, extending north through Mulvane to Wichita, where it will connect with other interurban lines. It is proposed to construct a line from Wellington to Mulvane to connect with the main line.

Bangor (Me.) Railway & Electric Company.—Work has been begun by this company double-tracking its lines on Harlow Street, Central Street and State Street, Bangor.

Bay State Street Railway, Boston, Mass.—Work will soon be begun by this company extending its double tracks from the corner of Hampshire Street and High Street to Railroad Square, Lawrence.

Springfield (Mass.) Street Railway.—Extensive repairs have been begun by this company in Springfield. The company will retie the entire stretch of track on Walnut Street from King Street to Hancock Street. The track will also be repaired at Memorial Triangle and in the Winchester Park section of State Street from Catharine Street to the New England crossing. The present rails will be replaced on Main Street on the west side of the north-end green. The company is also at work on Elm Street between Park Street and Westfield Street, West Springfield, where 60-lb. rails will be replaced by 80-lb. rails and the same procedure will be followed at Tubb's Hill on Westfield Street. The 7-in. rails on the Sumner Avenue line between the carhouse and the crossing will be removed and replaced by heavier rails.

Worcester (Mass.) Consolidated Street Railway.—Work has been begun by this company laying new rails on West Boylston Street, Worcester, between Chadwick Square and the fair grounds.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—Among the improvements being made by this company is the rebuilding of all bridges on its line from Biloxi and Pass Christian and the replacement of all defective poles.

Metropolitan Street Railway, Kansas City, Mo.—Plans are about completed for the single-deck viaduct and bridge to replace the Central Avenue double-deck structure over the Kaw River. At present the elevated structure of the Metropolitan Street Railway connects with the second deck of the Central Avenue bridge. The roadway on the lower deck extends on the ground level several hundred feet and connects with a viaduct that reaches the higher street level at the bluffs of Riverview. The new viaduct will be a single deck and will be about the present level of the upper deck. There will be viaduct approaches connecting with the roadway viaduct and approaches to the lower level roadway of the east side of the Kaw River. The total cost of the bridge and viaduct will be $450,000.

United Railways, St. Louis, Mo.—This company has received permission from the Board of Public Service to lay double tracks across the new Jefferson Avenue Viaduct, St. Louis.

Lincoln (Neb.) Traction Company.—This company has received permission from the Council to tear up its N Street line and relay the track on K Street, Lincoln. The company will begin work on the K Street line at once, and will maintain service on N Street until the new line is ready to carry traffic.

Brooklyn (N. Y.) Rapid Transit Company.—Bids are desired by the Public Service Commission for the First District of New York for furnishing approximately 37,800 tons of open-hearth track rails and about 2400 tons of open-hearth guard rails for equipping the new lines of the dual system.

Brooklyn (N. Y.) Rapid Transit Company.—The Public Service Commission for the First District of New York will open bids on July 20 for the construction of Section No. 1 of Route No. 49, a part of the Culver line. This a three-track elevated railroad, which will connect the Fourth Avenue subway through Thirty-eighth Street and Gravesend Avenue with Coney Island. Section No. 1 extends from a point in Thirty-seventh Street 246 ft. southeast of Tenth Avenue under private property and intersecting streets to Gravesend Avenue and over Gravesend Avenue to a point about 525 ft. south of Bay Parkway (Twenty-second Avenue).

International Railway, Buffalo, N. Y.—This company is rebuilding its Niagara Street line from Forest Avenue to Hertel Avenue with a concrete roadbed and heavier rails. The East Utica Street line is also being rebuilt on Kensington Avenue from the Erie tracks to Bailey Avenue.

Interborough Rapid Transit Company, New York, N. Y.—This company has received permission from the War Department to construct a bridge over the Bronx River at Westchester Avenue. The bridge will carry the tracks of the Pelham Bay Park branch of the Lexington Avenue subway, which at this point runs on an elevated structure. A permanent bridge will be built with a clearance of 61 ft. above mean high water.

Poughkeepsie City & Wappingers Falls Electric Railway, Poughkeepsie, N. Y.—This company plans to spend about $150,000 for improvements, including the reconstruction of track and extension of double track.

New York State Railways, Rochester, N. Y.—This company has been asked to double track its line on North Street, Rochester.

Western Ohio Railroad, Lima, Ohio.—Plans are being considered by this company to extend its line from St. Mary's south to Covington, via Minster and Fort Laramie.

Toledo, Bowling Green & Southern Traction Company, Toledo, Ohio.—Plans are being considered by this company to extend its line from Findlay to Kenton.

Toronto, Ont.—The Ontario Hydro-Electric Power Commission has completed surveys for the construction of the proposed railway from Toronto to Montreal and Ottawa. Plans have also been prepared for the construction of a radial railway to extend 60 miles north and west of London, Ontario.

Lehigh Valley Transit Company, Allentown, Pa.—It is reported that this company will begin work in the fall on a new route through Center Valley on its Philadelphia division. It is proposed to remove the tracks to private right-of-way for about 2 miles.

Easton & Washington Traction Company, Easton, Pa.—This company plans to construct a line between Washington and Hackettstown, N. J., extending along Lake Hopatcong, 19 miles.

McConnellsburg & Fort Loudon Railway, McConnellsburg, Pa.—Bennett & Randall, contractors, plan to begin work at once on this company's line from McConnellsburg to Fort Loudon, 10 miles. [May 8, '15.]

Scranton & Binghamton Traction Company, Scranton, Pa.—During the year this company plans to spend about $1,000,000 in building a 20-mile extension of its line, and 3000 tons of rail will soon be delivered for use in the construction of the line.

Nashville, Springfield & Northern Railroad, Nashville, Tenn.—Surveys will soon be begun by this company on its proposed line between Nashville, Springfield, Clarksville, Tenn., and Franklin, Ky. [June 19, '15.]

Virginia Railway & Power Company, Norfolk, Va.—This company reports that it has made about $25,000 worth of improvements at Ocean View in the way of new amusement devices and remodeling the hotel. An entirely new bulkhead has also been constructed.

***Wheeling, W. Va.**—Plans are being contemplated to construct an electric railway from Wheeling, W. Va., to Baltimore, Md., via Fairmont and Grafton. Preliminary surveys will be made at once. The Pennsylvania Electric & Lighting Company, Valley Falls, is interested.

SHOPS AND BUILDINGS

Arkansas Valley Interurban Railway, Wichita, Kan.—This company has purchased a site 66 ft. x 66 ft. at 111 Second Avenue East, Hutchinson, where its new terminal station will be erected. It is planned to construct a wye into the station off Second Avenue. The cost of the property was $6,850.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.—This company has completed its freight station at Lincoln Street, Lewiston.

New York Municipal Railway Corporation, Brooklyn, N. Y.—Contracts for the construction of eight elevated railroad stations in connection with the third-tracking of the Broadway elevated railroad in Brooklyn, submitted by the New York Municipal Railway Corporation, have been approved by the Public Service Commission for the First District of New York. The proposed stations are at Hewes Street, Lorimer Street, Flushing Avenue, Myrtle Avenue and Broadway, Kosciusko Street, Gates Avenue, Halsey Street and Chauncey Street.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—Pending the construction of a new terminal station, the depot offices of this company, with the exception of the freight department, have been removed to the temporary terminal at Third South Street and First West Street, Salt Lake City, which will be used jointly with the Salt Lake & Utah Railroad. Passenger train service was inaugurated on June 19.

POWER HOUSES AND SUBSTATIONS

Metropolitan Street Railway, Kansas City, Mo.—This company has ordered one 3000-kw., 575-volt d. c., six-phase, twenty-five-cycle, 250-r.p.m. compound-wound commutating pole rotary converter; three 1000-kva., single-phase, twenty-five-cycle, 6600-volt high-tension to rotary voltage low-tension air-blast transformers; one blower outfit for the above transformers and three-panel switchboard for the control of same. The contract for this apparatus has been placed with the Westinghouse Electric & Manufacturing Company.

Ephrata & Lebanon Traction Company, Mauch Chunk, Pa.—This company reports that it has completed and placed in operation its two substations at Iona and Clay in connection with its change from storage battery to overhead operation.

Ogden, Logan & Idaho Railway, Ogden, Utah.—Two substations will be built by this company, one at the Utah Hot Springs and the other at Deweyville, to care for the distribution of power for the entire system between Ogden and Preston. Each station will cost about $35,000, including equipment.

Kanawha Traction & Electric Company, Parkersburg, W. Va.—Preliminary work has been begun by this company for the construction of a power plant at Parkersburg, 140 ft. x 90 ft. The structure will be of brick and concrete. The condensers will be placed in a pit and the turbines will be installed on the floor immediately above. The cost is estimated at $500,000. Sanderson & Porter, engineers.

Wheeling (W. Va.) Traction Company.—This company will discontinue the operation of its power plant at Benwood, but will hold the plant in readiness for emergency service. The new main power plant located at Forty-second Street, Wheeling, has been completed.

Manufactures and Supplies

ROLLING STOCK

New York & Queens County Railway, New York, N. Y., expects to order immediately six double-truck end-entrance cars.

Carolina, Greeneville & Northern Railway, Greeneville, Tenn., a new line, is preparing specifications for rolling stock. F. A. H. Kelley, Greeneville, is chief engineer.

Isthmian Canal Commission, Major F. C. Boggs, general purchasing officer, will receive sealed proposals until Aug. 16 for twelve electric towing locomotives for canal locks.

Hutchinson (Kan.) Interurban Railway has purchased a Westinghouse 323-A motor equipment for one new steel semi-convertible passenger car mounted on Dupont single-trucks.

Corpus Christi Railway & Light Company, Corpus Christi, Tex., has ordered, through A. W. Burke, Wilmington, Del., eight steel single-track one-man cars from the Southern Car Company.

Ogden, Logan & Idaho Railway, Ogden, Utah, reported in the ELECTRIC RAILWAY JOURNAL of June 26 as having ordered six trailers, has awarded this contract to the American Car & Foundry Company. The cars are all-steel and 65 ft. in length.

Eastern Pennsylvania Railways, Pottsville, Pa., is having built by The J. G. Brill Company one all-steel car to be equipped with GE-90 four-motor equipments. The car is designed for experimental operation in both city and interurban service.

TRADE NOTES

Frank R. Farnham has joined the staff of Walter B. Snow, publicity engineer and advertising agent, Boston, Mass. Mr. Farnham was at one time with the McGraw Publishing Company.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received an order for one 6-kw. combination trolley and storage battery gathering locomotive equipped with two No. 904 motors and Nonclad Exide batteries.

Curtain Supply Company, Chicago, Ill., has received orders for Ring No. 48 fixtures and Rex rollers for the ten cars recently ordered by the Wilkes-Barre & Hazleton Railway, Hazleton, Pa., the ten cars ordered by the Lehigh Traction Company, Hazleton, Pa., and also from the Long Island Railroad and Miami (Fla.) Traction Company.

Standard Underground Cable Company, Pittsburgh, Pa., has been awarded a gold medal by the international jury of award, Panama-Pacific International Exposition, for its exhibit of a complete line of electric wires, cables and cable accessories. This is the seventh award of this degree which has been received by this company in as many different expositions.

Western Electric Company, New York, N. Y., has been awarded the following medals by the international jury of award of the Panama-Pacific International Exposition: The Grand Prix for the exhibit as a whole; gold medals, one for telephone switchboards and equipment, another for telephone train dispatching and control apparatus, and a third for insulated wires and cables.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" headlights, reports a change in the territory of its Southeastern representation. The Walker-Smith Company of Baltimore will now handle the sale of "Golden Glow" headlights in Delaware, Maryland, Virginia and District of Columbia only. New representatives will be appointed for the States of North Carolina, South Carolina, Alabama, Georgia and Florida.

Dayton Fare Recorder Company, Dayton, Ohio, received orders from the Louisville & Interurban Railroad, Louisville, Ky., and the Cleveland & Eastern Traction Company, Cleveland, Ohio, for large installments of its new interurban fare recorders, following sixty-day trials of the recorders in service. This manufacturing company has also recently secured contracts for recorder equipments from the Pearson Engineering Corporation for one of its South American customers; the Erie Railroad, New York & Long Island Traction Company, Pittsburgh Railways, and United Traction Company, Albany, N. Y. The Dayton company is now arranging to install recorders for trial for the Minneapolis & St. Paul Suburban Railroad and the Jamestown, Westfield & Northwestern Railroad, Jamestown, N. Y.

ADVERTISING LITERATURE

Dayton Fare Recorder Company, Dayton, Ohio, has issued a folder describing its various types of fare boxes. Inclosed with the folder is a photographic reproduction of a record card produced on this company's fare box recorder.

Railway & Industrial Engineering Company, Pittsburgh, Pa., has issued a catalog showing the application of Burke horn gap apparatus in connection with a few of its stationary designs of outdoor substations. Views and diagrams in the catalog show these installations as applied to the Wheeling Electric Company, Virginia-Western Power Company, Ohio Electric Railway, Steubenville & East Liverpool Railway & Light Company, Wilmington & Philadelphia Traction Company, Georgia Railway & Power Company, Central Illinois Public Utilities Company.

National Tube Company, Pittsburgh, Pa., has just issued a de luxe catalog of the material manufactured at the Kewanee works of the company. It is entitled "Catalog J" and contains 450 pages, printed in two, and in some places three, colors. An idea of the completeness of the book may be derived from the fact that the index embraces approximately 1800 entries. This material includes "National" pipe for steam, gas, water, and air; cast-iron, malleable-iron, and brass fittings; "Kewanee" unions and "Kewanee" specialties; brass and iron body valves, cocks, etc.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 47,050, describing this company's line of small plant switchboards made up of standard units in various combinations. The line provides for a great variety of conditions in small plants where panels of simple and inexpensive design are required. They are designed for 125-volt and 250-volt, d. c., two-wire service, for general power and lighting purposes. These units are described and illustrated in detail, various combinations are illustrated, dimensions are given, and panels designated by catalog numbers. The publication contains wiring diagrams and a list of accessories.

United States Steel Corporation, New York, N. Y., has issued in pamphlet form an extended description of its exhibit and those of its subsidiary companies at the Panama-Pacific Exposition at San Francisco. The pamphlet contains a number of illustrations showing the most interesting apparatus shown. Among the exhibits which will attract particular interest of electric railway men are rail sections, special work and electrically-welded joints of the Lorain Steel Company, rolled steel and forged steel wheels, heat-treated axles and steel ties of the Carnegie Steel Company, trolley poles and other tubing and pipes of the National Tube Company, and rail bonds, insulated wire and fencing of the American Steel & Wire Company. Some interesting statistics of the history, output and organization of the United States Steel Corporation are also given in the pamphlet.

NEW PUBLICATION

Shall the Government Own and Operate the Railroads, Telegraph and Telephone Systems? The Negative Side, published by the National Civic Federation, 1 Madison Avenue, New York. Paper, 119 pages; price, 50 cents.

In this pamphlet are contained the papers presented on the negative side of municipal and government ownership of public utilities at the meeting of the National Civic Federation in New York, Dec. 4, 1914. The authors are Prof. Jeremiah W. Jenks, Ex-Senator Jonathan Bourne, Jr., F. G. R. Gordon, and James W. Sullivan. A report of this meeting and abstracts of the papers were published in the ELECTRIC RAILWAY JOURNAL at the time, but the complete papers should be helpful to all who are interested in this very live subject. The extended experience of all the authors enables them to speak with authority and to marshal facts which are convincing.

Electric Railway Journal

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LOSING TIME IN TERMINALS

On many large railroad systems it is often most difficult for a company to avoid losing time in terminal approaches, on account of the magnitude of traffic, with its great diversity of origin concentrated upon a limited trackage. In interurban electric railway practice, street traffic often reduces schedule speed unduly in the last stages of a journey, but this also cannot be helped in a good many instances. What can be helped, however, is unnecessary delay in entering terminals in smaller places where ample room in the streets is available, or where the trackage conditions are favorable to good service. Sometimes the construction of a short section of double track in a terminal city of moderate size is of great value in enabling in-bound and out-bound interurban cars to make fast time without waiting to pass slow-moving locals, whether the latter are on or off schedule. Again, by avoiding stops considerably in advance of the destination to read registers, adjust running boards or other details which may better be handled at the end of the route, time may be clipped off the total run, with the resulting improvement in the schedule.

JUDGING HUMAN NATURE IN LEGAL DEPARTMENT

In a paper at the Pacific Claim Agents' Association, reported in the last issue, C. F. Young, adjuster Puget Sound Traction, Light & Power Company, emphasized the necessity on the part of the claim investigator of ability to combine tact with firmness. The same principle applies very appropriately to another field of the legal department, that of the attorney engaged in hastening the vacating by owners of property legally condemned for a new right-of-way. The necessity for handling different types of people in totally different manners was shown recently by a certain lawyer's personal experience in such work in an important Eastern city. With some owners a polite explanation of the situation which legalized the condemnation of property was sufficient to carry conviction of the railway company's authority to take possession and honesty of intention to settle fairly, but with the more ignorant landowners it was found that a tone of politeness was often mistaken for suavity as a veil for unscrupulous motives. Continued politeness only served to excite their suspicions, and cause them to classify the attorney and his company among the members of the Jack Sheppard Club. Experience taught that an answer of unmistakable sternness to such resentful utterances had the effect of immediately quieting both the objections and suspicions of the property owners. Severity and firmness in this case encouraged respect and thus saved much time that otherwise would have been wasted in unnecessary wrangling. The firm grasp took the sting out of the nettle.

MINIMUM CAR WEIGHTS FOR CLASP BRAKES

The report on clasp brakes made by a Master Car Builders' committee some weeks ago at Atlantic City constituted a very satisfactory indorsement of the device on the basis of experience obtained to date. There was, however, one feature of the report that serves also as an excellent argument for the use of the semicircular brass, at least by electric railways, in preference to the clasp brake as a means for eliminating the hot boxes due to journals that shift out from beneath their brasses under emergency applications. This was the establishment by the committee of a minimum car weight for clasp brakes, it being recommended only that cars weighing more than 96,000 lb. should be provided with them, and as there are very few electric railway cars whose weights even approach this figure the average interurban car, on the M.C.B. basis, would seem to be exempt from the necessity for clasp brakes. Undoubtedly, the establishment of this minimum weight was on the grounds of expense, the limit of 12,000 lb. per wheel being set bv the prohibitive pressures per shoe involved with standard rigging for the higher wheel loads rather than by any doubt in the value of the clasp brake for lighter cars. Of course, it has been demonstrated that the shifting of journals depends upon the percentage of braking pressure and not upon the actual weight on the wheel, and if clasp brakes are going to be considered too expensive for ordinary cars the only apparent alternative is the use of the semicircular brass if the journals are to be kept in place.

RIVETING WITH STEEL PRESSINGS

An objection to steel pressings as opposed to castings has recently been raised on the ground of the necessity for riveting on lugs, fixtures and the like instead of having them cast integral with the original piece. Apparently the major part of the complaint is based on experience with riveted joints that have worked loose, and it cannot be denied that this has been far from uncommon in electric railway work in the past. It is also true, however, that much of the riveting work that is done in electric railway repair shops is by no means up to the best standards, and it is hardly proper to condemn the process in general because of failures that could undoubtedly have been avoided by proper care in fabrication. Riveting, when properly done, is infinitely superior to any other method of making up a joint, and so far as reliability in attaching lugs is concerned it gives results quite as good as those obtained by pouring the projections solid on a steel casting and better than those obtained when cast iron is used. As compared with welding the riveted joint is distinctly preferable because it can be separated and remade at the expense only of cutting off the rivet heads and redriving them as desired, yet when once in place the strength of the construction is definitely known and does not depend, as does the weld, upon a complicated metallurgical process and a granular structure of the affected metal that is absolutely hidden from sight. All that is required is that the riveted pieces shall be firmly clamped together and that the rivet holes shall be rough-reamed before the rivet is driven. A high grade of rivet steel and the use of pressure riveters are largely incidental. Years of experience with locomotive boilers have shown this beyond a doubt, because there the riveted attachments never give the slightest trouble notwithstanding the continuous vibration and extraordinary strains set up by the wide temperature changes.

LIBERALITY WITH COST DATA It is a pleasure to commend the American Institute of Electrical Engineers and the railroads which co-operated for their respective enterprise and liberality which made possible the publication of data of costs of construction and operation of different types of contact systems. This was a unique feature of the Deer Park convention, one which was the cause of surprise as well as congratulation. Even assuming the necessary willingness on the part of the possessors of the valuable data, the reduction of the information to form for comparison was no light task. One writer of a paper based his conclusions on entries filling 250 foolscap pages, the figures being drawn direct from the railroad company's job records and requiring an analysis of these. Another element in the success of the program laid out by the railway committee of the institute was its definiteness. The study was confined to one part of the field, contact systems. In this restricted region attention was focused upon the particular things likely to interest and prove of value to railway men. The result speaks for itself. The lesson in it all seems to be that the old policy of hoarding cost data by railroads is on the wane. Electric railways are committed to the policy of publicity and, like charity, this should begin at home. They must serve each other as well as the public, and one effective way to do this is through the interchange of information which will lead to more economical construction and maintenance. The pocket notebook of many a master mechanic and engineer contains information whose value would be enhanced by circulation, for such circulation would stimulate others to like liberality. An example of the kind of information which is of great value to operating men was printed in the issue of the ELECTRIC RAILWAY JOURNAL for June 26, page 1214. By giving these figures the Los Angeles Railway Corporation shows a real willingness to serve. By the dissemination of such data the industry benefits, and the giver is in no wise impoverished.

CONSTRUCTING STEEL TOWER LINES

A group of papers presented at the recent A. I. E. E. convention dealt with the very important matter of the construction of tower lines. One may at the present time say that the steel tower on about 500-ft. or 600-ft. spacing has become the standard construction for high-voltage transmission lines. At first towers were very crude in design and generally erred either on the side of insufficient strength or of being made abnormally heavy in the attempt at improvement. As things stand to-day there are available steel towers which have been really designed for the purposes for which they are to be used, and the old difficulties have for the most part disappeared. Yet it is perfectly certain from the performance of tower lines that there is a good deal to be learned yet about economical design and construction. The convention papers to which we have reference deal in the main with one important and rather neglected consideration, that is, the foundations of the towers. Whether the tower itself is designed to be a rigid structure or to have a considerable degree of flexibility, as in some of the A-frame structures, the working strains come ultimately upon the foundation.

It is not difficult to design beforehand a tower sufficiently strong to stand the maximum stresses imposed upon it without buckling. This does not, however, insure it against tipping over or against being forced into a position where the added load may cause actual failure. The tower is meant to do its work when standing erect and in its normal position, and if pulled out of it through lack of foundations it may absolutely tip over or be twisted out of shape. The foundation work consists essentially in bolting the base of the tower to anchors of one sort or another sufficiently embedded in the ground to resist the turning moment of the base. In the papers before us two forms of foundation are chiefly considered: Steel anchors, usually of tripod form, so embedded that they will not pull out, and concrete masses of the general form of an inverted mushroom with embedded bolts or angle irons to which the steel structure is secured. As between these two types the choice seems to be chiefly based on the local conditions. Either can be made adequately strong to hold up the tower under all practical conditions. It has been actually shown that in some cases one form is cheaper and in other cases the other, each in its own situation being adequately strong. On the lines of the Pennsylvania Water & Power Company it was found that the mushroom concrete foundation could be installed more rapidly and at lower cost than the steel used on the first tower line of the company. On lines elsewhere the reverse situation has occurred.

The moral of the discussion seems to be that with any given tower the best form of foundation must be determined for the situation in which the tower is to be used, irrespective of experience elsewhere. The nature of the ground, the cost of labor, the cost of concrete, and transportation all play their part, and the indications are that it is wise before settling so important a question actually to try out the towers to be used under the stresses for which they are designed and with several types of foundation. The cost of such experimentation is small compared with the difference in final expenditure which can thus be determined. There seems to be no advantage in pushing such tests to the limit of breaking down the tower. It may be theoretically interesting to know whether with a given foundation the foundation itself will break or lift or the tower crumple under extraordinary stresses. The practical demand is merely whether the foundation is fully adequate to endure the stresses incurred when the tower is loaded to the designed point, with due regard to a proper factor of safety.

LINE INSULATION

Mr. Bang's institute paper on the operation of the transmission lines from the great plant on the Susquehanna into Baltimore, originally presented in Baltimore and brought up for discussion at the convention last week, brings to the front the ever-present insulation problem. The three circuits of aluminum cable which form this transmission system have apparently conditions not unfavorable to continuity of service.. They are carried on steel towers provided with grounded cables for protection against lightning, are worked at a voltage which cannot be considered exceptionally high, and are supported on suspension insulators having a large factor of safety, much larger than is found on similar circuits using pin-type insulators. Nevertheless the partial or complete interruptions of service have averaged more than a score per year, and of this number the vast majority have been due to lightning, although the lines are protected not only by the ground wires but by electrolytic arresters which, on the whole, are perhaps the most satisfactory form of arresters yet produced. Lightning is, of course, a contingency to be treated as always dangerous, especially when a direct stroke falls upon the line. Generally the arresters at the ends of the line are sufficient to keep the discharge from doing damage in the station, although now and then there are failures.

The damage on the line, however, is a different matter for it is strictly local. Hence the presence of arresters somewhere else on the circuit makes very little difference so far as damage to insulators is concerned. The situation seems to have been, on the circuits which Mr. Bang studied, that a powerful lightning discharge frequently flashed up alongside the string of insulators to the tower and broke down insulation, sometimes shattering the insulator disks in a startling fashion. The following arc did the rest. With all the insulators in first-class shape the power of the series to resist the lightning flash ought to have been considerable enough to avert damage, but it frequently failed to do so. A direct lightning stroke falling upon the line has so enormous a potential that a flash-over is not at all unexpected. In the case of this line, however, it may be questioned whether some of the destructive strokes were not due to gradually lessening strength of the insulators, caused by continued use and mechanical and electrical strains. Mr. Bang's investigation of the insulators by periodical resistance tests shows a somewhat disquieting state of affairs. Normally they were in first-class condition, but about one disk in seven or eight, after several years' service, showed a very great falling off of the resistance, practically rendering the injured disk useless. This was traced to two different causes, first superficial cracks, usually on the head of the disk, apparently developed from mechanical strains internal or external, and, second, failure of insulation, again usually at the head of the disk, not through cracking, but through a slight porosity of the porcelain, the effects of which seem to be cumulative with long exposure to moisture.

The moral appears to be that in the present state of affairs it is wise to make megohm tests of insulators from time to time to see whether any of them have become unreliable. Whether a similar condition holds for the pin-type insulators, more frequently used than the suspension insulators for the comparatively moderate voltages of railway transmission, remains to be seen. The situation as regards strains is quite different in the two forms, and at the commoner voltages also comes in the difference between glass and porcelain with respect to this particular kind of deterioration. Most lines use porcelain insulators, but in a great many cases glass is an effective substitute, and the relative reliability of the two materials as respects the progressive decrease in insulation deserves attention.

The most suggestive portion of Mr. Bang's paper deals with preventive measures to avert the damage following the lightning stroke. The real mischief is done by the arc which follows a breakdown of the insulation, and two devices tried seem to have proved effective in putting this arc out of business before the insulation was permanently destroyed. Both are described as in use here, and they have seemed to give promise of filling a very important function in line protection. One is a relay device for shunting the arc with a fuse as soon as it is established, thereby killing it, and then clearing the line by the destruction of the fuse. The other drops the excitation of the machines until the arc gives out and then re-establishes the field. The former can be made to act very quickly so that there is little risk of either damage to lines or of losing synchronous load. The latter operates more slowly but appears from Mr. Bang's results to be somewhat more certain in its operation. A combination of the two as worked out on the lines under discussion seems to have been very useful in lessening the trouble from lightning since these protective devices were installed. At all events it is clear that the insulators on a high-voltage line do require more watching than mere attention to physical breaks, and that protective apparatus properly installed is of material value in preventing interruptions of service even though the lightning may start trouble.

Shop Notes from Hampton, Va.

An Account Is Given of the Practices in Economical Management and Good Housekeeping at the Hampton Shops—Some Novel Features Are Described

In a recent visit to the Hampton shops of the Newport News & Hampton Railway, Gas & Electric Company, the following practices in economical management and good housekeeping were observed:

PAINTER'S STORAGE RACK OF ADJUSTABLE TYPE

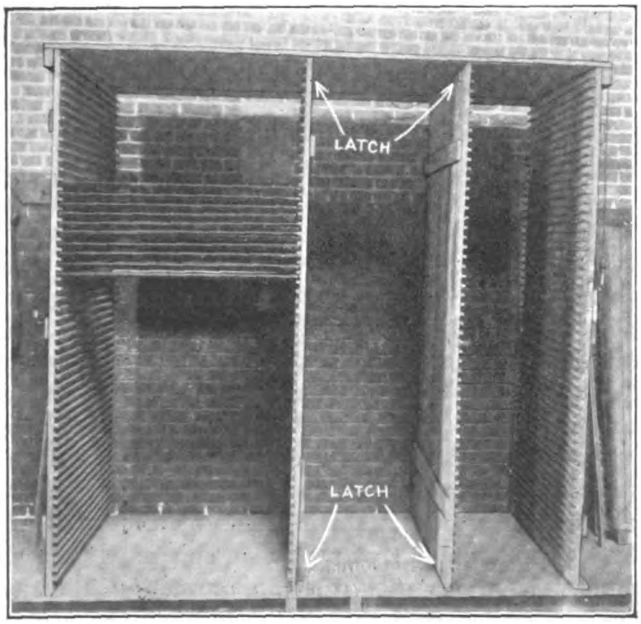
The painter's storage rack shown in an accompanying half-tone is not an absolute novelty, but its principle deserves to be more widely known than it is. So far as the horizontal placing of panels is concerned, the rack does not differ from that seen in most paint shops. However, with the aid of ordinary door latches, the vertical partitions may be moved to accommodate any width of panel. The latches are mounted vertically at the top and bottom of each partition and their tongues are merely drawn out of pockets in the top and bottom of the rack to permit the shifting of the partitions to any desired stops to the right or left.

VERTICAL ARMATURE RACKS

Where room is scarce vertical armature racks deserve wider use. In the accompanying illustration may be seen one for motor armatures and another for compressor armatures. The armatures are quickly handled by means of a jib crane which is attached to a corner post, a crane being used because the shop is too small to require an overhead track. Formerly the armatures were stored on a table under canvas. This led to trouble because careless workmen would throw heavy tools on the canvas, thereby damaging commutator bars which previously had been passed as perfect.

FIRE PAIL SUSPENSION

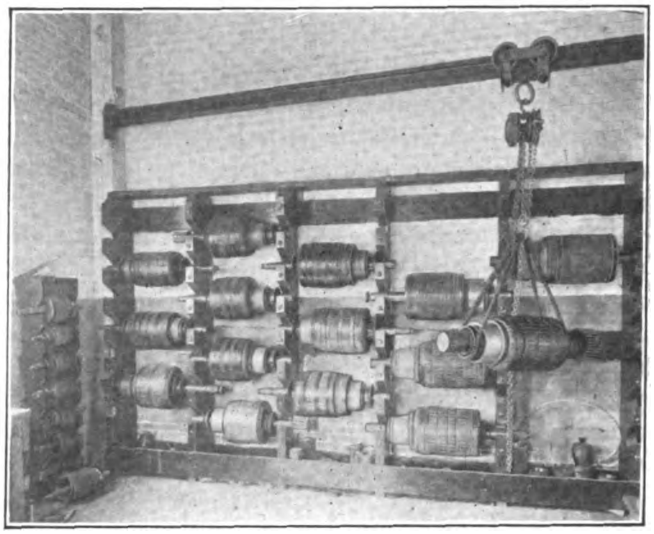
It is customary in many shops to carry the egg-bottomed fire pails through holes made for them in a solid wooden shelf. This shelf offers the shopmen a tempting place for so many odds and ends that eventually the pails themselves are lost to sight. Following a suggestion from the safety committee, all fire pails hereafter will be carried from metal brackets so that the space between and on the pails will not be cluttered up so easily. The two illustrations on the next page show one of the old wooden shelves and the other the new metal bracket.



HAMPTON SHOPS—PAINTERS' RACKS WITH MOVABLE PARTITIONS

RECLAIMING TWO-POINT RESISTORS

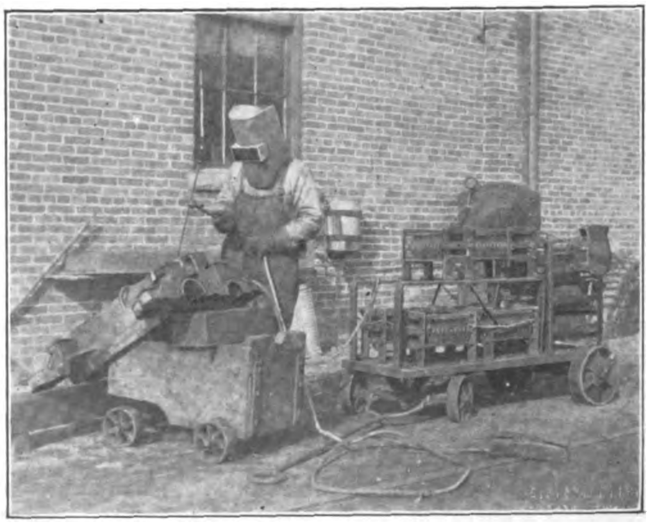
The company has already reclaimed some fifteen sets of Westinghouse two-point resistors which had been rendered useless by the corrosion of the two-screw brass lugs or contacts. After brightening the contact surfaces of the grids the old lugs were replaced by copper washers of the type used on the latest Westinghouse resistors.



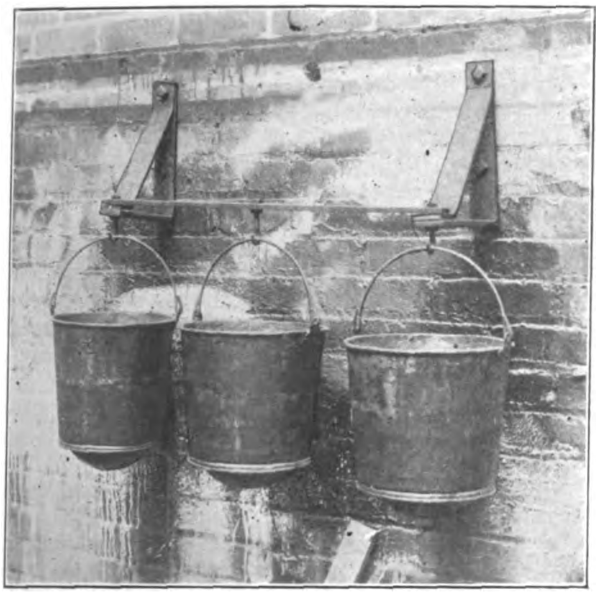
HAMPTON SHOPS—VERTICAL ARMATURE RACKS WITH JIB CRANE

ELECTRIC ARC WELDER

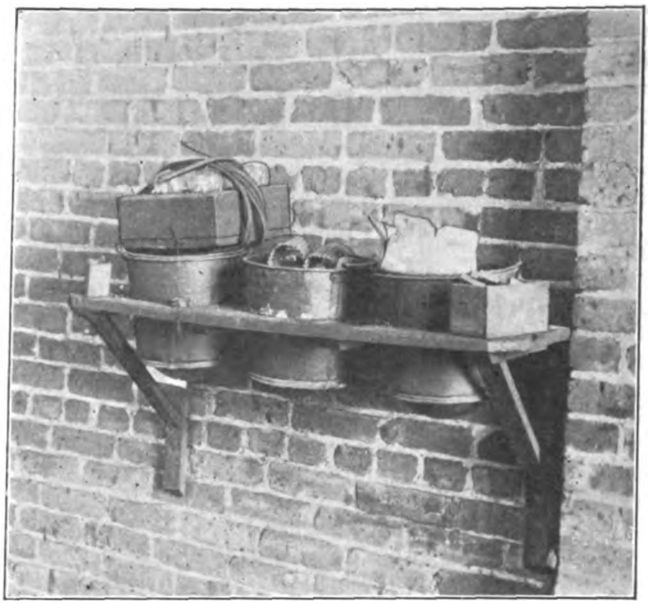
Out of five old resistors, the abandoned rheostat of a substation voltage regulator and a circuit breaker the



HAMPTON SHOPS—HOME-MADE WELDING OUTFIT IN USE ON A MOTOR SHELL



HAMPTON SHOPS—THE SAFE AND CLEAN WAY OF SUSPENDING FIRE PAILS



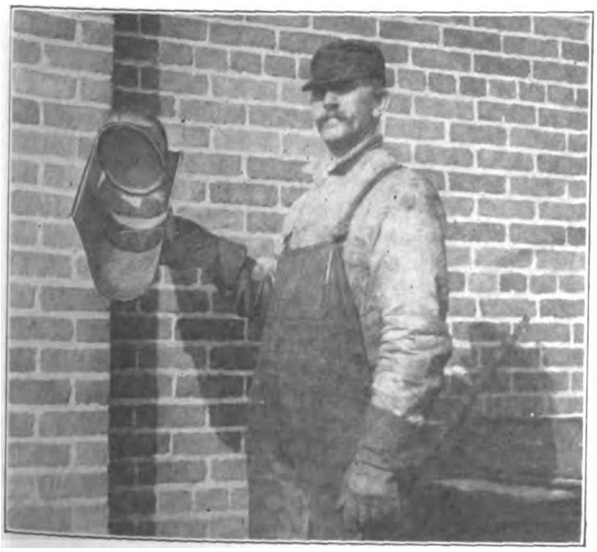
HAMPTON SHOPS—THE UNSAFE AND NEGLIGENT WAY OF SUSPENDING FIRE PAILS

shopmen constructed the electric arc welder illustrated. This equipment is mounted on a truck for convenience in working outside as well as inside the shops. The welding material is mild steel in the form of 5-16-in. diameter rods, and the flux is a cheap borax compound. The welding rods are held in a plug of metal bored for the purpose. The welder's metal hood has the usual combination of ruby and green lenses. The novel feature of the hood is that its weight is comfortably carried by building it around a cap made up of an ancient, rimless derby. The cap has a leather band to which brackets from the hood are attached.

One of the first jobs to which this welder was applied was the building up of No. 27-G truck side-frame brackets. It has also been used for patching gear cases and filling keyways and it will shortly be tried for building up trackwork.

CHANGE OF GEAR RATIO

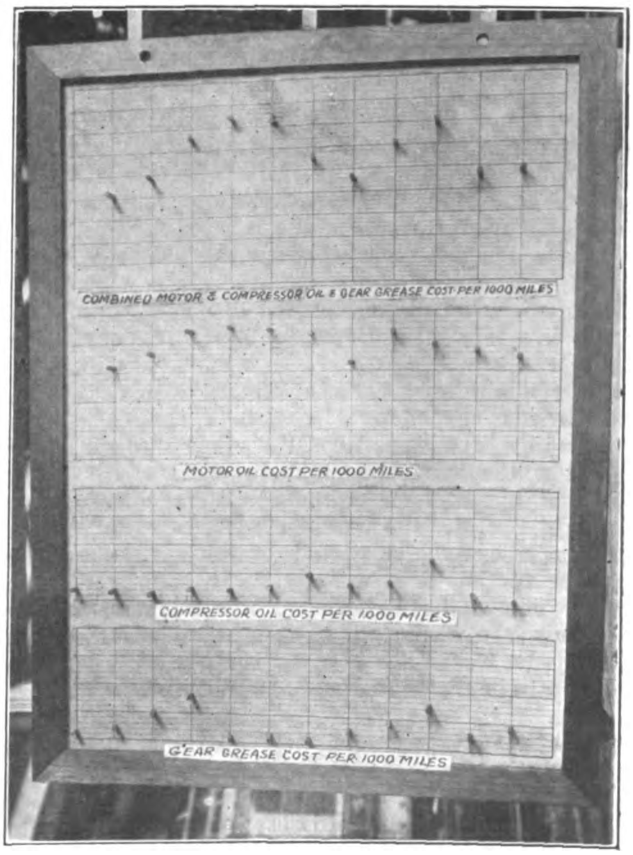
The gear ratio of many equipments was 24:58, which corresponded to a maximum speed of 35 m.p.h. A careful study of running conditions showed that the schedule could be maintained even if the maximum speed was cut to 28 m.p.h. The standard ratio is now 17:67. The saving in energy consumption has not been calculated, but there has been a very perceptible decrease in the number of baked armatures and fields. The company has also changed from bolted gears to the Cincinnati Tool Steel Gear & Pinion Company's solid gear.



HAMPTON SHOPS—A DERBY ANCIENT OF DAYS ADAPTED TO CARRY THE VISOR WITH EASE

MAINTENANCE RECORDS

Until the property was taken over in January, 1912, by Allen & Peck, Inc., with J. N. Shannahan as general


COMBINED MOTOR & COMPRESSOR OIL & GEAR GREASE COST PER 1000 MILES
MOTOR OIL COST PER 1000 MILES
COMPRESSOR OIL COST PER 1000 MILES
GEAR GREASE COST PER 1000 MILES

HAMPTON SHOPS—PEG BOARD POSTED IN SHOP TO SHOW MAINTENANCE COSTS manager, no records of equipment life were kept, nor were the cars inspected and overhauled on a mileage basis. At present they are inspected every six days, which is approximately on a 1000-mile basis. Beginning March 15 all cars were put on an actual 1000-mile inspection basis. Mileage records are now kept showing actual service obtained from brakeshoes, wheels, trolley wheels, harps, lubricant costs, etc.

A keen desire to keep down the lubrication costs has been created by showing the men just how the cost of each item varies from month to month and how this affects the total cost. To secure this publicity a wooden frame was constructed to hold a record sheet which is ruled vertically for months and horizontally for cents per 1000 car-miles. This sheet is subdivided to show the costs of motor oil, compressor oil, gear grease, and also of these three items combined. As shopmen are not accustomed to reading graphs the points which would serve to draw each curve are represented by plugs of wood. When a year's record has been made in this way the curves will be drawn and the plugs used again to show the monthly records for the current year.

The cost of car lubrication has already been cut down from 42 cents in 1912-1913 to 24 cents per 1000 car-miles, exclusive of packing, but it is expected that during the present year the cost will be brought down to the Galena contract figure of 20 cents per 1000 car-miles. It will be difficult to drop below that figure so long as 25 per cent of the mileage is performed with such motors as the Nos. 49 and 12a. These older motors must be lubricated every day and their felt-pad lubrication through Perfection packing, while satisfactory for service, is uneconomical because of stand-by leakage. In fact, with these motors the oil consumption is almost as great when the cars are standing as when the cars are moving.

Milwaukee Fare Case Decided

Supreme Court of the United States Says That the City Under Existing Statutes Had No Power to Make a Contract Covering Rates

A short note was published on page 1226 of the issue of this paper for June 26 in regard to the decision of the Supreme Court of the United States in the Milwaukee fare case. The principal question involved in the decision was whether the city of Milwaukee had power to make a contract with the railway company covering a term of years for a specified rate of fare. The opinion, which was handed down on June 14, upholds the Wisconsin Supreme Court in denying this right.

The opinion first recites the history of this case, which was briefly as follows: On Jan. 2, 1900, there was granted by the city to The Milwaukee Electric Railway & Light Company the right to operate over certain streets. By the same ordinance all franchises expiring prior to Dec. 31, 1934, were extended to that date and all franchises which would otherwise expire subsequently to that date were made to terminate at that time. The ordinance permitted the company to charge a 5-cent fare when paid in cash but required it to sell twenty-five tickets for $1 or six tickets for 25 cents good at certain hours up to Jan. 1, 1905, and thereafter good at any time. Subsequently, at the request of the city, the Railroad Commission held hearings to determine whether the rates were too high and finally ordered the company to sell thirteen tickets for 50 cents. The company claimed that this order took its property without due process of law. The case was first tried in the State courts and the order was sustained by the Supreme Court of Wisconsin. It was then taken by the company to the United States Supreme Court as being a violation of Sec. 10 of Art. I of the Constitution of the United States and of the fourteenth amendment thereto.

In its decision the federal Supreme Court upholds the Wisconsin Supreme Court in its decision that the city had no authority to make such a contract and that the authority to establish fares remained with the State. As a basis for this conclusion it quoted Sec. 1862 of the revised statutes of Wisconsin of 1860 which reads in part as follows: "Any municipal corporation or county may grant to any such [street railway] corporation * * * the right to construct, maintain and operate street railways, the use, upon certain terms as the proper authorities shall determine, of any street, parkway or bridges * * *. Every such road shall be * * * subject to such reasonable regular rules * * * as the proper municipal authorities may by ordinance from time to time prescribe."

The opinion then says: "The fixing of rates which may be charged by public service corporations of the character here involved is a legislative function of the State, and while the right to make contracts which shall prevent the State during a given period from exercising this important power has been recognized and approved by judicial decisions, it has been uniformly held in this court that the renunciation of a sovereign right of this character must be evidenced by terms so clear and unequivocal as to permit of no doubt as to their proper construction." The principle involved is well stated, according to the court, in Home Telephone Company vs. Los Angeles, 211 U. S. 265, 273.

Continuing, the court says that the Supreme Court of Wisconsin held that Sec. 1862 quoted above gave no distinct authority to the city to contract away the legislative authority of the State to fix tolls and fares by lowering them if found to be excessive; that while the term "grant" was used, the grant was to be upon terms such as the municipal authorities might determine, and that this language was more appropriate to the exercise of power by the municipality than to the making of a contract between parties. The Supreme Court of the United States adds: "The language of the section certainly lends itself to this construction, and there is nothing in specific terms conferring the right to contract by agreement between parties, much less to make such contract during its existence exclusive of any further right of the State to act upon the subject in the exercise of its legislative authority. It authorizes the grant of the use of the streets upon such terms as the proper authorities shall determine, not upon such terms as the parties in interest shall agree to."

The Supreme Court says that the plaintiff relied upon Detroit vs. Detroit Citizens' Street Railway Company, 184 U. S. 368; Cleveland vs. Cleveland Street Railway Company, 194 U. S. 517, and Minneapolis vs. Minneapolis Street Railway Company, 215 U. S. 417, but it finds a material difference in circumstances concerned in this case and in the cases in question.

The opinion continues: "It is true that this court has repeatedly held that the discharge of the duty imposed upon it by the Constitution to make effectual the provision that no State shall pass any law impairing the obligation of a contract, requires this court to determine for itself whether there is a contract, and the extent of its binding obligation, and parties are not concluded in these respects by the determination and decisions of the courts of the States. While this is so, it has been frequently held that where a statute of a State is alleged to create or authorize a contract inviolable by subsequent legislation of the State, in determining its meaning much consideration is given to the decisions of the highest court of the State. Among other cases which have asserted this principle are: Freeport Water Company vs.

Freeport, 180 U. S. 587, and Vicksburg vs. Vicksburg Water Company, 206 U. S. 496, 509."

The court then discusses the Wisconsin decisions on this point quoted by both sides, particularly Linden Land Company vs. The Milwaukee Electric Railway & Light Company, 107 Wisconsin 493, and Manitowoc vs. Manitowoc & N. T. Company, 145 Wisconsin 13, and agrees with the Wisconsin Supreme Court in holding the latter to be controlling and that Sec. 1862 denies authority to municipal corporations to make contracts preventing the State from its further exercise of its power to fix the rates which may be charged by public service corporations.

As stated in the issue of this paper for June 26 The Milwaukee Electric Railway & Light Company now proposes to take the matter up with the lower courts, and possibly also with the Railroad Commission, on the question of the reasonableness of the original order, and hopes to win its case.

Cost of Highway Bridges*

Apportionment Between Street Railways and Cities—Four Conclusions Upon Which the Determination of the Proper Settlement Should Be Based

BY CHARLES M. SPOFFORD OF FAY, SPOFFORD & THORNDYKE, BOSTON, MASS.

The fact that trolley cars are so much heavier than other road vehicles puts street railway companies under different obligations than other users of highway bridges and makes it seem fair to assess upon them the extra expense required to provide for traffic of this character. The assessment of street railways to pay for the cost of new bridges in Massachusetts has been established by legislative enactment and has varied from a minimum of 10 per cent to a maximum of 25 per cent, the cost being determined by hearings before a commission appointed by the court.

If the structure is to be of a monumental type, it would seem that the scale of the towers, carving and other ornamental features may be a function of the width of the bridge, and if increased width is necessary to provide for street car traffic, additional expense for this purpose may legitimately be incurred.

Whether any material increase in width is necessary to provide for street car traffic depends upon the total density of the traffic. If the car service is infrequent, there would seem to be no reason for increasing the width of the bridge to provide for street cars other than by the slight amount necessary to provide safe clearance for crowded cars. Ordinary traffic can readily run on the portion of the bridge occupied by the track with little or no delay, and space for extra lines of traffic need not be provided. An example illustrating such a case is the Meridian Street Bridge of Boston, where it was agreed that the proper distance center to center of trusses would be increased only 2 ft. 6 in. by the presence of street cars, although it carries two lines of track.

Another example illustrating the same case is the Chelsea North Bridge of Boston. Provision for four lines of traffic was evidently necessary on this bridge, but it was agreed by both sides before presentation to the Apportionment Commission, that a roadway 40 ft. wide between curbs, with trusses 44 ft. center to center, was required whether street cars were operated or not, this space providing for four traffic lines. In consequence, no charge was made to the railroad for additional width.

To measure the capacity of a bridge or street in relation to traffic, it is evidently necessary to consider the character of the vehicles and their speed as well as their number. For this purpose the London Board of Trade sets up as a unit a motor cab or carriage, and assigns the following numbers to other classes of vehicles, using the unit as one.

Trade Vehicles		Passenger Vehicles	
One-horse (fast)	3	Electric trams	10
One-horse (slow)	7	Omnibuses (horse)	5
Two-horse (fast)	4	Omnibuses (motor)	3
Two-horse (slow)	10	Cabs (horse)	2
Motor (fast)	2	Cabs (motor)	1
Motor (slow)	5	Carriages (horse)	2
Barrows	6	Carriages (motor)	1
		Cycles	½

The board lays down the following definitions: "Traffic volume" is the average aggregate number of traffic units attributable to vehicles which pass a given point per minute during the twelve hours from 8 a. m. to 8 p. m. "Average traffic density" is the aggregate number of traffic units attributable to vehicles which pass the point during the twelve hours, per minute, per 10 ft. of available carriageway. "Greatest traffic density" is the average density per minute, per 10 ft. of available carriageway, during the busiest hour, expressed in traffic units. With the above units and definitions in mind, the following comparison of traffic on London bridges is clear:

	Westminster Bridge	Waterloo Bridge	Blackfriar's Bridge	London Bridge	Tower Bridge
Traffic volume	91.4	60.5	105.9	89.2	84.7
Average traffic density	20.3	22.0	14.4	24.1	24.2
Hour of greatest density	6 to 7	5 to 6	6 to 7	11 to 12	11 to 12
Density of that hour	23.8	22.5	15.3	27.4	27.9
Average vehicles	4.2	3.9	5.0	4.0	6.0

In connection with the width of bridges it should be remembered that the capacity of a bridge in vehicles per hour is considerably greater than that of the ordinary city street due to the freedom from interruption by traffic on intersecting streets and by vehicles stopping at the curb to discharge and receive freight or passengers. It is evident that the width of bridges on curves may have to be increased greatly to provide proper clearance for street cars.

The increase in strength necessary to provide for street cars is most marked in the floor systems. It is less noticeable in trusses and girders, and least of all in foundations. The allowance for impact and future increase of street car loads must be carefully considered in determining the additional strength of the structure, but so far as the foundations are concerned, it is doubtful if any allowance for impact need be made.

The best plan to pursue in determining the difference in cost of bridges with and without street cars seems to the writer to be that of comparing the necessary sizes of main members in the two designs. Allowance for the weight of the details of the second structure may be made by considering the details of each individual member to vary in weight in proportion to the variation in the cross-section of the main member. If the structure has been completed, the weight of details may be established by the gross shipping weights reduced by the computed weight of the main sections.

In the case of a reinforced concrete barrel arch bridge, it would seem as if the additional cost would ordinarily be dependent entirely upon the increased width. The cost of engineering, insurance, etc., may be assumed to vary directly with the cost of construction.

The fact that the cost of maintenance and operation of a highway bridge would ordinarily be borne by the municipality should be considered in apportioning the cost to the street railway. This would be particularly pertinent in the case of swing bridges, where it would seem as if a fair arrangement would be for the railway to furnish the current necessary to open and close the bridge, and for the municipality to maintain the draw tenders and other attendants. In general, it would appear that the street railway might reasonably be charged, as its portion of the capitalized cost of maintenance, a share proportionate to its contribution to the cost of construction.

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*Abstract of paper presented before Western Society of Engineers, Chicago, on May 10, 1915.

All of the above discussion should be considered with due regard to the fact that the railway is ordinarily subject to heavy taxes, and in consequence should be entitled to operate without charge across the bridge with vehicles of weight equal to that of the heaviest motor trucks. The only equity in charging the railway more than the ordinary transportation company is because of the heavy loads which it operates.

The conclusions which the writer has drawn from his experience in apportionment cases of this character are as follows:

1. Additional width to provide for street cars is ordinarily necessary only in the case of bridges with narrow roadways, providing for no more than two lines of traffic.
2. The extra expense involved in strengthening heavy city bridges of permanent type to provide for 50-ton trolley cars would not ordinarily be greater than 10 per cent of the total cost, and may be as low as 6 per cent. This percentage will be greater for light country highway bridges without paved floors, but if such bridges are designed for heavy motor-truck traffic, as they should be, the additional expense will not be excessive.
3. To apportion the cost equitably and with credit to the engineering profession, the engineers on the two sides should try to agree upon the additional cost of provision for street cars before the case is presented to an apportionment commission.
4. It is doubtful if the railway should ordinarily be charged for additional convenience due to the reconstructed bridge. This, however, is a matter the settlement of which hardly comes into the province of the engineer.

Jitney Statistics at Fort Worth

Even on the Best-Traveled Route, Over Which Jitneys Were Operated Seventeen Hours a Day, Very Unfavorable Conditions Are Shown

On March 25 the Northern Texas Traction Company made a detailed check of the jitney business on a day of heavy travel. From the figures so obtained tables and a series of corresponding graphs were reproduced.

An assembly of data covering the jitney operation on all Fort Worth lines, hour by hour from 6 a. m. to 12 midnight, showed that the average passengers per trip on the nine divisions ranged from 1.9 to 2.54. The total number of trips made was 7498, the number of passengers carried, 16,661, the average passengers per trip 2.22 and the gross income of 217 cars $833.70.

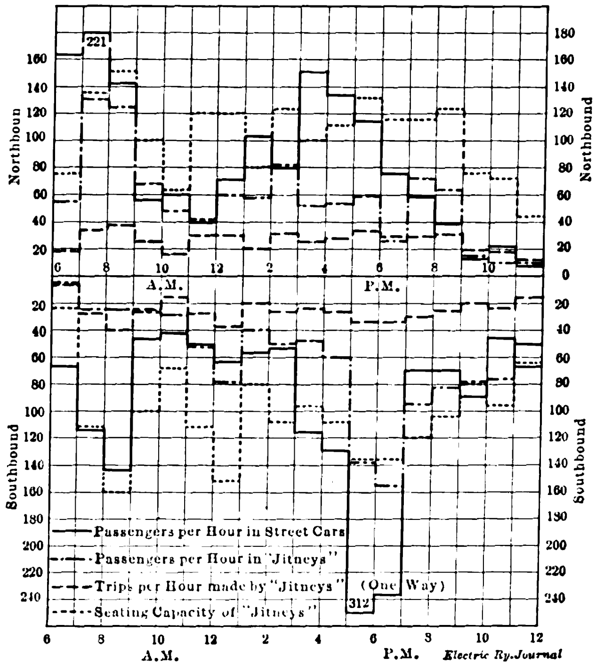
The travel in opposite directions during any given hour showed marked differences, empty trips being numerous. One line, however, was somewhat exceptional in having a fairly even traffic both ways during business hours. The noon-hour traffic was about half that of the peaks on most of the lines.

Among the individual cars on a typical line, which although the longest in the city is also the best-traveled, the highest gross earnings shown were $8.30. But in order to take in this amount the car was operated for seventeen hours, and this necessarily implies the employment of two drivers sooner or later. The gross earnings per mile ranged from 2.5 cents to 3.7 cents. The earnings per hour ranged from 26 cents to 51 cents. The schedule speed averaged about 12 m.p.h., this exceeding the Fort Worth cars by about 50 per cent, but one car made only 7.8 m.p.h. and another 9 m.p.h. The maximum schedule speed was 14.8 m.p.h.

It may be added that in the case of the line in question the maximum run of the jitney is only 3.7 miles long. Even this distance is in excess of the usual jitney ride in other cities, and this is reflected in the condition that the recorded earnings per hour are also somewhat less than usual.

The set of graphs shown in the accompanying cut relates to this line also. In these a comparison is made of jitney versus street railway traffic, also on an hourly basis. The trips per hour made by the street cars are not shown. They amount to four trips each way, during normal hours and from eight to twelve each way during rush hours. The seating capacity of a car on this line is forty, or ten times that of the average jitney.

One unusual feature of jitney operation at Fort Worth is that it was inaugurated by a company which began operation on Jan. 11 with thirty cars. This company has endeavored to keep to certain routes, but modifications have been made from time to time because of inroads from free-lance jitneys. A check of all the cars operated by this company as made on a given date showed that the maximum gross earnings of any one car were $9.50. This must have included the wages of two men as the car was operated sixteen hours and forty-five minutes. The earnings per mile of this car were only 4 cents. The best figure for any car, 4.2 cents, was made by one which ran for twelve hours and thirty minutes, therefore omitting the leanest traffic hours. The average gross for all cars was but 3.37 cents, barely enough to cover depreciation, fuel and maintenance, let alone wages.



JITNEY STATISTICS—GRAPHICAL REPRESENTATIONS OF COMPARATIVE STREET CAR AND JITNEY TRAFFIC

The Texas Power & Light Company on July 1 began to serve power to all Texas Traction Company lines. In the past the railway operated its own power plants, but recently a company was organized to take over the light and power plants.

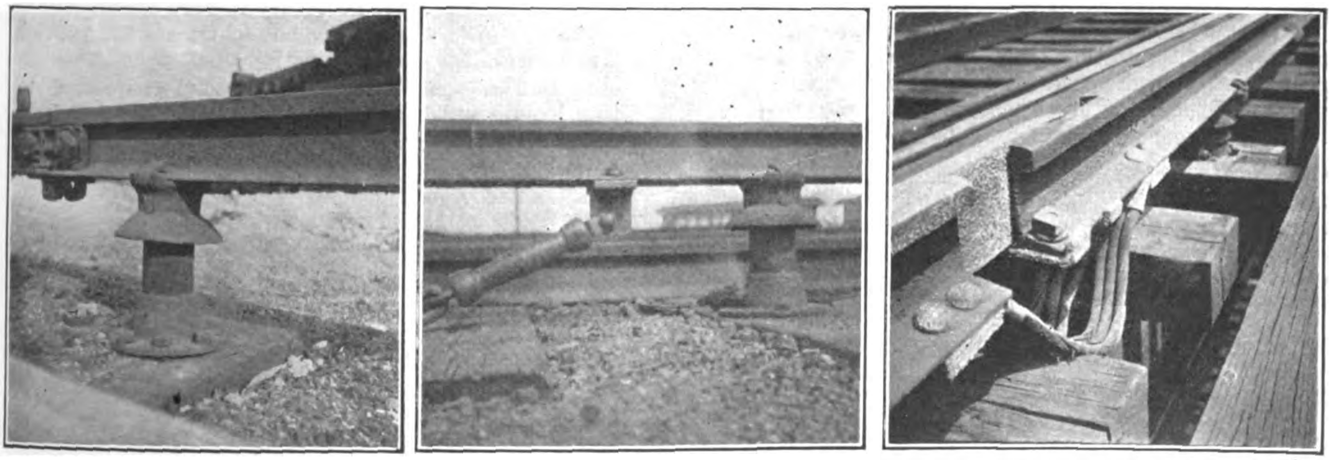
Electric Railway Session at A. I. E. E. Convention

At the Deer Park Convention One Session Was Devoted to Heavy Electric Traction Contact Systems—Abstracts of the Papers Presented and the Resulting Discussion Are Given

The Thursday morning session of the thirty-second annual convention of the American Institute of Electrical Engineers, which was held at Deer Park, Md., from June 29 to July 2, was devoted to a discussion of the construction and operation of overhead and third-rail contact systems with particular reference to costs. In these papers the practice of some of the most important electrified roads was described and the writers very frankly told of the difficulties which had been met and overcome. The salient features of these papers and of the resulting discussion are covered in the following abstracts.

TOP-CONTACT UNPROTECTED RAILS FOR 600-VOLT TRACTION SYSTEM

Charles H. Jones, assistant electrical engineer Metropolitan West Side Elevated Railroad of Chicago, discussed the various factors which enter into the construction, operation and maintenance of top-contact unprotected rail upon which the gravity type of collecting device was used. He took up the subject under the following subdivisions: weight of rail, quality of rail, insulating and supporting, bonding and jointing, anchoring, special work required, method of connecting at crossings and cost of installation and maintenance.



CONTACT SYSTEMS—THIRD-RAIL INSULATOR, ANCHOR INSULATOR AND ATTACHMENT, AND EXPANSION JOINT, RECOMMENDED BY MR. JONES

Referring to the tendency to use heavier contact rail, he stated that the advantage to be gained by the use of heavy rail lies in the fact that a large conductance can be secured for about the same amount of labor charge as that required to install lighter rails which can serve as contact members only. If a paralleling feeder system is required a medium weight of rail, say from 80 lb. to 100 lb., will give more satisfactory results. With heavy rails, the advisability of using a special section should be considered for the purpose of throwing more metal into the contact surface and thereby increasing the life. For weights of rail up to and including 80 lb., the standard A. S. C. E. section is satisfactory. As far as the wear is concerned, Mr. Jones gave data to show that contact rail will last twenty years or more.

For rails weighing less than 80 lb. per yard, there is nothing to be gained by the use of high-conductivity rail, which is more expensive and is more difficult to handle than the hard rail, being softer and therefore more easily kinked during installation. There is no appreciable difference in the rate of wear between low-carbon and ordinary steel in the class of service covered in the paper. With light rail it is better to get increased conductance by using a larger cross-section rather than a softer steel. With heavier rail, if by the use of higher conductivity the expense of a paralleling feeder system can be avoided, the high-conductivity rail should be used. On the other hand there is a certain amount of intangible gain to be secured by having a paralleling feeder system, especially with the narrow working margin that is assumed when the difference in conductivity would decide the question of whether or not a paralleling feeder system would be required.

Insulation of a contact rail for a 600-volt system is more mechanical than electrical. Wherever there is any vibration, porcelain and reconstructed granite, or insulators having castings bolted together have not been satisfactory. Mr. Jones stated that a type of insulator consisting of a circular socket base with flange for bolting to the tie, a cylinder of impregnated wood set in the socket, and a circular top casting with a slot on the top to accommodate the base of the rail, a petticoat to shed moisture and a pair of clamps to keep the rail from jumping out of the slot without binding it had proved very satisfactory. The base casting is the same for all weights of rail. The life of an insulator is from ten to twelve years under ordinary conditions, although impregnated-wood insulators have been known to last from fifteen to twenty years.

The third-rail is cut up into sections of from 1000 ft. to 1200 ft. for anchoring purposes and these are anchored at the center. On surface track not provided with a wooden guard rail the conductor rail may be anchored by attaching several strain insulators in multiple to an iron plate which extends over, and is bolted to several ties, the other end of the insulators being fastened to the base of the contact rail. If wooden guard rail is used, an anchor block consisting of a piece of 6-in. x 8-in. oak 2 ft. long, impregnated with preservative, can be attached to the guard rail, and the contact rail in turn can be bolted to the block. Porcelain insulators may be placed between this block and the guard rail. The best method of providing an expansion gap in the conductor rail is to end a run of rail with an incline leaving a 3-ft. space between stretches. A continuous expansion joint is shown on the preceding page.

Mr. Jones gave the cost of third-rail construction, using 80-lb. T-rail in 60-ft. lengths, as $3,662 per mile for labor and material, of which the labor is somewhat less than 10 per cent. An additional 10 per cent is allowed for engineering and supervision, making a total of $4,028 per mile. For a 50-lb. rail, in 30-ft. lengths, the cost is $3,284 per mile. At an average cost of $80 per mile per year the contact rail can be kept in first-class condition and the insulation changed every twelve years. This, however, does not include complete renewal of rails, plates and bonds, such as will occur when the rail is completely worn out.

OVERHEAD CONTACT SYSTEMS, CONSTRUCTION AND COSTS

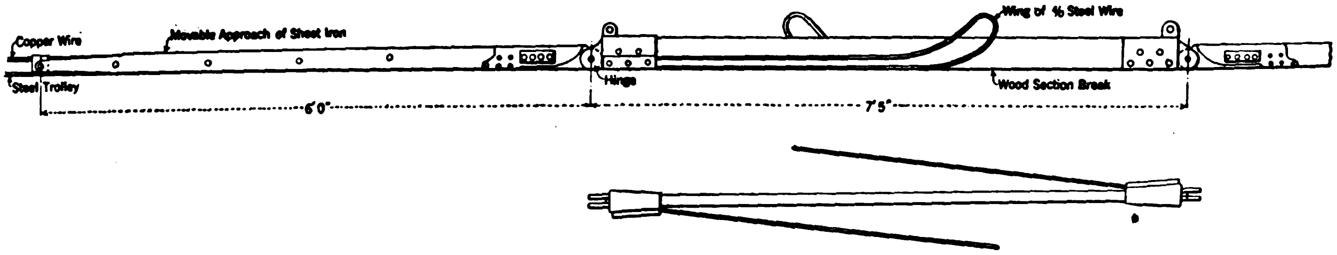
Under the above title E. J. Amberg, engineer McHenry & Murray, New Haven, Conn., and F. Zogbaum, engineer of maintenance New York, Westchester & Boston Railway, summarized the experiences of the New York, New Haven & Hartford Railroad and the New York, Westchester & Boston Railway in so far as they related to the construction and maintenance of the overhead system.

On the New Haven system three types of catenary construction are used; double, compound and single. The first-named was originally considered necessary to provide rigidity, but as first installed it was found not adapted to high-speed service. It was made flexible by the addition of a steel contact wire supported by clips from the copper conductor. The double catenary provided insurance against messenger-wire breakage but it involved several disadvantages. As two live messenger wires were carried over the bridges power had to be cut off to permit work to be done on the trusses. Lightning trouble was experienced with the insulated messenger wire even with electrolytic lightning arresters. The compound catenary provides a grounded messenger wire over each track, removing live parts from the trusses, eliminating lightning trouble and at the same time keeping the trolley wires nearly over the center of a track without the use of pull-off poles except on curves. On curves above 2 deg. the temperature has an influence on the alignment of the contact wire, requiring the use of pull-off spans between bridges. Single catenary is used for both main line and yards. In the latter the copper conductor can be omitted.

Mr. Amberg predicted that steel contact wire will be used less in future although its first cost favors its use. Steel trolley wire rusts considerably and the rust is washed off by rain and drips upon coaches and locomotives, making them unsightly and necessitating frequent painting. If there is not sufficient traffic to keep the under side of the wire bright the rust causes increased sparking and burning of pantograph shoes. On the subject of insulators he stated that the temperature strains in porcelain insulators should be given careful consideration, especially in the dead-end type. Failures have been caused by steam train operation in the electrified zone, breakdowns being most frequent where clearances between the locomotive stack and the insulator are restricted or where steam engines stop under or near insulators. Where clearances are restricted insulators should be located off the center line of the track or two insulators in parallel should be used. In tunnels two insulators in series are advisable.

On the New Haven electrification between Woodlawn and Stamford the bridges were designed so that all overturning moments were taken at the base, requiring large foundations. In later construction the bridges were designed so that the corner connection between the post and truss takes the moment acting across the track. The foundations need then only resist the overturning moment and the shear along the track and can thus be made much lighter. Cross-span construction is adapted for use over a large number of tracks equipped with single catenary, both on main line and in yards.

Mr. Amberg described a flexible wood section break for use in catenary construction, as shown in an accompanying illustration. It is designed to eliminate the hard spot produced by the rigid break. The break proper is connected in the line between two movable sheet-iron approaches. To prevent a train being stalled on the break, flexible wings of heavy steel wire, placed as shown, insure continuity of pantograph contact. These breaks are not necessary in yard construction on account of the slow movement of trains. On the New Haven line, air sectionalization is used wherever possible but there are a number of places where wood section breaks must be used.



CONTACT SYSTEMS—FLEXIBLE SECTION BREAK NEW HAVEN SYSTEM

Mr. Amberg gave also some curves and tables of costs somewhat similar to those given by W. S. Murray in his Philadelphia paper abstracted in the issue of this paper for Jan. 30, 1913, page 229.

Mr. Zogbaum gave the results of operating experience on the New York, Westchester & Boston Railway. He stated that it has not been found advisable to stagger the contact wire to secure uniform wear on pantograph shoes, but called attention to the necessity for allowing for swaying movement of locomotives and cars in locating the contact wire, especially on curves. Trains running at high speed on curves sharper than 1 deg. swing the pantographs toward the outside of the curve. More than 30 per cent of the 54¼ miles of contact wire on this system is over curved track, requiring slight adjustment from time to time.

In addition to the contact wire this system includes 181 miles of transmission line of which 109 miles are for traction power only, and the balance includes signal feeders and control lines. In the catenary system are six sectionalizing bridges and seventy-seven high-tension oil circuit breakers used for sectionalizing the high-tension power. In maintaining this system a force consisting of an engineer of maintenance, a general electrical foreman, one day foreman, one night foreman, five linemen and one assistant lineman is required. The force is able also to do the necessary construction work. It uses a work train consisting of a gasoline-electric locomotive and a work car, the locomotive containing an overhead platform. On the work car is a searchlight for use in making inspections and repairs.

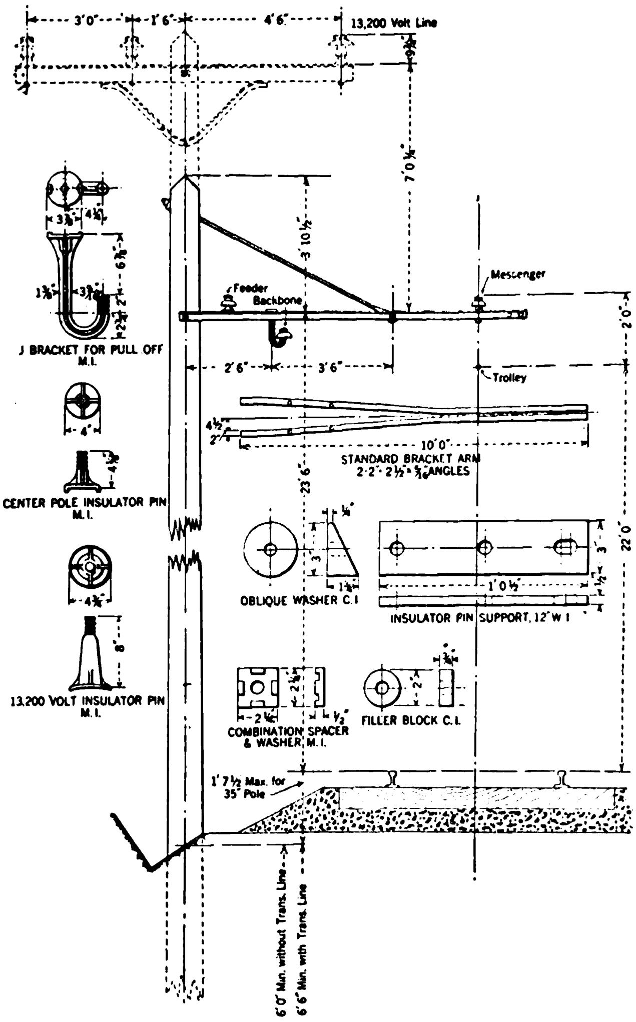
Very satisfactory operating efficiency has been secured, there having been in 1913 27,927 car-miles operated per pantograph failure; in 1914 55,503 car-miles, and in the three months ending March, 1915, 64,799 car-miles. The causes of pantograph breaks were: wire off center, low joints on running rails on curves, overhead frog on deflector out of adjustment, and loose sleeves on contact wire. In 1913 practically 880,000 train-miles were made with 210 delays of a total duration of 2170 min. from power trouble, and seventeen delays with a total duration of 129 min. from pantograph and contact-wire trouble. In 1914, with practically the same mileage, power trouble produced but ninety-seven delays of 2256 min. duration, while pantograph and contact-wire trouble produced fifteen delays of 117 min. duration. In the first three months of the current year, with proportional mileage, there was no power trouble, and but one delay of 2 min. duration from the other source. Details of the causes of the various delays were given, and train-minutes delays by months were charted. The road has an excellent insulator-failure record, troubles from this source being practically negligible.

The wear on the under side of the grooved-steel contact wire has produced a ⅛-in. flat surface, and this has been uniform over the line, no difference being noted between high wire and low wire, tangent track and curves. From present indications the steel wire will have a total life of from six to seven years. Pantograph mileage varies from 1000 to 1300 miles in the winter up to considerably more than 2000 miles in the summer. The higher mortality in winter is due to the necessary increase in tension on account of the contraction in the contact wire. The total maintenance cost per car-mile for July, 1914, is given as 1.56 cents and for December, 1914, as 1.42 cents, including supervision of transmission and contact system, miscellaneous electric line expenses, work train, etc. Details of the actual expenditures for selected months are included in the paper. It also contains a digest of the operating rules and regulations of the organization.

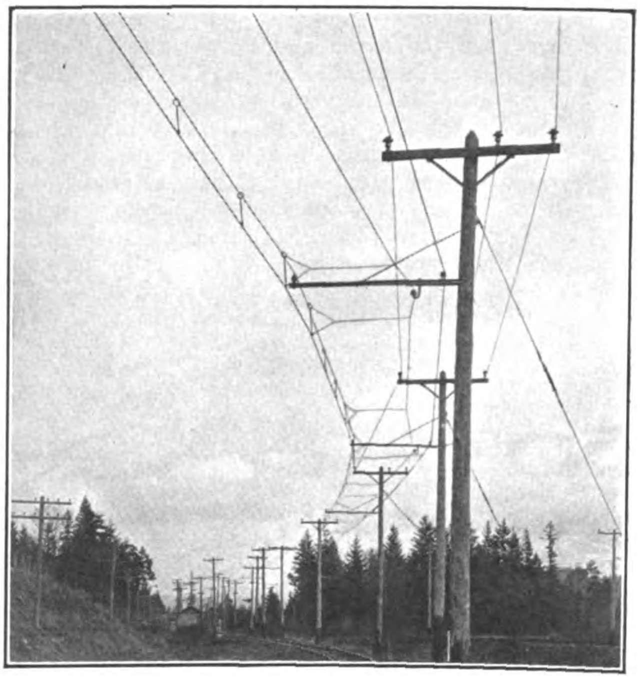
CONTACT SYSTEM OF THE SOUTHERN PACIFIC COMPANY, PORTLAND DIVISION

Paul Lebenbaum, electrical engineer Portland, Eugene & Eastern Railway, described the overhead construction of the electrified lines of the Southern Pacific Company between Portland and Whiteson, this being the first electrification in Oregon of the Southern Pacific System. The electrification involved 104 miles of single track with approximately 16 miles of second track and siding. With the exception of 3 miles of 600-volt trolley in Portland, the operating voltage is 1550. Electric operation was begun on this system in January, 1914.

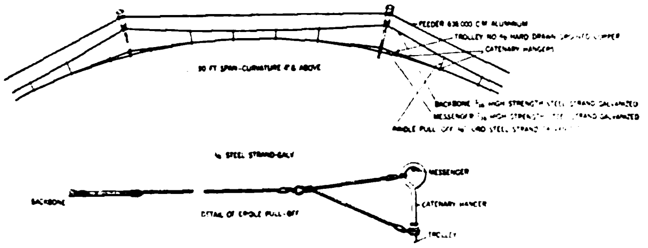
In general, side-bracket catenary construction of the type shown in an accompanying illustration is used, the 13,200-volt high-tension line being carried on the same poles on parts of the system. Standard pole spacing


3'0"
1'6"
4'6"
13,200 Volt Line
9"
7'0½"
3'10½"
3⅜"
4½"
6⅞"
1⅜"
3⅜"
2"
2½"
J BRACKET FOR PULL OFF M.I.
Feeder
Backbone
Messenger
2'0"
2'6"
3'6"
Trolley
4"
4½"
2"
10'0"
STANDARD BRACKET ARM 2-2"·2½"×5/16" ANGLES
23'6"
22'0"
4½"
CENTER POLE INSULATOR PIN M.I.
⅛"
3
1⅛"
OBLIQUE WASHER C.I
3"
½"
1'0½"
INSULATOR PIN SUPPORT, 12" W I
4⅞"
8"
13,200 VOLT INSULATOR PIN M.I.
2⅛"
2⅛"
½"
COMBINATION SPACER & WASHER, M.I.
¾"
2"
FILLER BLOCK C.I.
1'7½ Max. for 35' Pole
6'0" Min. without Trans. Line
6'6" Min. with Trans. Line

CONTACT SYSTEMS—STANDARD BRACKET CONSTRUCTION PORTLAND DIVISION, SOUTHERN PACIFIC COMPANY



CONTACT SYSTEMS—SINGLE-TRACK CURVE CATENARY CONSTRUCTION, WITH 13,200-VOLT TRANSMISSION LINE, ON PORTLAND DIVISION, SOUTHERN PACIFIC COMPANY

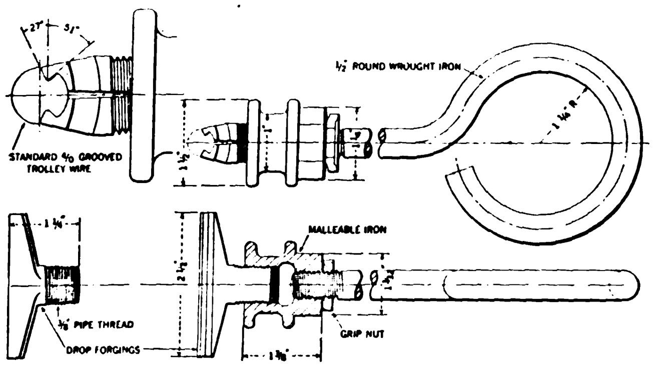

FEEDER 636,000 C M ALUMINUM
TROLLEY NO 4/0 HARD DRAWN GROOVED COPPER
CATENARY HANGERS
90 FT SPAN—CURVATURE 4° & ABOVE
BACKBONE 5/16 HIGH STRENGTH STEEL STRAND GALVANIZED
MESSENGER 7/16 HIGH STRENGTH STEEL STRAND GALVANIZED
SINGLE PULL OFF ... STEEL STRAND
¼ STEEL STRAND-GALV
MESSENGER
BACKBONE
DETAIL OF SINGLE PULL-OFF
CATENARY HANGER
TROLLEY

CONTACT SYSTEMS—STANDARD PULL-OFF CONSTRUCTION PORTLAND DIVISION, SOUTHERN PACIFIC COMPANY

on tangents is 150 ft., but the average rate of distribution of poles is fifty-four to the mile, there being 25 per cent of the main line mileage in curved track. The standard pole length for catenary construction is 35 ft. and for transmission and catenary 40 ft. These poles cost at the hole as follows: 35 ft., $6.90; 40 ft., $7.50; 45 ft., $8.25; 50 ft., $8.85, and 55 ft., $9.60, the lengths greater than standard being used for telephone and telegraph line crossings, etc. All poles were given two brush treatments with carbolineum avenarius from a point 18 in. above the ground to within 3 ft. of the butt. The preservative was applied by means of burlap fastened to the ends of long mop handles, and it was kept hot by steam coils placed at the bottom of the shallow tank over which the poles were rolled. Approximately 1 gal. of preservative, including losses, was used per pole.

The catenary hanger used was of the loop type. As roller pantographs were used, great flexibility of the contact system was necessary, especially on curves. On the latter a pull-off construction like that shown in an accompanying illustration was used.

Basing the annual cost of maintenance on the experience from Oct. 1, 1914, to March 31, 1915, when the contact system was almost new, the values are: For material, $804; for labor, $7,320, a total of $8,124, or $78.11 per mile per year. The maintenance crew consisted of one foreman, three linemen and four groundmen. In addition to maintaining the contact system this crew handled all repairs to the 13,200-volt transmission lines and 2½ miles of 60,000-volt transmission lines. Gasoline section motor-cars, equipped with towers are used for maintenance. On the electrified section the average train-miles per day are 1460, motor-car-miles per day, 3041, and trail-car-miles per day, 560. The weight of the motor-car is 53 tons, that of the trail car 35 tons and the schedule speed is 20 m.p.h. The average running current per motor-car is 200 amp. The cost of maintaining the roller collectors, which are now equipped with roller bearings, is about 40 cents per 1000 motor-car-miles. The collectors are made of 5-in. steel tubing and they are operated at a pressure of from 30 to 35 lb. against the wire. The mileage per collector has been about 9700, but this record was lower than it should have been because a defective quality of tubing was originally furnished. The wear on the trolley to date has been inappreciable.

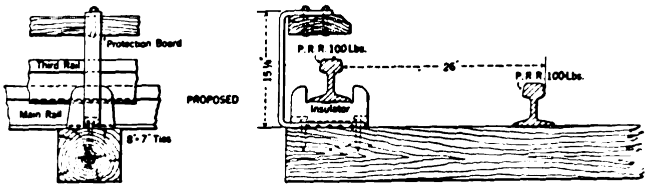

27°
51°
STANDARD 4/0 GROOVED TROLLEY WIRE
½" ROUND WROUGHT IRON
1⅛" R
1½"
1"
1¼"
MALLEABLE IRON
2½"
1½"
⅜" PIPE THREAD
DROP FORGINGS
GRIP NUT
1⅜"

CONTACT SYSTEMS—STANDARD CATENARY HANGER PORTLAND DIVISION, SOUTHERN PACIFIC COMPANY

THIRD RAIL AND TROLLEY SYSTEM OF THE WEST JERSEY & SEASHORE RAILROAD

J. V. B. Duer, assistant engineer Pennsylvania Railroad, Altoona, Pa., gave construction and operating data regarding this property in addition to those already available. The system has a total of 131.7 miles of third-rail track and nearly 20 miles of trolley track, about a mile of the latter overlapping the third-rail. Substations are 10 miles apart and no third-rail feeders are used. The substation bus voltage is 700. Trains of from two to seven cars are operated between Camden and Atlantic City.

The third-rail insulators are of reconstructed granite or porcelain and are held in position by a metal centering cup which is secured to the ties by means of lag screws. The rail rests upon the insulator and is not clamped thereto. The insulators are placed on ties 9 ft. 4 in. long, spaced approximately 8 ft. apart. This type of insulator, shown in an accompanying illustration, has been adopted on account of a change in the method of supporting the top protection board.

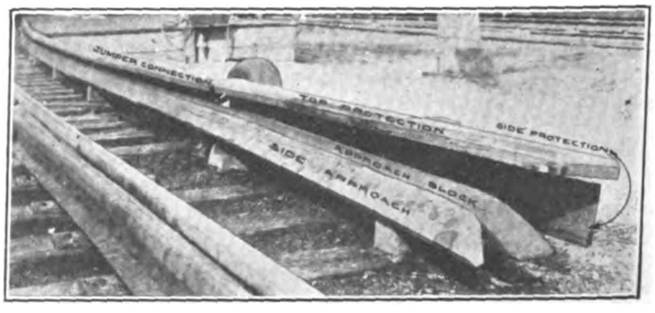

Protection Board
Third Rail
Main Rail
8"·7" Ties
PROPOSED
P.R.R. 100 Lbs.
15⅛"
26"
P.R.R. 100 Lbs.
Insulator

CONTACT SYSTEMS—PRESENT THIRD-RAIL CONSTRUCTION WEST JERSEY & SEASHORE RAILROAD

Originally the third-rail was equipped with protection only at stations, 75 ft. on either side of road crossings, and in terminal yards. This protection consisted of side and top boards carried from castings attached to the rails by hook bolts. Maple posts were attached to the bottom castings by bolts and supported top castings carrying the top protection boards. During the early part of 1912 top protection was added to all unprotected rails using the plan already mentioned. The boards were treated with two coats of hot creosote, and contiguous boards were joined by means of wrought-iron plates.

The original cost of construction of this line was as follows: For the 131.73 miles of third-rail, including the rail, bonding, insulators, protection, etc., $557,636, or $4,235 per mile; for the 19.56 miles of trolley, including wires, poles, line material, lightning arresters, etc., $80,500, or $4,120 per mile. The track bonding of 151.29 miles cost $102,659, or $678.50 per mile.

Shortly after the third-rail was placed in service it began to creep in the direction of traffic, with constant


JUMPER CONNECTION
TOP PROTECTION
SIDE PROTECTION
APPROACH BLOCK
SIDE APPROACH

CONTACT SYSTEMS—STANDARD THIRD-RAIL APPROACH WEST JERSEY & SEASHORE RAILROAD damage to insulators. To overcome the difficulty the third-rail was anchored to the ties at intervals of from 1000 ft. to 1500 ft. and the practice of periodically loosening the splice bars and oiling the joints was instituted.

Although sleet-cutting shoes were used on the cars during certain seasons, with a provision for applying extra tension of from 90 lb. to 100 lb. to the shoes, considerable delay was occasioned by sleet. This has been minimized by the use of calcium chloride supplied from tanks and distributed hot on the rail. These tanks were hauled over the road by steam locomotives when sleet began to form, with good results. The addition of the top protection to the rail prevented sleet formation except when a driving wind accompanied the sleet-forming weather, in which event the chloride cars were used as formerly.

During seven years past the average maintenance cost per single-track mile per year has been $490.25 for the trolley, $81.74 for the third-rail, and $25.84 for the track bonding, which amounts are respectively 11.9, 1.9 and 3.8 per cent of the corresponding investments.

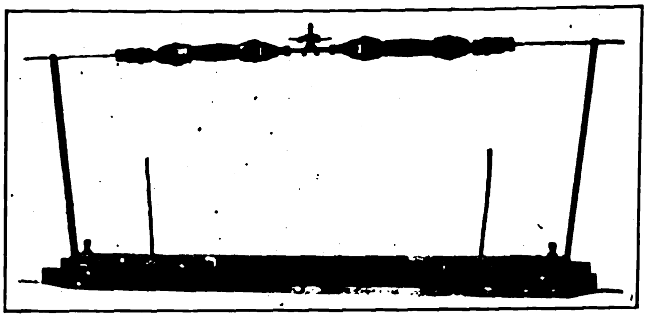
During the year 1912 the car-miles per minute of detention from various causes chargeable to the contact system were as follows: Third-rail short-circuits, 56,673; third-rail out of place, 1,161,809; third-rail protection out of place, 232,362; sleet on third-rail, 11,885, and trolley-wire trouble, 17,085.

CONTACT SYSTEM OF THE BUTTE, ANACONDA & PACIFIC RAILWAY

In an elaborate paper J. B. Cox, railway engineering department General Electric Company, described many of the special problems of the design of the rollers and overhead construction for this electrification. Overhead construction was used because approximately 60 per cent of the electrified tracks consist of yard trackage and sidings with numerous switches and street crossings.

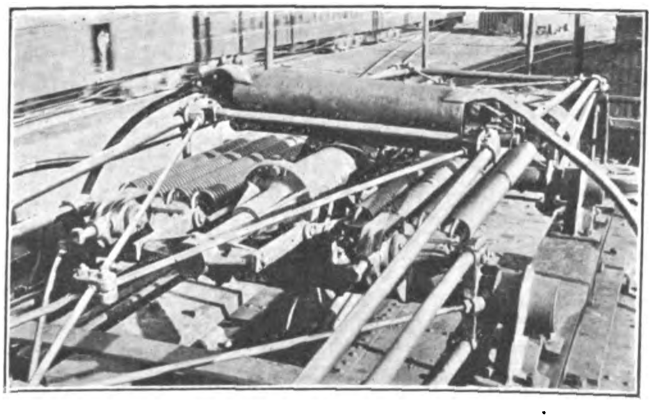
The roller used consisted of a Shelby steel tube 5 in. in diameter, 24 in. long and 1/8 in. thick when turned. Removable bearing housings of aluminum metal were fitted into each end of the tube, each carrying two bronze sleeve bearings. The complete roller revolved about a 5/8-in. steel shaft fixed at each end by clamps to the pantograph frame. The complete roller weighed about 31 lb. As this weight was much greater than that of the contact element of a sliding pantograph, it was decided not to attempt to make the contact device respond to inequalities due to hard or uneven spots in the trolley wire but to remove such spots. After experience with the operation of this roller it was modified by installing Hyatt roller bearings, which have proved very satisfactory. Early troubles in keeping the roller on the trolley wire have been overcome by the installation of improved wearing or guide plates.

In producing a flexible trolley wire a new hanger was devised. It was made up of 5/8-in. x 1/8-in. flat strap, with a malleable-iron ear secured by a 1/2-in. x 1 1/2-in. carriage bolt. The upper end was looped over the messenger wire, giving a flexible support. The jaws were designed to permit the operation of a trolley wheel should such be desired. A special pull-off was also designed by means of which the messenger and trolley wires were held in position by separate clamps, from each of which ran an individual pull-off wire with a strut between the two, maintaining the pull parallel to the horizontal plane of the trolley wire and allowing a free vertical movement independent of the messenger. The single pull-off of the type described was found superior to a double pull-off or a rigid pull-off, although these were used in some cases. It was found unnecessary to use deflectors such as are generally required with pantographs. Instead, the trolley and messenger wires which were intended to follow a switching track were started several feet ahead of the switch from a point convenient for dead ending, and several inches above the horizontal plane of the through wires, and gradually brought down to that plane a short distance ahead of the switching point where they were gradually carried away following over the switching track. Air-section insulation was used where practicable, the ends of the wires of each section being made to overlap the length of a pole spacing, the two sets of wires being carried in approximately the same horizontal plane and about 12 in. apart for a few feet in the middle of the span, from which point the dead ends of the trolley wire were gradually carried above the path of the collector to the anchorage.


CONTACT SYSTEMS—SECTION INSULATOR FOR PANTOGRAPH COLLECTOR, WITH ATTACHMENT TO SPAN WIRE

At street railway crossings two wooden section insulators were connected in the 2400-volt line about 75 ft. apart with a protecting zone between. The railroad tracks cross street railway tracks at six points, four of which are at street level in Butte. Two in Anaconda are not at street crossings and here the street railway company coasts its cars over the crossings. At two crossings in Butte watchmen employed to operate gates manipulate the switches which are interlocked with the gates. Special commutating switches were provided to overcome arcing difficulties.

The total cost of the trolley and feeder system, inclusive of bonding and all changes made necessary in the way of clearance for poles, bonding, etc., up to June 30, 1914, was slightly more than $500,000, or for the overhead system, including feeders and bonding, $5,514.15 per track-mile or $13,381 per route-mile. All of the construction was done while the road was under full operation and under many conditions which tended to increase the cost above normal. Among these were: the large percentage of curves and special work, the high price of all labor, interference of foreign wires, changes

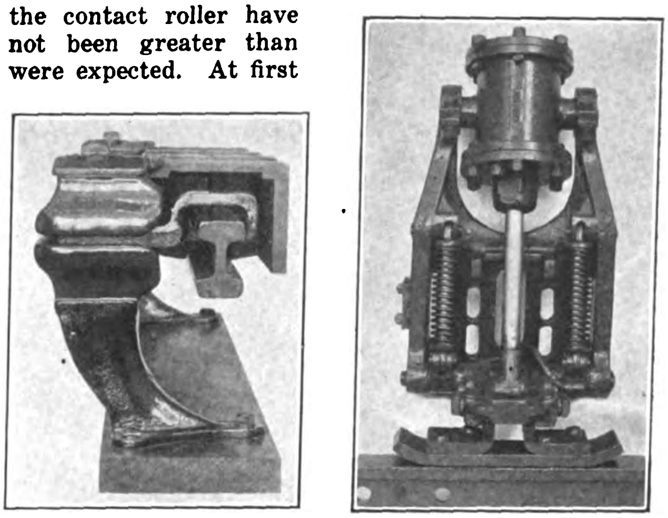

CONTACT SYSTEMS—ROLLER PANTOGRAPH MOUNTING WITH IMPROVED WEARING PLATES

in location of tracks, walkways, platforms, buildings, trestles, bridges, etc., extra-heavy foreign traffic on the main line, strike of electrical wiremen, cold weather, variation of ground condition, number of street railway crossings, etc. Seldom would there be found more complications than in this case.

Repair work on the 2400-volt trolley line is done from an ordinary wooden work car without special insulation with full voltage on the line and there have been no serious cases of shock to linemen.

The cost of maintaining the distribution system from October, 1913, to March, 1915, inclusive, has been slightly under $15,000. This is at the rate of $9,930.46 per year or $109.13 per mile per year. The paper gives full details of maintenance costs. Measurements have been recently made to determine the rate of wear of the trolley wire, the original diameter of which was supposed to average about 0.482 in. With due allowance for the change in the form of the wire as it wears, and from the fact that the measurements show an average of 3041 pantograph passages per 0.001 in. wear, the wire can be expected to last twenty-two years.

The difficulties with the contact roller have not been greater than were expected. At first sticking in the bearings occurred due to imperfect alignment of clamping jaws, loosening of the caps in the bearing head, collection of ice between the roller and the support, etc. These were overcome by simple expedients, including the adoption of roller bearings already mentioned. From results so far obtained the average mileage per tube is about 11,030. The average mileage with roller bearings is about 16,000, an increase of 35 per cent. The average cost of maintaining the original pantographs with three bearings was about $185 per month, or $3.20 per thousand locomotive-miles. The present corresponding cost is about $35 per month, or $0.62 per thousand locomotive-miles. At first a wooden lining was pressed inside the roller, but this was found unnecessary and is now omitted.

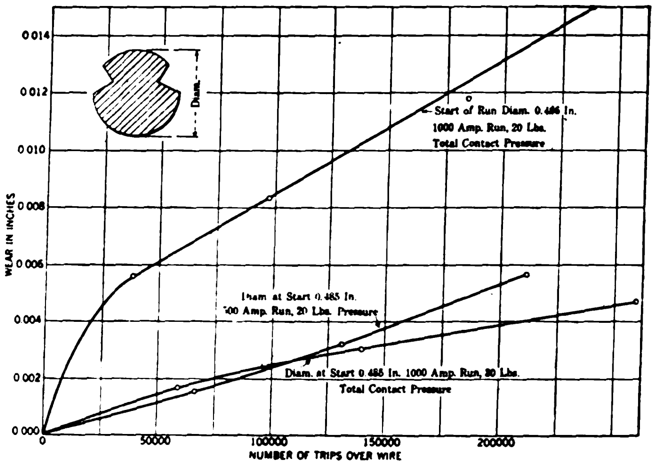


CONTACT SYSTEMS—HIGH-TENSION THIRD-RAIL ON EXPERIMENTAL LINE IN ERIE. AIR-OPERATED THIRD-RAIL COLLECTOR FOR HIGH VOLTAGE LINE IN MIDDLE WEST

Measurements made to ascertain voltage drop and energy consumption show the maximum voltage drop to be 14.5 per cent, the average being 5.6 per cent. In the Smelter Hill service, with an average train weight of 1633 tons and a schedule speed of 15½ m.p.h., at an average voltage of 2293, the average power consumption was 1398 kw., and the current 767 amp., while the unit energy consumption was 55 watt-hours per ton-mile. From Rocker to East Anaconda, with a schedule speed of 20.1 m.p.h., the average was 13.73 watt-hours per ton-mile.

CONTACT CONDUCTORS AND COLLECTORS FOR ELECTRIC RAILWAYS

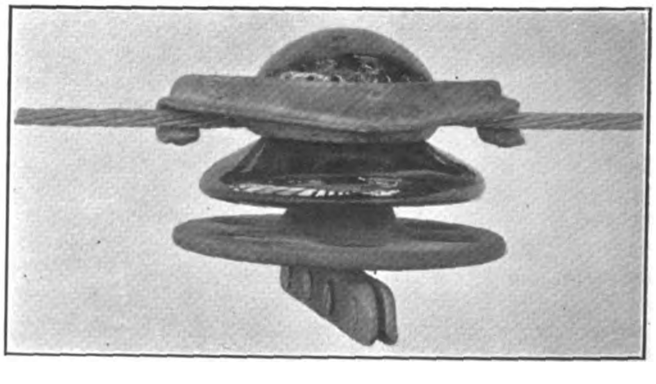
The problem of current collection as a whole and the essential factors in successful operation were discussed by C. J. Hixson, railway engineering department General Electric Company. He called attention to the fact that the A. I. E. E., when defining standards for electric railways, subdivides distributing systems into two classes—contact rails and trolley wires. He followed the same subdivision in contact devices, namely, contact rail collectors and trolley wire collectors. Similarly, rail collectors were subdivided into: third-rail shoes, overhead shoes, center shoes, and underground shoes. Trolley-wire collectors were classified as wheel trolleys, roller trolleys, and slider trolleys. The frames supporting the collecting mechanism may be pole, bow, or pantograph. The term "pantograph trolley" is not definite, since it designates a form of frame common to all three types of trolley wire collectors.



CONTACT SYSTEMS—WIRE WEAR WITH SLIDING CONTACT CURRENT COLLECTION

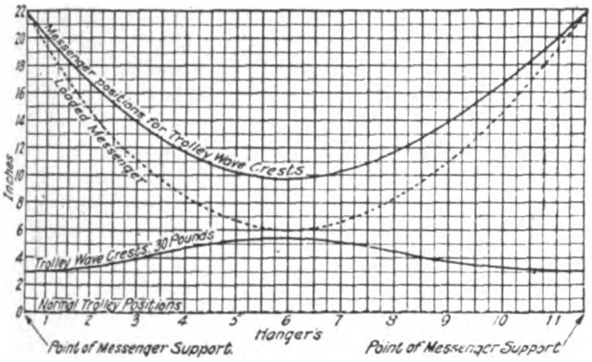
Contact-rail systems possess great reliability and involve low maintenance cost. They are particularly adapted for elevated and subway work, especially where it is necessary to change quickly from one to the other. High collecting capacity and space considerations are also in their favor. The high initial cost, danger to life, difficulties from sleet and snow, and complications in yards have been among the factors preventing their wide application to interurban and steam road service. Inverting the rail and using an underrunning shoe have overcome sleet and snow difficulties with some increase in cost. A 2400-volt third-rail is operative and its use permissible under some conditions.

Contact-wire systems are of two types, direct suspension and messenger or catenary suspension. The



CONTACT SYSTEMS—1200-VOLT SUSPENSION WITH PORCELAIN INSULATION direct suspension is suitable for low speeds and moderate amounts of power and, with the contact wire insulated by suspensions of molded insulation or other suitable material, gives good service. Giant strain insulators are in many cases connected in the span wires. The wood pole is undoubtedly responsible for much of the success of direct suspension. The use of wood for poles and insulators is gradually decreasing and porcelain is being adopted for strain and suspension insulators. Direct suspension is cheap and has performed useful service in keeping down initial investments, but with increasing speed and capacity requirements a more flexible form of construction is needed.

With messenger suspension the effect of the messenger wire is of great assistance in increasing the height of the wave produced by the passage of the collector. The crest of this wave is over the collector and the height depends upon the elasticity at that point. If the hanger is designed to permit a free further upward movement of the trolley additional flexibility is secured.



CONTACT SYSTEMS—TROLLEY WAVE CREST CURVE AND POSITIONS OF MESSENGER

Mr. Hixson gave the results of measurements made to determine the upward deflection of the trolley wire under different conditions of support and pressure. Typical results are shown in the accompanying diagrams. He also gave a pair of characteristic pantograph curves showing the relation of roller pressure to roller position, and other curves of importance in current collection under heavy traction conditions. He concluded by listing the following as topics worthy of discussion in this connection:

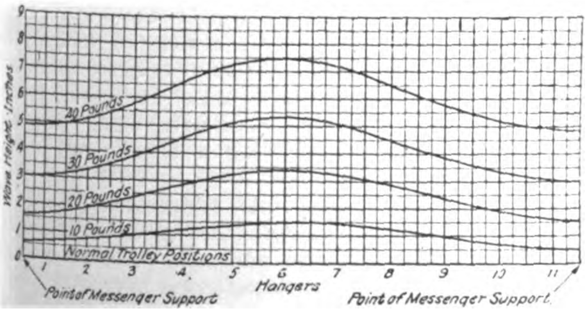
The use of deflectors or other devices at sidings.

The best method of section insulation.

Convenient means for taking up slack at anchorage vs. automatic take-up devices in conjunction with the introduction, artificially, of elasticity into the line.

Elimination of splicing sleeves, particularly of the soldered type.

The necessity for staggering the trolley wire and frequency of steady braces against action of the wind.



CONTACT SYSTEMS—TROLLEY WAVE CREST CURVES FOR DIFFERENT PRESSURES

Construction at tunnels and bridges both as regards insulation and collection.

The necessity for uniformity in the safety factors allowed in different parts of the country.

The best method of arranging "ticklers" for warning the brakeman of approaching bridges or tunnels upon electrified lines.

In regard to the problems which might be discussed in connection with trolleys might be mentioned:

The desirability of the air-locked vs. the air-raised type.

Height of the trolley wire.

Width of contact strips.

Shape of horn.

Clearance allowances between trolley and permanent way.

DISCUSSION ON CONTACT SYSTEMS

In the discussion of the topics covered in the papers and in connection with the presentation of the papers by the authors many valuable additional points were brought out. Mr. Duer said that on the West Jersey & Seashore Railroad reconstructed granite insulators are being used to replace worn-out porcelain ones. One reason for the selection of the same rail section for the contact rail as for the main rail was to give facility in making track repairs. He called attention to the independence of the new protection which he described from the contact rail, insuring non-interference with creepage, expansion, and contraction. Insulated anchors had been tried in an endeavor to prevent creepage, but they were the source of fires, and their use was abandoned in favor of oiling the angle plates. Stranded bonds have been substituted for ribbon bonds to give increased flexibility, although Mr. Duer thought that the latter might be satisfactory with very well ballasted track. The bond testing is done in a preliminary way by men equipped with contact points in their shoes connected to an indicating instrument. These men mark bad bonds for further and more accurate test. In reply to questions regarding the chloride treatment of steel he said that the specific gravity of the solution is 1.2 and that the solution is spread by means of special shoes. An overrunning conductor rail should be wide and low for stability, but raised on high insulators to protect the latter from stray ballast. Careful attention should be given to side and end approaches, as the shoes on high-speed cars are apt to be thrown against the protection boards at these points. On the West Jersey & Seashore Railroad end protection boards have to be renewed annually on account of the wear due to contact shoes. Metal sheathed side approaches were used on the Pennsylvania Railroad New York terminal.

Mr. Cox stated that on the Butte, Anaconda & Pacific electrification the safety of people who could not be kept away from the tracks was an important factor in the choice of an overhead contact system. In the paper no detention records were given because detentions had been negligible. While the dispatcher notes detentions on his record sheet they have not been important enough to warrant tabulation. Most of the troubles with the rollers at first were due to their not rolling.

Mr. Hixson said that he had felt the necessity of obtaining a comprehensive grasp of the whole subject of contact systems, and the purpose of his paper was to summarize the situation. The measurements described were the result of an effort systematically to improve operating conditions. He emphasized the importance of the flexibility of the messenger wire in absorbing waves as indicated by the hanger loop, which is lifted less at the center of the span than at the points of support. The pull-off presents the most difficult problems in overhead design and in choosing a method of support the designer must decide as to the influence to be allowed special construction, such as that on curves, in determining the plan to be followed.

G. H. Hill, engineer railway engineering department, summarized briefly a contribution to be published later in the proceedings. He stated that the costs of third-rail and trolley construction are about equal. The former is necessary with low-voltage heavy traction, but the general tendency is toward overhead construction. The lubrication of overhead pantograph shoes is a very important matter and can be accomplished readily, one plan being to use an inverted pressed-steel pan, shod with copper strips and with a central groove for storage of lubricant. The lubricant consists of graphite grease. This forms a film on the contact wire and incidentally prevents sleet accumulation. Adding lubricant does not interfere with current collection for the contact electrical resistance is actually lowered. Taking up the important subject of inductive voltage rises in overhead wires and in third-rail, Mr. Hill stated that there is a considerable rise and that this is about the same in the two. While the inductance of the rail is greater this produces a time lag which keeps down the voltage. The energy discharge is, of course, much greater from the rail. The peak voltage may be double the operating voltage.

H. M. Hobart, consulting engineer General Electric Company, described a novel form of third-rail construction being installed on the 1200-volt electrification in England between Manchester and Bury. This will be open for traffic in a few months. The rail is of the side-bearing type of channel section, protected all around with the exception of a top slot to admit the flat, hinged collector shoe. The rail with its protecting boards rests loosely in a slot on the top of the insulator and the protecting boards are held in place by means of steel spring clips and wooden wedges. Additional details of this installation will be given in an early issue of the ELECTRIC RAILWAY JOURNAL. The rail is the invention of J. A. F. Aspinall, general manager Lancashire & Yorkshire Railway. Mr. Aspinall is essentially a steam railroad man who appreciates the possibilities of electricity as a motive power. The installation is attracting much attention in Great Britain.

In reply to a query Mr. Zogbaum stated that wood insulators are generally used between tracks on the New Haven system with good results. They are thoroughly cleaned every three years. Prof. D. D. Ewing wanted to know if the maintenance cost of running rails is increased by the presence of the third-rail, and Mr. Duer said he would furnish data on that subject.

Prof. D. C. Jackson, Massachusetts Institute of Technology, chairman of the railway committee in charge of the program of the railway session, closed the discussion by referring to some research work which Dr. A. E. Kennelly, Harvard University, and he had under way relating to skin effect in rail conductors. This promises interesting results which will bear upon the subject of inductive effects in third-rail.

The session closed with an expression of its unique character and of the great value of the cost data contributed, such data being as a rule almost inaccessible.

A recent disastrous wreck in England was caused by the entry of an express train into a block where a local train was standing, an improper clear signal having been given by the manual-block operator.

A. S. T. M. Specifications for Trolley Wire

Committee on Copper Wire Outlines Reasons for Failure to Agree with American Electric Railway Engineering Association

At the eighteenth annual meeting of the American Society for Testing Materials, held in Atlantic City on June 22-26, the report of most importance to electric railways was that on copper wire specifications. In this the differences between the A. S. T. M. committee and the committee on power distribution of the American Electrical Railway Engineering Association were outlined as follows, the A. S. T. M. committee being referred to as Committee B-1 and the A. E. R. E. A. committee as the Power Committee:

"In the last two reports of the committee, reference has been made to work undertaken in conjunction with a sub-committee of the Power Committee of the American Electric Railway Engineering Association, with a view to the formulation of specifications for trolley wire, which might be adopted as the standard by both societies. Specifications were tentatively proposed by the A. E. R. E. A. sub-committee, which were reluctantly accepted by the sub-committee of Committee B-1. But Committee B-1 could not agree to these specifications, which in some important respects were different from our standard specifications, and radically at variance with definitely expressed opinions of the committee. Therefore, in 1914, Committee B-1 reported postponement of final action on these proposed specifications, and began to collect data and opinions from a number of large electric railways using trolley wire, on their practice with respect to specifications, and the necessary requirements for such wire. This canvass showed that a considerable majority of those roads buying under specifications had already adopted substantially the requirements of the standard specifications of this society. Many large purchasers were using no specifications, while others were buying a high-strength alloy wire instead of copper. In the meantime the Power Committee had presented to the American Electric Railway Engineering Association at its annual meeting, the proposed specifications which have been adopted.

"Finally at a meeting of Committee B-1, with nine of the eleven members present, it was unanimously voted that Committee B-1 recommend no change in the present standard specifications for hard-drawn copper wire in so far as they apply to trolley wire.

"For the information of the society, the committee makes this brief statement of the two points of difference between themselves and the Power Committee of the A. E. R. E. A.: (1) The Power Committee was of the opinion that trolley wire should not be hard drawn but should, in effect, be somewhat less than hard drawn, that is, more nearly what is defined as medium hard drawn; yet the values for strength proposed were, for minimum values, substantially those of our standard specifications for hard-drawn copper wire. (2) The Power Committee, after long consideration and after many tests had been made, appeared to agree that the twist test, upon the inclusion of which it was insistent, could only safely be applied qualitatively; yet the committee insisted upon specifying a definite minimum number of twists.

"To neither of these points could Committee B-1 agree. The first was considered inconsistent. The second the committee felt was adequately covered in the specifications as offered for amendment later in this report, namely, by the requirement that the wire shall be free from imperfections not consistent with best commercial practice. In the opinion of Committee B-1, other tests than the twist test may be preferred for the inspection of wire, and the committee sees no reason to make arbitrary choice among them."

The report went on to say also that as a result of the canvass of the practice of electric railways, Committee B-1 was convinced of the desirability of offering specifications for high-strength alloy trolley wire, and tentative specifications for this material were appended to the report. These provided for bronze wire of 40 per cent conductivity and approximately 70,000-lb. tensile strength and from 2.25 per cent to 3 per cent elongation in 10 in.; also for bronze wire of 65 per cent conductivity, about 60,000-lb. tensile strength and the same elongation, which depended on the size of the wire.

Tentative specifications for bare concentric-lay copper cable, hard, medium-hard or soft, were also submitted and both of these were ordered printed in the association's year book. Minor changes in the previously-mentioned specifications for hard-drawn copper wire were referred to letter ballot.

Mandatory Rules *

BY F. M. METCALFE, SPECIAL REPRESENTATIVE FIRST VICE-PRESIDENT OF THE NORTHERN PACIFIC RAILWAY

The railroad workman of to-day is no longer an automaton. He has developed into a reasoning being. This has created new economic conditions and demands progressive methods.

The rules by which we are governed in our railroad work have been amended and amplified from time to time, as our business has increased, and have become more progressive and complex. To-day they are the product of the minds of our ablest and most experienced railway operators, formulated after much study and discussion and presented as the acme of good practice. The standard transportation rules are largely mandatory. They tell men what they must or should do. But by the frequent and continued infraction of these rules, despite disciplinary action, railroad managers now realize that education and persuasion must substitute coercion and compulsion, as is illustrated by their vast annual expenditures for increased supervision.

My belief is that mandatory rules do not materially prevent accidents but that organized effort and the persuasive use of safety devices and methods are the means which should be substituted.

Transportation by Fadgl Auto-Train at San Francisco Exposition

The Fadgl Auto Train, Inc., has been carrying approximately one-fourth of all Panama-Pacific Exposition visitors in eighteen three-car trains of sixty-six seating capacity or 105 total capacity per train. The longest run one way is 1½ miles and the shortest is ⅜ mile. The initial fare is either 5 or 10 cents, according to the character of the run. Zone-fare additions of 5 cents each are charged when passengers make partial or complete circuits.

On Feb. 20, the opening day, fifteen two-car trains and one one-car train carried $3,246.95 of business. Up to June 1 about 1,250,000 passengers were carried, but it is expected that heavy summer business will bring the total for the year in excess of 4,000,000. The number of fares during four days of June averaged 15,150 a day.

All fare collections during this period were handled with Rooke registers.

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*Abstract of paper presented at annual meeting of Pacific Claim Agents' Association, San Francisco, June 24-26.

Medical and Claim Departments *

BY J. H. HANDLON, CLAIM AGENT UNITED RAILROADS OF SAN FRANCISCO

The relationship existing between the medical departments and the claim departments of rail transportation companies varies to such an extent that there is no general uniformity of co-operation. Some companies do not maintain a salaried medical staff but secure the services of outside surgeons when necessary. Others, particularly street railway companies, designate resident surgeons to examine the injuries in their several districts and report on a fee basis to the salaried chief surgeon of the company. These district surgeons also render emergency treatment. Many steam railroads and interurban and suburban electric railways adopt a similar plan on account of the convenience of having a surgeon representing the company promptly at the scene of the accident.

Some companies maintain a salaried medical staff, which, if possible, renders immediate and continuous surgical and medical attention at the sole expense of the company and without respect to the question of liability. Still others employ a salaried emergency surgeon who is always on duty, ready to make an immediate examination of personal injury cases and treat such cases, if necessary.

It is the practice of the United Railroads of San Francisco to request an early examination of all injured persons by one of its salaried medical staff, regardless of whether a claim has been filed or such action is intended. Medical attention and hospital accommodations are offered only in cases where the company's liability is clearly established. Emergency treatment is usually rendered by the city emergency hospital surgeons or surgeons residing or having their office near the scene of the accident. A fee of $10 is allowed by the company to practising surgeons whose services are sought in an emergency by an employee.

Wherever feasible (local conditions always governing) the services of the medical department are more effective if it is composed of surgeons who are on the payroll and devote almost all of their time to company business. It is true that surgeons who are occasionally employed on a fee basis are not so likely to have their testimony attacked as prejudiced and biased, but unscrupulous attorneys often attack the reliability of such witnesses, particularly if they have testified on several occasions in behalf of the defendant corporation.

The surgeon whose time is devoted almost exclusively to the company becomes a specialist in personal injury cases. He is aware of the dependence placed upon him by the claim agent in reporting as accurately as possible the extent and length of disability, and he is alive to the advantage of employing simple and unsuspected tests of the claimant's veracity and physical ability. He is able to judge the monetary value of a claim and the reasonableness of charges for surgical services. If he is tactful and considerate in his behavior toward a claimant, he can influence him to deal directly with the company. It is highly important, however, that he should not make an intentional misstatement of the extent of the injury to an injured person with a view of minimizing the injuries and so enabling the claim agent to effect an unjust settlement. Neither should he resort to any similar deception, for the courts have held that a release secured through such fraudulent methods is voidable. An error in diagnosis is excusable in the eyes of the law.

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*Abstract of paper presented at annual meeting of Pacific Claim Agents' Association, San Francisco, June 24-26.

COMMUNICATIONS

Flange-Bearing Special Work

METROPOLITAN STREET RAILWAY COMPANY
KANSAS CITY, MO., June 25, 1915.

To the Editors:

Concerning the question of flange-bearing special work, the following is my experience in Kansas City: In order to avoid noisy special work and the hard blows incident to the use of very abrupt rises in the flangeway, the writer adopted flange-bearing work with long approaches about four years ago. Experience with this type of work since that time has fully justified the change.

The principal problem to solve in connection with the flange bearings was the lengths of the inclined approaches to the intersections. It was impossible to get the desired results with the small manganese inserts that were in use a few years ago. Moreover, the best results cannot be obtained with the largest practicable plates used to-day except in those in very acute angle intersections. If it is practicable, the length of the approach from the point where the flange begins to take a bearing to where it is raised to its greatest height should not be less than 18 in. In order to secure approaches of this length we built some special work of carbon rails bolted together with the manganese fillers forming the flangeway floors. Similar construction with a bar of manganese inserted in a rolled filler in the bottom of the flangeway was adopted, and both types of work have given most excellent service. Later, crossings were assembled as bolted work, using high carbon rail in the bottom of the flangeways. This has given results as good as, if not better than, were obtained from that with the manganese in the bottom of the flangeway.

In all of these types of work, when the flangeway is worn down so that the wheels have a tread bearing, it is practicable to grind down the head of the rail and thereby secure a true flange bearing again. Our later work, some of which has been ordered in the solid manganese steel, provides for a flange bearing with 18-in. approaches. A feature found undesirable in our first flange-bearing crossings was the raising and lowering of the wheels over each flangeway intersection. To avoid this, it has been our practice, and it has proved entirely satisfactory, to raise our wheels upon the flange as they approach the first intersecting flangeway and continue the shallow depth through the crossing. This has been done in right-angle crossings and the wheels are carried upon their flanges entirely through the crossing or series of crossings as the case may be.

The only argument that the writer has ever encountered in recommending shallow flangeways has been that they might be the cause of chipped or broken wheel flanges. Curiously, these arguments have never been advanced by men connected with the mechanical departments or by the manufacturers furnishing wheels under contract. In fact, discussions with them of the effect of this practice has indicated that the adoption of the full flange bearing makes an easier riding car, reduces the shock to the equipment and causes less damage to flanges than the non-flange-bearing intersection, or one with a shallow groove only at the intersecting flangeways. Some manufacturers of cast-iron wheels have advocated a change in the contour of wheel flanges to give a wider bearing on the bottom of the flangeway than that given by the standard wheels. This change was only presented as a theory and has never been tried out.

As noted in some of the other communications, the flange-bearing idea is an old one; in fact, it is so old that testimony in regard to the matter twenty years ago indicated that it was an obsolete practice. On the other hand, no doubt, the adoption of long approaches, giving a slight angle of impact at the point where the wheel flanges strike the bottom of the flangeway, has again made this practice useful and satisfactory. In conclusion I will say that there have been installed in Kansas City some thirty or forty crossings, built with flange bearings, and also a large number of frogs of various angles, and our experience with all of this work has fully justified our continuing its use.

A. E. HARVEY, Chief Engineer.

The Jitney and the Small Car

THE SOUTHWESTERN ELECTRICAL & GAS ASSOCIATION
DALLAS, TEX., June 29, 1915.

To the Editors:

I have been very much interested in the communication on "Jitneys vs. Light Cars" by Mr. Wilson of Mobile, Ala., in your issue of June 26.

Mr. Wilson is absolutely right in the first portion of his communication with regard to the profitable advantage of more frequent operation of cars or, to put it in another form, of more rapid service. The writer has proved this fact in times past in several small cities where the business section was only a comparatively few blocks from the residence section. He has taken non-paying properties and made them pay, largely by giving a more frequent, more rapid and a perfectly regular and dependable service, and the frequency of the service has been the main point of success. The instance which Mr. Wilson gives of the city where the revenue of the street car company had been reduced $1,000 per day by something over 350 jitneys, gives a case in point. In the five months during which the jitney has been in active operation, the revenue of this company has been reduced $150,000. Even allowing 33 1/3 per cent of this due to the hard times, the remainder, $100,000, if applied to the purchase or hire of small cars and their operation on a much shorter schedule on the lines peculiarly afflicted by the jitney, would have saved them a considerable portion of this loss, would have discouraged the jitney, would have had a strong moral effect on the public and, I fully believe, the balance sheet at the end of the year, under the above suggested operation, would have shown a profit instead of a loss.

One of the lessons that the street railways, and in some instances the shorter interurbans, must take to heart from the jitney experience is the desire of the public to "get there" in the shortest possible time and to keep moving while it is getting there. While the public does not like overcrowded cars and prefers sitting down to hanging to a strap, it will, as between the two evils, accept the discomfort rather than the delay, in nine cases out of ten. This applies particularly to the rush hours. The intermediate light traffic hours of shopping, visiting and pleasure automatically provide seats and prevent overcrowding, by reason of the lessened traffic, and at such times a slightly longer wait for the car is not liable to cause complaint or lessen traffic to any great extent. But during rush hours, especially during the business rush hours at morning, noon and night, the ability to get to business or to get home with a minimum of waiting time is the overpowering desire of a majority of those who travel in public conveyances.

In large cities the "skip stop" has been introduced with success, simply to accomplish the end of a more frequent service, and enormously expensive terminals and loops in city centers have been built, not especially for the end of greater convenience, comfort and safety in handling the traffic, but that the final end of greater dispatch in the vital matter of getting the passenger to his destination without unnecessary delay might be accomplished.

It is true that the abandonment of the large cars may mean a tremendous loss to a great many railway properties, necessitating as it will the virtual scrapping of cars and equipment, the purchase of smaller and lighter cars and the employment of more trainmen, but the handwriting is on the wall that the public will have more frequent service, even if it has to patronize the jitney or its equivalent and put up with its discomfort, inconvenience and danger. When the street railways make it more convenient and more pleasant to ride than to wait or walk, then and then only will street railways obtain all the traffic that is possible, and at that time only will they put themselves in a position where they will not be open to some character of destructive competition such as the jitney.

Outside of this is the matter of public policy which affects the street railways not only directly in their car receipts but indirectly in unfavorable and onerous franchises and taxes and in inequitable accident damage verdicts. As I have said in a previous article, the best three assets of a public utility are "satisfied customers, a pleased public and contented employees." Satisfied customers tend to make a pleased public, and a pleased public helps to make and maintain contented employees. There are yet some few public utilities who argue that it is impossible to "satisfy the public," and where there is this opinion in a public utility there is always a manifestation of it in the service which that utility gives. The jitney has awakened the public to the fact that it needs—and can have if necessary—a more frequent service, which means a lessened wait for the conveyance and, as a rule, a higher rate of speed, or, at any rate, a lessened interval between the starting point and the terminus of the desired trip. If the street car company is wise it will imitate this feature of the jitney as fully as is possible. It may not be able to give as frequent a service as does the crowded line of jitneys; this the public will not ask, for the reason that this effect of the jitney carries the compensating disadvantages of irregularity of schedule and service and also a limited zone of service.

There is one point, however, in Mr. Wilson's communication to which little attention seems to have been paid and which is a basic weakness of the jitney, whether in small or large size. Events within the last few years have proved that no unit vehicle generating its own power can compare in efficiency of operation and maintenance with the central-station-fed vehicle. One of the claims of the jitney as against the street car has been that the jitney was an independent, self-contained and self-operating, trackless vehicle and that therefore the failure of one jitney did not cause the stoppage or delay of other jitneys nor was it possible for any physical cause connected with the vehicles to compel the total cessation of operation of all the jitneys in any one community. It was emphasized that the break-down of a street car greatly delayed the handling of the cars following, that the break-down of trolley lines stopped the operation of all cars on those lines, and that a break-down at the central point of power supply stopped the operation of every street car in the community. This is true to a certain extent, but proper inspection and maintenance of the whole system will reduce this, as it has reduced it in many electric railway systems, to a negligible minimum, and this favorable claim of the jitney is true only to the extent that the negligence of the electric railway company allows it to happen.

Any vehicle which generates and uses its own power does so in small and therefore inefficient units, and in order to do this it must have a myriad chain of intricate and delicate parts, which not only increase greatly its first cost but also increases its maintenance costs and its probability of break-down or of an increase of inefficiency.

The machinery which actuates the central-station-fed vehicle is, so far as the vehicle itself is concerned, the acme of simplicity and is built so as to give the minimum of maintenance. In nearly every case the machinery on central-station-fed vehicles, such as the street car, is in duplicate all the way through and while a failure of any one part of its propelling machinery may possibly cause a delay, it does not often cause a total cessation of operation, such as happens when the single vital part of a self-contained vehicle breaks down.

The initial economy and efficiency of generation in large units, the present economical method of supply from central station to vehicle and the present efficient propelling apparatus on the ordinary electric car all combine to give such a total economy and efficiency as is impossible with any present vehicle that generates its own power. It must be remembered that in the matter of efficiency "what is sauce for the goose is also sauce for the gander." Any efficient method of generating power in small units on self-contained vehicles can be applied even more efficiently in larger units in a central station, and the average or relative efficiency of large and small generating units has been proved to be such as more than to cover the costs of distribution from the large generating plant to the vehicle that it supplies.

This is the fundamental weakness of the jitney, whether as a small car or as a large bus, and this will be the fundamental weakness of Mr. Wilson's proposition as to self-power-generating vehicles to be used on tracks. When the interurbans first began to parallel steam roads, the gasoline and the gasoline-electric motor cars were pushed forward as being a means by which the steam roads could maintain themselves against the inroads of the electric interurban. With very few exceptions, this type of self-generating vehicle has gone to the scrap heap, has been relegated to little, non-paying branch lines, to locations where there are peculiar local conditions favorable to its use, or has been used for other purposes than comfortable, convenient and rapid transit such as is given by the electric trolley car. On the other hand, not only have the terminals of the larger steam roads done away with the self-power-generating locomotive of all types and kinds, but on their main lines, far away from cities, they are using central-station-fed traction vehicles over long distances, and the main reason for their doing this is economy and efficiency in the operating of the vehicle or tractor. If any further proof were needed on this point, it would be in the enormous increase in the use, in cities, of what is virtually a station-fed vehicle, viz., the storage-battery vehicle, which, as a rule, has proved its economy and efficiency for heavy work over the unit self-generating vehicle, and this notwithstanding the fact that it has an intermediate loss—the battery—to which the direct station-fed vehicle is not subject.

The final failure of the jitney as a competitor of the street car will occur through inefficiency and lack of economy alone, but that final failure might have been hastened tremendously if the electric railway companies had been prompt to take to heart the lesson of the jitney, viz., more frequent and faster service to the public.

H. S. COOPER, Secretary.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

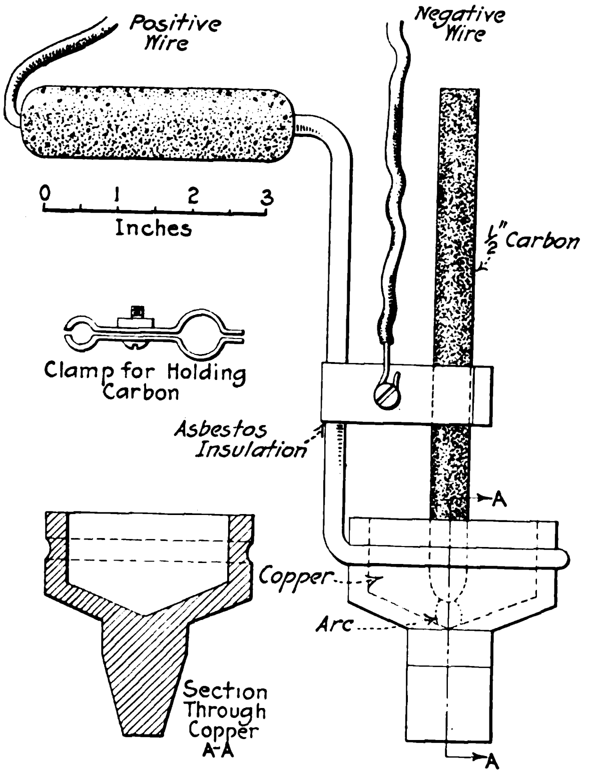
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

A Convenient Electric Soldering Iron

BY J. N. GRAHAM, MASTER MECHANIC ROCKFORD & INTERURBAN RAILWAY

The electric soldering iron illustrated in the accompanying drawing has been in use in the shops of the Rockford & Interurban Railway for the past year. It can be used on a 550-volt circuit and, when connected in series with an ordinary arc-headlight resistance, very good results are obtained in soldering the leads into commutators. It utilizes the heat of the electric arc in keeping the soldering tip at high temperature.

The body of the iron is made from a piece of 2½-in. round bar copper, turned to the form shown in the section. The point is planed down to ½ in. x 1 in. and is tinned like any ordinary soldering iron.



ELECTRIC SOLDERING IRON

The handle is made of ¼-in. round iron fitted in a groove turned in the body of the copper and bent in the form shown. At the upper end is a grip of wood or rubber used to protect the operator from electric shocks. An arc-light carbon, not less than ½ in. in diameter, is supported, as shown, from the handle by means of an adjustable clamp made of two pieces of flat iron held together by a small screw and nut. The clamp is insulated from the handle with sheet asbestos. It is adjusted so that it slides with sufficient ease to permit regulation of the arc length.

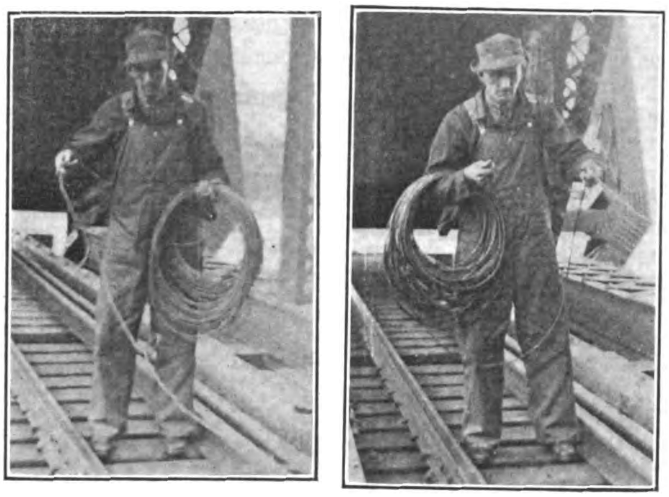
The lead wires are attached as indicated, one to the clamp by means of the screw and the other to the handle inside the grip. To protect the operator's eyes a washer of transite is slipped over the carbon and rests on the copper. The heating of the copper can be regulated by adjusting the length of the arc.

Preventing Kinking in Handling Wire from Coils

BY J. G. KOPPEL, ELECTRICAL SUPERINTENDENT OF BRIDGES, SAULT STE. MARIE, MICH.

A recent experience with conduit wiring has impressed upon the writer the importance of careful handling of wire in conduit work. The general principles of conduit wiring are well understood, but this experience may be of interest.

The wiring in question was installed about sixteen months ago in a large new carshop, and all wires were in conduit with suitable condulet outlets for lamps and switches. Recently the new wiring began to give trouble, indicated by the blowing of fuses. The substitution of larger fuses did not cure the trouble and a few days ago, when an accidental ground occurred on the trolley wire inside the carshop, some of the circuits were burned out. On removing the damaged circuits several kinks with broken insulation were found, indicating careless work on the part of the wireman in drawing in the wires.



ILLUSTRATIONS SHOWING INCORRECT AND CORRECT METHODS OF PAYING OUT WIRE FROM A COIL

The writer's experience has shown him that very few wiremen know how to uncoil wire by hand, that is without some mechanical device. The following simple method permits the uncoiling of wire without kinks:

Referring to the illustrations, the first one shows the ordinary method of taking off loop after loop from one side of the coil with the resulting kinks as shown. In the second illustration the wireman is taking off loops without the least tendency to kink and it will be noted that he has the coil on his right arm. He unloops two loops of wire in this position, then shifts the coil to his left arm and pays out two more, alternating in this way until the entire coil is paid out. By this process his wire gets slight twists alternately backward and forward, the twists neutralizing each other.

Hand-Brake Pressures

BY L. W. HORNE, CHIEF ENGINEER LORD MANUFACTURING COMPANY

It will probably be admitted generally that too little attention has been given in the past to the design and installation of hand-brake rigging. Many cars even now are equipped with hand-brake rigging that does not assure uniform pressure distribution among the brakeshoes. The brake rigging of some double-truck cars is so arranged as even to afford no assurance that the brakes will be applied on more than one truck under all conditions.

The condition of unequal pressure is readily understood by reference to Figs. 1 and 2. The arrangement of hand-brake rigging shown in Fig. 1 assures the application of pressure to both front and rear trucks, as it does not embody a fixed fulcrum, the lever simply being hung in a slotted guide. Considering the brake pressure to be delivered to the forward truck, let P represent the brake pressure required in the front-truck top rod, the lower one in the figure, and X the brake pressure necessary to be exerted at the hand-brake rod at the top in the figure. Then the formula is

$$X = P \div g/h.$$

The pressure delivered to the rear truck is, of course, greater, the formula being

$$X = P \div [(g + h)/h].$$

It will be noted that the lever arm g for the forward truck becomes $g + h$ when the pressure is transmitted to the rear truck.

The method of calculating the forces transmitted by the lever system shown in Fig. 1 is sometimes puzzling. A simple diagram, however, will show the manner in which the different fulcrums are obtained. Consider that the hand-brake pull rod has moved the lever so that the brakeshoes have been brought up rigidly against the wheels of the rear truck. The truck-rod connection to the lever then becomes fixed and the lever rotates around it as a fulcrum, applying the brakes on the forward truck. The leverage then obtained is g/h. Considering the rear truck, it follows that when the brakeshoes on the forward truck have been brought up rigidly against the wheels its brake-rod connection to the lever becomes a fulcrum. The lever then rotates about this fulcrum, applying the brakes on the rear truck, and thus is obtained the leverage $(g + h)/h$.

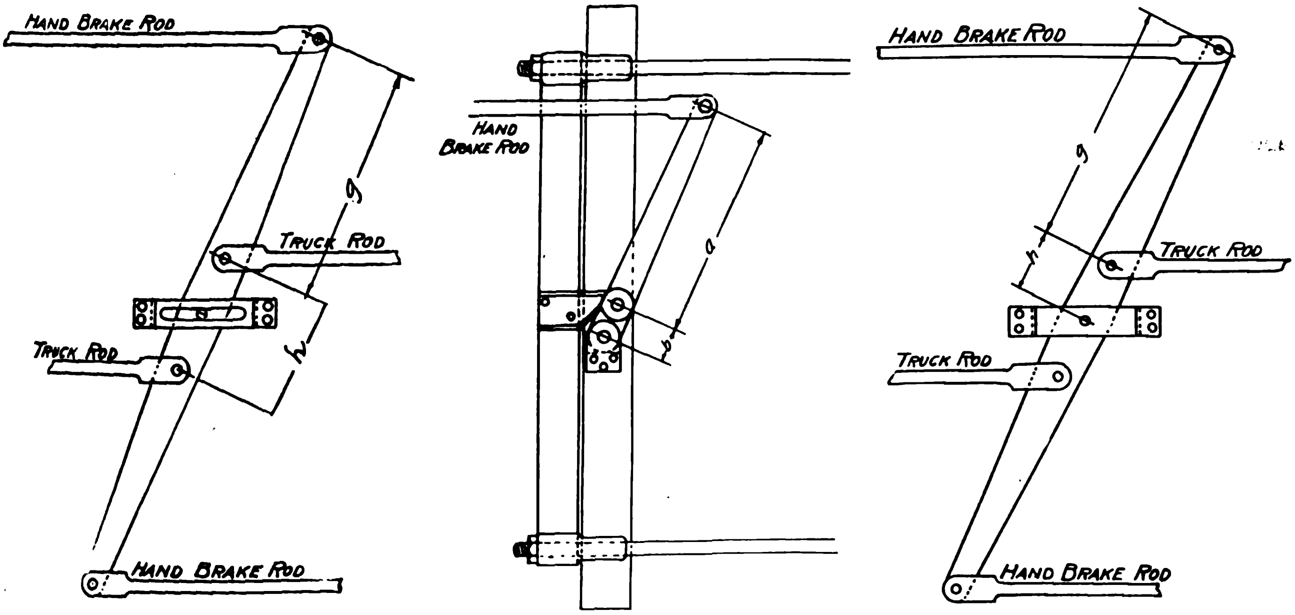
On single-truck cars the brake rigging shown in Fig. 2 is almost universally used. This also produces unequal pressures, having the same fault as the rigging shown in Fig. 1. The pressures on the forward and rear wheels are found respectively from formulas

$$X = P \div a/b \text{ and } X = P \div (a + b)/b.$$

Fig. 3 shows a most dangerous type of brake rigging sometimes used on electric railway cars. With this type of rigging, provided the shoe clearance and slack are not exactly the same on both trucks, the brakes are applied only on the truck having the least travel or slack. With this system of leverage a fixed fulcrum is used and, in applying the brakes, if one truck rod becomes rigid before the other, the lever has two fixed points and cannot rotate any farther. Consequently the brakes will not be applied on the other truck. The formula for computing the leverage developed by means of this rigging is

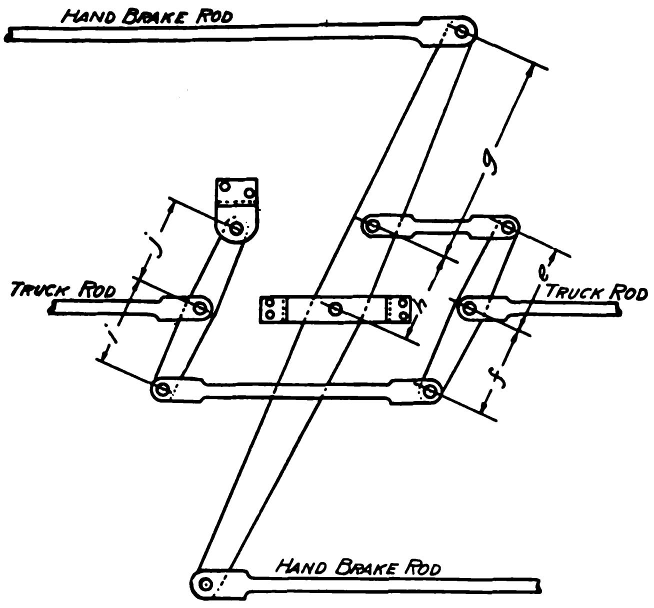
$$X = 2P \div [(g + h)/h].$$

In comparing the formulas corresponding to Figs. 3 and 1 it is sometimes puzzling to understand why twice the force must be exerted in the hand-brake rod to give the same truck-rod pull as is obtained by the lever arrangement shown in Fig. 1. This is explained by considering the travel of the lever. It is well known that power and distance traveled are directly comparable. In Fig. 3 the brakes on both trucks are pulled up at once. Therefore each truck receives only half the force developed, and the travel of the lever is only that of



HAND-BRAKE PRESSURES—FIG. 1—DOUBLE-TRUCK CAR-BODY BRAKE EQUIPMENT; FIG. 2—SINGLE-TRUCK BRAKE EQUIPMENT; FIG. 3—DANGEROUS TYPE OF BRAKE EQUIPMENT

This result is at variance with the correct theory of car retardation. A perfect arrangement of brake rigging should always provide a slightly higher pressure on the forward truck, because the car tends to overturn or rotate about the axis of the forward truck. This tendency is due to the centrifugal force exerted during retardation, which transfers part of its proportion of weight from the rear truck.



HAND-BRAKE PRESSURES—FIG. 4—BRAKE RIGGING GIVING PERFECT EQUALIZATION

the travel of one truck rod. In Fig. 1 each truck rod obtains the full pressure by means of a continued pull. In other words, one truck receives the full pressure and then the lever continues to travel until the other truck has also received the full pressure. The travel of the lever, therefore, is the total travel of the rear truck rod plus the total travel of the forward truck rod, or twice the travel of the lever shown in Fig. 3.

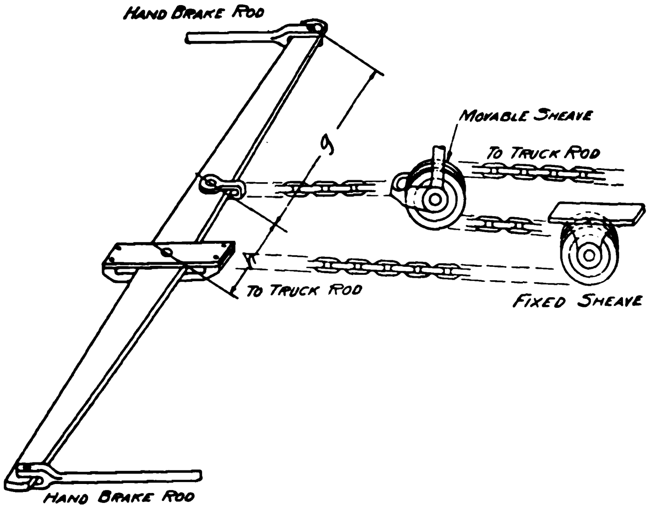
For cars not equipped with air brakes the system of hand-brake rigging shown in Fig. 4 produces exact equalization of pressures between trucks and absolute provision for applying the brakes on both trucks regardless of unequal travel and slack conditions. The formula for calculating the required brake pressure at the hand-brake rod for the rear-truck top rod is

$$X = P \div \left[\left(\frac{g+h}{h}\right)\left(\frac{e+f}{j}\right)\right]$$

and for the forward-truck top rod is

$$X = P \div \left[\left(\frac{j+h}{h}\right)\left(\frac{e}{f}\,\frac{i+j}{j}\right)\right].$$

An arrangement of sheaves (Fig. 5) can also be used, which comprises the same type of rigging shown as Fig. 3, except that it has the advantage of affording exact equalization of pressures and the application of brake pressure to both trucks under all conditions.



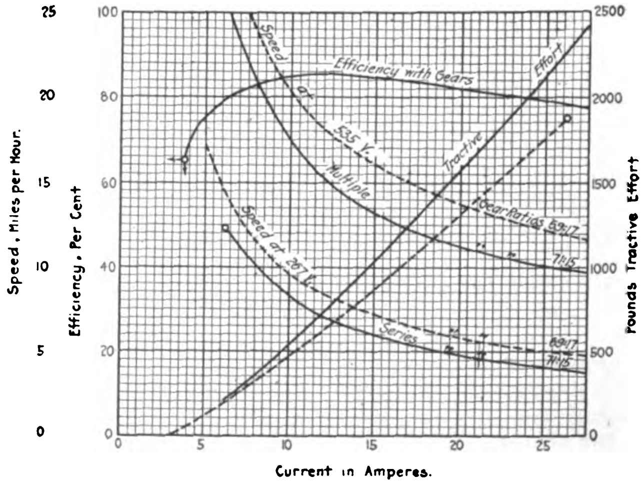
HAND-BRAKE PRESSURES—FIG. 5—RIGGING EMBODYING SAME PRINCIPLE AS THAT SHOWN IN FIG. 4

When hand brakes are applied to air-brake cars it has generally been the practice to provide levers for multiplying the hand-brake power and a chain for operating the brake-cylinder piston, thereby applying the brakes to the trucks through the air-brake live and dead levers. By this method exact equalization of hand-brake pressure is obtained through the air-brake levers. However, some master mechanics favor a separate and independent brake rigging right to the truck levers. Their preference is based on good, sound judgment, as it not only provides against a failure of the air, but against the breakage of any of the air-brake pull rods. The practice of operating through the air-brake rigging, however, has the advantage of extreme compactness, and an additional safety measure has been provided by means of the stop device recommended by the Westinghouse Traction Brake Company. This device limits the travel of the live and dead levers in such a way that, should one of the top rods break, the lever can fulcrum against the stop, assuring a brake on at least one truck.

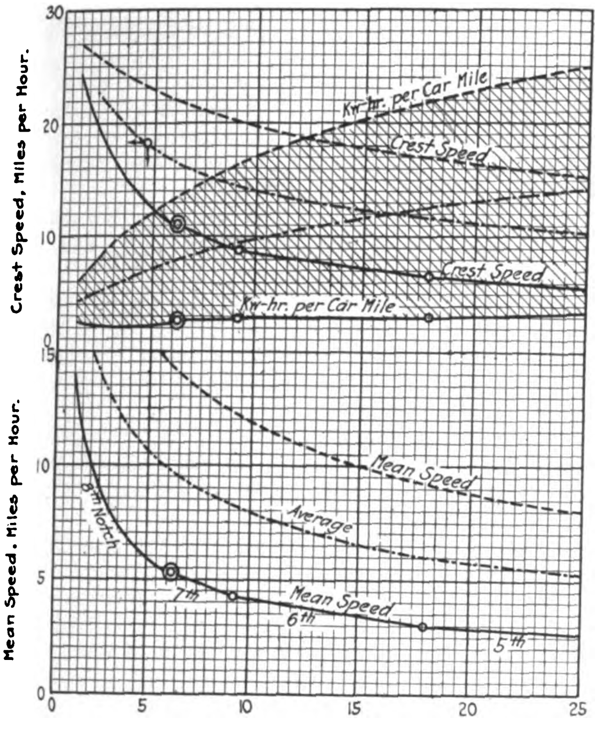
In designing hand-brake equipment and rigging for a car of known weight, it is desirable to obtain the maximum force possible in the hand-brake pull rod. Efficient hand-brake devices can be made very compact and can develop high power without the space required for the swing of long brake levers. For this reason the best proportion can generally be obtained by having the multiplying ratio transmitted through the car-body levers as low as possible, which results in short travel of the levers, the travel being directly comparable with the multiplying ratio. Economy of valuable space under the car is also thereby effected, allowing room for the many devices now being added to modern car equipment.

Effect of Gear Ratio on Operating Economy

In the sixth annual report of the Board of Supervising Engineers, Chicago Traction, the results of a study of a change in gear ratio are given. These results are shown in the accompanying curves. The study was made on a change in ratio from 69:17 to 71:15 on the standard 1908 Pullman car of the Chicago Railways, weighing 30 tons. Fig. 1 shows the characteristic motor curves for the two gear ratios, the efficiency being practically the same. On the assumption of an accelerating rate of 1.65 m.p.h.p.s. and different periods of coasting, the operating results obtained with the new



GEAR RATIO AND OPERATING ECONOMY—FIG. 1—CHARACTERISTIC CURVES OF CHICAGO SURFACE LINES MOTOR



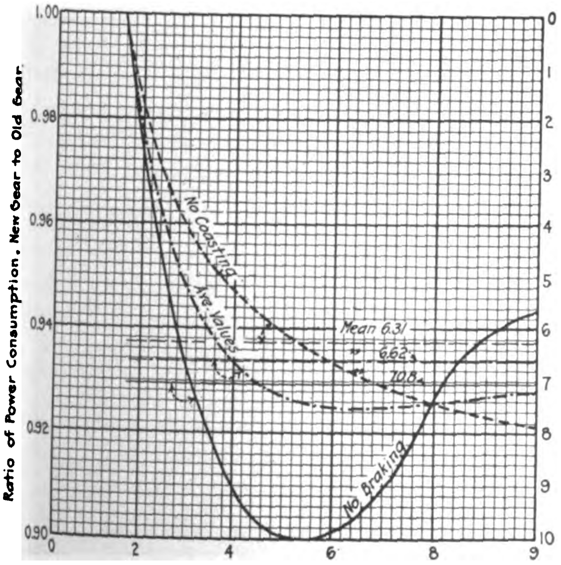
GEAR RATIO AND OPERATING ECONOMY—FIG. 2—SPEEDS AND ENERGY CONSUMPTION WITH DIFFERENT COASTING PERIODS

gear ratio are shown in Fig. 2, the speeds given being running speeds with no allowance for stops. Assuming ten-second stops at intervals of 528 ft., or ten stops per mile, as typical of the service on heavy streets, the following results were indicated by the study:

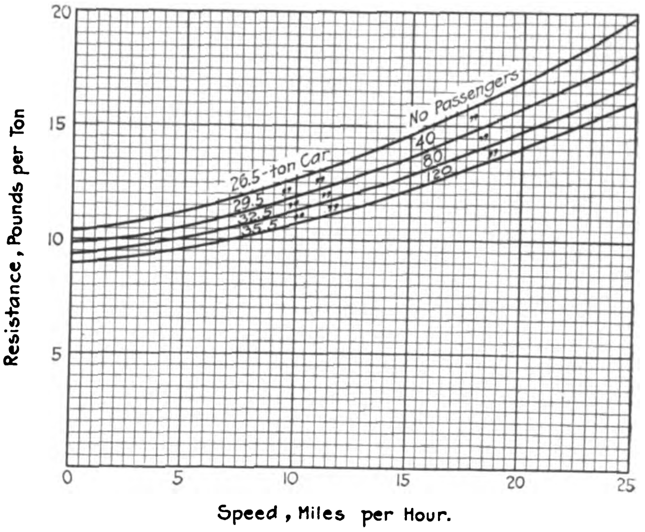
1. With no coasting, a schedule speed of about 9 m.p.h. cannot be exceeded without increasing the acceleration rates assumed. 2. The maximum or crest speed of 20 m.p.h. is necessary to reach this average speed. 3. With part coasting and part braking, the relation between maximum and average speed is in general of the same character, i.e., with a given maximum of crest speed the schedule speed is limited and cannot be raised without increasing acceleration rates. Considering the present average schedule speed of Chicago cars, i.e., 9 m.p.h., it appears from the average curve of Fig. 2 that a crest speed of fully 18 m.p.h. must be reached and stops limited to five per mile or their equivalent as an average, if the rated capacity of the equipment is not to be exceeded.

In general, from the results of the study, it appears that the new gear ratio is better adapted for the heavy Chicago traffic under the assumed conditions for the following reasons: 1. The maximum crest speed of the cars is reduced by about 13 per cent. 2. A mean power saving of 6.6 per cent may be realized within the usual range of stops. This can be seen in Fig. 3, where the ratio of power consumption between new and old gearing is plotted against stops per mile. 3. The rate of acceleration on subnormal voltage may be materially increased without dangerously overloading the motors. This is particularly advantageous in the congested districts as a means of increasing schedule speeds.

The report also calls attention to the effectiveness of field control, the principal advantage of which is in providing a flexible gear ratio, changeable electrically through the operation of the controller. The gear ratio suitable for field control is given as 69:15, or 4.6, as compared with 71:15, or 4.73, for the revised rheostatic control, and 69:17, or 4.055, with the rheostatic control then in use.



GEAR RATIO AND OPERATING ECONOMY—FIG. 3—CURVES SHOWING RELATION OF STOPS PER MILE AND SAVINGS DUE TO CHANGE IN GEAR RATIO



GEAR RATIO AND OPERATING ECONOMY—FIG. 4—TRAIN RESISTANCE CURVES USED AS THE BASIS OF PREVIOUS CALCULATIONS

In calculating the schedules on which the above conclusions are based, the board employed the results of resistance tests made by the Chicago Railways in 1912, using standard passenger cars and the dynamometer or drawbar-pull method. These results are shown in Fig. 4. The tests were made upon a car weighing 26½ tons empty and loaded to 35½ tons, that is, with 120 passengers. The curves represent the resistance at constant speed, it being found that during acceleration the resistance is considerably higher, especially at low speeds. The resistances shown are much lower than are usually given for cars of this type.

The formula representing them is based upon the Armstrong train-resistance formula with the constants revised to fit the results of these tests. It is as follows:

$$R = \frac{53.5}{\sqrt{W}} + 0.05\,S + \frac{0.00877 \times A \times S^{1.7}}{W},$$

where R = car resistance at uniform speed in pounds per ton.

W = weight of car in tons.
S = speed in miles per hour.
A = head end area square feet (100 sq. ft.).

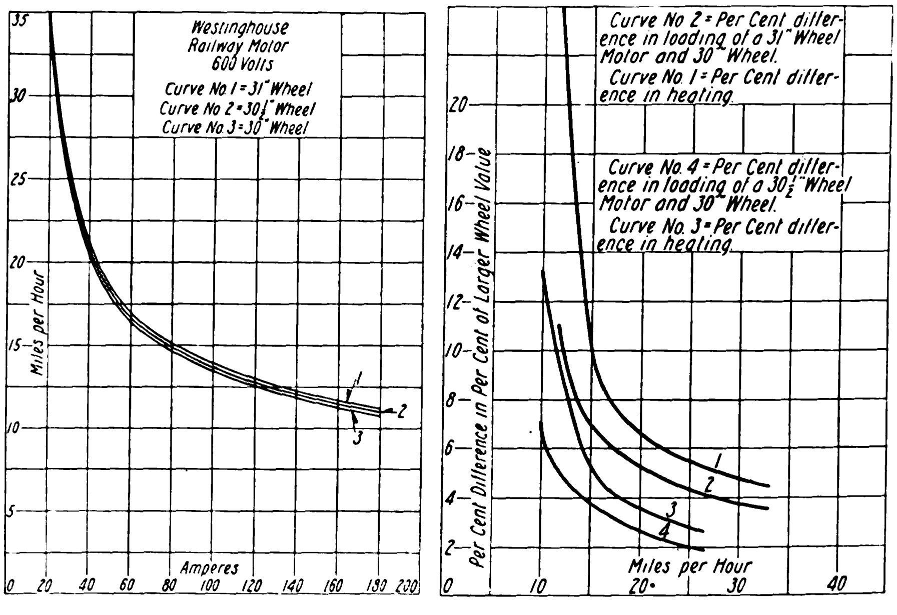
The report calls attention to the fact that there is general acceptance of a form of curve starting at zero speed with a certain static friction, and increasing more rapidly than the speed due to head or wind resistance and track friction. But none of the empirical curves for free-running train resistance recognize the fact that the resistance during acceleration is considerably greater than indicated by the curve of free-running resistance, and that the curve of total drawbar-pull or resistance is very high at the start, minimum at a moderate speed and again rises at higher speed. Hence in the preceding study the resistance during acceleration was assumed as high as 22½ lb. per ton, nearly double that found in free running.

Although these data were obtained from actual dynamometer tests, the great diversity of opinion and results among various investigators suggests the necessity for further analysis, especially differentiating between train resistance during acceleration and during free running.

Effect of Car-Wheel Diameter on Motor Heating

In a recent publication of the Westinghouse Electric & Manufacturing Company appears a continuation of the discussion of the effects of the size of wheel on motor heating begun in a series of articles in the ELECTRIC RAILWAY JOURNAL, to which the writer referred. These articles appeared in the issues for Oct. 3, 1914, page 622; Oct. 31, 1914, page 1014; Nov. 28, 1914, page 1203, and Dec. 19, 1914, page 1344. After referring to the discussion in the ELECTRIC RAILWAY JOURNAL the writer of the article proceeded as follows:

As an example of the effects of differences in wheel diameter, the case of a car which has wheels 30 in., 30½ in., and 31 in. in diameter, equipped with typical 37.5-kw. (50 hp.) motors, has been considered and will show the difference in the load and heating for each of the motors driving the three sizes of wheels.



WHEEL DIAMETER AND MOTOR HEATING—FIG. 1—SPEED CURVES FOR DIFFERENT DIAMETERS; FIG. 2—DIFFERENCES IN CURRENT AND HEATING

From the speed curves, Fig. 1, the amperes load taken by each of the motors for any given speed may be easily determined. For example, if the car is operating at 15 m.p.h., the motor on the 30-in. wheel is drawing 75 amp., and the motor on the 31-in. wheel is drawing 81½ amp.

From this difference we have constructed curve No. 2, Fig. 2, which shows the per cent difference in the loading carried by the two motors based on the amperes in the motor driving the larger wheel. Due to the difference in amperes taken by the motors there is naturally a difference in the heating resulting therefrom. Curve No. 1, Fig. 2, shows the per cent difference in the heating between the motors driving the 30-in. and the 31-in. wheels, based on the heating in the motor driving the 31-in. wheel. At 25 m.p.h., which is the approximate free running speed, this heating will be 5.5 per cent less in the motor driving the smaller wheel than in the motor driving the larger wheel.

When the car is accelerating, these motors will draw approximately 90 amp., and when the resistance is all cut out of circuit, the speed will be approximately 14.5 m.p.h. Therefore, the load on the motor on the 30-in. wheel is 7.3 per cent less than on the motor on the 31-in. wheel, and the heating is approximately 12 per cent less. It may be seen from the shape of the curve that when the motors are heavily loaded the difference in heating may be very great.

Fig. 2 also shows the difference in the load and heating between motors on 30-in., 30½-in. and 31-in. wheels.

These curves were worked up assuming the motors had identically the same speed curves, but in commercial production, due to the variation of materials, machining, etc., the speeds of different motors may vary as much as 5 per cent.

If the motor which is mounted on the larger wheel rotates at a higher speed for the same amperes than the motor on the small wheel, then the difference in loading will be greater than shown on these curves.

If the service is such that the motor is accelerating during the greater part of the time, the difference in wheel size permissible will not be so great as when it is operating in a service which is largely made up of running at high speeds with few accelerations.

It is not the purpose of this article to state what wheel-size variation is allowable, because this depends entirely on the shape of the speed curve, and particularly on the service to which the motor is subjected. It is evident that when the motors are running comparatively cool a certain difference in heating between two motors on a car is not so objectionable as with the motors worked to the limit. This means, in general, that it is not so necessary to be particular with reference to wheel sizes where the motors are running cool, while with motors running hot it may be best economy to keep the wheel sizes very nearly alike.

The approximate curves shown are given merely as an aid in deciding for each individual case the maximum difference allowable.

A recent census of the trainmen of the Louisville (Ky.) Railway showed that the men had been in the service of the company as follows: Fifteen for more than twenty-five years; forty-one for more than twenty years; forty-seven for more than fifteen years; eighty-four for more than ten years; 385 for more than five years; fifty-five for less than one year.

A Convertible Car for General Service

The Burlington (Vt.) Traction Company has recently placed in service a type of convertible car that has numerous features of advantage for general service. The design is standard with the builders, the J. M. Jones' Sons Company, Watervliet, N. Y., and it is claimed that the car probably constitutes the nearest approach to a single universal type for surface operation that has yet been attempted.

The special features, aside from the fact that the design provides an open car in summer and a closed body in winter, thus eliminating double equipment, consist in the low window sills, the absence of wall pockets that ordinarily collect rubbish, the maximum seat length and aisle space, the low platforms, and the inclosed platforms, preventing accidents to passengers and conductors, whether used as a summer car or as a winter car.

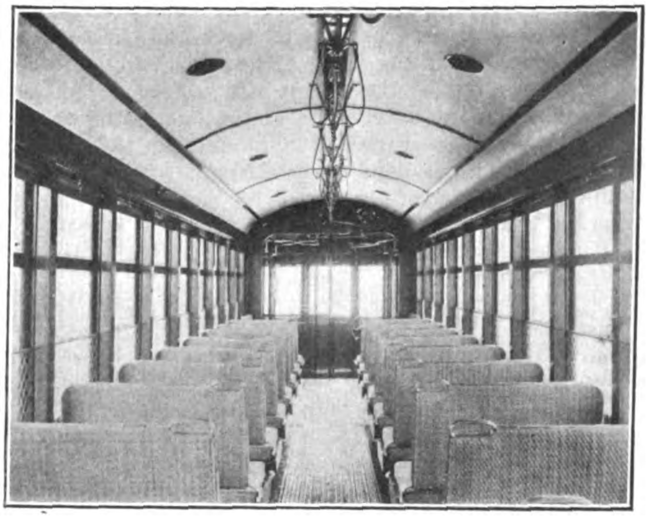
For the Burlington car, the general dimensions are as follows:

Length over all	45 ft. 0 in.
Length over corner posts	32 ft. 0 in.
Extreme width	8 ft. 5 in.
Height from rail to trolley board	11 ft. 10 in.
Weight fully equipped	45,000 lb.
Seating capacity (exclusive of platforms)	58

The car body is constructed upon a steel underframe with steel-plate girders at the sides. The side posts are made of ash, but the roof sheathing is of sheet steel. The interior finish, in general, is of cherry. The interior equipment includes AA-DT American sheet glass, Globe ventilators, Curtain Supply Company's curtains, Heywood Brothers & Wakefield rattan-covered seats, solid-bronze polished trimming, folding platform doors and steps with Consolidated fixtures, Consolidated buzzers and heater equipment with thermostatic control, and International registers. Taylor trucks with 4-ft. 10-in. wheelbase and 34-in. wheels are installed, and with these is a four-motor equipment of Westinghouse 101-B motors.

The detailed weights of the various pieces of apparatus that enter into the construction are shown in the following table:

Car body	17,500 lb.
Trucks	12,500 lb.
Motors	10,800 lb.
Brakes and control	3,000 lb.
Doors and steps	900 lb.
Heaters	300 lb.
Total	45,000 lb.



INTERIOR VIEW SHOWING STATIONARY SCREENS IN WINDOWS

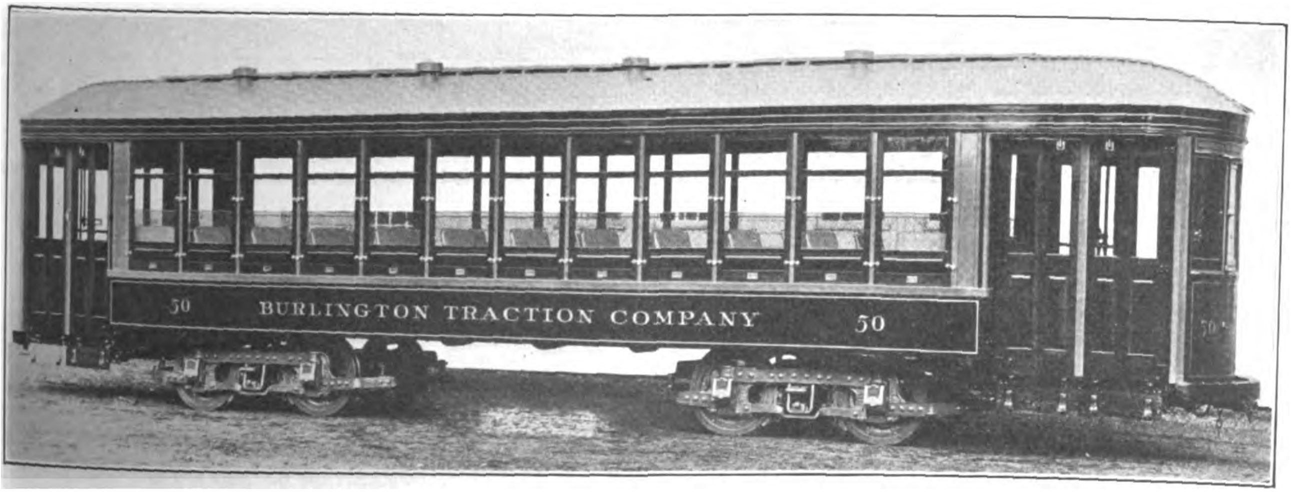
It will be noted from one of the accompanying illustrations of the car that there are no hand straps at the ends of the car, and that the longitudinal end seats are unusually short, seating only two passengers. The idea involved is that, by eliminating the hand straps, standees will move forward to a point where they can reach the handholds on the backs of the transverse seats, and in this way the ends of the car will be left clear for entrance and exit.

Tank Lifters for Small Oil Switches

Oil-switch tank lifters are a great convenience, particularly in stations where a large number of switches are installed, and although a tank with oil for a comparatively small switch is not especially heavy, the character of the load makes it somewhat cumbersome for one man to manage. The result of this is that often the oil-switch contacts are not inspected as regularly as they should be to insure the most satisfactory operation.

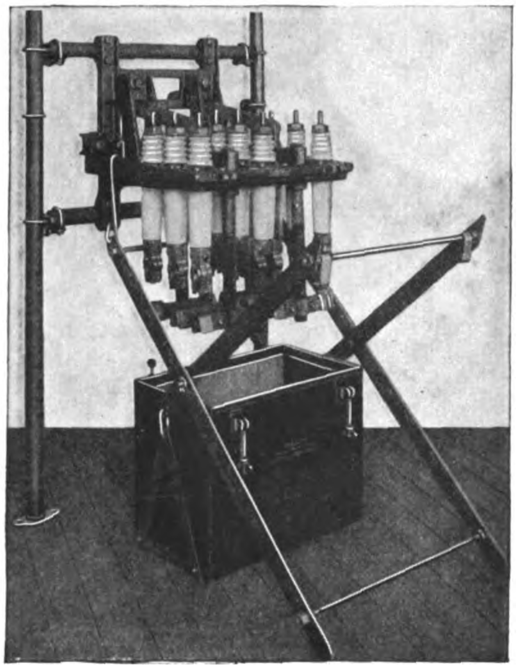
The tank-lifting arrangement, which is manufactured by the General Electric Company and illustrated on page 74, provides a very simple and easy means for lifting quickly an oil-switch tank either up or down through the entire distance between the switch frame and the floor. The lifter is made in two widths, one for single and the other for double-throw switches, and these widths differ only in the lengths of the three rods that join the two pairs of parallel operating arms, this being necessary owing to the differences existing in the dimensions of the tanks.

To fasten the tank lifter to the switch frame two hooks attached to the inner ends of the longer pair of



CONVERTIBLE CAR WITH SASH IN PLACE FOR WINTER SERVICE operating arms are placed over the ribs of the switch frame, the operating arms are raised and the tank supports fitted under the tank. Then the wing nuts that secure the tank to the frame are turned to unfasten the tank, and the outer ends of the long arms are lowered to the floor. Finally two catches on the cross-rod between the inner pair of operating arms are released, and these arms are allowed to rise until the tank reaches the floor.

The tank supports are separate from each other and attach to the tank by continuations of the two equal sides of each strap-iron triangle, which are bent upward to fit over the rim on the bottom of the tank. Each support is removed from a tank by lifting an end of the tank a few inches from the floor and sliding the support from under.



VIEW OF TANK LIFTER FOR SMALL OIL SWITCHES

To place the tank on the oil switch, the operation as described is reversed, the time required for the process being practically negligible.

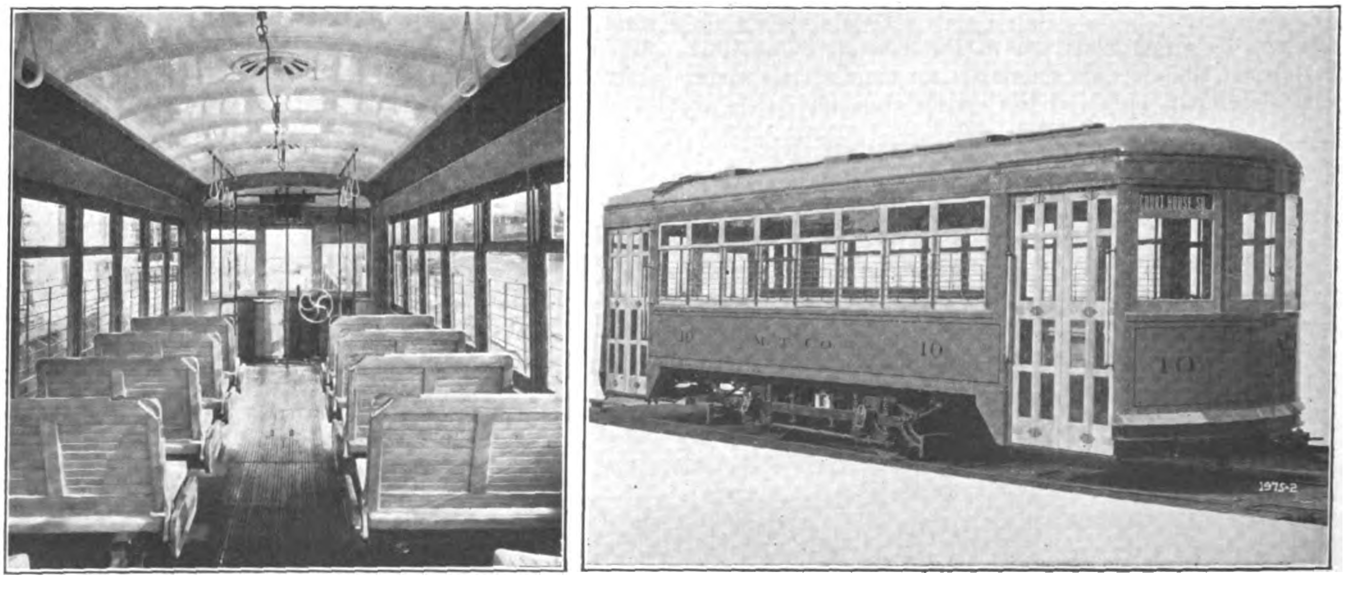
All-Steel One-Man Car

Some months ago the Marshall (Tex.) Traction Company, as noted in the ELECTRIC RAILWAY JOURNAL for March 27, ordered three all-steel one-man cars from the Cincinnati Car Company on a forty-five-day guaranteed delivery. The cars left Cincinnati on the date agreed and are now in service on the Marshall Traction Company's line. They possess a number of unique features, prominent among which is the all-steel construction notwithstanding their small size.

The side girders are made of ⅛-in. steel plates to which the side sills of 3-in. x 5-in. x 3/16-in. angles are riveted. From the side sills pressed-steel channel crossings of ⅛-in. steel plate are supported and these carry the flooring. All body posts are formed from continuous steel tee bars 1½ in. x 2 in. x 3/16 in., these members extending from side sill to side sill and forming the roof carlines. Vestibule corner posts are made of No. 12-gage sheet steel pressed into a box section, and the roof is covered with No. 18-gage sheet steel riveted direct to the steel carlines. The outside of the vestibule below the sash is covered with ⅛-in. sheet steel pressed at the top to form the window sill, and the letterboard for both body and vestibule is also a ⅛-in. steel plate, both top and bottom being shaped to receive respectively the canvas molding from the roof and the top sash.

The floor of the car is formed of two layers of wood applied longitudinally with the car body, and the interior finish, such as sash, doors and molding is made of ash. Outside of this, however, the construction is of steel throughout. No headlining is installed, the roof being covered on the outside with 1-in. thickness of compressed cork that is cemented to the steel, the cork, in turn being covered with No. 8 canvas secured to a wooden molding on the letterboard and bound with 1½-in. beveled edge iron. The wainscoting below the window sills also is made from compressed cork 1 in. thick and cemented to the steel side plates, and is covered with 1/16-in. linoleum. The vestibule between the floor and the windows is sheathed in the same manner.

A prominent feature of the car is the very high grade of painting that has been followed throughout, this being in accordance with the Cincinnati Car Company's standard system. The smooth finish is especially noticeable in the white enameled ceiling shown in one of the accompanying views. This has eliminated abso-



EXTERIOR AND INTERIOR VIEWS OF MARSHALL TRACTION COMPANY'S ONE-MAN CAR lutely any objection to the absence of headlining on the grounds of appearance, as the exposed carlines give an impression of panelling that is exceedingly attractive. An air space under the steel roof sheathing is, of course, made unnecessary by the cork insulation on top of the roof.

The car seats thirty-two passengers and is 33 ft. 5 in. long over all. However, the weight of the car body, complete with all details but exclusive of the car-body electrical apparatus and trucks, was guaranteed not to exceed 10,000 lb. Single Brill trucks are used, these weighing 6800 lb. when equipped with two Westinghouse 307 motors and double-end control. This gives a total weight of 16,800 lb. for the car.

The following equipment specialties were furnished: Consolidated electric heaters, Hale & Kilburn seats, Hunter destination signs, Pantasote curtains, Rico sanitary strap covers, and Peacock brake mechanism with Cincinnati ratchet and pawl. Combination ventilator registers and lamp fixtures, sash locks, weather stripping, push buttons, and sand boxes were supplied by the Cincinnati Car Company.

The car body is fully inclosed and of the double-end type, the car having been designed for one-man operation. There are, however, two sets of folding doors and a stationery step on each side of the vestibule so that the car is suitable for two-man operation in case this is desired. The doors are normally under the control of the motorman by suitable operating mechanisms, and a removable division rail is provided in each vestibule to separate the entering from the exit passengers.

The general dimensions are as follows:

Length over all	33 ft. 5 in.
Length over corner posts	21 ft. 6 in.
Height, rail to trolley board	10 ft. 9 in.
Extreme width	8 ft. 2⅛ in.
Step from rail	15¾ in.
Step to platform	13 in.
Step to car floor	8⅜ in.
Door opening between posts	3 ft. 11⅝ in.
Width of seats	37 in.
Width of aisle	20 in.
Side post center	30 in.
Seating capacity	32
Size of wheel	33 in.
Wheelbase	8 ft. 6 in.
Total weight of car	16,800 lb.

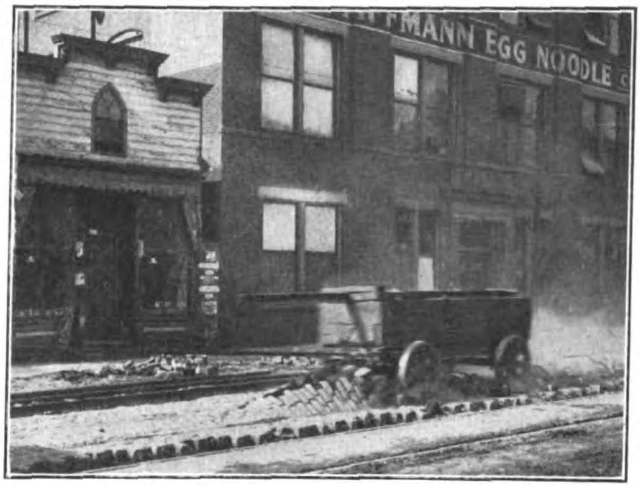
Effect of Zinc Chloride on Timber Strength

Some interesting results of a study of zinc chloride as a preservative of lumber were presented recently in a thesis by Alfred H. Clarke, at the Massachusetts Institute of Technology, Boston. The author pointed out that the main objection to the use of the cheaper grades of pine for structural purposes is the susceptibility of such lumber to destruction by dry rot. The seeds of the rot fungi are microscopic and may exist unobserved in new wood. If they are left unhindered they may, under proper atmospheric conditions, develop rapidly and injure the whole structure of the wood and be disastrous to the building. The usual means of prevention is by filling the wood with a poison which destroys the food of the fungi. Zinc chloride, often used for this purpose, is cheap, easy of application, and efficient as a rot destroyer. Under ordinary conditions it has not been thought harmful, but it has also been argued that under the conditions of temperature and humidity that favor dry rot, the zinc itself may impair the strength of the timber.

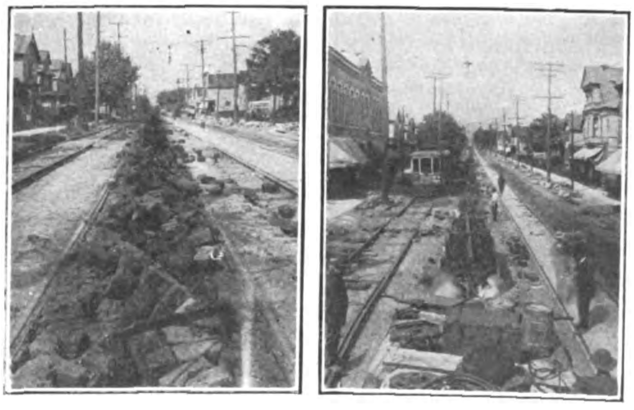
The method followed was to treat small sapwood specimens with the desired amount of the salt by immersion in a bath of weak solution, then to consider and observe in fairly large sets the wood so treated for strength in various ways, moisture content, etc. Comparisons were also made with untreated wood. A temperature of 150 deg. Fahr. was maintained for several days. The moisture content was found to be about the same in treated and untreated woods, but the breaking strength of the treated pieces was only 38 per cent of the untreated specimens. The tests indicated the desirability of further research along this line.

Tearing Up Pavement at 500 Ft. per Minute

Rooting up granite-block pavement between the rails at the rate of approximately 500 ft. per minute is the startling result obtained by the use of the pavement rooter invented by Charles H. Clark, engineer maintenance of way Cleveland Railway Company, and described on page 1346 of the ELECTRIC RAILWAY JOURNAL of June 13, 1914. The device consists of a heavy steel plow casting mounted beneath a substantially built carriage which weighs complete approximately 11 tons. In the particular instance shown in the three accompanying illustrations, the total time required to set the plow in position for beginning the work, attach it to the motor car and plow up 1475 ft. of granite-block pavement between the rails was twelve minutes. The actual plowing time for this length of track was three minutes. Since this rooter accomplishes its work so quickly, pictures of it in action have been difficult to obtain. For the information of track and roadway engineers one need not dwell upon the saving in labor thus effected, only two men with the plow and the crew on the motor car being needed. Immediately after the pavement is torn up it is necessary for a small crew of men to make the street crossings safe, but this would be necessary in any case, hence this gang's time is not chargeable to the cost of tearing up the pavement.



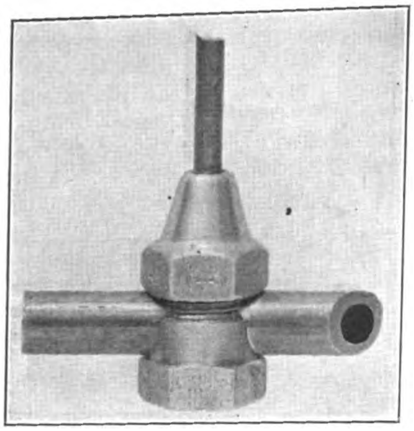
VIEW OF ROOTER IN ACTION



VIEWS OF TORN-UP PAVEMENT

Quickly Detachable Busbar Tap

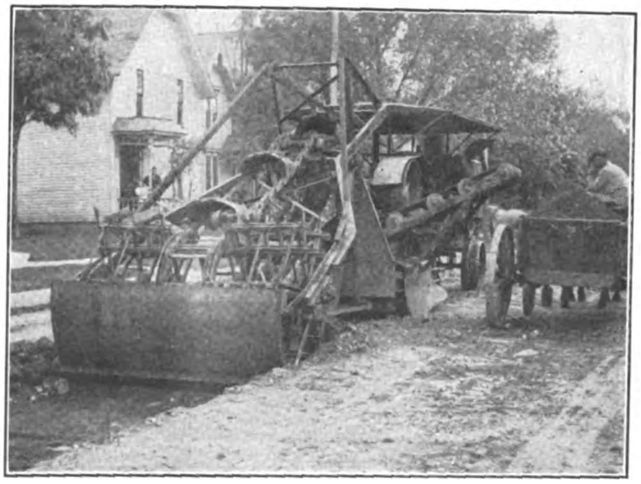
The busbar tap shown in the accompanying illustration is one of the cable-connecting devices made by the Fargo Manufacturing Company which were mentioned in the ELECTRIC RAILWAY JOURNAL of June 26. This is reported to make a material current saving on account of its positive contact, as it makes a practically welded joint, the tap wire being forced against the busbar with almost any desired degree of pressure. This is accomplished merely by tightening the screw nut which holds the tap wire firmly through the cone-shaped grips fitting inside of it. The connection naturally has great strength and it is very easily installed, eliminating any necessity for using solder or bolted clamps. It can be disconnected with equal facility so that the work of cutting out a transformer, for instance, can be accomplished in a couple of minutes. This ease in handling obviously makes the device a great money saver in both the central station and the substation. In fact, wherever electrical taps are installed either permanently or for temporary work, this form of connection can be used with invariable success.


COMPRESSION-TYPE BUSBAR TAP

Track-Trench Excavating Machine

One operation to complete the track trench ready for ties, rail and ballast, is the result obtained by a special type of excavating machine that is operated by the General Engineering & Constructing Company, Rockford, Ill. This was designed particularly for excavating street railway track trenches in any width up to 9 ft., and depths up to 36 in. may be excavated in one operation. A roadbed true to grade is easily regulated, the depth of the trench being controlled by the boom operator who varies the depth of the cut as shown by an indicator on the machine.

This indicator points to the true grade which is established by a line and stakes set beside the trench. During the process of excavation the machine will deposit the spoil on either side of the trench or cast it into dump wagons in the street beside the trench. The ability of the operator to regulate this machine to cut a trench true to line and grade, and at the same time leave the trench practically clear of loose material, makes unnecessary any leveling of the finished trench.


TRACK-TRENCHING MACHINE—VIEW OF MACHINE IN OPERATION

TRACK-TRENCHING MACHINE—VIEW OF INTERVAL BETWEEN TRACK AND EXCAVATING GANGS

In a contract recently completed for the Rockford & Interurban Railway, a 20-in. trench, 8½ ft. wide, was excavated at a rate of approximately 500 ft. a day. The material removed was a sandy loam paved with macadam. Before beginning the excavation the track was removed from the street with jacks, and the trencher followed this work so closely and was in turn followed by the track-laying gang, that a maximum distance of only 300 ft. was left between the point where the old track left off and the new track began.

Experience with various kinds of materials has demonstrated that the machine will successfully and economically excavate any of the usual composite materials found in city streets. If the spoil is to be used again for ballast it may be cast on one side of the trench, leaving the other side clear for traffic and track operations. When only a part of the spoil is to be used for future work, that which is to be hauled away may be run into dump wagons as the work progresses. In case all the spoil is to be removed from the street, the waste time of teams is minimized as the wagons are loaded rapidly and continuously after the teams have been properly spaced. The continuous flow of excavated material from the machine to the wagon makes it possible to load the average dump wagon in about two minutes, and experience has shown that it is possible also to obtain about ¼ yd. more load per wagon with machine-loaded material than with material loaded by hand. In the two accompanying illustrations the excavating machine and the interval between the machine and the track-laying gang are shown.

The recent talk by H. C. De Camp, Cincinnati, to two groups of trainmen of the Louisville (Ky.) Railway, is the first of a series which Mr. De Camp will deliver during the year. No meetings will be held during the hot weather. The company will resume the educational work in the fall, when Mr. De Camp will discuss the equipment of the street car. Other speakers will be heard from time to time. The meetings will be held at irregular intervals, according to the plans which the company has announced.

News of Electric Railways

TOLEDO FRANCHISE CONFERENCE

The conference between the franchise committee of the City Council of Toledo, Ohio, and Henry L. Doherty and other representatives of the Toledo Railways & Light Company on July 2 was brief and as a consequence not much was accomplished. Another conference was arranged for July 7.

The tentative draft as it stood on July 2 provides that the municipal ownership ordinance, passed by a vote of the electors on Aug. 4, 1914, shall not be changed, altered or affected in any respect by the provisions of the new ordinance, nor shall the new ordinance be construed as replacing the municipal ownership ordinance. This ordinance, it is expected, will state that its terms may be exercised whenever the city is in position to purchase the property.

Section 7 of the new ordinance provides that the city may buy the company's property under the provision of the referendum ordinance, the value to be based upon an appraisal which shall be determined by arbitration. The city must give the company notice twelve months before it expects to exercise this privilege and the purchase is to be settled by a referendum vote. The right to purchase may be exercised within sixty days after a referendum election, if the majority of voters favor the purchase.

It was agreed that when a question arises in regard to the fare to be charged, the rate in effect at the time shall be continued until the matter is settled by a court of common jurisdiction. Attorney Thomas H. Tracy suggested that if it is found that the fare was not sufficient to meet requirements provided in certain sections of the franchise, the loss should be made up to the company. While the matter was not definitely settled at the conference on July 2, the committee seemed inclined to concede this contention. Mr. Tracy also insisted that questions of efficiency in operation should be left to arbitration.

ROCHESTER CONNECTING RAILROAD

The Rochester Connecting Railroad has applied to the Public Service Commission of the Second District of New York for a certificate of public convenience and necessity for its 2½ miles of line in the outskirts of Rochester. The company recites in its petition its connection with the Buffalo, Lockport & Rochester Railway, an electric line, which is also connected with the proposal to build a new international bridge across the Niagara River and to connect it with the Buffalo, Lockport & Rochester Railway by a new line from Niagara Falls to Lockport. The New York Central Railroad has objected to the granting of a certificate to the Niagara Falls and Lockport line. The eastern end of the Buffalo, Lockport & Rochester Railway, through the proposed Rochester Connecting Railroad, is to be connected with the Pennsylvania Railroad and the Erie Railroad at Rochester.

It was said at a recent hearing before the commission for a certificate for the western connecting link that this, with the new bridge, would give the Pennsylvania Railroad access not only to the rich territory of the Buffalo, Lockport & Rochester Railway, but also would afford a connection over the new bridge with the Canadian transcontinental lines. The project is backed by men prominent in electric railway affairs in western New York, including E. G. Connette, president of the International Railway, Buffalo, and the petition for the Niagara frontier link of the new road is supported by petitions of the local authorities, boards of trade, and prominent manufacturers. The New York Central Railroad in its opposition to the propect maintains that the territory is already supplied, if not over-supplied with railroad facilities. It says that the present railroad bridges into Canada are of a capacity sufficient to care for the business of many years' growth, and that to allow competition in this territory would be ruinous to its own interests as well as to the business of the new road. A hearing has been held before the commission on the Niagara link and the question of the Rochester connection will be heard within the next few weeks.

THE CHICAGO ARBITRATION

Employees Complete Presentation of Evidence—Railway Begins with Testimony of President Busby

Day and night session are being held by the arbitrators selected to pass upon the differences between the Chicago surface and elevated railways and their employees. The employees completed the presentation of their case with the examination of President Mahon of the Amalgamated association. The railway opened its case with L. A. Busby, president of the Chicago Surface Lines.

The hearing of June 30 was largely devoted to taking the testimony of employees regarding wages and working conditions. With each witness counsel for the employees emphasized the point that one year of training was sufficient to warrant paying a motorman the maximum wage. One witness stated that he knew of no skilled trade where the men received the maximum wage in one year unless it was the hodcarriers. This witness said that hodcarriers worked only about eight months of the year and he was not sure that men of this trade received more pay than motormen. Joseph Riordan, a motorman on a supply car, contended that his duties were more difficult than those of a regular motorman. For that reason he should receive the same pay and be of the same grade as the motormen in the train service. In cross-examination, however, Mr. Riordan stated that most men who went from the supply-car service to the train service did not like the work and quit. According to the witness motormen on supply cars would not be credited with seniority when they entered the train service.

The examination of motorman Myles Callaghan showed that he had a split run, from 6 a. m. to 8 a. m., and then from 1.40 p. m. to 9.30 p. m. He admitted, however, that he could have chosen a run with fewer consecutive hours which would have paid as much as the one he had selected. Practically all the other motormen witnesses had objected to smoking on the platform, but Motorman Callaghan advised that he had not suffered. It was very easy to ventilate the vestibule. The witness admitted that the company purchased the uniforms of new men in cases of emergency, and that the cost of uniforms had decreased. Ten years ago the extra men averaged four days a week. At present they average at least five days a week. The men were permitted to select the system by which runs were picked.

Maurice Lynch, assistant financial secretary of the union, was examined regarding the speed of cars. He stated that this was computed from one end of the line to the other, and included delays. On a line of fifty runs, each run having ten trips, or a total of 500 trips, a minute taken off each trip would save the company 1500 minutes. Also, if one hour was required for a round trip on a three-minute headway, and the time was reduced to fifty-seven minutes the company would save four men, or $12.80 a day. High speeds required greater alertness on the part of the motormen, took cars off the line, and threw men back on the seniority list.

Ordinary common sense, a little clerical ability and honesty were essential for a man to be a good conductor. Concerning unemployment in other trades, bricklayers worked about 75 per cent of the year, structural iron workers 75 to 80 per cent, plasterers 75 per cent, lathers the same, and steam fitters continuously. Trainmen in the street railway service could not work the entire year.

Lawrence D. Bland, editor of the *Union Leader* since 1905, presented a table of increases in the prices of articles of food since 1907.

On July 2, W. D. Mahon, president of the Amalgamated Association, outlined the history of the organization and the railway industry. More than 200 locals had contracts with the companies. He believed the responsibility of motormen and conductors was greater than that of any men in any other form of transportation. The financial statements of companies in the United States showed a steady increase in gross income. In 1902 one out of 18,000,000 passengers was killed, and in 1907 one out of 13,000,000. In the last three years in Chicago, twenty-two trainmen were killed on the surface lines, and eight totally disabled. The industry owed the employees a living when they became too old for service. Mergers resulted in a reduction of the cost of management. In 1892 there were six companies in Chicago. Now there was only one. The reduction in the expense of supervision should make it possible to take better care of the men. The men were not properly provided for anywhere in the street railway industry in this country or Canada. The arbitrators should consider only local conditions. When Mr. Mahon had finished, counsel for the employees announced that he had completed their side of the case.

L. A. Busby, president of the Chicago Surface Lines, took the stand on July 5. He outlined his ten years' connection with street railways, and explained briefly the development of the graded scale up to 1909, when the present five-year spread was established. Mr. Busby introduced exhibits showing the average monthly wages of regular, extra and carhouse men for May, 1915, for all employees to be $74.20 a month. With $3.10 a month added as the cost of free transportation to the men, the general average of all men in the service was $927.60 a year, with the average for high-rate men $1,011.60 a year. Other statistical exhibits were introduced to show that Chicago conditions were better than those in other cities as regards fall-backs, pull-outs, turn-ins, accident report time, night cars and receiver's pay. An exhibit was also introduced showing that bonus and dead-time allowances cost the company 3,255,540 man-hours a year, or $1,011,786. This resulted in the Chicago trainmen receiving the equivalent of 34 cents an hour maximum wage.

Exhibits introduced showed that the average fare per passenger ranged from 2.8 cents in Chicago to 4.96 cents in some of the Eastern cities. The purpose of the graded scale was to insure just recognition of increased efficiency, to reward the men for long years of service, and to keep them in the service. In connection with the graded scale, Mr. Busby introduced an exhibit showing conditions in other cities.

The graded scale had been adopted for Chicago school teachers and was in line with the apprenticeship courses required in other skilled trades averaging approximately four years. According to Mr. Busby 200 days a year was the average working time for carpenters, with 185 days of the year as the average working period for all trades. The average earnings per annum for outdoor trades amounted to $785. The average wage in Chicago in all industries was approximately $590 a year, and the average wage of all industries in Illinois ranged from $588 to $914 a year. Most of this information was taken from the census of 1910.

Mr. Busby said that 6546 new applications were filed within the past year. In addition more than 5000 men had been refused permission to file applications. Only 871 positions were available during the year. Chicago conditions did not warrant an increase in wages at this time. Operating expenses were increasing faster than the gross income. Between 1902 and 1912, the capital required to develop and carry on the industry increased 113 per cent. Other exhibits showing the per cent of increase in passenger receipts over previous years, the decrease in the last annual report and the decrease since Feb. 1, 1915, were introduced. Another exhibit showed the receipts, expenditures and divisible receipts per revenue car-hour as increasing prior to 1914, and decreasing since that time. Numerous other statistical exhibits showing the expenses of maintaining property and making renewals were also introduced. In 1912 46,380 accidents were reported, or 46.7 per million passengers. In 1913 these figures were 39,330 accidents, or thirty-five per million passengers. In 1914 there were 37,143 accidents or thirty-three per million passengers. During the first four months of 1915, beginning Feb. 1, the number was reduced to twenty-eight accidents per million passengers. This included accidents of all kinds as reported by the trainmen. This closed the testimony taken on the evening of July 5.

On July 6 Mr. Busby was cross-examined regarding wages and transfers. Counsel for the employees questioned him about the surface railways contract with the city, the original purchase price of the properties and the allowances on construction costs when work was done by company forces. Mr. Busby thought that the Cleveland Railway and New York subway ordinances were more favorable to the companies than the 1907 Chicago ordinance. Mr. Busby received $60,000 a year salary; Henry A. Blair, chairman of the board of operation, $30,000 a year, and John M. Roach, adviser to the president, $20,000 a year. Each of the other four members of the board of operation received $2,500 a year. Counsel for the employees criticised the company for setting aside 14 per cent in cash for maintenance and renewals. Questions of depreciation, taxes and dividends paid by the surface railways were also touched upon.

William Weatherwax, general superintendent of transportation of the Chicago Surface Lines, followed Mr. Busby. In direct examination, he stated that men were promoted from the train service to responsible positions in nearly all the railway departments. He would rather not employ ex-trainmen because it was difficult for them to overcome their old habits. Mr. Weatherwax outlined his experience with the company beginning as a tow-boy in 1886. He compared old-time and present-day working conditions. Mr. Weatherwax thought that the five-year period was just right for a man to attain maximum efficiency. The request of the employees that all Sunday runs be eight hours or less was not practical. It would require the use of many men who would not have work on other days of the week. Mr. Weatherwax had not endeavored to increase the schedule speed, but found it difficult to keep the men from running in advance of the schedules.

MARKET STREET OPERATION, SAN FRANCISCO

Superior Court Judge Sturtevant granted a temporary injunction on July 6 to the United Railroads, San Francisco, Cal., restraining the city of San Francisco from operating municipal C and D line cars on the outer Market Street tracks below Geary Street. The court held that the city violated the contract with the United Railroads dated Nov. 12, 1912. No question of the usurpation of the franchise is involved, and municipal railways may still operate on Market Street the lines in operation prior to the 1912 agreement. This means that all passengers from the ferry to the exposition via Market Street must transfer. The court finds the municipal cars on the outer ferry loop so numerous that the United Railroads business is affected and excessive wear caused to the track and overhead construction. The judge states that his decision parallels the case of the Second Avenue Passenger Railway, Pittsburgh, involving the same principle. The United Railroads has been placed under a bond commensurate with the financial loss estimated by the Municipal Railway. Appeal to the Supreme Court is to be made immediately.

LATEST DETROIT PURCHASE DRAFT ACCEPTABLE

The Detroit (Mich.) United Railway, through President J. C. Hutchins, has notified the Detroit Street Railway Commission that the latest draft of the proposed agreement for the purchase by the city of the company's property within the one-fare zone is acceptable to the officials and will be presented to the stockholders on July 14 with a recommendation for acceptance. The letter to the commission also advised that upon acceptance by the commission of the contract the company would take steps immediately to procure the consent required of the trustees for the holders of the bonds to appear in the chancery court to fix the price of the property provided the contract is accepted by the electors. The commission accepted the contract and gave the company until Aug. 2 to obtain formal ratification by the stockholders and consent of the trustees of the bondholders to appear in the suit. In addition to the contract a number of city charter amendments must be prepared, and upon these agreement must be made by both parties.

In a letter to the commission, Mr. Hutchins repudiated the suggestion that the company's attorneys had endeavored to write anything into the contract "prejudicial to the city's interests," and stated that a similar allegation might be made against the city's attorneys. The company also wrote the commission to the effect that it would not accept the idea of having the grievances of the street car men's union threshed out before the commission, maintaining that the present method of arbitration is sufficient to take care of the matter. It is stated that Elihu Root will pass upon the agreement for the bondholders.

CINCINNATI TAX CASE

On the plea that the State is attempting to collect double taxes, the Cincinnati, Milford & Loveland Traction Company appealed to the Ohio Supreme Court on June 18 for an order directing the Hamilton County Court of Appeals to certify the record of the decision it recently rendered in favor of the State. This court decided that the company must list for taxation as its gross earnings all the sums collected by it, although under the terms of the agreement between it and the Cincinnati Traction Company it is compelled to turn over 3 cents out of every 5 cents from fares collected in the city to the Cincinnati Traction Company. As the Cincinnati Traction Company pays excise taxes on this portion of the receipts the interurban line holds that the construction of the law made by the lower court is incorrect.

The State Tax Commission has placed the value of the Cincinnati, Newport & Covington Light & Traction Company's property in Ohio at $1,020,620, an increase of $360,000 over 1914. This amount was fixed on the basis of the company's settlement with the Hamilton County authorities for the years prior to 1911, it is said. The question now arises as to whether the commission can add to the valuations for the years 1911-1914 inclusive. This has been submitted to the Attorney-General for a ruling. The increase grew out of a complaint recently made by Attorney R. S. Alcorn of Cincinnati.

QUESTION OF CONSENTS

Neither Cleveland nor Cincinnati may be able to push through certain contemplated extensions and improvements, requiring consents of owners of abutting property before October, if the Ohio Supreme Court does not convene in special session to render decisions on the cases that were argued on June 30 and July 1, since this tribunal has adjourned for the summer vacation. The cases were those of property owners on Euclid Avenue, Cleveland, between East Twentieth and East Fortieth Streets, and David L. Carpenter and other property owners on Reading Road, Cincinnati, who object to the extension of the Bond Hill line over their street.

Walter M. Schoenle, city solicitor, appeared for the city of Cincinnati and argued that the law requiring the consent of property owners to a street railway is unconstitutional and that a decision for the city would be of great advantage to all cities and towns of the State. Attorney Dinsmore, representing the property owners, asserted that the consent law is not a delegation of legislative power, as had been contended, but that it merely states conditions upon which the city may act.

The main question in the Cleveland case is whether the new charter adopted takes precedence over the State law, when there is a conflict between them. The charter provides that consents of property owners along the line of a proposed street railway track are not necessary. Law Director Stockwell represented the city and Attorney Harry J. Crawford represented the Cleveland Railway, while Attorney Wilbur Wilkin appeared for the property owners. Mr. Stockwell contended that the charter under the home-rule amendment to the constitution supersedes the State law.

Director Stockwell contends that if the Supreme Court rules against the city, it will have the right to build the track itself and lease it to the Cleveland Railway.

STATEMENT OF RAILROADS ON RAILWAY MAIL PAY

The committee on railway mail pay, representing 264 railroads, operating 218,000 miles of line, made public on July 3 a booklet entitled "What the Railway Mail Pay Problem Means to the Railroads." In the booklet the committee discusses the law dealing with the system of payment for mail transportation advocated by the Post-office Department introduced in the last session of Congress. This proposed law, known as the Moon bill, failed of passage, but the Postmaster General has announced that he intends to have it introduced again in the new Congress. In the opinion of the committee as set forth in the booklet, the defects of the present practice respecting the payment to the railroads for carrying the mails can best be remedied by providing the following reforms:

1. That the mails be weighed, and the pay be readjusted, at least once a year on every railway mail route, instead of once in four years, as at present.
2. That the railroads be paid for the use and operation of compartment post-office cars—for which the present law allows no pay—on a pro rata basis with the compensation allowed for full railway post-office cars.
3. That the railroads be paid for, or relieved from, the duty of carrying the mails between railroad stations and post-offices.

The booklet contains the resolutions unanimously adopted at the meeting of railroad executives in New York City on May 20, last, at which 90 per cent of the mileage of the country was represented. These resolutions completely sustained the position of the committee on railway mail pay, and indorsed the remedies it has suggested. The resolutions also approved the suggestion of the committee that in its opinion the ultimate solution of the railway mail pay problem would lie in reference of the matter to the Interstate Commerce Commission, with full power.

PHILADELPHIA TRANSIT LOAN APPROVED

The Councils of Philadelphia, Pa., on July 1 by unanimous vote passed ordinances appropriating the $6,000,000 transit loan to the Department of City Transit and authorizing Director of City Transit A. Merritt Taylor to let contracts and start work immediately on the Broad Street subway and the Frankford elevated. The ordinances allotted $3,000,000 of the loan for each of these projects. Actual construction work on both projects will be started on Sept. 13. Mr. Taylor says that if there is no delay in making the loans available, the entire Broad Street subway can be completed in thirty-two months and the Frankford elevated road within two years.

Advertisements appeared in the Philadelphia morning papers of July 2 inviting bids for the construction of the section of the Broad Street subway which will extend from a point in Broad Street at the north side of the existing subway structure of the Market Street Elevated Passenger Railway north of City Hall to a point in Broad Street at the south side of the existing subway structure of the Market Street Elevated Passenger Railway south of City Hall. This section will pass diagonally under the westerly side of City Hall. Bids for this work will be opened on Aug. 16. The specifications call for actual construction to be commenced on Sept. 13, and for the contract to be completed within thirty months.

Advertisements were scheduled to appear in the papers on July 8, inviting bids for the construction of the foundations for the Frankford elevated line, between Callowhill Street on the south and Unity Street on the north. Bids for this work will be opened on Aug. 16. The specifications call for actual construction to be commenced on Sept. 13, and for the contract to be completed within eight months. Advertisements will appear in the papers on July 26 inviting bids for the construction and erection of the steel work for the section of the Frankford elevated line, extending from Callowhill Street on the south to Unity Street on the north. Bids for this work will be opened on Aug. 23. The specifications call for the erection of the steel work to be commenced on Dec. 1, 1915, and for the contract to be completed within one year.

On July 1 Mr. Taylor issued a statement in regard to the work which he concluded as follows:

"Now that the policy of the city of Philadelphia has been finally determined by formal action on the part of the electors and the municipal authorities, after three years of research and public discussion, with full knowledge of all relevant facts, I hope that all parties in interest will co-operate generously in expediting the completion of the much-needed facilities which have been authorized, and such additions thereto as will be necessary, to the end that Philadelphia and Philadelphians may enjoy the bounteous returns which they will gain in time saving, convenience and comfort, and from a wider field of opportunity which will result from the establishment and operation of adequate rapid transit facilities in Philadelphia on a proper basis."

The Mayor has signed the transit loan bills.

WAGES IN SPRINGFIELD AND WORCESTER

The employees of the Worcester (Mass.) Consolidated Street Railway and the Springfield (Mass.) Street Railway have ratified the wage agreement with the New England Investment & Security Company referred to in the ELECTRIC RAILWAY JOURNAL of July 3, page 34. The new wage schedule provides for the same daily rate of wages now paid conductors and motormen on the Springfield Street Railway, but hereafter all overtime will be reckoned on the basis of nine hours a day instead of ten hours a day, as was settled upon when the previous agreement became operative. The employees of the Worcester Consolidated Street Railway, who received a minimum wage of 23 cents an hour and a maximum wage of 28½ cents an hour, will receive a minimum wage of 25 cents an hour and a maximum rate of 30½ cents an hour for the first six months and a minimum of 25 cents and a maximum of 31 cents for the last six months under the new agreement. The agreement will expire on May 31, 1916.

The miscellaneous departments, which include messengers, freight handlers, yard men and other employees, exclusive of conductors and motormen, will all receive increases in wages. The messengers hereafter will receive conductor's wages, which will mean that instead of working on an hourly basis at 25½ cents an hour for a ten-hour day, they will receive $2.85 for a nine-hour day, or an increase of about 6 cents an hour over the present rate. The platform men will receive an increase of 7½ cents an hour, with a reduction in hours. Instead of working a ten-hour day for $1.92½, they will receive $2 for a nine-hour day. All other departments classified under miscellaneous will get a nine-hour day, with an eight-hour day on Sundays and holidays. They will receive time and a half for all overtime work. It is estimated that 120 or more men of the miscellaneous departments will receive an increase in wages ranging from 5 to 37½ cents a day over and above what they receive now, not including the increase that is represented in the reduction of the working day from ten to nine hours.

Under the new management the wages of the employees of the Springfield Street Railway and the Worcester Consolidated Street Railway are practically equalized, the former still profiting by a small margin. The Worcester men receive a minimum of $2.25 a day for a nine-hour day as compared with $2.30, the present wages on the Springfield lines. They will receive a maximum of $2.75 for the first six months of the agreement and $2.79 for the last six months of the agreement, as compared with $2.85, the maximum daily rate on the Springfield lines. They will still continue to operate on platform time, whereas the Springfield conductors and motormen will continue to operate under a day schedule. The Springfield employees, instead of receiving a minimum of 23 cents and a maximum of 28½ cents for overtime, will receive about 25½ cents an hour for the minimum schedule and about 31½ cents for the maximum schedule. This means an increase of 2½ cents an hour for the one-year men and an increase of 3 cents an hour for the three-year men.

KANSAS CITY-CLAY COUNTY SUIT

Nine of twelve jurors in the Jackson County Circuit Court gave a verdict on July 1 for $1,500,000 damages to the Interstate Railway against the Kansas City, Clay County & St. Joseph Railway, the Wyandotte Construction Company, and the estate of George Townsend. The motion for a new trial will be heard on Aug. 2. If unsuccessful, appeal will follow. The Interstate Company, suing for $2,000,000, alleged that the defendants had usurped a right-of-way, which two-year options received several years ago had kept alive. Some property owners testified they had not given consent as claimed by the plaintiffs to notation of renewal on options. One question involved was whether the plaintiffs had paid for any land, or had done the work required by law to preserve the charter rights. A similar suit by the Interstate Company against the Missouri River & Camden Company, a Townsend steam road project, was thrown out of court four years ago. Suit similar to the Interstate case had been filed against the Kansas City, Clay County & St. Joseph Railway for $200,000 damages by the Kansas City & St. Joseph Electric Railway. This suit was dismissed, and the Kansas City-St. Joseph Electric Railway joined the Interstate Company, alleging it had sold its rights to the Interstate.

CINCINNATI TRANSIT COMMISSION REPORTS

The Rapid Transit Commission at Cincinnati, Ohio, made its report to Mayor Spiegel on July 2. It calls for the construction of a line under what is known as Modification H of Plan No. 4 and locates the line from a point in Norwood, a suburb of Cincinnati, through the Duck Creek ravine, under Owl's Nest Park, skirting the bluff and Mount Adams to a point near the Pennsylvania Railroad station; thence over Pearl Street to Walnut Street, as a subway under Walnut Street to the canal, in the canal to St. Bernard and then through the open country to Norwood. The cost of the line, exclusive of power house, equipment, and damages to adjoining property, is estimated by the commission at $5,717,849.

The commission says that the line should be built by the city according to the plan mentioned in its entirety and that the people should be asked to vote for a bond issue that will cover the cost. It is the opinion of the commission, however, that the line should be leased to an operating company. If no tenant is found in advance the city should operate the line in order to give the interurban lines an entrance to the business section.

The report contemplates a high-speed line over private right-of-way on the section between St. Bernard and Norwood as soon as the city is built up in that section and street crossings become dangerous. The commission recommends that land be purchased at once for that purpose. The opinion is expressed that the line would not earn its fixed expenses in the beginning and that the city should arrange to make this good in some way. The commission suggests that the proposed boulevard along the Miami and Erie canal be developed with the construction of the road. The subway should be open between street crossings, so that as much light and air as possible may be admitted to the cars.

The commission has been at work a year and has had the aid of George F. Swain, chairman of the Boston Rapid Transit Commission, Engineer F. B. Edwards, and Engineer Ward Baldwin, the latter having charge of the electrical phase of the proposition.

Mayor Spiegel has expressed disapproval of the plan, principally because it would provide excellent advantages to St. Bernard and Norwood, both of which have opposed annexation to the city. He says the western part of the city has been practically ignored by the commission. He also favors a wide street along the canal, instead of a boulevard. Mayor Spiegel said he would be in no hurry to act on the report, because such a large proposition should not be rushed through without due consideration. The report urged the appointment of a commission at once under the Bauer rapid transit act, so that the road may be built as soon as possible.

ARBITRATION OF WAGES IN RHODE ISLAND

The question of wages, about which the officers of the Rhode Island Company, Providence, R. I., and the representatives of the men have been unable to agree, will be arbitrated. A. E. Potter, president of the company, was quoted by the Providence *Journal* of July 2 in part as follows:

"We have agreed to arbitrate the wage question. We have reached a good understanding on all other matters, that is, the five demands made by the men. It is true that we offered the extra men $1.50 a day. In fact, we even went further, as we agreed to give that sum to all such men who were required to report for duty. This was done in lieu of any arbitration on this particular point. At yesterday's conference I offered to grant without further arbitration such increases as the men asked for in their recent demands, providing the company received an increase of 2 per cent in its business month by month compared with the previous year. Likewise I assured them that I would recommend to the board of directors that they be given the increase asked for next year, providing we received an additional increase of 2 per cent in our business. I do not know what action has been taken on these proposals."

Electrification of Short Oregon Line.—It is reported that the purchase of the Rogue River Valley Railroad by the Southern Oregon Traction Company, Medford, Ore., means the electrification of the Rogue River line for its entire length, 8 miles, which includes 1 mile in Medford, 5 miles between Medford and Jacksonville, and 2 miles to the brickyard, and the extension on West Main Street of the present line of the Southern Oregon Traction Company.

First-Aid Chests Required on Illinois Railroads.—The Illinois Legislature, which adjourned last week, passed a bill requiring all railroads to provide emergency chests for first-aid to the injured on all trains. The workmen's compensation act was also amended so that its provision would apply to transportation companies, and a third bill amends the public utilities act to permit railroads to give transportation to newspapers and magazines in exchange for advertising

New Publicity Department for Barstow Properties.—W. S. Bartow & Company, New York, have started a new publicity department in charge of E. Burt Fenton, manager, an experienced newspaper man. For the present Mr. Fenton's headquarters will be in Sandusky, Ohio. The purpose of the new department is to distribute information of interest to the public concerning the various railway and lighting properties controlled by this company and bring the public into closer relations with these properties.

Mr. Moore Returns.—George Gordon Moore, well known through his activities in electric railway promotion in Michigan and his connections with the San Francisco-Oakland Terminal Railways, Oakland, Cal., has returned from Europe. When the war began Mr. Moore was invited by General Sir John French to visit France, and he was at the British army headquarters almost continuously from the outbreak of hostilities up to the time of his return to this country. It is said that Mr. Moore has the distinction of being the only American permitted to visit the English headquarters.

Question of Tunnel or Bridge in New York.—Chairman Edward E. McCall of the Public Service Commission for the First District, has sent a letter to the Board of Estimate and Apportionment, inclosing a report from Alfred Craven, chief engineer of the commission, upon the proposal made by the Board of Estimate that a tunnel under the East River at Sixtieth Street be substituted for the use of the Queensboro Bridge for the tracks of the new Broadway subway, to be operated by the New York Municipal Railway Corporation. The chief engineer prefers the use of the bridge in accordance with the dual system contracts rather than risk the delay which may follow a change in plans at this time. Commissioners J. Sergeant Cram and Robert C. Wood, however, favor the tunnel and have notified the Board of Estimate and Apportionment to that effect.

Pennsylvania Public Service Commission Appeals.—In declaring that it had no jurisdiction over appeals from the decisions of the Public Service Commission of Pennsylvania under the revised act of June 3, 1914, the Dauphin County Court has left nearly twoscore of such appeals from various business men's and improvement associations undecided with no apparent way of ever questioning these decisions in court. Under the act of 1913, the Dauphin County Court was named as the tribunal to hear all appeals from the Public Service Commission's decisions. When the act was superseded on June 3, the appeals were directed to the Superior Court with the proviso that they must be made within thirty days of the commission's decision. Some forty decisions had already been filed for argument in the Dauphin County Court, and when the first of these came up the court announced that it had no jurisdiction under the latest act. As more than thirty days have elapsed since the commission's decision, these appeals have no means of disposition. Several appeals have already been made to the Superior Court and at least one of these will question the constitutionality of the new legislative act.

Financial and Corporate

ANNUAL REPORT

Pittsburgh Railways

The statement of income, profit and loss of the Pittsburgh (Pa.) Railways for the year ended March 31, 1915, follows:

Gross earnings from street railway operations	$11,670,091
Operating expenses:	
Maintenance of way and structures	$1,183,427
Maintenance of equipment	733,076
Traffic	28,017
Transportation	4,384,329
General and miscellaneous	1,286,271
Total operating expenses	$7,615,120
Taxes	438,082
Total operating expenses and taxes	$8,053,202
Net earnings from street railway operations	$3,616,889
Auxiliary operations:	
Gross earnings	$143,532
Operating expenses and taxes	97,098
Net earnings	$46,434
Total net earnings	$3,663,323
Other income	112,833
Total income	$3,776,156
Deductions from income	2,955,797
Net income before deducting fixed charges	$820,359
Interest on funded debt	389,620
Interest on income debentures	330,739
Net income for the year	$100,000
Surplus, April 1, 1914	636,982
Additions to surplus	6,984
Gross surplus	$743,966
Deductions from surplus	116,692
Surplus March 31, 1915—per balance sheet	$627,274

Although the territory served experienced a very severe industrial depression covering almost the entire year, the loss in gross earnings from street railway operation was more than offset by economies practised and reduced cost of power. A comparison of the results of 1915 with those of 1914 show a decrease in the gross earnings from street railway operation of $112,769, or 0.95 per cent, the operating expenses having been decreased $280,747, or 3.55 per cent. The result was a gain in net earnings of $167,978, or 4.32 per cent. The operating ratio for street railway operation was 65.25 per cent in 1915 as compared with 67.01 per cent in 1914. The average passenger earnings per car-mile were 31.29 cents, as compared with 31.45 cents, a decrease in 1915 of 0.16 cent.

There was expended during 1914 the sum of $1,453,061 for improvements, betterments and extensions, of which $1,073,970 was charged to property accounts, and $379,091 to a deferred maintenance account, to be amortized during the life of the property benefitted. In addition, there was expended by the maintenance of way department $1,183,427 for ordinary maintenance of roadway, tracks, bridges and overhead construction. By improvements the fire-insurance cost for the year was reduced $7,955. During the year the toll bridges showed an increase in receipts of $4,875, or 20.19 per cent, and a decrease in expenses of $1,065, or 7.24 per cent.

During the year the company received the one hundred low-floor motor cars mentioned in a previous report. Nearly all of these are now in service. The low-floor, low-wheel, side-entrance car has met with the approval of the public, and it has been very satisfactory in operation. Owing to the public educational program adopted by the transportation and claim departments, the accidents and expenditures for claims have been greatly reduced. All the employees, with the exception of the trainmen, have been insured under the group-policy plan of the Equitable Life Assurance Society.

The above information is contained in the annual stockholder's report of the Philadelphia Company, which controls the Pittsburgh Railways. This report states that during the year the Philadelphia Company caused valuations to be made of its transportation and distribution lines, service lines, regulators, meters and compressing stations by independent engineers. After making due allowance for depreciation these were incorporated in the balance sheet to the extent of a total increase of $12,556,441. The book values of the Philadelphia Oil Company, the Pittsburgh & West Virginia Gas Company and Equitable Gas Company shares were increased to represent more correctly the actual value. The company availed itself of the above increases to make a reduction of $8,924,254 in the valuation upon its books of street railway and traction stocks and other reductions in gas values sufficient to make the total amount of reduction in book values $15,774,052.

The report also contains the annual statement of the Beaver Valley Traction Company, showing in the main the following results: Gross earnings from railway operations, $334,093; operating expenses and taxes, $236,704; net earnings from railway operations, $97,388; net deficit from auxiliary operations, $4,262; total net earnings, $93,126; other income, $518; total income, $93,644; deductions and fixed charges, $96,132; deficit, $2,488, and surplus on March 31, 1915, $92,336.

NORTHERN ELECTRIC REORGANIZATION

Preliminary Details of New Arrangement—Plan Believed to be Satisfactory to All Parties

It is reported that the reorganization of the Northern Electric Railway, Chico, Cal., has been brought into concrete form. The new organization plan represents the perfected work of the attorneys representing the bankers' committee, the underlying bondholders' committee, the Spreckels interests and the Sloss trustees.

The general features of the plan are that a new railroad corporation will be created to acquire the properties of the Northern Electric Railway, the Sacramento & Woodland Railroad, the Marysville & Colusa Branch and the Sacramento Terminal Company, the latter subject to the $150,000 existing mortgage. This new corporation will issue first income bonds in exchange, bond for bond, for the bonds of the Northern Electric Company, the Sacramento & Woodland Railroad and the Marysville & Colusa Branch, and it will issue second income bonds in exchange, bond for bond, for the bonds of the Northern Electric Railway. All the bonds will bear interest at the rate of 5 per cent per year.

The unsecured creditors of the present companies will receive, as security for their claims, second income bonds equal to 50 per cent of their claims. These second income bonds will be delivered to the unsecured creditors by the Sloss Securities Company, and will be the consideration which the latter company will receive for its participation in the plan and for its cancellation of various unsecured claims it now holds against the Northern Electric Railway amounting to more than $1,000,000.

The new corporation will also create a first mortgage bond issue of $500,000 for the purpose of raising sufficient money to pay for necessary repairs and replacements to the road, receivers' certificates, expenses, attorneys' fees, costs of litigation, preferred claims for labor or materials which have been ordered paid by the court, and expenses of reorganization.

Interest will be payable unconditionally on the first mortgage bonds from the date of issue, and after five years from date upon the first income bonds. During the first five years interest will be payable on the first income bonds only as and when earned by the new corporation. Upon the second income bonds the annual interest charges will be non-cumulative.

All of the stock of the new corporation will be placed in trust with the Union Trust Company of San Francisco for a period of five years, with the power of selling the same for not less than $2,000,000. In case of such sale the money will be distributed pro rata among the unsecured creditors and those secured by second income bonds. While the stock is so held in trust, the trust company will vote a majority of the stock in accordance with the instructions of the first income bondholders.

It is expected that the complete reorganization plan will soon be submitted to the bondholders and the creditors for their final approval. Support for the arrangement from all sources is anticipated.

REASON FOR PUGET SOUND DIVIDEND CUT

A circular has been addressed by the directors of the Puget Sound Traction, Light & Power Company, Seattle, Wash., to the stockholders in regard to the reduction of the quarterly dividend on the preferred stock of the company to three-quarters of 1 per cent, as noted briefly in the ELECTRIC RAILWAY JOURNAL of July 3, page 38. The directors say:

"This reduction of dividend is due to a decrease in earnings caused by operation of jitney buses at a time when business conditions have been generally unsatisfactory. The jitney first appeared in the Puget Sound district in January of this year, rapidly increasing in number until in February and March there were about 700 in operation, resulting for a time in a loss in gross earnings to the company of more than $2,000 a day. A careful study of jitney operation throughout the country gives every indication that such cars under fair and reasonable regulation cannot be operated permanently and profitably in competition with street railways. A gradual decrease in such competition is, therefore, to be expected and such decrease is already taking place in the Puget Sound cities, the number of cars now in operation being less than 400.

"It is the opinion of the directors that neither the business depression alone, nor the operation of the jitney alone, would have affected earnings to such an extent as to make the reduction of dividend advisable. The company is at present in a strong position financially, with a substantial cash balance and only a small floating debt. The directors believe that this position should be maintained. As the company has had but six months of jitney competition, and as under most favorable circumstances this competition will not immediately disappear, they feel the company's resources should be conserved through postponing the payment of a portion of the preferred stock dividend.

"A return of general business toward normal conditions, or a further reduction in the operation of jitneys, should warrant the resumption of preferred stock dividends at the regular rate. The preferred stock is cumulative and, therefore, any deferred payments must be made up before dividends are paid on the common stock."

DES MOINES RECEIVERSHIP

Emil G. Schmidt, president of the Des Moines (Iowa) City Railway, has been appointed receiver of the property by the Federal Court as a result of action by the bondholders of the company to protect their interests. The decision of the State Supreme Court that the company's right to operate in Des Moines ends on Aug. 22 is believed to have been nullified by this latest court proceeding. Franchise negotiations are continuing, however, and a franchise settlement is expected. The franchise rights of the company were already being contested for by the bondholders in the federal courts, and the receivership will enable the company to make much-needed improvements which could not be made before on account of the unsettled franchise situation. Mr. Schmidt says that the jitney traffic in Des Moines is showing a big decrease and is now on the point of vanishing, if the growing receipts of the city railway are a criterion. The validity of the new jitney ordinance, which has been attacked in the courts, is undecided. Previous reference to the default in bond interest and the franchise difficulty of this company was made in the ELECTRIC RAILWAY JOURNAL of April 17.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.—The officers of the Augusta-Aiken Railway & Electric Corporation recently filed with the Secretary of State of South Carolina a certificate of increase in capital stock from $1,500,000 to $2,500,000.

Bay State Street Railway, Boston, Mass.—The directors of the Bay State Street Railway have decided not to pay any dividend at this time on the $20,517,200 of common stock, practically all of which is owned by the Massachusetts Electric Companies.

Belvidere (Ill.) City Railway.—W. C. Foster, Rockford, Ill., representing interests of that city, has purchased at auction the Belvidere City Railway.

Camaguey (Cuba) Company, Ltd.—The stockholders of the Camaguey Company, Ltd., have approved a proposition to give the Electric Bond & Share Company an option for ninety days on the $1,000,000 of capital stock of the company at $90 a share. Examinations of the properties will be made.

Cleveland (Ohio) Railway.—The State Tax Commission has fixed a tentative valuation of $24,891,100 on the property of the Cleveland Railway. Although the company has refused to pay the amount of taxes demanded for the last two years because of the excessive valuation placed on its property, and has brought suit to enjoin the collection of the amounts claimed each year, the tentative figures show an increase of $2,138,370 over the value fixed last year and about $5,000,000 more than the company is willing to concede. Each year the company tendered a check for the amount of taxes it was willing to pay and each year this was rejected by the county treasurer. These amounts have been set aside for payment when the courts adjudicate the matter. The company has insisted that the commission make known its methods of fixing the valuation, but this request has been refused.

Grand Valley Railway, Brantford, Ont.—The offer by the city of Brantford of the sale of the Grand Valley Railway line from Paris to Galt for $30,000 and electrification of the Lake Erie & Northern Railway from Port Dover to Brantford, has not been accepted by M. H. Todd, acting for the Canadian Pacific Railway.

Lake Shore Electric Railway, Cleveland, Ohio.—The directors of the Lake Shore Electric Railway have decided to use the surplus earnings in the development of the business instead of making further dividend disbursements at present. The power service of the company is being improved at considerable cost, but the changes are expected to reduce the cost of production materially and make it possible for the company to increase the business of this department. The first preferred stock of the company is a cumulative issue.

Norton & Taunton Street Railway Company, Norton, Mass.—Judge De Courcy in the Supreme Court has appointed Amos F. Hill, Lowell, as receiver of the Norton & Taunton Street Railway Company, until foreclosure proceedings are brought by the American Trust Company, trustee for the bondholders, on account of defaulted interest. The company is a consolidation of the Mansfield & Norton, Mansfield & Easton, Norton & Attleboro and Norton & Taunton street railways. On June 1, 1903, all were mortgaged to the American Trust Company to secure $296,000 of 5 per cent bonds.

Pacific Gas & Electric Company, San Francisco, Cal.—The board of directors of the Pacific Gas & Electric Company has declared a stock dividend of 6 per cent on the outstanding common stock, payable with stock certificates for whole shares of new common stock and stock dividend warrants for fractional parts of such shares in two instalments, 3 per cent on July 15, 1915, and 3 per cent on Dec. 15, 1915, to holders of common stock of record on June 30, 1915. Previous reference to this declaration was made in the ELECTRIC RAILWAY JOURNAL of June 19.

Peoria (Ill.) Railway.—The Illinois Public Utilities Commission has issued an order permitting the Peoria Railway to sell $115,000 of first and refunding 5 per cent mortgage bonds.

Southern Oregon Traction Company, Medford, Ohio.—The purchase of the Rogue River Valley Railroad, an 8-mile steam line, by the Southern Oregon Traction Company is reported.

Washington & Maryland Railway, Washington, D. C.—The Public Utilities Commission of the District of Columbia has authorized the Washington & Maryland Railway to issue $66,200 of first mortgage thirty-year 5 per cent bonds at the highest price obtainable under such details of sale as may be approved by the commission. The proceeds are to be used to fund indebtedness for cost of construction and improvements now made and to provide working capital. In a previous decision the commission valued the property of the company, including working capital, at $63,381 as of Aug. 15, 1914. The present debt to be funded is $53,000, and in order that the total securities may not exceed the fair value, the outstanding capital stock must be reduced to $10,360.

Western Ohio Railway, Lima, Ohio.—The Western Ohio Railroad was authorized by the Public Utilities Commission of Ohio to transfer its interurban property to the Western Ohio Railway and its electric light property at Sidney to the Standard Power & Equipment Company.

DIVIDENDS DECLARED

Bay State Street Railway, Boston, Mass., 3 per cent, first preferred.

Boston (Mass.) Suburban Electric Companies, 50 cents, preferred.

Brooklyn (N. Y.) City Railroad, quarterly, 2 per cent.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, quarterly, 2 per cent.

International Traction Company, Buffalo, N. Y., 2 per cent preferred.

Kentucky Securities Corporation, Lexington, Ky., quarterly, 1½ per cent, preferred.

Ottawa (Ont.) Traction Company, Ltd., quarterly, 1 per cent.

Ottumwa Railway & Light Company, Ottumwa, Iowa, quarterly, 1¾ per cent, preferred.

Public Service Investment Company, Boston, Mass., quarterly, $1.50, preferred.

Puget Sound Traction, Light & Power Company, Seattle Wash., quarterly, 75 cents, preferred.

Railway & Light Securities Company, Boston, Mass., 3 per cent, preferred; 3 per cent, common.

South Carolina Light, Power & Railways Company, Spartanburg, S. C., quarterly, 1½ per cent, preferred.

Springfield & Xenia Railway, Springfield, Ohio, quarterly, 1½ per cent, preferred.

Youngstown & Ohio River Railroad, Leetonia, Ohio, quarterly, 1 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May, '15	$165,033	$114,124	$50,909	$39,678	$11,231
1 " " '14	186,749	125,732	61,017	39,604	21,413
11 " " '15	1,818,854	1,175,487	643,367	438,487	204,880
11 " " '14	1,920,524	1,219,435	701,089	420,259	280,630

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

1m., May, '15	$60,920	*$32,008	$28,912	$17,500	$11,412
1 " " '14	56,965	*27,962	29,003	17,367	11,636
12 " " '15	791,131	*382,303	408,828	209,925	198,903
12 " " '14	772,137	*352,698	419,439	208,423	211,016

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., May, '15	$90,909	*$59,018	$31,891	$30,079	$1,812
1 " " '14	94,761	*59,111	35,650	28,840	6,810
12 " " '15	1,045,731	*704,925	340,806	347,431	†6,625
12 " " '14	1,172,194	*709,159	463,035	315,806	147,229

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m., May, '15	$245,947	*$151,170	$94,777	$37,821	$56,956
1 " " '14	254,559	*166,580	87,979	43,673	44,306
12 " " '15	3,065,554	*1,846,344	1,219,210	467,975	751,235
12 " " '14	3,052,154	*1,965,552	1,086,602	489,108	597,494

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., May, '15	$1,108,008	*$585,862	$522,146	$359,853	$162,293
1 " " '14	1,106,985	*586,519	520,466	343,608	176,864
12 " " '15	14,017,929	*7,520,595	6,497,334	4,294,048	2,203,286
12 " " '14	13,894,073	*7,697,943	6,196,130	3,988,669	2,207,461

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

1m., May, '15	$204,546	*$117,802	$86,744	$70,326	$16,418
1 " " '14	197,885	*114,135	83,750	63,504	20,246
12 " " '15	2,550,473	*1,441,152	1,109,321	769,781	339,540
12 " " '14	2,429,876	*1,398,351	1,031,525	747,687	283,838

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., May, '15	$194,301	*$117,593	$76,708	$63,889	$12,819
1 " " '14	227,430	*153,711	73,719	59,686	19,033
12 " " '15	2,498,810	*1,483,543	1,015,267	747,005	268,262
12 " " '14	2,751,609	*1,731,975	1,019,634	611,725	407,909

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., May, '15	$323,324	$191,317	$132,007	$51,524	$80,483
1 " " '14	323,036	191,808	131,228	50,660	80,568
5 " " '15	1,424,675	900,768	523,907	255,962	267,945
5 " " '14	1,403,920	860,110	543,810	250,815	292,995

REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.

1m., May, '15	$247,644	*$148,625	$99,019	$56,845	‡$42,239
1 " " '14	256,325	*159,538	96,787	56,454	‡40,407
5 " " '15	1,210,228	*755,134	455,094	284,286	‡171,132
5 " " '14	1,247,905	*777,784	470,121	279,187	‡191,284

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*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

THE JITNEY BUS

Philadelphia Regulatory Measure Signed—New Orleans Ordinance Sustained in State Supreme Court

On July 2 Mayor Blankenburg of Philadelphia signed the Jitney regulation ordinance after it was returned to him by Councils with his amendment to the zone clause refused. The ordinance will become effective on July 12. In a statement the Mayor made it plain that he objected to the zone clause in the measure, but that he was opposed to permitting jitneys to operate unregulated all summer. Immediately after announcement was made that the Mayor had signed the bill, G. S. Winner, president of the Jitney Auto Service Company, said his organization would ask the Court of Common Pleas to grant a temporary injunction restraining the department of public safety from enforcing the provisions of the law. If this request is refused, he said, the company would appeal to the Public Service Commission for redress. John H. Fow, counsel for the Jitney Auto Association, also said he would file a bill in equity restraining the police department from enforcing the zone section of the ordinance.

The New Orleans ordinance designed to regulate jitney traffic was upheld on June 28 by the State Supreme Court, and a temporary injunction obtained in the Civil District Court by jitney owners to prevent the city authorities from enforcing the law was dismissed. Owners of jitneys objected principally to a provision of the ordinance which stipulated that all owners must give an indemnity bond of $5,000. Each of the cars of the New Orleans Railway & Light Company is affected by the ordinance.

When the proposed ordinance regulating the jitneys in Scranton, Pa., came before Councils, a delegation of jitney owners asked Councils to define regular routes for them to travel on streets not occupied by the lines of the Scranton Railways, and offered to furnish the city with a blanket bond covering all members of the association. The offer was accepted.

At the request of the Pottsville (Pa.) Jitney Owners' Association, Judge Brumm has issued an injunction on Mayor Mortimer and the City Council preventing the enforcement of the jitney ordinance recently passed. The jitney owners say the new law is impossible of enforcement, as it requires a certificate of efficiency from all drivers, and there is nobody with authority to issue such certificates. They also charge that taxicabs exact large fares and are taxed only $10 annually, while jitneys with 5-cent fares are taxed from $25 to $100.

City Solicitor Field of Baltimore, Md., has submitted to the Board of Estimate a tentative ordinance for the regulation of the jitney in that city. The measure fixes the license fee at $200 for a car with a capacity of eight passengers or less, with an additional payment of $25 for every passenger in excess of eight. A further tax of 9 per cent of the gross receipts is provided, this being at the same rate as the tax imposed on the earnings of the local railways for park purposes. The matter of an indemnity bond has not been covered in the measure as prepared by Mr. Field, as the Mayor believes that this could perhaps be dealt with better in a separate measure.

The jitney regulatory ordinance passed by the City Council of Grand Rapids on May 10 has gone into effect. The Council found that of the 3385 names signed to a petition presented by the jitney men for a referendum only 947 were qualified electors and the petition was promptly revoked. The ordinance provides for the payment of a license fee of $3.50 for each passenger according to seating capacity. The bond for each driver is fixed at $10,000. Jitneys are required to operate between 6 and 10 a. m., noon, 1 and 2 p. m., and 5 and 8 p. m.

Judge Leslie R. Hewitt of the Superior Court at Los Angeles, Cal., has sustained the city's demurrer to the suit of J. M. McClasky for an injunction to restrain enforcement of the motor bus ordinance. The ordinance became effective July 1, but the provision for $11,000 indemnity bonds does not become effective until July 17.

JITNEY DECREASE IN OAKLAND

Careful counts made by the San Francisco-Oakland Terminal Railways of the jitney buses operating in Oakland, Cal., indicate a gradual decrease in the number of 5-cent auto vehicles. The craze began the latter part of December, 1914, and within thirty days approximately 500 machines appeared in the service. The need of legislation was quickly demonstrated. At that time jitney drivers were operating under a resolution passed by the City Council, permitting them to operate on a $5 per annum license fee. The first formal ordinance, passed in February, 1915, added an indemnity bond of $10,000 for each machine. Under this clause the jitneys have been paying a premium of $80 to $100 per annum to the Pacific Coast Casualty and the Guardian Casualty & Guarantee Companies. The latter company, however, has recently withdrawn from the field, gradually cancelling all bonds already written and refusing to write any new business. This ordinance also raised the city license fee from $5 to $60 per annum, payable quarterly; specified regular routes; called for a full stop at all railway crossings and other minor regulations under direct supervision of the chief of police of the city.

The ordinance was objectionable to the jitney operators, particularly the clauses in reference to the $60 annual license fee and full stop required at all railway crossings. The City Council reconsidered the matter and passed a new ordinance which, while requiring the annual license fee of $60, provided full stops at railroad crossings not controlled by flagmen or traffic officers and permitted operation over street railway crossings at a reduced speed of 5 m.p.h. This second ordinance was also opposed by the jitney operators on the ground that the $60 license fee was exorbitant. An amendment was proposed to reduce this amount to $10 per annum. This proposal was referred to a referendum vote by the people at the regular mayoralty election on May 11, and was defeated. The election at the same time approved an amendment making it obligatory upon the chief of police to revoke jitney licenses for violation of any part of the ordinance or any traffic law passed by the city.

The principal point now in dispute is between the city and those jitney operators who are operating under the original $5 annual license fee. The city is endeavoring to collect the license fee under the new ordinance while the jitneys contend they are not liable to the $60 tax until their original license expires. The city attorney has advised the Council that the right to increase the license fee is a legal one and the jitney operators received grace until July 1 to come in under the new license.

At present about seventy-five jitney operators are running under the original $5 license fee which nominally expires on Jan. 1, 1916. They are preparing to contest the ruling of the city attorney through a case now pending in the lower courts, but with little encouragement for relief.

During the latter part of April 284 machines were licensed for jitney operation, but from actual count only 246 operated regularly during the week, except that on Saturdays due to increased travel and half-holidays, nearly all were operated. At that time the average earning per car was about $4.25 per day, the longest route was 4.4 miles and the shortest 2.1 miles. In the latter half of May the total of machines licensed to operate had decreased to 270, but only 196 were in actual operation on week days other than Saturday. The greatest reduction was noticeable on the longest routes. By the middle of June the total number of licenses had decreased to about 200, which is accounted for by the rapid deterioration of machines, accidents, extraordinary wear, decrease in earnings and the apparent wearing off of the novelty as well as the usual loss of travel during the summer months on account of the absence of vacationists from the city.

Inquiry among jitney bus drivers indicated that no operators have made more than a living wage; also that a great many who are now running contemplate leaving the jitney field as soon as they are able to procure employment elsewhere. It was considered likely that many machines would be withdrawn from service under the provision for the renewal of licenses which was to go into effect on July 1.

THE PUGET SOUND COMPANY'S JITNEY SERVICE

A. L. Kempster, manager of the Puget Sound Traction, Light & Power Company, operating in Seattle, Everett, Bellingham, and Tacoma, states that preparations for installing jitney bus service in Seattle, heretofore reported in the ELECTRIC RAILWAY JOURNAL, are well under way, and that the first unit of fifty machines will be in operation in the very near future. Mr. Kempster said:

"Some of the machines are being operated temporarily in Everett, but they will be put on in Seattle as soon as we are in shape to handle the traffic. The first fleet will consist of fifty machines. We may confine the jitney system to that number or we may put on 200 more, just as there seems to be profit in a speedy short-haul business. No selection of routes has been made as yet, but it is probable that the Broadway and the Woodland Park runs will receive our attention first, as these seem to be profitable and much desired by the independent jitney operators. We are training our own men for the operation of our jitneys, and shall not accept anyone from the ranks of the licensed jitney bus operators. In this manner, we will find an outlet for certain labor not productive of profit now, and in addition we will be utilizing men whose records are well known to us and who have the fullest measure of our confidence. This will reduce the possibility of reckless driving, inefficient handling of traffic, or discourtesy."

The company contends that with a central repair plant, the ability to purchase supplies in large quantities, and other advantages that accrue through its well-developed organization it will make a better profit than is possible for the independent operators. According to the plans of the company, there will be no specially constructed bodies on small-car chasses, the company taking the stand that as soon as the attempt is made to carry a large number of persons in a jitney the element of speed, which is apparently one of the main desires of the traveling public, is lost.

SAN DIEGO TRAFFIC DECREASE

Division of Traffic Losses in San Diego Ascribes 62 Per Cent to the Jitney

Although it is the seat of the Panama-California Exposition, San Diego has suffered a slump in travel of all kinds due to the business depression. So far as the San Diego Electric Railway is concerned, the losses are enlarged by the still-unregulated jitney business. The company has made analyses of the jitney travel from time to time, and from these it has drawn the conclusion that about 62 per cent of the losses are due to this cause. The comparative figures for Sept. 1 to April 30, 1914 and 1915 respectively show a decrease in gross earnings from $638,399 to $625,847, or $12,551, equivalent to 2 per cent. During the period of Sept. 1, 1914, to April 30, 1915, the jitneys carried about $84,000 of business, while the hard times were held responsible for a loss of $50,153. The latter two figures are based on comparisons of actual business and what the company expected with the normal annual increase in business up to May 1, the influence of the Panama-California Exposition has not become a determining factor in the company's revenues.

A count of jitney business at San Diego on May 29 for the eighteen hours from 6 a. m. to 12 midnight showed 2954 round trips, 7046 passengers, and $352.30 in receipts. The average passengers carried per trip were 2.39. The total number of cars was 125, giving an average of $2.82 per car. An ordinance regulating jitney traffic was passed by the Common Council on May 1, but its enforcement was postponed pending the service of a restraining order which expired on June 7. Since Jan. 1 the number of jitneys has averaged about 125. At one time as many as 200 men were engaged in jitney operation.

The company has lately adopted the plan of carrying its case to the public through a series of advertisements in the newspapers. All of the advertisements occupy large space and are directly concerned with problems growing out of the jitney competition. The subjects dealt with are indicated by the headings on the advertisements. Some of the headings in recent statements to the public follow: "Reduce Fares and You Break the Street Car Company," "Why We Reduced Our Car Service," "Would the People Stand for the Jitney Bus if They Owned the Street Railway Lines?" "A Crippled Street Car System Is the Surest Way to Cripple a City," "Is the Jitney Competition Fair?" "Jitney Buses Make Hundreds of Men Jobless."

THE RECKLESS CHAUFFEUR

Vigorous Campaign of the Long Island Railroad to Inculcate Respect for Safety

The Long Island Railroad has inaugurated a campaign to induce chauffeurs and automobile drivers to be more careful when driving over grade crossings on Long Island. At prominent points on Long Island, where they cannot fail to be seen by those in automobiles, the railroad is placing huge signs which read:

THIS SIGN MAY SAVE YOUR LIFE TO-DAY
All the Precautions in the World Will Not Save the
Lives of Those Who Drive Automobiles Recklessly
Over Railroad Crossings
When Approaching a Crossing Please Stop, Look and Listen
We Are Doing Our Part. Won't You Do Yours?
LONG ISLAND RAILROAD.

The first of these signs has been placed at Broadway, Flushing, on the electrified division, where the railroad bridge crosses the highway. Some of the signs will be 50 ft. long and 10 ft. high, while others will be 10 ft. square. Several of them will be electrically lighted at night.

Not only is the Long Island Railroad putting up signs calling the attention of motorists to the danger of driving recklessly over grade crossings, but it is going to conduct an advertising campaign with a series of "life saving bulletins." These bulletins will make a plea for greater care on the part of drivers of motor cars on Long Island. There are still 631 grade crossings on Long Island. Up to date, 305 have been eliminated at a cost of more than $15,000,000. At the present time, work on the elimination of thirty-two more crossings is in progress.

J. A. McCrea, general manager of the company, is urging upon the State of New York action similar to that taken by New Hampshire, which has just passed a law requiring every city and town to maintain a warning sign on every highway approaching a crossing at a reasonable distance on each side of the crossing. Under the New Hampshire act grade crossing protection is put in the hands of the Public Service Commission. That commission has ordered that enamel metal signs 24 in. x 12 in., white letters on a blue ground, shall be placed at varying distances from grade crossings. If any town for sixty days neglects to comply with the commission's order, it forfeits $1 for each day. Anyone injuring or defacing these signs is liable to a fine of $10.

Since 1911 there have been some 507 accidents at grade crossings on Long Island as the result of recklessness on the part of automobilists, motorcyclists, carriage and wagon drivers. In that period forty persons were killed and 111 persons injured, for none of which casualties the railroad company was responsible. Of the people killed twenty-four were in automobiles, twelve in wagons and carriages, and four on bicycles and motorcycles. Of the people injured sixty-seven were in automobiles, twenty-six in wagons and carriages, and eighteen included pedestrians, bicyclists and motorcyclists. In forty-two of the 507 grade-crossing accidents nobody was injured. In 157 cases automobile and wagon drivers defiantly ran their machines and vehicles through lowered gates, damaging the railroad's property to the extent of breaking the crossing gates. In attempting to cross the tracks 125 autos and fifty-three wagons were damaged. Some were struck by trains while others sustained damage by contact with lowered gates. From 1911 to June 17, 1915, a total of sixteen horses were killed and eight injured at Long Island grade crossings through the carelessness of their drivers.

J. A. McCrea, general manager of the Long Island Railroad, said on June 20:

"The Long Island Railroad management regards every accident as one too many, and it is now in the midst of an aggressive campaign to the end that life and property shall be preserved. If those who have occasion to use grade crossings on Long Island will co-operate with us, we shall succeed in accomplishing this distinctly humane object. Without their aid we must fail."

MILWAUKEE FARES

Pending the determination of the reasonableness of the original order by the Railroad Commission of Wisconsin commanding thirteen tickets to be sold for 50 cents by The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., the fare coupons given out by the company pending the Supreme Court Appeal will not be accepted for passage, according to J. D. Mortimer, president of the company. In a statement which he made Mr. Mortimer is quoted as follows:

"This company's investment in railway business is now earning so little as to make the expenditure of additional capital for further facilities absolutely impossible without obtaining some relief. Relief should take two forms—increased revenues and the cessation of hostile attacks on the business of the company. Both are necessary and the latter is as important as the former.

"When The Milwaukee Electric Railway & Light Company appealed from the decision of the Railroad Commission of Wisconsin, ordering the company to sell thirteen tickets for 50 cents, it was agreed by stipulation that the company should have the opportunity of contesting the reasonableness of the order, should the courts finally hold that the commission had the power to modify rates of fare prescribed by the company's franchise.

"The courts have now held that the commission possesses this power. Pending the determination of the reasonableness of the 'thirteen tickets for 50 cents' order, the fare coupons cannot be accepted in payment for transportation.

"Subsequent to the entry of the commission's order referred to, many things have occurred. The expense of the company of maintaining paving within the track zone has developed into large proportions. Requirements for increased service, resulting from special orders of the commission, have largely increased operating expenses. Opening of new lines and extensions of track, yet unproductive of appreciable earnings, have further reduced the margin which the commission believed to exist in the year 1912. General advances in prices paid for materials and labor have also increased expenses. More recently the advent of the jitney bus has reduced receipts without reducing expenses."

The decision of the United States Supreme Court in the Milwaukee fare case is abstracted elsewhere in this issue.

SAFETY FIRST IN BROOKLYN

The safety organization of the surface transportation department of the Brooklyn (N. Y.) Rapid Transit Company has presented its first half-yearly report, for the six months ended June 7. The report is signed by A. Maxwell, superintendent of employment, who is secretary of the departmental safety committee of the surface transportation department. In summarizing the results of the safety work to date Mr. Maxwell says:

"As to what bearing the net result of the safety movement to date has had on the accident situation is an interesting question. The monthly claim department accident statement for Classes A, C, D, and E accidents for the six months under review shows as follows in per cent, when compared with the corresponding period of the previous year:

Classification	Dec., 1914	Jan., 1915	Feb., 1915	Mar., 1915	Apr., 1915	May, 1915
Car collisions	—57.2	—32.1	—70.0	—35.5	—16.7	—53.1
Car and vehicle collisions.	—32.9	—18.9	—42.6	—52.2	—21.2	—28.1
Cars striking persons....	—43.1	—12.5	+43 1	+11.7	— 4.9	—35.7
Boarding and alighting..	—25.9	— 2.4	—17.3	— 0.7	Even	—21.7

"The prime reason for tabulating only the above four classes of accidents here is that these classifications more directly concern platform employees than any other class of accident, and, if statistics count for anything, these figures should reflect just what the men themselves are accomplishing toward minimizing and reducing our accident hazard.

"In conclusion it is believed that the safety movement of the surface transportation department has been fairly and successfully launched, and that, as time advances, what may now be described as an imperfect system will become a complete, harmonious and perfect system to the ultimate benefit and gain of the company and the community at large."

Curbing the Philadelphia Chauffeur.—The trainmen in the employ of the Philadelphia (Pa.) Rapid Transit Company have been asked to co-operate with the police of that city toward reducing reckless auto driving by reporting infractions of the traffic rules by chauffeurs.

One-Man Car Request Refused.—The Public Service Commission of Massachusetts has refused the request of the Milford, Attleboro & Woonsocket Street Railway for authority to operate electric cars in charge of one man on its lines between Cellingham, Four Corners and Caryville.

St. Louis Skip-Stop Hearing Concluded.—The hearing before the Public Service Commission of Missouri upon the request of the United Railways, St. Louis, for permission to eliminate 770 car stops was concluded on June 26. Attorneys were instructed to file their briefs within ten days.

Passes Withdrawn.—A bulletin has been issued by the East St. Louis & Suburban Railway, East St. Louis, Ill., in regard to free transportation. Mail carriers will hereafter be carried gratis only between 6 a. m. and 8 p. m. Deputy sheriff badges will not be honored, nor will the special agents of railroads receive free rides. Terminal Association agents will be carried free only on Eads Bridge. Policemen and firemen will be carried free only when they are dressed in full uniform.

Invites Manufacturers.—The Indiana & Michigan Electric Company, South Bend, Ind., is advertising in the Chicago daily papers, the manufacturing advantages of the St. Joseph Valley and the many attractions of South Beach, Elkhart, Mishawaka, Niles, Buchanan and other communities to manufacturers seeking smaller cities for location. Manufacturers are invited to submit their industrial problems to the Indiana & Michigan Company and the traction company promises co-operation.

New Detroit Interurban Station.—On July 1 the Detroit (Mich.) United Railway opened a new interurban station in Detroit. The ground floor is given over almost entirely to the uses of patrons of the interurban lines, while the remaining five stories of the building will be used for the general offices of the company. One of the features of the building is a wide gallery which has been fitted up as a ladies' rest room. The new office building and station is at Bates Street and Jefferson Avenue and was formerly the Edson-Moore Building.

Lexington Participation Plan.—All of the non-union trainmen of the Kentucky Traction & Terminal Company, Lexington, Ky., have accepted the contract proposed by the company some time ago, on the basis of an increase in wages proportioned on the saving made through any reduction in the cost of accidents. The union men have declined to accept the contract. They are reported to have drawn up a substitute contract which they will present to the company to replace the old one, which expires this month. The contract with the non-union men went into effect on July 1 for a term of three years. The general conditions of the participation plan were referred to in the ELECTRIC RAILWAY JOURNAL of June 19, page 1183.

The Memphis "Jim Crow" Case.—The Memphis (Tenn.) Street Railway has won its case in the courts in which its interpretation of the "Jim Crow" law was involved, the State Supreme Court having upheld the measure thus reversing the Circuit Court and the Court of Appeals. The case centered on the question of seats, two white men having entered a street car when there were plenty in the white compartment and having taken seats reserved for negroes. When the car filled up the conductor called upon them to give up their seats to negroes. They agreed to if he would get them seats in the white section. The upshot of the incident was that the conductor ejected the men and had them put under arrest, whereupon they brought suit for damages, getting an award of $1,000 each in the lower court. The Supreme Court said in part: "These seats must be kept separate and apart; there should be a well-defined dividing line; blacks should be made to occupy their own seats and the whites theirs. Conductors have a sort of police power over passengers, and the latter are subject to orders from this officer, who must live up to the statutory provisions." The case was that of A. M. Keisker, and Ralph Bowden against the Memphis Street Railway.

Personal Mention

Prof. Charles M. Spofford, of the firm of Fay, Spofford & Thorndike, consulting engineers, Boston, and head of the department of civil and sanitary engineering of the Massachusetts Institute of Technology, has been appointed by the Governor of Massachusetts a member of the Terminal Commission, constituted by a recent legislative act to investigate the subject of terminal facilities and the improvement of facilities for the transportation of freight in the Boston metropolitan district.

Mr. Frank C. Rose has been appointed purchasing agent for W. S. Barstow & Company, Inc., New York, N. Y., engineers and manager for the General Gas & Electric Company and the Eastern Power & Light Corporation, which control among other properties the Rutland Railway, Light & Power Company, Rutland, Vt.; the Claremont Railway & Lighting Company, Claremont, N. H.; the Reading Transit & Light Company, Reading, Pa., and the West Virginia Traction & Electric Company, Wheeling, W. Va. Mr. Rose was connected with the Delaware, Lackawanna & Western Railroad for eighteen years, with J. G. White & Company for seven years as assistant purchasing agent and with the Foundation Company, Ltd., Montreal, for a year and a half as general purchasing agent. He succeeds Mr. F. A. E. Thorling as purchasing agent with Barstow & Company.

Mr. Fred F. Stockwell has been appointed treasurer of the New England Street Railway Club, succeeding the late Edward P. Shaw, Jr. Mr. Stockwell is widely known in the electric railway field as treasurer of the Barbour-Stockwell Company, Cambridge, Mass., manufacturer of special trackwork. He was born in Brattleboro, Vt., but his parents moved to Cambridge soon after his birth, and after attending the local schools Mr. Stockwell learned the machinist's trade in Boston. He entered business with a partner in 1889, and a consolidation of interests led to the incorporation of the Barbour-Stockwell Company in 1893. The new treasurer has been closely identified with the development of electric railway special work since the days of horse traction. He is a charter member of the club and is active in the American Electric Railway Manufacturers' Association.

Col. Timothy S. Williams, president of the Brooklyn (N. Y.) Rapid Transit Company, celebrated twenty years of service with the company and its constituents on July 1. On his arrival at his office on the morning of July 1 President Williams found on his desk a huge silver loving cup filled with American beauty roses—the gift of nineteen men of the company's official staff, whose service with the company has been coextensive with his own. The men who presented the loving cup to Colonel Williams were Messrs. G. H. Beck, E. Brower, T. S. Curley, J. H. Dwyer, G. H. Jackson, W. J. O'Neill, J. F. Throckmorton, J. Weidman, F. J. Spaulding, C. D. Meneely, J. H. Bennington, H. A. Crowe, J. Duffy, W. H. Gordon, A. Maxwell, W. Siebert, J. Walsh, Jr., C. T. Victorine, I. Isaacsen. The loving cup is inscribed on one side with the names of the donors and on the other side bears the following inscription: "To our president and friend, Col. Timothy Shaler Williams, to whose wisdom, foresight and courage is so largely due the conception, nurture and development of the Brooklyn Rapid Transit System to its present proud pre-eminence, from those who have been associated with him for twenty years, who have to some extent shared his labors and who rejoice in his well-earned success."

OBITUARY

Joseph H. Pierson, assistant claim agent of the Terre Haute, Indianapolis & Eastern Traction Company, was killed when his automobile turned over on the evening of June 23, while he was driving from his office to his home at Valley Mills, a few miles south of Indianapolis. Mr. Pierson was born in Wayne Township, Marion County, Ind., in 1870. He was educated in the public schools of his native township and later took a course in the Central Normal College, Danville, Ind. He taught in the schools for several years. Mr. Pierson was active in Democratic politics for many years and was elected as representative to the 1909 session of the Indiana Legislature. He became connected with the claim department of the Terre Haute, Indianapolis & Eastern Traction Company in 1909.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Lauderdale Power Company, Florence, Ala.—Incorporated in Alabama to construct a railway between Florence and Huntsville, 75 miles. Alan Jemmison, Birmingham, president.

Intercity Terminal Railway, Little Rock, Ark.—Incorporated in Arkansas to construct and operate a railway in Little Rock and Argenta. It is reported that the company has been organized to take over the Argenta Railway. Capital stock, $500,000. Officers: C. C. Kavanaugh, president; E. W. Jackson, vice-president, and F. J. Schmutz, secretary and treasurer.

Mississippi Valley Railway & Power Company, Dover, Del.—Incorporated in Delaware to construct railroads and to operate by steam, electricity, or other power. Capital stock, $4,500,000. Incorporators: Charles B. Bishop, Clarence J. Jacobs and Harry W. Davis, Wilmington, Del.

FRANCHISES

Phoenix, Ariz.—The Phoenix Railway has received a franchise from the Council to build a double-track line down Fourth Street from Roosevelt Street to Washington Street and to extend the Monroe Street loop to Fourth Street.

Los Angeles, Cal.—The Council decided on June 26 to advertise for sale a franchise for a street car track covering a distance of 448 ft. on Central Avenue in front of the Southern Pacific Station. The track is to turn in toward the station at a point 69 ft. south of Fifth Street and turn back to the present tracks at a point 448 ft. farther south. The track is desired by the Los Angeles Railway to provide for its passengers easier access to the station than is afforded by the present arrangement. The plan has been indorsed by the board of public utilities and the public utilities committee of the Council.

Los Angeles, Cal.—The Board of Public Works has been authorized by the Council to advertise for bids on the street railway franchise on South Park Avenue. Bids will be received on two sections of the line, the first extending from Jefferson Street to Slauson Avenue, and the second from Slauson Avenue to Florence Avenue.

Hutchinson, Kan.—The Hutchinson Interurban Railway has received from the Council a franchise to extend its line on Second Street from Main Street to a point 300 ft. east of Walnut Street. The Council also granted to the Arkansas Valley Interurban Railway the right to use the Second Street track for reaching its terminal station which will be located at 111 Second Avenue, East, recently purchased.

Pittsburgh, Pa.—In a recent letter to the Council Mayor Joseph G. Armstrong recommended that seventeen out of the twenty-five requests for franchises for curves, additional tracks and sidings made to him by the Pittsburgh Railways be granted. Together with this letter the Mayor submitted to the Council a proposed ordinance in which the conditions under which these franchises should be given were fully stated. The Mayor told the Council that he had prepared his recommendations after conferences with the law department and the Department of Public Works. He asked for immediate action on the part of the Council, inasmuch as conferences with the officials of the Pittsburgh Railways will probably be necessary.

TRACK AND ROADWAY

Birmingham, Ala.—In connection with the proposed electric railway from Birmingham to the Warrior River, it is planned to continue the line to Jasper, about 35 miles from Birmingham. W. W. Shortridge, Birmingham, is interested. [June 26, '15.]

Douglas (Ariz.) Traction & Light Company.—This company is constructing 300 ft. of additional trackage at Camp Douglas, extending the line eastward from its former terminus to a point near the eastern boundary of the Eleventh Infantry camp. It is later intended to extend the trackage the entire distance to the eastern edge of the camp.

Hoxie Electric Railroad, Calico Rock, Ark.—Plans are being made to revive the project for an electric railroad from Hoxie to Calico Rock. J. W. Myers, Calico Rock, is interested. [Feb. 27, '15.]

Burlingame (Cal.) Electric Railway.—It is stated unofficially in San Francisco that the Burlingame Railway, owned by Ansel M. Easton, Burlingame, and others, will be equipped with the overhead trolley. The road, 2 miles long, has been operated since March 1, 1913, with storage battery cars.

Marin County Electric Railway, Mill Valley, Cal.—Construction has been begun on the first unit of this company's line. This stretch of track will extend from the heart of the town to the upper end of Cascade Canyon. It is expected that the system will eventually be extended to Sausalito. [May 22, '15.]

San Francisco (Cal.) Municipal Railway.—Bids will be received by the Board of Public Works on July 14 for steel rails to be used in the construction of the Church Street municipal railway. The city engineer plans to have the construction of the road contracted for in three parts—one from Van Ness Avenue and Market Street to Church Street and Eighteenth Street; another from Eighteenth Street to Twenty-second Street and the third from Twenty-second Street to Thirtieth Street. The plans for the section from Van Ness Avenue to Eighteenth Street will provide for the construction of two tracks on Market Street from Van Ness Street to Church Street.

Capital Traction Company, Washington, D. C.—The Public Utilities Commission of the District of Columbia has denied the application of this company to build an extension of its lines on Seventeenth Street, I Street, Thirteenth Street, H Street and other streets in Washington.

Orlando (Fla.) Interurban Traction Company.—W. C. Temple, president, reports that the project to build an electric railway to connect Orlando, Kissimmee and Sanford has been abandoned. [April 12, '13.]

Palatka-Hastings Interurban Railway, Palatka, Fla.—This company reports that the project to build an electric railway from Palatka to Hastings has been abandoned on account of the inability to secure permission from the Putnam County Commissioners to use the bridge crossing the St. Johns River upon a basis that would enable it to operate. F. J. Von Angelken, East Palatka, secretary. [Nov. 15, '13.]

***Pearl Harbor, Hawaii.**—Bids are desired until Sept. 18 by H. R. Stanford, chief of the bureau of yards and docks, navy department, Washington, D. C., for the construction of a marine railway at the naval station, Pearl Harbor, Hawaii, according to specification 2172. The appropriation for this work is $94,000.

Lincoln Railway & Light Company, Lincoln, Ill.—This company expects to lay new track on Union Street from Broadway to Tremont Street. The 40-lb. rail now in use will be replaced by 60-lb. rail. The company has laid 80-lb. rail on its Broadway line.

Evansville & New Harmony Traction Company, Evansville, Ind.—This company announces that it has contracted with M. A. Peoples, Chicago, for the financing and construction of its line from Evansville to New Harmony, 30 miles. The line will connect a number of suburban towns in the vicinity of Evansville. It is expected that construction will be begun about Sept. 1. C. J. Seibert, Evansville, general manager. [Nov. 28, '14.]

Louisville & Northern Railway & Lighting Company, New Albany, Ind.—Complete suspension of traffic on Market Street between Washington Street and Vincennes Street has been ordered by the Board of Public Works, while the concrete bed for the new brick pavement is laid and allowed to settle, the railway company transferring passengers from car to car across the intervening square. The city and the Louisville & Northern Railway & Lighting Company are in a controversy as to the nature of a crossing which the company is to construct over Market Street. The city calls for T-rails embedded in cement between the tracks, and the railway wants to use oak planks.

Topeka (Kan.) Railway.—Material has been ordered and work will be begun at once on the extension of this company's line on Kansas Avenue from Seventeenth Street to Twenty-first Street. A bridge across the Shunganunga River will be built in connection with the extension. It is estimated that the bridge will cost about $19,000.

Cumberland & Manchester Railroad, Manchester, Ky.—T. J. Vermillion & Son, Barbourville, have received the contract to construct a 3-mile section of this company's line from Manchester to Barbourville. The route extends via Cannon, Girdler, Hopper and Woollum. M. E. S. Posey, Barbourville, chief engineer. [June 19, '15.]

Brandon (Man.) Municipal Railway.—This company reports that it is constructing 6700 ft. of single track, forming a belt line 5½ miles long.

United Railways, St. Louis, Mo.—This company will construct new tracks on Olive Street between Fourteenth Street and Boyle Avenue, St. Louis.

***Rutherfordton, N. C.**—Plans are being considered to build a line from Rutherfordton to Columbus, about 15 miles. L. D. Miller, Rutherfordton, is interested.

***Dayton, Ohio.**—Plans are being considered to build a railway between Dayton and St. Marys. At a meeting of the citizens of the towns on the proposed line, held at Covington on June 30, Judge Dennis Dwyer of Dayton was appointed chairman of the committee to look after the financing of the line.

Oklahoma (Okla.) Railway.—Plans are being made by this company to reconstruct its tracks from the Rock Island Railroad tracks north on Broadway to Tenth Street and on East Fourth Street.

Sand Springs Railway, Tulsa, Okla.—This company contemplates the construction of an extension of its lines southwest to the oil fields, about 30 miles.

Northampton (Pa.) Traction Company.—Arrangements for the physical connection of the property of this company with the Northampton, Easton & Washington Traction Company across the Delaware River are under consideration and are expected to be completed in the near future.

Philadelphia, Pa.—Bids will be received until Aug. 16 by A. M. Taylor, director department of City Transit, 754 Bourse Building, Philadelphia, for the construction of the City Hall station section of the Broad Street subway under City Hall and Market Street subway and work appurtenant thereto, known as Contract 101. This section will be about 700 ft. long, and will include the underpinning of the west side of City Hall and the Market Street subway. Plans and specifications may be had at Room 748, Bourse Building, upon a deposit of $50 per set, pending return.

Rhode Island Company, Providence, R. I.—Work has been begun by this company laying double tracks on North Main Street between Camp Street and Mill Street, Providence.

Southern Public Utilities Company, Greenville, S. C.—Material has been received and work will be begun at once on the reconstruction of this company's tracks on Whitner Street and South Main Street, Anderson.

Carolina, Greeneville & Northern Railroad, Greeneville, Tenn.—A. H. Jacoby, Greeneville, has been awarded the contract for part of the work of this company's line from Bristol to Knoxville, via Kingsport, Newport and Sevierville, 140 miles. The maximum grade will be 1.5 per cent and the maximum curvature 10 deg. Three steel bridges aggregating 1500 ft. will be built on the line. H. S. Reed, 205 Grant Building, Los Angeles, president. [June 26, '15.]

Corpus Christi-Ward Island Interurban Railway, Corpus Christi, Tex.—Grading has been begun on this company's line from Corpus Christi to Ward Island, 7 miles. The work of laying track will be begun in about four weeks and it is expected that the line will be completed about Oct. 1. The company plans to develop Ward Island as an amusement park. J. H. Caswell, San Diego, is interested. [May 15, '15.]

Dallas (Tex.) Southwestern Traction Company.—At a meeting of the stockholders of this company on June 21 it was announced that the sale of $60,000 of the company's $2,500,000 of bonds has been authorized. E. P. Turner, Gaston Building, Dallas, president. [June 12, '15.]

Lynchburg (Va.) Traction & Light Company.—In connection with improvements being made by the city, this company plans to double track its line on Main Street.

***Norton, Va.**—Plans are being made to construct a railway from Norton to High Knobs in Stone Mountain, about 5 miles. Patrick Hogan, High Knobs, is interested.

Radford-Willis Southern Railway, Radford, Va.—The contract for constructing this company's line from Willis to Radford has been awarded to Williams Brothers Construction Company, Roanoke. John L. Vaughan, Shawsville, president. [March 13, '15.]

Virginia Railway & Power Company, Richmond, Va.—In connection with the proposed extension of this company's line on West Broad Street from Robinson Street to the corporate limits, officials of the company have stated that further extensions of its lines are practically at a standstill owing to the difficulty in securing the desired legislation, jitney encroachment and general depression. It is stated that at the present time the company finds it impracticable to build the line, and, as the time limit has already expired on the franchise, is prepared to avail itself of the alternative provision of forfeiting the $5,000 bond which it put up as assurance at the time of securing the franchise.

Charleston (W. Va.) Interurban Railroad.—Four miles of track on this company's 25-mile extension from Charleston to Montgomery has been laid and it is stated that cars will be operated between Charleston and Malden, 6 miles above Charleston, by July 15.

***Morgantown & Wheeling Railway, Morgantown, W. Va.**—This company advises that it is extending its line from Cassville to Blacksville, 15 miles. All the grading and masonry is completed with the exception of one bridge 186 ft. long. The bridge is completed and ready to put in place as soon as it is reached by track. Seven miles of track have been completed and are being operated by steam. The company is using 70-lb. A. S. C. E. rails and oak and chestnut ties. It is planned to operate the line by steam for about two years, when it will be operated by electricity.

Weston & Glenville Electric Railroad, Weston, W. Va.—Surveys will soon be begun by this company on its proposed line between Weston and Glenville. Lloyd Rinehart, Weston, is interested. [Oct. 17, '15.]

SHOPS AND BUILDINGS

Connecticut Company, New Haven, Conn.—A new trolley station will be built at Woodmont by this company in the near future. The structure will be of stucco. The cost of the building is estimated at $5,000.

Detroit (Mich.) United Railway.—On July 1 this company removed its interurban station and general offices to the Detroit United Building on the southeast corner of Jefferson Avenue and Bates Street. The waiting room is located on the ground floor with the main entrance on Jefferson Avenue, while the exit to the cars will be on Bates Street, as will also be the entrance to the general offices.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—This company announces that it will soon begin the construction of general repair shops at Faribault, Minn.

Citizens' Traction Company, Oil City, Pa.—Announcement has been made by this company that it will erect a modern carhouse on the site of the present structure in Franklin. The building will have a frontage of 52 ft. on Liberty Street and will be 150 ft. deep. The structure will be of brick with concrete floors and rolling steel doors.

POWER HOUSES AND SUBSTATIONS

Pittsburgh (Pa.) Railways.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for four 1800-kw., 600-volt d.c., six-phase sixty-cycle, 514-r.p.m. compound wound commutating-pole rotary converters; twelve 625-kva. single-phase, sixty-cycle, 11,000-volt high-tension to rotary voltage low-tension O. I. S. C. transformers and one thirty-three-panel switchboard to control the above apparatus; also three 1000-kw., 550-volt, commutating pole d.c. generators with 1440-hp., three-phase, sixty-cycle, 10,000-volt, a.c., 514-r.p.m. synchronous motor generator sets with d.c. exciters.

Manufactures and Supplies

ROLLING STOCK

Southern Traction & Power Company, Alexandria, La., will probably purchase two or three cars.

Mobile Light & Railroad Company, Mobile, Ala., is expecting to purchase a number of single-truck cars.

Little Rock Railway & Electric Company, Little Rock, Ark., has ordered three buses from the Southern Car Company.

New York & Queens County Railway, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL as expecting to purchase six double-truck cars, has ordered this equipment from the Southern Car Company.

Ogden, Logan & Idaho Railway, Ogden, Utah, has ordered six trailers from the American Car Company, St. Louis, Mo. This item is a correction of a note in last week's issue, in which the name of the contracting carbuilder was erroneously stated.

Connecticut Company, New Haven, Conn., noted in the ELECTRIC RAILWAY JOURNAL of May 15, 1915, as having issued specifications for ninety-two all-steel cars, has ordered forty-six cars from the Wason Manufacturing Company, and forty-six from the Osgood-Bradley Car Company.

TRADE NOTES

Automatic Ventilator Company, New York, N. Y., has received an order to equip with ventilators seven cars of the Union Electric Company, Dubuque, Iowa.

Q. P. Signal Company, Needham, Mass., has erected at Needham a new four-story brick and concrete manufacturing plant 103 ft. x 40 ft. The plant is completely equipped and will be ready for operation in about two months. Special power house apparatus and substation signal apparatus and trolley catchers will be manufactured in the new plant.

General Railway Signal Company, Rochester, N. Y., has received a contract to build a new interlocking plant at the crossing of the Illinois Traction System and Wabash, Illinois Central and Alton railroads at Pontiac, Ill. Work will commence at once and will be completed in ninety days. The plant will be all electric and of the latest type of modern construction, and will have eighty levers.

Universal Safety Tread Company, Waltham, Mass., is now manufacturing all types of its safety treads in its new plant at Waltham, Mass. All the machinery and shops have been moved from Groton, N. Y., where the treads were formerly manufactured, to Waltham, Mass. The new plant is completely equipped with lathes, presses, stamping and special machinery for the manufacture in all its processes of "anti-slip" and lead-filled safety treads used in the transportation and building industries.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" headlights, has received an order for twenty-four SE-95 headlights from the Shreveport (La.) Railways. This makes a complete installation of this equipment by the Shreveport property. The company reports deliveries of this equipment during June to the following railways: Austin (Tex.) Street Railway; Atchison Railway, Light & Power Company; Chicago & Joliet Electric Railway; Helena (Ark.) Interurban Railway; Arizona Copper Company, Clifton, Ariz.; Sioux City Service Company; Scranton Railway; American Car Company for new cars of the Fort Dodge, Des Moines & Southern Railway; Wichita Railroad & Light Company; Pressed Steel Car Company for new cars of the New York, Westchester & Boston Railway; Des Moines (Iowa) City Railway; Hutchinson Interurban Railway; Denver & Interurban Railroad; Auburn & Syracuse Electric Railroad; St. John (N. B.) Railway; Windsor, Essex & Lake Shore Rapid Railway; Biddison & Crow Interurban Railway, Tulsa, Okla.; San Antonio (Tex.) Traction Company; Cincinnati Car Company for new cars of the Lancaster Traction & Power Company; Union Electric Company; Shreveport (La.) Railways; Seattle (Wash.) Municipal Railway; Trinidad Electric Transmission Railway & Gas Company; Hocking-Sunday Creek Traction Company; Wisconsin-Minnesota Light & Power Company; Georgia Railway & Power Company; Denver Tramway; Ephrata & Lebanon Traction Company; South Carolina Light, Power & Railways Company; Northern Texas Traction Company; Tarentum, Brackenridge & Butler Street Railway; Binghamton (N. Y.) Railway, and Topeka (Kan.) Railway.

ADVERTISING LITERATURE

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued a folder listing its various types of rolling stock and other railway equipment.

G. M. Gest, New York, N. Y., contracting conduit engineer, has issued a folder which contains a map on which are designated the various cities where he has completed contracts.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued a price list of its second-growth hand-shaved hickory handles for use as axe, hammer, hatchet and pick handles in railroad work.

L. S. Brach Supply Company, New York, N. Y., has issued a catalog describing its types 36 and 40 vacuum arresters, mica shield protected, to meet the requirements of telephone train dispatching.

General Electric Company, Schenectady, N. Y., has just issued Bulletin No. 44,712, which illustrates and describes G-E lightning arresters for electric railway service, both in the station, on the line and on the car. This bulletin supersedes the company's previous bulletin, No. A-4135.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, has issued a folder on its tool steel gears and pinions, also a reprint from an article by T. C. Goodyer in the *Tramway & Railway World* which contains data showing the greater length of life of treated as compared with untreated gears.

Railway & Industrial Engineering Company, Pittsburgh, Pa., has issued advertising sheets describing and illustrating the Burke switching and protective apparatus, high-voltage air-break switches, horn-type fuses, improved horn-type lightning arrester and choke coil, and combination horn-type fuse and series horn-gap lightning arresters and choke coil.

Rail Joint Company, New York, N. Y., has issued an attractive catalog illustrating its continuous, Weber and Wolhaupter rail joints as applied to A. R. A. Series A and B rails, guard rails, frogs and switches, T-rails and girder rails. Illustrations are also shown of the different types of joints with fiber and with wood insulation, the "twin" insulated rail joint and the step rail joint.

Ohmer Fare Register Company, Dayton, Ohio., has issued a folder on its fare register system. The folder states that the *Denver Tramway Bulletin,* referring to the monthly list of conductors' Ohmer efficiency grades records that the general average for the entire system for April broke all previous records. This company has also issued an advertising blotter on its fare register system.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued in pamphlet form a paper entitled "Considerations in the Design of Railway Motors," a treatise on the ventilation of this type of motor, by R. E. Hellmund. This paper is a reprint of an article which appeared in the ELECTRIC RAILWAY JOURNAL of May 1 and also the *Electric Journal* and goes very thoroughly into this important subject. A large number of illustrations are used showing practice in ventilating motors, together with diagrams showing the air currents through the windings and cores of the armatures.

Electric Service Supplies Company, Philadelphia, Pa., has issued a general catalog on the Garton-Daniels lightning arresters. The catalog is divided into four sections, so arranged as to make easy the selection of proper apparatus for any set of conditions. Part I contains descriptions and price lists of a.c. arresters up to 20,000 volts, d.c. arresters up to 2400 volts, arc circuit lightning arresters for both a.c. and d.c. circuits, panel-board arresters, and lightning arrester cross-arm hangers. Part II contains a description and price lists on choke coils and disconnecting switches. Part III deals thoroughly with the subject of lightning phenomena as regards the construction and operation of a.c. and d.c. arresters. Part IV contains valuable information accompanied with diagrams on the installation of lightning arresters, their grounding, distribution, and inspection.

Sangamo Electric Company, Springfield, Ill., has issued Bulletin No. 41, which describes and illustrates its "economy" electric railway meters, for use in aiding motormen to increase their efficiency by saving energy in operation. These meters are of two varieties, ampere-hour meters and watt-hour meters. They are both of the mercury motor type and therefore have all the advantages inherent to mercury flotation, the chief of which is immunity from damage due to vibration and shock. Through the use of these meters it is claimed that the motorman will take active interest in his car or train in that he will look for troubles and promptly report all defects for repair. The catalog contains tables and data concerning the use of these meters on the Chicago & Milwaukee Electric Railroad and shows the saving in power consumption per car-mile effected thereby. Testimonial letters from the Chicago & Joliet Electric Railway and the Rockford & Interurban Railway are also included which are significant in showing the saving brought about on these lines.

Trussed Concrete Steel Company, Detroit, Mich, has issued a comprehensive 128-page publication on its united steel sash. The book covers all the various types of sash with its applications in building construction. The first portion of the book is devoted to the general discussion of the features of steel sash construction, covering the questions of strength, weathering, workmanship, daylighting, ventilation, hardware, and glazing. The large variety of sections that are combined to make up steel sash are described in the next portion of the book, including among them the mullions. Standard pivoted sash is next thoroughly covered, including the horizontally and vertically-pivoted sash of all types. Continuous sash of the top-hung and center-pivoted type are comprehensively covered with numerous pages of details. Vertical-sliding sash represents the most recent development in steel-sash construction, and a large amount of space is devoted to the various types, including vertical-sliding sash with removable jamb guides, counter-balanced sash, counter-weighted sash and spring-balanced sash. Horizontal-sliding sash is also indicated at this point. Partitions and steel sliding and swinging doors are shown. The remaining portion of the book is devoted to photographic reproductions of important installations. One page contains illustrations of the attractive stations and shops of the New York, Westchester & Boston Railway where these windows are used. They are also shown in views of a paint shop of the Los Angeles (Cal.) Railway and a power house of the Philadelphia (Pa.) Rapid Transit Company.

NEW PUBLICATIONS

Proceedings of Sixth Annual Convention Pacific Claim Agents' Association, Spokane, July 9-11, 1914. 79 pages. Paper.

This book contains a list of the officers and committees of the Pacific Claim Agents' Association, and presents the running discussions, papers and reports before the convention in Spokane last year. A general index permits the ready finding of any desired information.

Human Nature and the Railroad, by Ivy L. Lee, published by E. S. Nash & Company, 620 Sansom Street, Philadelphia, Pa., 129 pages. Price, $1.

Mr. Lee's easy style and analytical reasoning are well known through his contributions to the popular and technical press and his addresses before various bodies. The present volume is made up of ten of these addresses, and while they will be of interest and instruction to the general public because they tell the story of the railroad, they are equally of interest and instruction to the railway official because they explain to him his weaknesses and foibles, tell him the importance of telling the story and how to tell it as well as to live up to the story. The purpose, as explained by the author, is to establish a point of contact, to make the railroad manager, the employee and the public in their mutual relations understand one another's point of view. We hope that the volume will be widely read so that this wish will be fulfilled.

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RETROGRESSION IN RATE MAKING

While we have all proper respect for the theory that administrative bodies should exercise constraint in interpreting "doubtful" provisions of law relating to their own powers, we believe that the Public Service Commission, Second District, New York, has no right so rigidly to interpret its enabling act as to rob it of one of its most progressive and constructive features. In declaring in the Ulster & Delaware Railway mileage case that it must be subservient to the old 2-cent statutory maximum rate fixed before commission regulation began in New York, it has reverted to the practice of inexperienced legislative domination which the commission law endeavored to destroy. The maximum rate was simply an ill-considered guide pending the installation of more scientific methods which the present regulatory machinery was intended to supply. While this should be self-evident, the point is strengthened by the facts that in Michigan the maximum rate law has been declared superseded by the commission law and that in New York since 1907 Governors have vetoed all rate bills as infringements on the powers delegated to the commissions. For a non-expert Legislature to force a commission to exercise discrimination so as to grant unlimited relief to the public and greatly restricted relief to the carriers, is a travesty upon the whole spirit of commission rule. Of course, if the Legislature wishes to resume its rate-making power, it can; but while commissions last, no super-technical nullification should be exercised against their potential usefulness in granting rates which they are convinced are just to carriers.

THE PURPOSE OF COMMISSIONS

We realize that it is not a popular thing for a commission to raise rates and so diminish the privileges which the public has enjoyed for a great many years. We believe, however, that the "unpopularity" which would result from such an action is more imaginary than real. In the first place, the public mind is prepared to accept increases in railroad rates with much more grace than it was a few years ago. There has been so much publicity on the necessity of higher rates that everyone now realizes that the expenses of operation of the railroad companies have increased, just as have the living expenses of individuals. Again, the public has a better recognition of the obligations of the railroad commissioners to grant such increases when they are justified. This view of the situation was well expressed in a recent address by Hon. J. F. McLeod, chairman Public Service Commission of Massachusetts. He said: "Capital honestly and prudently invested under economical and efficient management has a constitutional right to a fair return, and the commission is under legal compulsion to allow such rate as will make that return possible. If an increase in fares is shown to be just and reasonable according to that standard, the commission has no discretion except to allow it." We agree with the sentiment thus expressed. The purpose of the appointment of a commission is to provide an impartial body with opportunities in the way of obtaining testimony on which the merits of the rate case can be judged. The testimony alone, and no outside considerations of populariy or unpopularity, should decide whether the rates are to be increased or decreased in any particular case.

SAFETY FIRST FEDERATION

An effort to correlate and perpetuate the general safety work now being conducted in different cities is the purpose of the Safety First Federation of America. For many years electric railway companies have been working out their problems largely unaided. When safety-first work began the railway companies were possibly surprised but certainly gratified to find that they would have willing associates among the public authorities, representatives of the public schools, chambers of commerce and individual, public-spirited citizens. While in many cities the initiative in the safety-first movement was taken by the local railway companies, it soon became, and properly, a community movement in which all of the interests already mentioned participated. In this form most important work has been accomplished, but there have been two points upon which some fear has been expressed in regard to the future. The first of these has been a question of the maintenance of interest in it. In all volunteer movements, after the first enthusiasm has passed away, there is danger that the interest in it will flag. This feeling was expressed in these columns some months ago under the heading "The Brass Band in the Safety Movement." The question raised was: How long-lived will a movement be which has no definite organization behind it whose sole purpose would be to keep it alive? The other point was in connection with the correlation of the work done in the different cities so as to get the most effective results for the least expenditure of energy and money. This meant a comparison of methods followed wherever safety-first work has been undertaken. These two needs, in brief, it is the aim of the Safety First Federation of America to supply. As with the movement in individual cities, it is not primarily a railway matter or even a corporation matter, and it is well that it is not so, but President Allen of the American Electric Railway Association has accepted the office of chairman of the transportation committee of the federation so that the railway interests will be properly represented. A report of the first meeting of the transportation committee, which occurred this week in New York, will be found on another page of this issue.

THE TELEPHONE IN CITY DISPATCHING

Mr. Strong's article in the issue of May 8 on telephone dispatching at Rochester and the article in this issue on a similar system at San Antonio should help to promote wider use of this most rapid means of communication. If it is a good thing to be able to adjust schedules from day to day it is a better thing to adjust them from hour to hour and even from minute to minute. On the European battlefields of to-day we see millions of men moved about as easily as Napoleon maneuvered his thousands, and in no small measure is this due to the telephone. It is not enough to order a regiment to do a certain thing; it must be possible to change its orders almost instantaneously.

Car operation should be on the same modern plane. The schedule, for example, may designate certain cars as short-liners and others as through. Now, if a car is carrying a large number of passengers who want to go beyond the short-line terminus, literal obedience to the schedule will probably displease some of the passengers, especially in bad weather. Sometimes an inspector is stationed at the short-line terminus to decide whether or not the car shall go on, but with telephone dispatching in practice the crew could get instructions directly from the dispatcher. Contrariwise, a long-line or through car could be converted to a short-liner if it has no through passengers and when the dispatcher knows that the following car will go through in a few minutes.

Most deviations from the schedule, like those due to mass meetings, public concerts and ball games, can be provided for in advance; not so with large movements of people due to fires or other unforeseen events. Not long ago there was a big fire in a large Southern city. Had an effective telephone dispatching system been in use the local railway would not only have rerouted the affected car line more quickly, but would also have collected thousands of fares by running special cars to and from the fire. Instead, the jitneys got the business. The way the San Antonio Company dispatched and rerouted cars in accordance with the progress of a parade shows how readily the telephone permits the remolding of a schedule.

It is hardly necessary to reiterate here the advantages of telephone dispatching as revealed by the detailed practices of Rochester and San Antonio. But the conclusion may be drawn that the telephone offers barely-appreciated opportunities to make the service flexible, thereby securing with one stroke more revenue and greater public satisfaction. The latter result, in fact, is seldom capable of attainment by direct means, but where every car crew, even in the farthest outlying districts, can notify the passengers in advance regarding unexpected operating changes, at least one prolific source of friction is at once removed.

COLLECTING TRAFFIC DATA

The latest article by F. W. Doolittle, director of the bureau of fare research, published elsewhere in this issue, is unusually valuable by virtue of its lucid presentation of the best practice in the work of collecting traffic data. From the experiences of individual railways and engineering companies that have made traffic surveys, Mr. Doolittle has collated basic information for all electric railway operators and has also added carefully-drawn distinctions in regard to the survey plans to be followed by companies of different sizes. Officials who desire for themselves or for their traffic survey staff a readable analysis of traffic survey procedure will find Mr. Doolittle's article replete with concrete suggestions.

In constructing his paper Mr. Doolittle develops his theme logically along the line of the items to be covered by a traffic survey, the frequency of their collection, the preliminary work, and the actual collection and the recording of data. The two points most interesting are in connection with the frequency of collecting data and the extent of the data to be taken. The frequency of traffic studies is impossible of exact determination on account of such factors as size of company, character and growth of territory, traffic density, business conditions and season changes, but sufficient generalization can be made on this topic to say that the time interval between collection dates should be short so that the company will keep pace with traffic fluctuations. The conducting of separate studies for the five ordinary week-days and for Saturdays, Sundays and holidays; the use of twenty-four hours as a minimum period of observation and the making of surveys by preference in the autumn and winter better to estimate peak conditions—these seem also to be becoming definitely formulated principles. It is more difficult to state the extent to which traffic count data should be accumulated, but we believe that Mr. Doolittle has outlined a feasible platform for the average comprehensive survey when he suggests in general the ascertaining of the average number of passengers getting on and off each car at every point during twenty-four hours in the case of the larger companies, the number of passengers getting on and off each car at important traffic points during eighteen hours for companies of medium size and the number of passengers on each car at the point of maximum loading during rush hours for the smaller companies.

It may be that some traffic experts will not agree entirely with this platform. The more one goes into the detail of Mr. Doolittle's article, the greater chance there is of finding particular practices which some experts may not like so much as their own. The science of making traffic surveys is still new to the transportation field as a whole, and through the kindness of local conditions individual initiative has had full sway in its development up to now. But Mr. Doolittle's article is concerned not so much with details as with general principles. Traffic survey principles are gradually becoming clarified and more widely accepted, and he who desires to understand the theory of such work should give the article a careful perusal. The technique to be followed, however, in applying these principles to specific properties under the varying effect of local conditions and inherent characteristics is a problem to be worked out with all possible standardization by the men who are experienced in the multitudinous details of traffic surveys.

CONTACT SYSTEMS FOR HEAVY TRACTION

Never were there more interesting developments in progress in electric traction than at the present moment and in no place are these developments more interesting than in heavy electric traction. In this field one hears more about locomotives, cars, power plants and transmission lines than about contact systems, but the importance of the contact system was brought out in the railway papers and discussion presented at the A. I. E. E. convention, which were abstracted at length in last week's issue of this paper. While much of the discussion was taken up with routine construction and operation, one can read between the lines and note some very significant facts.

In the first place the phraseology of contact systems needs definition in order that the apparatus and its performance may be accurately and concisely described. The art is changing so rapidly that there is the possibility of adopting names for objects almost off-hand, that the words that are first perhaps thoughtlessly applied will remain. This would be unfortunate. In the early days of electrical development cases of this kind occurred, and expressions then coined have become so closely associated with the industry that it has never been possible entirely to get rid of them. The terms "booster" and "to boost down" are examples. In the present advanced state of the art, however, there is no excuse for the establishment of such barbarisms or their perpetuation.

It is further quite apparent that this is a trying-out period for heavy electric traction contact equipment. Broadly speaking, the system is entirely successful, but in detail there is much that is experimental. Steel contact wires are substituted for copper or phosphor-bronze contact wires, but it is found that they rust; rollers are supplied with wood cores and sleeve bearings, but later the cores are omitted and roller bearings are substituted. At the same time data of cost of operation are being accumulated, and if the operators and manufacturers will make these data fully available there will be ample compensation for the annoyance and expense accompanying the developmental work.

In the third place progress in this instance, as always, brings up new problems or old ones in new guise. Provision for voltage rises in third-rail conductors is one such problem. Readers of this paper have noticed several recent references to the subject. When a current in any circuit is interrupted the collapse of the accompanying magnetic field upon the conductors produces a voltage rise. This is more evident when there is magnetic material in the neighborhood of the circuit, as is the case with a third-rail conductor. Such voltage rises add to the difficulties of design of high-voltage d.c. equipment.

Electrification has not as yet made serious inroads upon the steam railroad field. It will do so in due time. Meanwhile the present experiments with motors, contact systems, drives, etc., will make it possible ultimately to electrify a large system without danger of obsolescence losses like those incurred in the early street railway electrifications.

A REMEDY FOR THE NEWSPAPER YELLOW PERIL

The false public impression created by undeserved criticism from unscrupulous newspapers is difficult and often impossible for public utility companies to correct by mere improvements in service. Experience has shown, however, that the misrepresentation may occasionally be rectified by deflecting the editorial "punch" in another direction.

The president of a public service company in a medium-sized city recently related confidentially the experience of his company, which for a while found itself at the mercy of two local newspapers. One of them bitterly attacked its service, while the other stood up for it, putting it in a position somewhat like that of the ancient mariner when the two specters were dicing for his life. Though many of the attacks were unwarranted the company realized that some of them were justified. It accordingly remedied the defects of service and then, calling the hostile newspaper's attention to the betterments accomplished, requested it to give due publicity to them. The editor of the newspaper, however, frankly replied that retraction of its present propaganda would be impossible, for without such a resourceful means of opposing its local rival's policy life would become a bore to his readers and the circulation list would melt away. This answer was a hard blow to the company, but it presently adopted another plan. Through its influence a citizen's advertising club was formed for the purpose of attracting people and industries to the city. When the new plan was explained to the hostile newspaper, the latter, tickled at the thought of prospective subscribers from a city of increased population, at once discarded its toreador policy and backed the advertising club with enthusiasm. It even claimed to have originated the plan. The officials of the public service company smiled inwardly at this assertion, but were perfectly satisfied to allow the newspaper full credit because the latter's columns now glowed with notices of the special facilities afforded by the city, among which were mentioned an up-to-date street railway and a low-priced lighting system.

Whether newspaper criticism is just or unjust, so long as the criticism is sincere public utility companies may aspire to overcome its effect by adopting more progressive operating methods. If the motive behind the attack, however, is simply the idea that to keep attention attracted to it the paper must always be charging with head down at somebody, practically the only remedy, as in the above case, is to wave a red flag in a different direction.

Telephone Dispatching at San Antonio

The Flexibility of Schedules in Meeting Traffic Changes Has Been Greatly Improved—All Outside Men and Service Cars Are Also Controlled from the Dispatcher's Office

The San Antonio (Tex.) Traction Company has been using, since August, 1914, a telephone dispatching system with connections to forty-two street box dispatching stations. The equipment is of Western Electric manufacture installed and operated under lease by the Southwestern Telegraph & Telephone Company. The system is so arranged that in case of need any Bell telephone may be used.

The dispatcher's board is equipped with two private trunks which join it to the San Antonio public telephone exchange. The board also has connections to the traction company's commercial switchboard. The number of active plugs is now forty-two, with room for sixty. The telephones of all officials of the company are tied in with this board so that the dispatcher can get into touch with them at once.

The primary purpose of the board is, of course, the dispatching of cars, but the use of the telephone gives a much greater flexibility than would otherwise be the case, and certain other uses have developed as by-products.

The cars are dispatched by one man ordinarily, an assistant being employed only for meal relief and during the peak hours. The board is operated for the complete daily transportation period of nineteen hours. To enable two men to work together if necessary the board is divided into two sections.

CHARACTER OF SCHEDULES

The regular schedule calls for headways varying from five to fifteen minutes, according to the line and the time of day. However, conditions frequently arise which make it desirable to deviate from the regular headways. Practically all runs are of such character that the men report for orders on reaching each end of the run. In this way the dispatcher can give clearance orders to the men at frequent intervals or special orders if necessary.

A typical conversation is as follows: The dispatcher says: "Hello." The motorman then replies, "Car 317, Tobin Hill (the line), Otto (motorman)." The dispatcher then says, "9:15 a. m." (time of day). The motorman repeats "9.15," and the dispatcher closes with "O.K."

MAKING CHANGES IN SCHEDULES

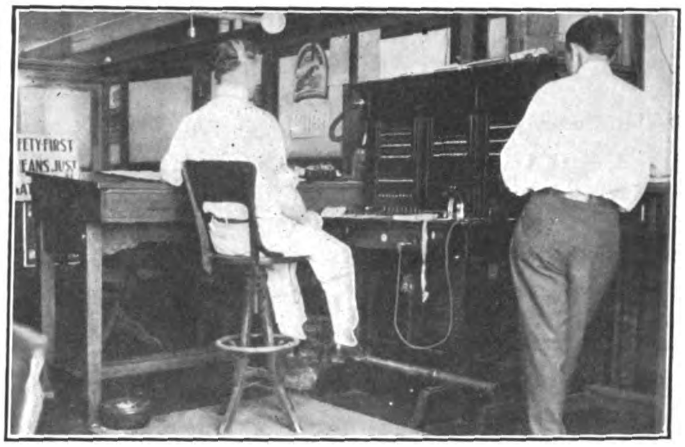
The usefulness of the telephone in adding to the flexibility of the schedule will be apparent from the following instances:

Following rains it may be desirable to slow down the running time by adding say one minute on a fifteen-minute headway. This is readily accomplished by the time instruction which the dispatcher gives to succeeding cars at any given terminus. To guide each man he gives out the revised round-trip time and headway so that the car man can figure his new time-points accordingly.

Saturday and Sunday night service is left entirely to the dispatcher, through the road inspectors, as to when it is desirable to pull off or add cars on any line. The inspectors merely telephone the load conditions to the dispatcher, who acts accordingly.

The convenience of the telephone for setback operation is illustrated by a condition which arose on the West End line on Thursday, May 13. The street was being paved at one end of the line, and many delays were caused by the use of temporary track and the congestion of foreign vehicles which could use no other place but the track. All cars were made equally late. As the schedule headway was fifteen minutes the cars were set back a half-space, or seven and one-half minutes, at 5:37 p. m. and another half space at 7:22 p. m. Of course, the same result would have been accomplished with one full-space setback at 5:37 or perhaps at 6:07, but this would have caused all cars to drag the line at the period of heaviest riding. Consequently, the half-space setback was used, as described, the second half-space being made when traffic was not so important. On other like occasions the conditions before the first setback have been restored by later advance of the same amounts of time.

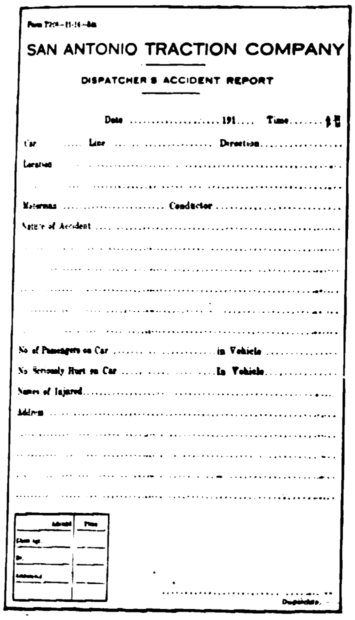
The most frequent source of delay is due to the breakdown of foreign vehicles where only one car is affected. In cases of this kind the delayed car is generally allowed to proceed until caught by the car following. When this occurs the car with the least passengers transfers its load (usually to the car ahead) and turns back at the last meeting point. When it is impossible to turn back both cars because of a heavy load on each, the cars are permitted to go to the end of the line, and a special car, designated a "pull-out," is taken out of the car station to fill the gap in town and to the opposite end of the line. It may be added here that all San Antonio lines are routed from one side of the town through the business district to the opposite side of the town. The lines are not necessarily true radii, as they make several bends in their course, especially in the business district.



TELEPHONE DISPATCHING—BOARD IN USE AT SAN ANTONIO, TEX.

Still another schedule feature of telephone dispatching is the conversion of short-line cars into full-run cars when load conditions unexpectedly demand it. As soon as such cars have been ordered to proceed to the end of the line, the dispatcher orders out additional cars to maintain the original headway on the short-line section.

Another field for the telephone is found in the ease of securing additional transfers, tickets or change if the conductor runs short. The conductor telephones his wants to the dispatcher advising when his car will pass



SAN ANTONIO TRACTION COMPANY

DISPATCHER'S ACCIDENT REPORT

Date ....191.... Time........

Car ...... Line .... Direction..........................

Located ....

Motorman .... Conductor ....

Nature of Accident ....

No. of Passengers on Car .... in Vehicle ....

No. Seriously Hurt on Car .... In Vehicle...............

Names of Injured..

Address ....

	Advised	Time
Claim Agt.		
Dr.		
Ambulance		

....

Dispatcher.

TELEPHONE ACCIDENT REPORT RECEIVED FROM TRAINMEN

downtown headquarters. The supplies are then delivered by messengers.

TROUBLE REPORTS

The telephone is also used by the trainmen to report not only on car troubles but also on line and track defects. These matters are handled on standard forms which show the disposition made by the dispatcher and by the department concerned.

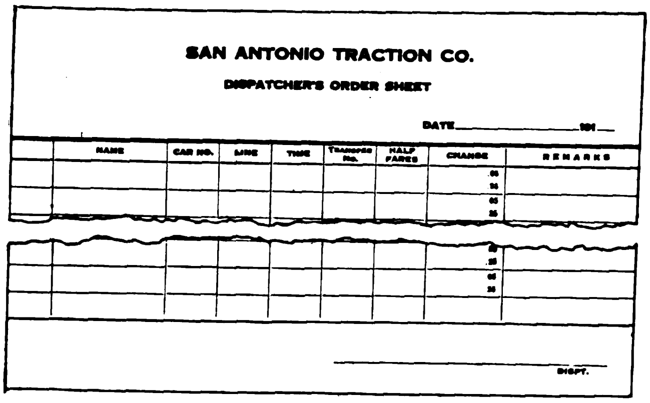
A still more important form of report, which is reproduced, is that relating to accidents. The almost instantaneous knowledge of accidents thus obtained permits representatives from the executive office to get to the scene of trouble at once. Minor accidents involving only slight damage to property are not reported until the car reaches the terminal.

One interesting feature of the company's accident practice is that the conductor is frequently ordered to remain with the injured person. In the meantime the motorman handles the car alone to the end of the trip, thereby avoiding car blockades and delays to passengers.

One "trouble shooter" and one traffic inspector are always on hand at the main office to take care of contingencies.

REPORTS FROM INSPECTORS

The dispatcher also keeps in regular touch with the road inspectors who must report their whereabouts to him at least once an hour, oftener if possible. The dispatcher from these calls plots squares showing when an inspector reported from a given line. By glancing at the sheet one can readily see whether the inspectors are spending too little or too much of their time on given routes. Of course, the fact that the inspectors report at frequent intervals enables the dispatcher to assign any of them to special service. A typical example of the use of inspectors is afforded by stating the conditions under which they were employed to supervise traffic during the "Battle of Flowers" week in April. In addition to the usual number of inspectors in the downtown district, special men were placed at five important corners where telephones were installed to keep the dispatcher in touch with the location and progress of parades; also to keep the regular inspectors advised of the dispatcher's orders concerning the shifting of routes and the turnbacks made necessary by the parades. This made it possible to keep up continuous service to the very last minute and to resume it as soon as possible.



SAN ANTONIO TRACTION CO.

DISPATCHER'S ORDER SHEET

DATE______________191__

	NAME	CAR NO.	LINE	TIME	TRANSFER No.	HALF FARES	CHANGE	REMARKS
							.05 .25	
							.05 .25	
							.05 .25	
							.05 .25	

____

DISPT.

TELEPHONE DISPATCHING—RECORD OF CONDUCTORS' REQUESTS FOR SUPPLIES RUN SHORT

SERVICE GANGS AND CARS

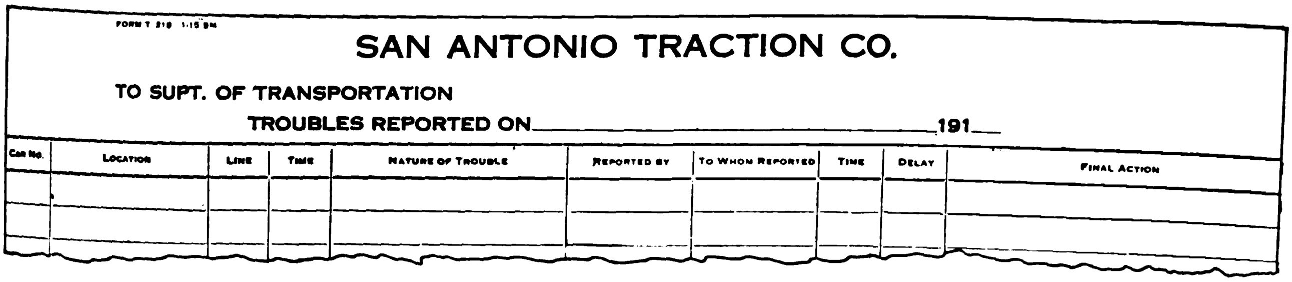
Contact with the line and track workers in the field is also greatly improved by means of the telephone dispatching system, mainly by requesting trainmen to deliver certain messages to the workers along their route.

Even the sand car is dispatched by telephone, as it can thus be used to the best advantage as reports on track conditions may indicate. The wrecker also reports to the dispatcher for orders immediately after clearing up any job in hand. In general, all service cars and gangs are subject to telephone control.

OTHER BENEFITS

The telephone dispatching system has not only effected the improvements in service noted but has also been of value to the general public in other ways. It has facilitated especially the handling of lost articles. Again, in the case of flooded track, it is now possible to answer inquiries more quickly and more intelligently than before so that patrons will know just how they can best reach their destinations in the absence of regular routing facilities.

The Galesburg (Ill.) Street Railway has opened Highland Park, near that city, to the public. Amusements for children received special attention. The park is equipped with a large dining-room for banquet purposes. At Highland Lake, adjacent to the park, the company has developed attractive swimming pools, chutes and springboards. The Galesburg *Daily Mail* spoke editorially in a very complimentary manner of the public work which the company is doing and urged out-of-town shoppers to plan picnics in this park as a part of their sight-seeing while in Galesburg.



FORM T 219 1-15 5M

SAN ANTONIO TRACTION CO.

TO SUPT. OF TRANSPORTATION

TROUBLES REPORTED ON________________191__

Car No.	Location	Line	Time	Nature of Trouble	Reported by	To Whom Reported	Time	Delay	Final Action

TELEPHONE DISPATCHING—JOINT REPORT BY TRAINMAN AND DISPATCHER ON TELEPHONED TROUBLE

The trainman's section is shown at the left of this blank, the dispatcher's section at the right

The Collection of Traffic Data

The Items to Be Included and the Method and the Frequency of Their Collection—Preliminary Work, Length of Period of Observation and Data to Be Taken in the Field—Conclusions to Be Drawn

BY F. W. DOOLITTLE, DIRECTOR BUREAU OF FARE RESEARCH, AMERICAN ELECTRIC RAILWAY ASSOCIATION

The frequency and the regularity with which traffic studies were made in the past varied considerably. In 1910 information from twenty-four companies indicated that eight made such studies daily, three twice per week, three once or twice per month, two upon complaints, and eight at irregular and indefinite intervals. A report[1] made at that time suggests the following factors which may be said to control the frequency of such studies and the seasons at which they should be made:

1. Size of the property.
2. Character of the territory served.
3. Rapidity of its growth.
4. Density of traffic.
5. Business conditions.
6. Season changes.

The report further points out that in order to secure full advantage of fluctuations in traffic and to anticipate public complaints the interval between such studies should be short. In this connection it is of interest to quote the following two paragraphs:

"*Passenger counts.*—That there should be periodical developments of records of passenger traffic with comparatively short intervals intervening."[1]

"The committee wishes to recommend that all member companies make daily records of passenger business by trains in interurban operation, feeling that such records are necessary statistics, not alone for proper construction of schedules and time-tables, but as well for the purpose of comparison with past results (the 1910 report shows eighteen companies out of fifty-seven making such a comparison) and as essential factors in developing estimates of future operation."[2]

Since traffic conditions vary not only with the seasons of the year, but also with the days of the week,[3] many who have studied the matter believe that it pays to make a separate traffic study for week days, Saturdays and Sundays, since the termination of even a small part of the service and for a short time only may mean the saving of many car-miles. Touching on this matter, C. M. Larson says:[4]

"Such a record is necessary for week days, for Saturdays, and for other seasons of the year when the traffic is not of the same magnitude. There are, of course, variations in traffic due to weather conditions. These can usually be determined by general observations and the necessary steps taken for the required variation in the service."

In a paper presented in March, 1914, before The Milwaukee Electric Railway & Light Company's section of the American Electric Railway Association on "The Purposes of a Street Railway Traffic Survey," E. J. Archambault says:

"The traffic count that is carried on in an extensive manner is generally taken during the late autumn and winter months, because it is then that the peak loading is most pronounced and hardest to handle. Other checks, however, are constantly made at all times of the year. It is obvious that this is necessary since the demand is constantly on the increase as a rule, and also that changes are brought about by local conditions along various lines, which affect the loading of other lines as well."

It is interesting to note in this connection that the 1914 Detroit, as well as the 1910 and 1912 Philadelphia, traffic surveys were all made in the autumn of the respective years. The Detroit survey was made by Barclay Parsons & Klapp.[5] The first Philadelphia survey was made by Ford, Bacon & Davis[6], and the second by the Department of City Transit, Philadelphia, with Ford, Bacon & Davis as consulting engineers. To quote from the latter report:[7]

"The survey extended over a period of five weeks from Oct. 14, 1912, to Nov. 18, 1912, which period was selected as representing most nearly normal traffic conditions in Philadelphia."

Quite naturally the periods of heaviest riding throughout the year, the week, and the day have received the greatest amount of attention, but if the traffic survey is to accomplish for any company all the good that it can, it should indicate plainly the relation existing at all times between the amount of transportation furnished and the amount required.

PRELIMINARY WORK

The extent of data to be collected in a street railway traffic study is variable, depending upon how comprehensively it is desired to analyze the transportation problem. Most recent traffic studies consist of a systematic series of inspections and observations in which an actual passenger count is made and the movements of cars and passengers are recorded by inspectors or field agents stationed at selected pertinent points, or riding on cars, or both. In addition other observations of a somewhat general nature are often made. These will be referred to later. Traffic experts are fairly well agreed as to those points on each line of an electric railway system at which a passenger count should be made, and generally a preliminary survey is made to determine them, although occasionally they can be located by a rather casual inspection.

R. M. Feustel, in his report on the 1913 Winnipeg traffic survey, gives an account[8] of the preliminary work, and other recent studies, such as those in Milwaukee, Cincinnati, Philadelphia, etc., follow similar methods of procedure in laying out the work.

"Inspectors were placed on every car on some lines, on every other car on other lines, and on every third car on the larger lines. They were kept on the car during the entire day, from the time the car left the carhouse in the morning until late in the evening. Points were chosen along each line, approximately four blocks apart, and the inspector recorded the number of passengers on the car when passing these points and the time of passing. These data gave an accurate record of loading conditions on the different lines, both as to geographical location and as to the time loading occurred. The observations taken covered at least two representative days of travel on each line, and if these two days checked satisfactorily one against the other the data were considered sufficient. If, however, for any special reason the loading was eccentric, additional observations were taken until a normal record was had. An examination of data taken indicates that the travel throughout the day could be divided into rather characteristic periods. The record plotted shows the average of all the observations taken, and each of the characteristic periods was plotted separately into what might be called 'car-loading' curves. These plainly showed the average load carried by the car for each period over the entire length of line. The points where the total number of passengers on the car was noted included all regular transfer points along the line as well as the other important traffic stops. * * * From the car-loading curves for each line the point of maximum loading was determined. Other points along the line were selected so that in most cases several street observations were taken on each line simultaneously. The inspectors who had become familiar with car loads were then stationed at these points to record cars and passengers."

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[1] 1910 Proceedings of the Transportation & Traffic Association of the American Electric Railway Association, pp. 256a and 264. (ELECTRIC RAILWAY JOURNAL, Oct. 14, 1910, pp. 822 and 824.)

[2] 1911 Proceedings of the Transportation & Traffic Association of the American Electric Railway Association, p. 506. (ELECTRIC RAILWAY JOURNAL, Oct. 13, 1911, p. 836.)

[3] See article by F. W. Doolittle in ELECTRIC RAILWAY JOURNAL, May 15, 1915, p. 926.

[4] C. M. Larson—"A Street Railway Traffic Survey"—*Municipal Engineering*, February, 1914. (ELECTRIC RAILWAY JOURNAL, Jan. 24, 1914, p. 177.)

[5] Barclay Parsons & Klapp—Report on Detroit Street Railway Traffic and Proposed Subway, January, 1915, p. 57. (ELECTRIC RAILWAY JOURNAL, April 3, 1915, p. 664.)

[6] Ford, Bacon & Davis—Report on Philadelphia Service and Equipment. (ELECTRIC RAILWAY JOURNAL, June 17, 1911, p. 1065.)

[7] A. M. Taylor—"The Solution of a City's Transit Problem"—*Electric Journal*, October, 1914, p. 516. (ELECTRIC RAILWAY JOURNAL, Jan. 10, 1914, pp. 76-79.)

[8] R. M. Feustel—Report on Winnipeg Street Railway Service—Public Utilities Commission of Manitoba, 1913. (ELECTRIC RAILWAY JOURNAL, April 18, 1914, p. 865.)

The following special features were shown by these preliminary observations:

1. Variations of traffic in both directions for the different periods of the day.
2. Territory in which the pick-up of passengers is made.
3. Location of through territory in which comparatively few passengers are discharged or taken on.
4. Location of unloading territory.
5. Duration of time in which the overloading occurs.
6. Effect of certain transfer points on car loading.

The following preliminary observations were made by Ford, Bacon & Davis in their 1910 study on "Philadelphia Service and Equipment":[9]

"1. Preliminary car riding by inspectors from July 12 to Sept. 1, to determine: (*a*) Characteristics of traffic. (*b*) Principal time points.

"2. Preliminary rush-hour street observations between 4 p. m. and 7 p. m. from July 15 to Aug. 26 to determine: (*a*) The number of passengers carried past or away from each important point. (*b*) Regularity of schedule. (*c*) Car loading."

The practice followed by companies making studies with their own forces is generally less complicated than that indicated by the above references. This has resulted from the fact that the former studies have usually been made for the purpose of answering specific questions as to conditions at definite points, while the latter have sought to obtain information concerning all lines and routes on the same basis. A report made in 1910 shows that out of eighteen companies reporting, eleven used points of maximum load for observations. In addition, certain other points along the line were chosen in order to get roughly the general characteristics of the line.[10]

"Similar observations should be made at such other points along the line as may be determined by circumstances. The principal purpose of these latter observations would be to furnish a basis for turning of cars which it is not necessary to operate the entire length of the line."[11]

An extension of the above method to cover every stop along a line may be found in the so-called "boarding and leaving" tabulation method, reported in use by the Boston Elevated Railway and the Public Service Railway Company of New Jersey[12] and used by Barclay Parsons & Klapp in the 1914 Detroit traffic survey.[13] It consists of having the checkers ride on a certain proportion of cars along a line and record the number of passengers getting on or off the car at each stop. This method was also used by Ford, Bacon & Davis in their 1910 Philadelphia traffic study.[14] Observers were on one car in every eight along each line for twenty-four hours and recorded the number of passengers getting on or off the car at each stop, together with the time the car passed. The lines were counted by selected groups, related or adjacent lines being counted together. The count extended from Aug. 29 to Sept. 22, but no observations were taken on Saturdays, Sundays or holidays.

Recent traffic studies, particularly those in Milwaukee, Cincinnati, St. Louis and Winnipeg, have demonstrated that the point of maximum load is approximately the same for traffic in each direction—that is, for in-bound cars in the morning and for out-bound cars in the evening; that these points may be considered to follow roughly a line about the congested section; that between the point at which maximum loading first occurs and the point at which it ends the number of passengers is approximately constant, and that there is a point on every line at which the company is justified in terminating part of its service, since few passengers live near the end of the line and the waste of car-miles in order to make a turn is considerable.

LENGTH OF PERIOD OF OBSERVATION

The period of time to be covered by the count on any line at any point is fairly well agreed upon, considering the variation in local conditions and the divergent points of view of those having traffic studies in charge. A recent paper[15] comments thus:

"Unless special inspection is made for the rush hours only, the point of maximum loading is covered by an inspector at all times of the day from about 6 a. m. to about midnight. Frequently surveys are made which cover the complete twenty-four hours. This is done only where a question arises about the owl service."

Another says:[16]

"The count should cover a long enough period to obtain normal results with twenty-four hours as a minimum."

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[9] Ford, Bacon & Davis—Report on Philadelphia Service and Equipment. ELECTRIC RAILWAY JOURNAL, June 17, 1911, p. 1065.

[10] 1910 Proceedings of the Transportation & Traffic Association of the American Electric Railway Association, p. 256a. (ELECTRIC RAILWAY JOURNAL, Oct. 14, 1910, p. 822.)

[11] C. M. Larson—"A Street Railway Traffic Survey"—*Municipal Engineering*, February, 1914. (ELECTRIC RAILWAY JOURNAL, Jan. 24, 1914, p. 177.)

[12] "Recent Practice in Traffic Counts," D. J. McGrath, ELECTRIC RAILWAY JOURNAL, Dec. 26, 1914, p. 1385.

[13] Barclay Parsons & Klapp—Report on Detroit Street Railway Traffic and Proposed Subway—January, 1915, pp. 57 and 148. (ELECTRIC RAILWAY JOURNAL, April 3, 1915, p. 664.)

"The work was divided into two classes:

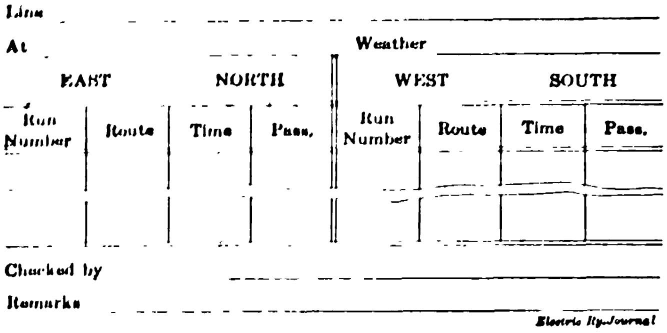
"1. The continuous riding of lines from one terminus to another, recording the number of passengers loading and unloading at every street corner, the time from point to point, the number of passengers in the cars at various points, transfer conditions and a few other special items peculiar to individual lines.

"2. Additional trips on all lines through the congested district. * * *"

[14] Ford, Bacon & Davis—Report on Philadelphia Service and Equipment—ELECTRIC RAILWAY JOURNAL, June 17, 1911, p. 1065.

[15] "Purposes of a Street Railway Traffic Survey," E. J. Archambault, The Milwaukee Electric Railway & Light Company.

[16] C. M. Larson—"A Street Railway Traffic Survey"—*Municipal Engineering*, February, 1914. (ELECTRIC RAILWAY JOURNAL, Jan. 24, 1914, p. 177.)



Line

At Weather

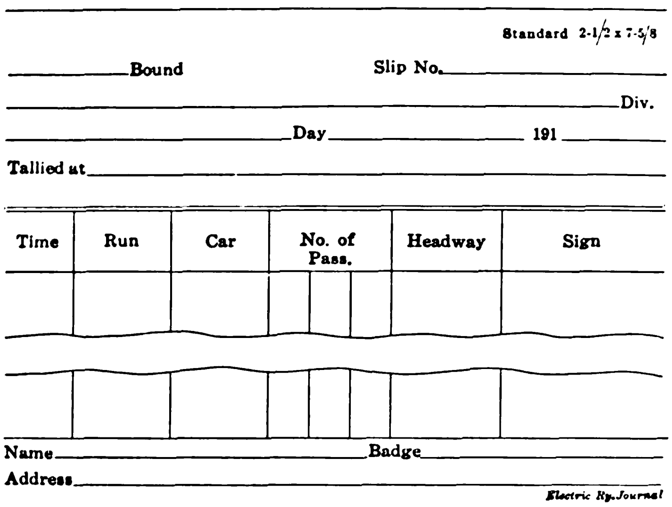
EAST				NORTH				WEST				SOUTH			
Run Number	Route	Time	Pass.	Run Number	Route	Time	Pass.

Checked by

Remarks

Electric Ry. Journal

COLLECTION OF TRAFFIC DATA—FORM I—NOTEBOOK RULING FOR FIELD DATA USED BY CHICAGO SURFACE LINES



Standard 2-1/2 x 7-5/8

Bound Slip No.

Div.

Day 191

Tallied at

Time	Run	Car	No. of Pass.	Headway	Sign

Name Badge

Address

Electric Ry. Journal

COLLECTION OF TRAFFIC DATA—FORM II—TALLY SLIP USED BY NEW YORK RAILWAYS

The reports of many of the recent traffic studies show that twenty-four hours was the minimum time spent at each point. In some cases observations at a point covered a period of several days. A surface car traffic study in the Chicago business district, made in 1909 by the bureau of engineering of the Department of Public Works," covered a twenty-four-hour period. The same amount of time was then spent in a study of the elevated lines. In their 1910 Philadelphia general traffic survey, Ford, Bacon & Davis" used a twenty-four-hour period as a minimum upon any one line. In the Winnipeg survey "from two to four days' counts were taken on each line in order to obtain average results.""

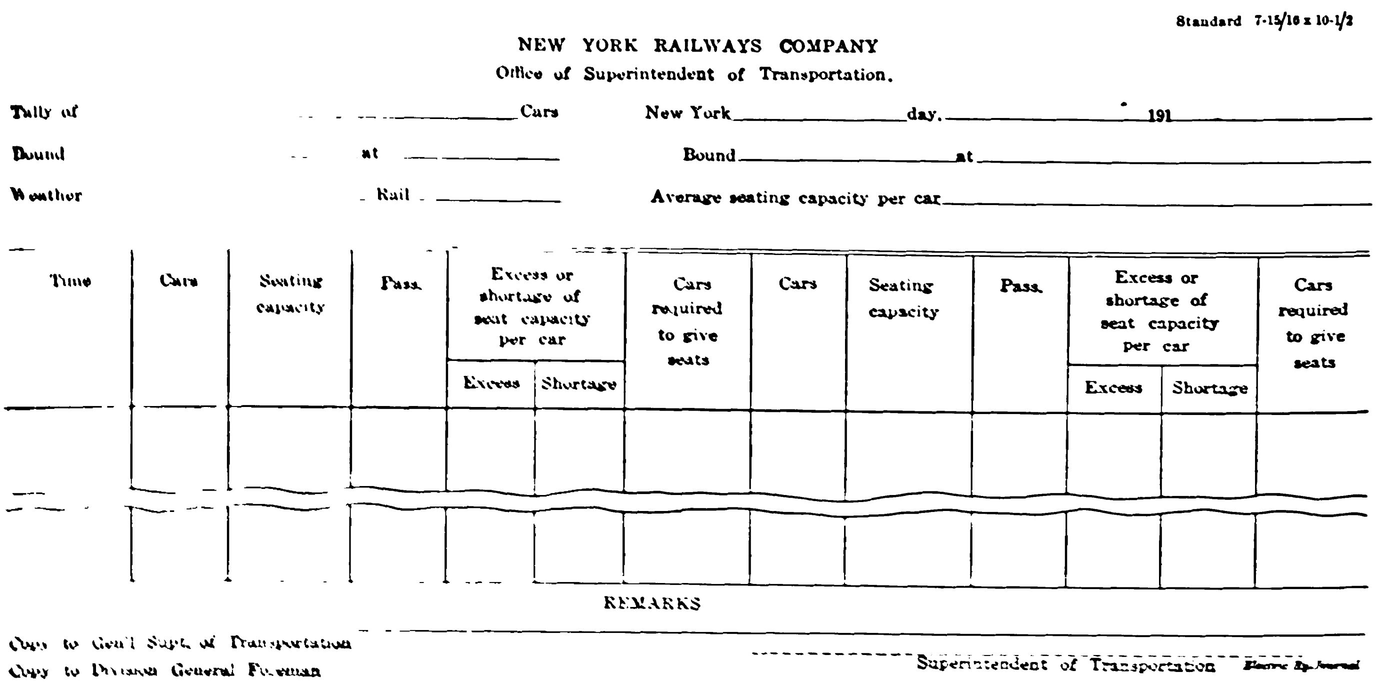
When the points of observation and the period over which data are to be taken have been determined, observers are stationed to collect the required data.

DATA TO BE TAKEN IN FIELD

There is, as has been indicated, considerable divergence in practice between the items recorded in different surveys. This is due to varying local conditions, both as to the character of traffic and as to the purposes of the study, and to the organization of the traffic survey department. It is the usual, although not universal, practice to record all cars in each direction at all observation points along each line, the data for traffic in the two directions being preferably kept separately on the opposite pages of a notebook. It is standard practice on the Chicago Surface Lines to employ a notebook ruled as shown in Form I. The New York Railways uses "tally slips" (Form II) which are conveniently handled and from which figures for fifteen-minute periods are entered on Form III for report to the superintendent of transportation. The Milwaukee Electric Railway & Light Company uses Forms IV, V and VI for collecting and summarizing its traffic data.

In general the forms furnished to observers provide for taking the following information:

1. Name of line.
2. Point of inspection.
3. Origin, destination and direction of car observed.
4. The car number.
5. The run number.
6. The time of arrival and departure.
7. The number of passengers on car.



Standard 7-15/16 x 10-1/2

NEW YORK RAILWAYS COMPANY

Office of Superintendent of Transportation.

Tally of Cars New York day 191

Bound at Bound at

Weather Rail Average seating capacity per car

Time	Cars	Seating capacity	Pass.	Excess or shortage of seat capacity per car		Cars required to give seats	Cars	Seating capacity	Pass.	Excess or shortage of seat capacity per car		Cars required to give seats
				Excess	Shortage					Excess	Shortage	

REMARKS

Copy to Gen'l Supt. of Transportation

Copy to Division General Foreman

Superintendent of Transportation

Electric Ry. Journal

COLLECTION OF TRAFFIC DATA—FORM III—REPORT TO SUPERINTENDENT OF TRANSPORTATION USED BY THE NEW YORK RAILWAYS

ELECTRIC RAILWAY JOURNAL, May 14, 1910, p. 867.

ELECTRIC RAILWAY JOURNAL, June 17, 1911, p. 1065.

R. M. Feustel Report on Winnipeg Street Railway Service—Manitoba Public Utilities Commission, 1913. (ELECTRIC RAILWAY JOURNAL, April 18, 1914, p. 865.)

TRAFFIC CHECK

Car Number	Time Arriving	Total Passengers	Total every 15 minutes		
			Passengers	Seats	Cars

Date

Line Checked at

Direction From .M. to .M.

Weather Checked by

Electric Ry. Journal

COLLECTION OF TRAFFIC DATA—FORM IV—TRAFFIC CHECK USED BY THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

RECAPITULATION OF TRAFFIC CHECK

Line ____________ Date ____________

PERIOD	
From	To
6:00	6:15
6:15	6:30
6:30	6:45
6:45	7:00
11:00	11:15
11:15	11:30
11:30	11:45
11:45	12:00

Electric Ry. Journal

COLLECTION OF TRAFFIC DATA—FORM V—RECAPITULATION OF TRAFFIC CHECK FOR THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

On the last point the practice is not uniform. Some cards require an estimate of the total number of passengers on a car as it passes the observation point. Others specify the number of passengers on the car when arriving and when leaving the observation point. The number getting on and off at each observation point has also been recorded occasionally.

In Cincinnati[20] the following information as to passengers was required:

1. Total passengers on car as it arrives and as it leaves.
2. Number of passengers standing in front and rear vestibules.
3. Number of passengers standing in car body.
4. Number of passengers boarding and leaving car.
5. Group or type of passengers: (*a*) Wealthy or professional; (*b*) middle type and shoppers; (*c*) laboring people.

In determining the number of passengers on a car, practice has shown that close estimation of the number from the street on the basis of seating capacity (known by the inspector for each type of car) by adding for those standing and subtracting for vacant seats is a sufficiently accurate method—95 per cent accuracy being attained by the inspectors as shown by check during the recent traffic survey in Milwaukee by the Railroad Commission of Wisconsin.[21]

In estimating the number of passengers it is cus-

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[20] R. W. Harris—Report on Cincinnati Traffic Conditions, 1912. (ELECTRIC RAILWAY JOURNAL, Nov. 2, 1912, p. 956.)

[21] R. M. Feustel—Report on Winnipeg Street Railway Service—Manitoba Public Utilities Commission, 1913. (ELECTRIC RAILWAY JOURNAL, April 18, 1914, p. 865): "Checking was continued . . . rigidly. . . . The car number and the time being taken each was a check on every other, as the car could be traced then from one end of line to the other. This work was then again checked against the car counts (preliminary study) taken from same corner, and a very substantial agreement was had."

R. W. Harris—Report on Cincinnati Traffic Conditions, 1912. (ELECTRIC RAILWAY JOURNAL, Nov. 2, 1912, p. 956): "Experience in collecting data of this character has shown this method (estimating from street) to be most accurate. In order to ascertain the correctness of the information thus collected, checkers were put on cars and an accurate count was made of a number of cars being observed by field inspectors. Considering the entire amount of data, the check indicates, on the whole, that the count on the street is 95 per cent accurate."

Date ________ Weather ________
Date ________ Weather ________
Date ________ Weather ________

The Milwaukee Electric Railway and Light Company

SUMMARY OF TRAFFIC CHECK

Checked by ________ Day ________ Line
Checked by ________ Day ________ Place
Checked by ________ Day ________ Direction
Checked by ________ Day ________ From ______ To ______

15 Min. Period	Date	Actual Passengers			Actual Seats			Actual Per Cent Load Factor		Allowed Per Cent Load Factor	Actual Seats Necessary	Number of Cars Arriving		Car Demand	Headway
		By days	Average 15 Min.	Average 30 Min.	By days	Average 15 Min.	Average 30 Min.	15 Min.	30 Min.			By days	Avg.		
6:00 to 6:15															
6:15 to 6:30															
6:30 to 6:45															
11:30 to 11:45															
11:45 to 12:00															

Electric Ry. Journal

COLLECTION OF TRAFFIC DATA—FORM VI—SUMMARY OF TRAFFIC CHECK FOR THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY tomary to allow for those voluntarily standing.[22] The proportion to which this preferential standing may extend is well brought out by an investigation by the Wisconsin Railroad Commission covering many thousands of observations[23] and showing that with a full carload as high as 20 per cent of the seating capacity represents standing by preference. The extent of preferential standing varies, of course, with local conditions, among which may be noted type of equipment, rules, class of passengers, time of day, and length of ride.[24] Probably there is a considerable number of smokers who would rather stand if allowed to smoke, and, when there are vacant seats, it is well to consider these.

The number of passengers on a car has been recorded in the past in several ways—either the actual number estimated or, for instance: light, medium, heavy (Wisconsin Railroad Commission); very light, light, full, crowded, overcrowded (1910 committee on construction of schedules and time-tables of the American Street & Interurban Railway Association); or as no load (less than six), comfortable load (eight or less standing), eight to twenty standing, more than twenty standing (St. Louis Public Service Commission), etc.

In addition to recording all of the above described data, the following additional items are usually considered to be of sufficient value to warrant their collection:

1. Weather conditions throughout day.
2. Abnormal occasions such as ball games, etc.
3. General traffic conditions at observation points, both pedestrian and vehicular.[25]

Traffic may be classified as vehicular and pedestrian, and again as: few; considerable but causing no delay; considerable and causing much delay.[26]

The transportation department of the old Metropolitan Street Railway, New York, classified delays to cars of five minutes or more as follows:[27]

1. Blocking by vehicles.
2. Carelessness of employees.
3. Miscellaneous car trouble.
4. Accidents.
5. Plow trouble.
6. Electrical car trouble other than plow trouble.
7. Electrical transmission trouble.
8. Mechanical defects (cars).
9. Faulty track.
10. Fires.
11. Caused by outside lines.
12. Miscellaneous trouble.
13. Due to outside construction.
14. Due to obstruction in slot.

In order that any traffic study may furnish information of the greatest value to the officers of a transportation company, it must determine as far as practicable the causes of the variations in traffic demand. To do this it is necessary to note many items which may at first seem superfluous. It should be borne in mind that while the primary purpose of traffic studies is to permit the making of scientific schedules, there is frequent opportunity to use the information derived from such studies in prognosticating the future, in meeting complaints, and in stimulating traffic at times and places such as will make the increased traffic profitable.

The steps which must be taken in any community to determine the characteristics of the various lines will necessarily vary, but the following suggestions cover the field in a general way and have formed the basis of inspector's reports in various surveys:

1. Divide line into characteristic sections, and discuss each under the heads: (*a*) Class of passengers; (*b*) time of travel; (*c*) probable destination.
2. Locate various origins of passengers along line and obtain destination and probable route (factories, etc.).
3. State transfer points and give idea as to number (in percentage) of passengers leaving car from which transfer is made, transferring to other lines. If cars on more than one route operate over line, make separate estimates of interchange of traffic.
4. Determine attitude of public as regards service given by the particular line (casual conversation).
5. Make a few specific observations (record counts) of movements of passengers (seated to vestibule and vice versa) in the car as it approaches a stop in downtown and outlying districts.
6. How does standing by preference vary with time of day, class of passengers, district, etc.?

The method used in the 1912 Philadelphia traffic survey differed in many respects from all of the preceding and might be of comparative interest, though its ultimate purpose was somewhat different from most of the herein mentioned studies. To quote from the report:[28]

"The present flow of traffic between all sections of the city was determined by a traffic survey made by the following novel and practical method."

A brief summary follows:

1. A program was prepared from schedules in effect on the Philadelphia Rapid Transit Company lines providing for: (*a*) The counting of passengers on about one car in every five (eighteen-hour) cars operated; (*b*) about four lines a day were to be covered.
2. Two experienced conductors (borrowed from the company and properly instructed and aided) were placed on each car: (*a*) The first, stationed at the entrance, properly filled out and presented an identification slip to each passenger with a request to keep same until collected; (*b*) the second, stationed at the exit, collected such slips and noted on them, after inquiry, the passengers' destination.
3. The count slips were printed tickets, somewhat larger than street car transfers, were numbered serially and supplied in pads of 100. Differently colored slips were used for each of four general directions of travel.
4. At end of each half trip all slips collected for it

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[22] Bion J. Arnold—Report on Traffic Situation in San Francisco, 1913 (ELECTRIC RAILWAY JOURNAL, Jan. 11, 1913, p. 63): "Allowance must be made, especially in San Francisco, for the existing fact that many passengers stand by preference even when seats are vacant."

[23] Railroad Commission of Wisconsin, 13—W. R. C. R.—156.

[24] R. W. Harris—Report on Cincinnati Traffic Conditions, 1912 (ELECTRIC RAILWAY JOURNAL, Nov. 2, 1912, p. 956): "The number of preferential standing passengers for any car load is peculiar to the conditions existing in each locality. In Madison, Wis., 21 per cent of any load will stand by preference; in La Crosse, 15.5 per cent; in Lincoln, Neb., 14 per cent; in Milwaukee, 19 per cent, and in Cincinnati, 15.5 per cent."

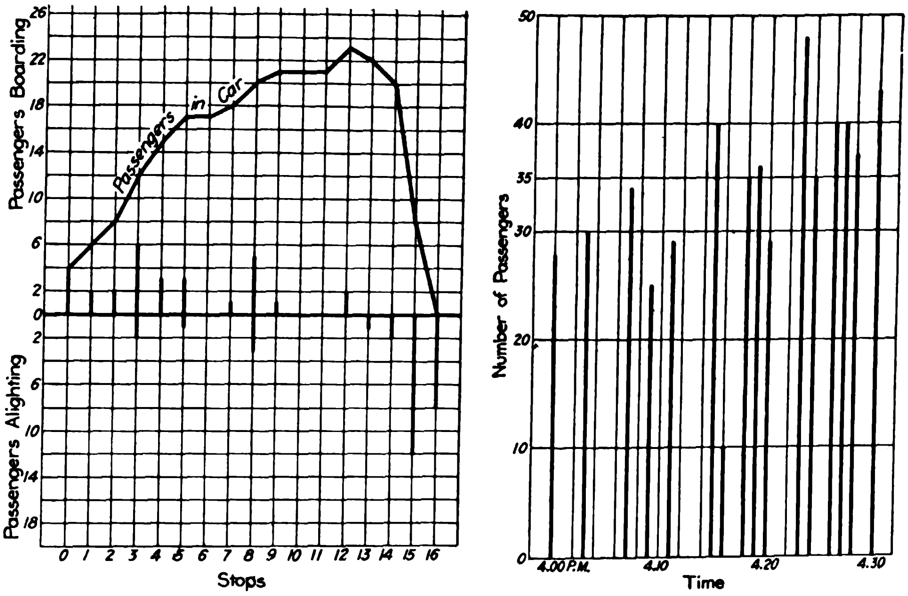
R. B. Stearns, vice-president and general manager The Milwaukee Electric Railway & Light Company, made the following statement in the summer of 1914: "Since smoking on the cars in the Milwaukee system has been discontinued and pay-within systems of folding doors and closed platforms adopted, a recent recalculation of the number of passengers standing by preference would indicate approximately 5 per cent as compared with 19 per cent a few years ago when smoking was permitted and all the cars were operated with open platforms, front and rear."

[25] Bion J. Arnold—San Francisco Transportation Report on Traffic and Service—December, 1912 (ELECTRIC RAILWAY JOURNAL, Jan. 11, 1913, p. 64): "One very serious cause of the increased difficulties of giving adequate service is the interference of vehicle traffic. . . . A very material improvement, however, has resulted from the institution of traffic regulations in this city (San Francisco) by the traffic squad of the police department, with results that heavy and slow moving vehicles are being gradually encouraged to seek and follow less congested thoroughfares, which has greatly facilitated passenger movement."

[26] R. W. Harris—"A Method for Determining the Adequacy of an Electric Railway System"—Proceedings of American Institute of Electrical Engineers, 1910. (ELECTRIC RAILWAY JOURNAL, July 9, 1910, p. 80.)

[7] ELECTRIC RAILWAY JOURNAL, June 25, 1910, p. 1088.

[28] A. M. Taylor—"The Solution of a City's Transit Problem"—*Electric Journal*, October, 1914, p. 516. (ELECTRIC RAILWAY JOURNAL, Jan. 10, 1914, pp. 76-79.)



COLLECTION OF TRAFFIC DATA—FIGS. 1 AND 2—SHOWING GRAPHICAL PRESENTATION OF BOARDING AND ALIGHTING DATA AND OF TRAFFIC VARIATION THROUGHOUT DAY

were inclosed in an envelope giving the following information. (*a*) Number of envelope corresponding to the number of half trips counted; (*b*) name of collector; (*c*) date; (*d*) name and number of line being counted; (*e*) direction; (*f*) time of beginning of half trip; (*g*) number of slips inclosed; (*h*) delays; (*i*) unusual traffic movements, and (*j*) other notes.

5. The envelopes containing slips were turned in after midnight each day, and were then sent to the Statistical Service Company. Here the information contained on slips was transferred to twenty-four column Hollerith cards, which were then electrically sorted and recorded.

6. No count was made on holidays, Saturdays or Sundays.

7. Checks were made by repeating the count on several lines. These recounts were found to agree in a satisfactory manner with the originals.

8. The data recorded by the Statistical Service Company were returned to the survey office, where they were further analyzed and charted.

RECORDING DATA

"Results are plotted into curves from which it can be readily seen wherein service is defective and recommendations for changes made accordingly."

This comment on the practice of the Board of Supervising Engineers, Chicago Surface Lines, may well serve both as a statement of present general practice and as a recommendation to all engaged in the accumulation of traffic data. Such curves simply represent a summary of observations, but for the great majority of those dealing with such matters the graphic representation of data is far more quickly interpreted than numerical tabulations.

A few typical curves together with the data from which they are drawn will be illustrated. An observer on a car noted passengers boarding and alighting during a run of sixteen blocks, as shown by Table I. Fig. 1 shows this information graphically.[*] Data for, say, fifteen or thirty-minute periods can be combined readily and drawn in the same manner, or from street observations as to number of passengers on the car the car loading line can be drawn.

The variation in traffic throughout the day at any point may be shown by a diagram similar to Fig. 2. Here an inspector stationed at one point throughout the day reports the data shown in Table II. Such a diagram as Fig. 2 serves to indicate whether or not unusual loading is due to distortion of headway, and also, by the use of a line showing seating capacity, points out the relation between excess seats and standing passengers for the particular point on the line.

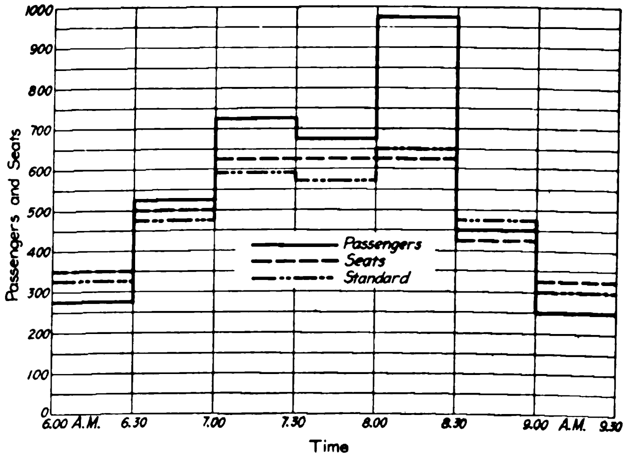
Of general application and frequent use, the diagram reproduced in Fig. 3 combines several important features. An observer records for each car the number of passengers aboard and the time of passing the point of observation. The seating capacity of cars being known, summaries are made (see Form VI, summary sheet of the Milwaukee Electric Railway & Light Company), and the results plotted as indicated. By plotting on the same figure the seats required by company

TABLE I—SHOWING DATA NOTED BY OBSERVER AND USED IN FIG. 1
Car No. 100
Passengers

Street	Boarding	Alighting	In Car	Street	Boarding	Alighting	In Car
0	4	..	4	9	1	..	21
1	2	..	6	10	..	..	21
2	2	..	8	11	..	..	21
3	6	2	12	12	2	..	23
4	3	..	15	13	..	1	22
5	3	1	17	14	..	2	20
6	..	..	17	15	..	12	8
7	1	..	18	16	..	8	0
8	5	3	20				

TABLE II—SHOWING DATA FOR TRAFFIC VARIATION AT CERTAIN POINT AS USED IN FIG. 2
Main Street at Twentieth
Southbound

Time	Car Number	Passengers	Time	Car Number	Passengers
4.00 p. m.	1260	24	4.19 p. m.	1247	36
4.03 p. m.	1240	30	4.20 p. m.	1253	29
4.07 p. m.	1229	34	4.23 p. m	1242	48
4.09 p. m.	1262	25	4.24 p. m.	1223	35
4.11 p. m.	1271	29	4.26 p. m.	1218	40
4.15 p. m.	1230	40	4.27 p. m.	1212	40
4.16 p. m.	1231	10	4.28 p. m.	1226	37
4.18 p. m.	1254	35	4.30 p. m.	1261	43



COLLECTION OF TRAFFIC DATA—FIG. 3—GRAPHICAL PRESENTATION OF DATA SHOWING PASSENGERS ABOARD, TIME, SEATING CAPACITY AND STANDARD SEATING REQUIREMENTS standards, or by franchise standards or those of commissions, the sufficiency of the service can be quickly judged.

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[*] When the stops are laid off on the base line to the scale of their distances apart in miles, the area under this curve represents passenger miles, and divided by the total passengers "on" gives the average length of ride. The maximum ordinate will generally be less than the total "ons." The area between a horizontal line representing seating capacity and that part of the curve lying above the seating capacity line represents "standing passenger miles."

Other diagrams than those here illustrated will readily suggest themselves and will permit the setting forth of the tabular data in ways best fitted to the problem under examination.

SUMMARY

It is impossible to indicate other than very general conclusions with regard to the frequency of the collection of data. It may be concluded, however, that this is to an extent automatically determined by conditions already enumerated but that in order to secure full advantage of fluctuations in traffic and to anticipate public complaints, the interval between such studies should be short. Moreover, such studies should be made not only for week days but also for Saturdays and Sundays, and not only for rush periods but for non-rush periods as well. Furthermore, in order to estimate peak conditions accurately, some traffic studies should always be made in the late autumn and winter months.

The type of property will have an important bearing on this question. Following the classification proposed in a previous article in this series, published in the ELECTRIC RAILWAY JOURNAL of June 19, the varying requirements of different companies may be roughly stated as follows:

For the larger companies, all lines should be subjected to a twenty-four-hour study covering week days, Saturdays, Sundays and holidays, and representing also traffic conditions throughout the various seasons of the year. The size of the department which it is necessary to maintain to make these studies will depend upon the frequency with which it is desired to complete the study of all lnes in the system and upon the number of lines it is possible for the department to consider at a time.

For the companies of medium size, a twenty-four-hour general study should be made periodically and eighteen-hour studies on the heaviest lines in rotation.

For the small companies, an eighteen-hour general study, supplemented with special data concerning the points of maximum loading on certain lines during rush hours, will be sufficient.

No definite conclusion can be drawn as to the extent of data to be taken in any traffic study except that the more comprehensive the study made, the greater the value of the information secured. Stated very generally, however, experience indicates the following general procedure:

A preliminary study, covering a number of representative car trips during the different periods of the day and ascertaining the number of passengers at different points along the route, should be made for each line to determine the points of future observation. The points of maximum load and a number of others bringing out the characteristics of the traffic on the line should be used as these points of observation, together with points at which there are cross-overs which may be used for short routing. A car-loading curve, based on the preliminary observations, will help to locate the desired points. The period of time covered by the observations on any one line at any one point should be long enough to give normal results, with twenty-four hours as the minimum.

Inspectors should be stationed at each observation point and should record accurately the following data for every car moving in either direction.

1. Name of line.
2. Point of inspection.
3. Day and date.
4. Weather.
5. Origin, destination and direction of car.
6. Car number.
7. Run number.
8. Time.
9. Number of passengers on car.

The last-named item should be estimated on the basis of seating capacity, by adding for those standing and subtracting for vacant seats (seating capacity of all types being known by inspectors). Allowance should be made for those voluntarily standing, varying from 5 per cent to 20 per cent, according to conditions. In addition to the above data, any other pertinent remarks should be made, such as: ball game, street traffic light, medium, heavy, etc.

A general survey of each line indicating the following should be made:

1. Class of passengers: (*a*) Business and professional; (*b*) middle type and shoppers; (*c*) laboring people.
2. Time of travel.
3. Probable origin and destination (factories, etc.).
4. Transfer points and their effect.
5. Attitude of public as regards service on the particular line.
6. Other pertinent data.

It is possible to reach more definite conclusions concerning the extent of data to be taken and the manner of its determination, by grouping companies in classes as has been previously done in discussing the organization and the frequency of studies. Adopting this plan, the following paragraphs take up the question of method in greater detail.

It is neither necessary nor practicable to study the loading of every car at every point of a trip. It is desirable, however, and the larger companies will obtain this information, to know the average number of passengers getting on and off each car at every point for twenty-four hours of the day and for various days and periods of the year. This information should be obtained by a sampling process—that is, by taking certain cars and certain points at one time and other cars and other points at other times. It will be found that the traffic characteristics of the various car trips will be very nearly alike from day to day, so that it will be possible to combine data concerning one car line taken to-day with that taken concerning another car line to-morrow, provided, of course, no unusual circumstances arise.

For companies of medium size, the number of passengers getting on and off each car at important traffic points previously determined should be noted, and for the smaller companies an estimate should be made of the number of passengers on each car at the point of maximum loading during rush hours.

At the beginning of any traffic study, all the lines should be listed and the general characteristics of the territory they serve should be recorded. The relation of these lines to each other will determine to a certain extent the order in which they will be studied. The general characteristics of the traffic on each line can be determined from conductors' trip reports and from a few rides of inspection prior to the beginning of the collection of specific data.

Each observer should be carefully instructed as to the observations which he is to make and he should be furnished with convenient forms ruled and with printed headings. It is very necessary that every effort should be made to place the observations on a comparable basis, inasmuch as the data from many observers are combined to make the final determination of the sufficiency of service on any line.

In addition to the data concerning the number of passengers on cars at various points, together with the identification of the car by route and time, the observer should record information concerning street traffic, unusual occasions, weather, etc., in order that the extreme variations may be eliminated from the statistical analysis. It is generally advisable also to determine the diversity of loading. For this purpose the passengers in each car passing a given point, for say fifteen-minute periods throughout the day, should be determined and the relation of the maximum to the average should be computed. Certain typical forms for use in collecting and recording this information have been shown.

After these data have been assembled they can be made of greatest value by being represented graphically. There are three general types of curves which it is found helpful to prepare from the traffic data collected. The first is a curve on the horizontal axis of which is laid off the various streets passed in a car trip. Parallel to the vertical axis and above the horizontal axis there is laid off a line proportional in length to the number of passengers boarding the car at each street, and below the horizontal axis, a similar line representing the number of passengers leaving the car at each street. By computing the cumulative difference of passengers on and off, the curve showing the number of people on the car at each street can be drawn.

The second typical curve shows the number of passengers on each car passing a given point and the time at which the car passed the point. The vertical lines representing the number of passengers on the car are drawn at horizontal distances representing the time, and a line connecting the upper extremities of the vertical line represents the loading at any point throughout the period of study. The distance between the lines indicates, of course, the headway of cars and whether or not unusual loadings were due to irregular spacing of cars.

The third general type of curve is one which is plotted for any given point on a line showing, for each fifteen or thirty-minute period during the time under observation, the number of passengers carried by the point, the number of seats furnished and the number of seats which should be furnished in order to conform to the company's rules or to regulations laid down by some controlling body.

Another article will take up the analysis of these curves and their application to the problem of constructing time-tables—which is, of course, the immediate purpose of the traffic survey. There are other ways, however, in which the traffic survey department can be of value to those in charge of the property, and all data should be further analyzed for suggestions as to means of stimulating traffic on such lines and at such times as will make it a profitable addition to the business. There are many questions which the traffic survey department is in a position to investigate and shed light upon, and it should be an able ally of the traffic department.

The United Gas & Electric Company, the Louisville & Southern Indiana Traction Company, and the Louisville & Northern Railway & Light Company, New Albany, Ind., are behind a plan which will provide a monster auditorium in Glenwood Park, the outing park in Indiana, between New Albany and Jeffersonville and across from Louisville. This is a popular picnic ground, a chautauqua ground, camp meeting ground, etc. Incidentally it is signed up for picnics of one kind or another and other attractions for practically all of the summer, and the three railway lines mentioned will get the business.

New Haven Operating Results

In Several Written Discussions on W. S. Murray's Paper on Main Line Electrifications the Relative Costs of Power for Steam and for Electric Operation Were Taken Up

In a paper presented before the Franklin Institute and reported in abstract in the ELECTRIC RAILWAY JOURNAL for Jan. 30, W. S. Murray, consulting engineer New York, New Haven & Hartford Railroad, gave figures covering the cost of construction and operation for the electrified division of the New Haven Railroad and discussed the general principles of successful steam-railroad electrification. Several written discussions of the points brought out by Mr. Murray were presented at the meeting, and these have become available for publication through the Journal of the Franklin Institute, being given in abstract below.

Alfred W. Gibbs, chief mechanical engineer, Pennsylvania Railroad Company, contended that 1 lb. of coal burned under the boiler of a central power plant would not develop twice the drawbar power that the same amount of coal would produce when burned in a locomotive firebox. He cited the record of twenty-seven tests on one locomotive in the testing plant at Altoona. The tests showed that the coal consumption per drawbar horsepower ranged from 2.5 lb. to 5 lb., twelve of the tests showing rates between 2.5 lb. and 3 lb. These are the rates when the locomotive is running, and added to them are certain stand-by losses at terminals. The power station expense, as given by Mr. Murray at 0.69 cent per kilowatt-hour, including fixed charges, taxes and insurance of 0.18 cent, evidently did not include a charge for obsolescence. The fixed overhead charge should be nearly double the figure given, or say, 0.35 cent or 0.4 cent per kilowatt-hour.

George R. Henderson considered that uniformity of traffic is just as important as density of traffic because the peak loads can only be smoothed out when the traffic is uniform, the importance of this being measured by the fact that the power-house and transmission lines cost in the order of $100 per kilowatt. Mr. Henderson considered that the relative fuel consumption for steam and electric locomotives of 50 per cent mentioned by Mr. Murray was due to the comparison with the old type of saturated-steam locomotives. Modern steam engines fitted with super-heaters would change this ratio to, say, 65 per cent.

E. H. McHenry, McHenry & Murray, New Haven, spoke of the growing tendency toward the consolidation of the best features of all of the divergent systems into one system of greatest combined merit. The so-called war of the systems was already nearly at an end.

C. Renshaw, Westinghouse Electric & Manufacturing Company, considered that, owing to ten years' experience in construction and operation, the New Haven electrical plant could be reproduced to-day for not more than 60 per cent of its original cost.

F. E. Wynne, Westinghouse Electric & Manufacturing Company, called attention to the figure of $15,000,000 given as the expenditure for electrifying the New Haven Railroad to date, this indicating that the expenditure has been $120,000 per unit of motor power and $30,000 per mile of single track. Complete electrification of the New York-New Haven division will be accomplished without additional expenditure for trolley construction, and consequently these unit figures eventually will be somewhat changed. The estimated reproduction cost of the installation at 60 per cent of the original cost indicates that the total construction may be made for less than $70,000 per unit of motor power, while the cost per mile of single track will be about $20,000. With regard to the results secured in connection with energy consumption, these check closely the accuracy of calculations made in connection with the service, thus illustrating the fact that energy consumption with electric operation can be very closely predetermined where trains are operated on a steam railroad basis with definite schedules and definite stops.

Philip Torchio, New York Edison Company, then spoke of the fact that power companies, by averaging the power demand from a great diversity of users, reaped economic advantages in the production of power which the railroad cannot secure under independent generation. The saving in investment in power stations, substations and transmission lines may represent a sensible item in the costs of railroad electrification.

W. A. Del Mar, New York, considered that the results submitted in the paper would have been more valuable if they had been based upon a complete year rather than upon a record for two months only. He asked whether the $15,000,000 expenditures for the installation as mentioned by Mr. Murray included the cost of reducing telephone disturbances and of altering the right-of-way to conform with electrical requirements. Mr. Del Mar was appalled at the development charges amounting to 40 per cent of the entire investment, which were to be inferred from the statement that the present system could be replaced for 60 per cent of the original cost. An interesting feature about the installation had been the development from the complex to the simple and mechanical details, and vice versa in the electrical features. He asked whether the mileages upon which the unit costs were based included yard switching and light locomotive mileage, as these two items might easily amount to 15 per cent of the total. He spoke favorably of results obtained by watt-meters on locomotives.

R. H. Wheeler, Mackenzie, Mann & Company, Ltd., Montreal, stated that a form of electric power which may be standardized for all classes of train service was vitally necessary. He considered that the d.c. motor was especially desirable, but it could be used only in connection with the mercury arc rectifier in case the overhead line was energized with alternating current. This imposed a serious handicap in both weight and control complication. However, by placing the rectifier in the roadside substation and supplying the overhead wire with power at 3000 volts direct current, the desired essentials of transmission economy and standardization of motor-power equipment were obtained. This second standard was offered to emphasize Mr. Murray's definition of the successes arising from a choice of energy which can be standardized.

CLOSURE BY MR. MURRAY

In closing Mr. Murray stated that the fixed charges mentioned in his paper as 1.8 mills per kilowatt-hour were in error and should be changed to 2.9 mills, the latter figure being based upon an 11 per cent rate on the total investment involved, carrying with it interest, insurance, depreciation and taxes. The total cost, therefore, for energy would become 0.8 cent per kilowatt-hour instead of 0.69 cent, the rate mentioned in the paper.

Realization of the suggestions regarding the uniformity of traffic is, he said, largely accomplished by the electrical movement of freight as well as passenger trains, as the maximum power demand for the former can be made to follow at the time of minimum demand for the latter. By plotting the combined load curve of the New Haven Railroad's passenger, freight and switching services without any rearrangement of the schedules as they are made up to-day, a load factor of 75 per cent is secured. With regard to fuel saving, if the economy of generating units remained fixed it would be fair to grant Mr. Henderson's point that the ratio of coal consumption should be changed from 50 per cent to 65 per cent. On the other hand, the improvement in over-all efficiency of the generating plant is easily keeping pace with that of steam locomotive, and, granting this, there are no other constants or variables which will tend to alter the ratio of 1 to 2 in favor of the fuel economy of electricity versus steam.

With regard to the transfer of steam locomotive power to different divisions of a road where congestion may require it, it was easily conceivable that a division could be electrified with economy without including the financial credit due to the steam locomotive replaced, thus automatically providing steam locomotives for the congested districts and leaving the electrical apparatus to be operated at very high load factor.

The increased reliability of operation with electricity which had been referred to was based upon the engine mileage per failure. A fair average for steam locomotive operation might be cited as 5000 miles per engine failure whereas electrical operation certainly should be as high as 12,000 miles, and in a number of instances on the New Haven it has been as high as 18,000 miles per engine failure. Of course, maintenance and repairs on electric locomotives should be compared to those of steam upon the basis of equal service and weight on drivers.

With regard to the coal consumption cited by Mr. Gibbs as applying to steam locomotives, Mr. Murray emphasized the necessity for considering the stand-by losses in a comparison between steam and electric power, these stand-by losses not being included in Mr. Gibbs' figures for steam locomotive coal consumption.

In answer to Mr. Del Mar's questions, Mr. Murray said that the expenditures made to reduce telephone interference and for altering the right-of-way to conform with electrical requirements were included in the general figure of $15,000,000 for the cost of the entire installation. However, experience has indicated a method of laying out the transmission and distribution systems whereby automatic compensation for telegraph and telephone services can be secured for a very nominal amount. The so-called high development charges appearing in the New Haven installation were in reality due to reductions of cost of material in many cases. In 1907 large high-tension insulators cost $63 each while to-day with three times greater factor of safety the price has been reduced to $7.

With regard to the mileages upon which were based the unit costs given in his paper, Mr. Murray stated that these included both passenger and freight service but did not include yard switching, which is provided for by engines designed especially for that purpose. Light mileage of locomotives was included for the mileages of road engines. The train mileages did not include the mileage of light locomotives, but these had been recorded and were included in the total locomotive mileage, including the total unit cost per locomotive-mile both in freight and passenger service.

The point made by Mr. Del Mar with regard to the negligible error of meter registration on locomotives was interesting, and so far as Mr. Murray had been able to determine the meters on the New Haven locomotives have been accurate and valuable adjuncts in the determination of the general distribution of power.

Employees of the Illinois Traction Company at Champaign, Ill., have perfected a permanent organization for an I. T. S. band, and weekly rehearsals are being held. The company gives the use of a room on the third floor of its new office building at Champaign for this purpose.

Safety-First Committee Meets

Prominent Railway Officials Discuss Precautionary Measures at First Meeting of the Transportation Committee of the Safety First Federation of America

Policies and activities for the ensuing year regarding uniform street traffic regulation were discussed at the first meeting of the transportation committee of the Safety First Federation of America on July 13, at the Federation's headquarters, 6 East Thirty-ninth Street, New York. The meeting was presided over by C. Loomis Allen, president of the American Electric Railway Association and chairman of the transportation committee.

The field of work which has been assigned to the transportation committee covers a wide scope in regard to both steam and electric railway operation, as indicated by the following subjects, which were selected at the organization meeting at Detroit for consideration by the committee:

1. Near-side stop for street cars.
2. Type of cars in regard to entrances and exits.
3. Uniform street regulation governing the operation of jitney buses.
4. Uniform signs and signals at grade crossings (steam and electric lines).
5. Educational campaign outlining the dangers of grade crossings and trespassing on railway property.
6. Suggestions offered by the street traffic committee at the meeting held in Detroit on June 4.

The meeting in New York was attended by several prominent railway executives and operating officials, many of whom have been designated to serve upon the committee by organizations affiliated with the Safety First Federation. In addition thereto, representatives of other organizations concerned in various forms of transportation were in attendance. The following executive officers of the Federation were present either at the business sessions or the luncheon which was later tendered to the committee by President Kingsley: D. P. Kingsley, president of the Federation and of the New York Life Insurance Company; John Gillespie, third vice-president and police commissioner of Detroit; C. L. Bernheimer, treasurer of the Federation and president Safety First Society of New York, and F. H. Elliott, general secretary. The members of the transportation committee present included the following: Chairman, C. Loomis Allen, president American Electric Railway Association, Syracuse, N. Y.; W. E. Cann, assistant to general manager Detroit United Railway, representing the Safety First Society of Greater Detroit; R. W. Meade, president Fifth Avenue Coach Company, representing the Safety First Society of New York City; J. K. Punderford, vice-president and general manager The Connecticut Company, New Haven, Conn., representing the New Haven Chamber of Commerce; J. T. Moffet, superintendent of transportation Washington Railway & Electric Company, Washington, D. C., representing the Washington Safety First Association; F. L. Hubbard, assistant to the general manager Toronto Railways, representing the Ontario Safety League; F. W. Bacon, vice-president Kentucky Traction & Terminal Company, Lexington, Ky.; J. W. Crawford, supervisor of claims Philadelphia Rapid Transit Company, representing the Philadelphia street traffic committee, and H. B. Potter, assistant to the second vice-president Boston Elevated Railway, representing M. C. Brush, who was not able to be present. The members of the committee not in attendance were H. Spoehrer and Richard McCulloch of St. Louis, George Keegan of New York, T. C. Powell of Cincinnati, C. R. Myers of Indianapolis, and E. G. Connette of Buffalo. Among the others present were E. B. Burritt, secretary American Electric Railway Association, and G. A. Walters, secretary to the police commissioner, Detroit.

BUSINESS MEETING

F. H. Elliott, general secretary of the Federation, opened the meeting by presenting a general outline of the present development of the Safety First Federation and the work which it proposes to do in future. The Federation, Mr. Elliott stated, was organized last February. Its membership includes at present all of the safety-first organizations except two in the country, representatives of public service commissions, chambers of commerce in various cities and states, organizations concerned with transportation and various public-spirited citizens. No effort has yet been made to develop a large membership list. The purpose of the new organization is to direct work entirely to problems of public rather than of industrial safety. One of the direct results of the February meeting was the preparation of a safety-first text-book for children. This book, a few preliminary copies of which are now printed, contains rhymes and jingles accompanied by four-color illustrations calculated to impress children with the idea of caution in avoiding the dangers of street cars, automobiles, fire and water. Mr. Elliott spoke of the suggestions which were recommended for general use at the meeting of the street traffic committee in Detroit on June 4-5. These suggestions were mentioned on page 1137 of the ELECTRIC RAILWAY JOURNAL for June 12.

The business of the present meeting, Mr. Elliott stated, was to consider in a preliminary way all transportation matters regarding safety in preparation for the first annual convention of the Safety First Federation of America, to be held at Detroit on Oct. 19, 20 and 21. In commenting on the near-side stop Mr. Elliott alluded to its success in New York as shown by the report of the Public Service Commission for the first six months of its operation. At present there is but one New York newspaper which is agitating against it. Apparently the only difficulty met is that of having to board and alight in winter from the rear ends of cars in an un-snow-swept part of the street. This objection raised the question of whether the position of entrances on cars could be standardized.

C. Loomis Allen stated that standardization of car equipment had received careful consideration by the American Electric Railway Association and standards of certain kinds had already been adopted. While he doubted whether it would be possible to adopt standard cars he maintained that the committee could do many things that make for real safety. It could demonstrate the advantages of the near-side stop by citing its successful use in other cities. It may take time to convince railways and public service commissions of the advantages obtained thereby.

W. E. Cann, assistant to the general manager Detroit (Mich.) United Railway, said that after fifteen months of experience with the near-side stop, he wished to go on record as favoring it. This system has met with almost universal favor in Detroit. The only contention against it was that of having to alight in dirt or snow. For that matter, however, crosswalks were apt to be as dirty as the rest of the street. Moreover, the increasing use of trailers had removed any advantages which the far-side stop may have had, because with trailers all entrances could not be opposite the crosswalk. Mr. Cann spoke favorably of the use of trailers in Detroit. He considered the jitney movement not a business proposition but the result of the hard times. Nevertheless, its regulation is undoubtedly needed. He believed in the great necessity of an educational campaign on the dangers of grade crossings. During the week-end of Independence Day six people were killed at grade crossings in Detroit. In one of these cases he knew there was absolutely no excuse. No attention whatsoever was paid to the whistle of the train by the driver of the automobile. An educational safety campaign could be largely handled by the local newspapers. Mr. Cann stated that the signals of traffic policemen absolutely govern the cars in Detroit. Fire siren whistles also are held as sacred as a red flag on the railway. He hoped that the use of siren whistles on automobiles could be confined to fire-department vehicles, so that the public would be put on its guard whenever the whistle was heard. He thought that there ought to be signs showing the proximity of fire department stations.

J. W. Crawford, supervisor of claims Philadelphia Rapid Transit Company, described the safety zones used in that city. They are defined by rope barriers, held in uprights.

J. K. Punderford, vice-president and general manager The Connecticut Company, New Haven, Conn., explained that it would be unnecessary, so far as his own railway was concerned, to put through laws enforcing some of the present suggestions for large cities because his property reached only small cities. However, he was decidedly in favor of requiring all teams to show lights at night. A law regulating the encroachment of vehicles on tracks should also be desirable. A written examination for motormen had recently been adopted by his company and he believed it was in the interests of safety. The questions relate to safety in operation. Near-side stops are being made at certain street intersections. The laborers of the company are used to clean off the streets in winter where the near-side stop is used, otherwise the cleaning off probably would not be done. Mr. Punderford thinks that the possibility of standardized car equipment as regards entrances is hardly more than Utopian. A good innovation recently ordered by the Public Service Commission for all electric railways in Connecticut has been the installment of uniform signs where street car tracks emerge from a private to a public highway. These signs are erected diagonally and bear the words "Railway Crossing." He also described an arrangement made by the company with the fire department in New Haven by which the department apparatus, in going to fires, would use certain designated streets. At the intersections of these streets with the railway lines signs are posted and a full stop of the cars is required.

F. W. Bacon, vice-president Kentucky Traction & Terminal Company, Lexington, Ky., described the educational campaign which his railway had conducted in issuing to school children small buttons bearing the words "I stop before I cross the track" and signs for teamsters and merchants to put on their vehicles, "We stop before we cross the track." Mr. Bacon suggested as an additional traffic recommendation the question of regulating slow-moving vehicles on street car tracks. If horse-drawn vehicles could be eliminated from the tracks the movement of traffic could be greatly facilitated and small interruptions prevented. Country people were special offenders in this respect. They were apt to stop their buggies for conversation while on the track. In regard to safety signs his railway has made a special effort to drive home the idea of safety by placarding the whole line with special warning signs at every road and lane intersection and in the near vicinity of livery stables and garages.

H. B. Potter, assistant to the second vice-president Boston (Mass.) Elevated Railway, spoke of the difficulty of adopting standardized traffic rules for irregular streets, as in Boston, which are said to have been laid out from the original cow paths. His company has installed many near-side stops. Each locality, however, has to be considered separately. It would be inexpedient, for example, to install two near-side stops where two streets cross the tracks at close intervals. This innovation should be installed slowly, otherwise the American public, conscious of its inalienable rights, will start an agitation to revert to the old practice. Mr. Potter believed that it would be a good thing if the Federation could bring about standard rules for steam and electric road grade crossings. Better co-operation between the steam and electric roads was needed. Steam railroad men are apt to adopt the big brother attitude toward their electric railway contemporaries.

Mr. Potter thought that safety-first campaigns were very difficult to launch by the railways alone, because the public was apt to suspect ulterior motives. In the recent campaign in Boston the co-operation of the newspapers was obtained. The press announced generous prizes to children who could compose the best poems on "Safety First." This movement was taken up with enthusiasm by many schools. In many cases the teachers had pupils learn the poems. The railway, however, wanted to conduct a wider campaign. Advertisements on safety first were posted conspicuously on inside cars and on billboards. This movement was successful largely because it was supported by the Chamber of Commerce.

Richard W. Meade, president Fifth Avenue Coach Company, New York, said that the jitney bus was a forerunner of a transportation system that was certain to increase in this country in proportion to the improvement in roads and motor vehicle construction. The bus system in London is an example of wonderfully efficient operation. The shops there are a model of mechanical perfection. If bus operation is possible in England it is also possible in the United States. The Federation can be of much assistance in drafting regulations for safety which shall be fair and just to all interests.

At the suggestion of Mr. Allen, two sub-committees were appointed for the purpose of preparing reports for the transportation committee in anticipation of the safety convention in the fall. These sub-committees included a committee on municipal regulation, composed of W. E. Cann, J. T. Moffet, J. W. Crawford and H. B. Potter, and a committee on State and federal regulation composed of J. K. Punderford, R. W. Meade, F. W. Bacon and E. G. Connette.

A luncheon at the Republican Club followed the morning meeting and in the afternoon sessions of the two sub-committees were held. At the luncheon Darwin P. Kingsley, president New York Life Insurance Company and of the Safety First Federation, spoke of the aims of the safety organization. The safety-first movement, Mr. Kingsley said, was the natural outgrowth of the intensive life of to-day. He referred to the large number of fatalities in New York and said that one of the highest aims of the safety-first organization should be to educate the public in the hope of diminishing these accidents. The public was largely to blame for a great many of them and yet was always ready to condemn public utility corporations without awaiting investigations. The safety-first movement is not purely humanitarian, however, but is a good, sound business proposition. The need of regulating traffic, for instance, was graphically illustrated at the time of the recent police parade in New York City. Soon after the traffic police were withdrawn to parade a condition reigned which approached chaos. The more intensive the life we lead the more necessary is extended government control.

Railway Motor Commutation and Flashing

R. E. Hellmund Discusses the Problems of the Design of Direct-Current Motors from the Standpoint of Commutation

In the current issue of the *Electric Journal* R. E. Hellmund of the Westinghouse Electric & Manufacturing Company has an elaborate article on the causes of flashing and sparking in electric railway motors. Some of the important points are abstracted below.

Improved commutation of itself is of little advantage to a railway company except as it brings with it reduced maintenance cost. Commutator wear is reduced as is evidenced from the fact that the sale of replacement commutators by manufacturers has practically ceased since the introduction of commutating-pole motors. Improved commutation further means reduced wear of carbons and reduced quantities of carbon and carbon dust inside the motor. Such dust accumulations often cause insulation breakdowns. Good commutation further avoids roughening of the commutator which is usually followed by vibration, leading to wear and tear in the brush-holder parts. It also prevents commutator blackening, which leads to the breaking down of the insulation between segments.

The commutating pole has made possible the carrying of heavy overloads on railway motors, permitting higher rates of acceleration and therefore more economical operation, and in some cases making it possible to use two-motor in place of four-motor equipments. It has also made field control possible as well as the design of direct-connected motors for voltages higher than 600, and for use with very small wheels with armature diameters correspondingly small.

Commutating conditions cannot be made altogether ideal for several reasons. Ideal commutation requires a commutating-pole flux changing in proportion to the load, which in turn requires unsaturated magnetic poles. On account of space limitations the iron parts of motors cannot be made as heavy as would be required for this purpose. Further, it is not advisable to design armatures with a large number of small and flimsy teeth and a large number of weak coils, giving numerous chances for insulation breakdown. The preference is for large slots which lead to certain irregularities in commutation. Again, it is not possible to secure the best ratios between armature diameter and length from the commutation standpoint.

Flashing in railway motors is the formation of electric arcs just as in an arc lamp. In the latter the carbons are brought into contact and subsequently drawn apart. After the arc has been established a comparatively small voltage will maintain it. In order to obtain flashing in a railway motor, it is necessary, first, that an arc be established and, second, that this be maintained long enough to cause a flash around the commutator, either extending part of the distance from brush to brush or the entire distance, or a distance around part of the commutator and from thence to ground. Flashing can be prevented by avoiding the formation of the arc and by keeping the voltage between commutator segments so small that an arc cannot be maintained between them. Improving commutation reduces flashing, but even with commutating poles arcs will occur. Brushes may be thrown away from the commutator as a result of a jar, and one of the most successful means for preventing flashing from this cause is the use of a comparatively high pressure on the carbons. In motors having good commutation satisfactory results can be obtained with brush pressures of from 3 to 5 lb. per square inch, although a somewhat increased pressure does not materially increase the losses and wear. This pressure is not always a sufficient safeguard against jumping of brushes. It seems, therefore, in many cases advisable to use pressures in excess of 5 lb. per square inch, a good rule being to apply an initial brush pressure of 5 lb. per square inch, decreasing it slightly if there is no trouble from flashing and increasing it from 6 lb. to 7 lb. per square inch if flashing proves troublesome. It has even been found necessary to raise the pressure as high as 9 lb. per square inch in some cases, but in these the increase in brush and commutator wear was quite noticeable. Jumping of the carbons is the most frequent cause of sparking in commutating-pole motors.

Sparking occurs also in commutating-pole motors under abnormal running conditions, due to the fact that with sudden changes in current the commutating flux does not immediately respond to these changes. Any interruption and re-establishment of power will, in a series motor, always cause temporary arcing and spitting at the brushes.

The above statements explain why the commutating poles have not eliminated the first cause of flashing altogether. Even with the commutating pole it is necessary to design motors so that there is not much voltage between commutator segments. There is, however, a limit to the reduction in the number of commutator bars and the corresponding reduction in the number of turns between bars due to the limit of practicable width of the bar.

Some few commutating-pole motors are more subject to flashing than most of the more popular non-commutating-pole design. The reason for this is that when the limitation in design regarding the allowable voltage between segments in non-commutating-pole motors was removed by the development of the commutating-pole type, some designers were led to bring out motors with strong armatures and weak fields, as well as with many armature turns between segments. These motors were very liable to flash, in fact they would flash-over at high speed at almost every bad rail joint. However, it would not be fair to hold this against the commutating-pole motor. Again, in motors properly designed for flashing a small amount of sparking at the brushes in normal operation does not have any harmful influence upon the flashing. This is especially true of the very small arcs at times observed at the brushes of commutating-pole motors, which produce but a limited amount of vapor and require a large voltage to maintain them. This condition follows from the fact that, as the commutating pole is not a safeguard against the establishment of arcs at the brushes under all circumstances, it is necessary to keep down the voltage which tends to carry the arc over.

Ventilation of motors should have a good effect upon flashing and sparking because the ventilation tends to remove carbon and copper dust from within the motor and to keep the motor dry inside. It further removes hot metal vapors which may exist on account of sparking or incipient flashes.

There are two conditions of operation under which almost any rationally designed motor is liable to flash. First, motors are at times subjected to very high overvoltages, for example, in third-rail installations where, when a heavy load is suddenly taken off the line, voltage rises up to two or three times the line voltage. It would hardly be possible to design commercial motors which would stand this under any condition of load without flashing over now and then. However, the damage caused to an up-to-date motor by flashing under over-voltage conditions is usually negligible, because the high-voltage surges are usually of very short duration. The damage caused by voltage surges through insulation break-downs may, of course, be quite serious. A second cause of flashing and which often results in serious damage to the motor is the practice of throwing the reverse handle of a four-motor equipment, that is "bucking the motors." With the motor connections established under these conditions it is possible for the motors to pick up as generators under practically short-circuit conditions. The rush of current is so great and the building up of the flux so rapid that the induced voltages are very high, and together with the effect of field distortion nearly always cause a severe flash-over if the motor is running at fairly high speed. The practice of throwing the reverse handle while running should not be tolerated except possibly in order to avoid accidents and damage more serious than the burn-out or break-down of a motor.

Electric Railway Earnings

Analysis by Mr. Doolittle Shows Relative Stability of Earnings from Electric Railway Operation

Continuing the studies of electric railway earnings which were published in the ELECTRIC RAILWAY JOURNAL of Jan. 23, page 183, and of March 13, page 506, F. W. Doolittle, director of the bureau of fare research of the American Electric Railway Association, has compiled the accompanying table to show the results of economic disturbances during 1913 and 1914 upon the several industries mentioned. Eight of the first nine items included therein are derived from electric railway figures.

TABLE SHOWING COMPARATIVE RESULTS OBTAINED IN SEVERAL INDUSTRIES DURING 1913 AND 1914

		1914 in per cent of 1913
1.	Electric railways—net earnings—South	104.41
2.	Electric railways—gross earnings—South	104.19
3.	Electric railways—gross earnings—United States (263 companies)	100.68
4.	Electric railways—gross earnings—East	100.58
5.	Electric railways—net earnings—East	99.74
6.	Electric railways—gross earnings—West	99.69
7.	Agriculture—farm crop value—United States	99.60
8.	Electric railways—net earnings—United States (263 companies)	99.57
9.	Bank clearings—amount—West	97.41
10.	Electric railways—net earnings—West	96.79
11.	Steam railroads—net earnings—West	94.52
12.	Steam railroads—gross earnings—West	94.50
13.	Steam railroads—gross earnings—South	93.72
14.	Building permits—value—West	93.58
15.	Steam railroads—gross earnings—United States	93.46
16.	Bank clearings—amount—South	93.29
17.	Steam railroads—gross earnings—East	92.31
18.	Building permits—value—United States	91.86
19.	Building permits—value—East	91.66
20.	Steam railroads—net earnings—United States	91.61
21.	Bank clearings—amount—United States	90.64
22.	Bank clearings—amount—East	89.89
23.	Steam railroads—net earnings—East	89.82
24.	Steam railroads—net earnings—South	86.17
25.	Building permits—value—South	85.76
26.	Steel production—tons	75.50
27.	Iron production—tons	74.20
28.	Cotton crop—value	63.00

The exhibited data argue, of course, not the relative profitableness of the traction industry but its relative stability. No business operating from year to year under constantly increasing costs and furnishing continually more and better service for a fare which is vastly less when measured in terms of the material and labor it goes to purchase than it was twenty years ago, is likely to be very profitable. The fact that it requires the investment of $5 to $7 to produce $1 of gross revenue annually is a further indication that large profits cannot be expected generally. The electric railways of the United States carry ten passengers for every one carried by steam railroads. In cities of 8000 population and over, the average individual rides more than 250 times each year. This use is an integral part of the lives and habits of many millions of people, and it is not strange to find it maintained during periods when other habits are changed. Electric railways are an economic necessity and the service they furnish cannot be accumulated or postponed. The further growth of a city is dependent upon the growth of its transportation facilities. The money for these facilities must be obtained in competition with other industries, and it can be obtained only by the willingness to pay a fair return. The essential stability of the volume of traffic operates, when rates are reasonable, to fix this rate of return below that which must be offered to investors in businesses more speculative in their nature, but unless stability of earnings accompanies stability of traffic, the community loses this advantage which its own habits can create.

West Virginia Association Organized

The Public Service Utilities Association of West Virginia, which includes in its membership electric railways, electric light and power and water works companies, held its first meeting in Charleston on June 15 and 16 and effected permanent organization by the adoption of a constitution and by-laws and the election of permanent officers, as follows: President, Herbert Markle, general manager Appalachian Power Company, Bluefield, W. Va.; first vice-president, G. O. Nagle, general manager Wheeling Traction Company; second vice-president, Mentor Hetzer, general manager Moundsville Water Company; third vice-president, James Imboden, general manager West Virginia Light & Traction Company, Charleston, W. Va.; secretary and treasurer, W. C. Davisson, vice-president West Virginia Water & Electric Company, Charleston, W. Va.; executive committee, W. C. Mathews, president Virginia-Western Power Company, Clifton Forge, Va.; Herbert Markle, G. O. Nagle, Mentor Hetzer, O. B. Welch, vice-president and general manager Williamson Light & Power Company, Williamson, W. Va.; W. L. Foster, general manager Beckley Electric Light & Power Company, Beckley, W. Va.; H. S. Newton, general manager Ohio Valley Electric Company, Huntington, W. Va.; E. W. Alexander, general manager Charleston-Dunbar Traction Company, Charleston, W. Va.; W. A. Maxwell, general manager Logan Heat, Light & Power Company, Logan, W. Va.

The object of the association is to promote the interests of public utility companies in the State along educational and political lines.

Lectures to Employees

Periodical lectures to employees on proper relations with the public have been found to be very helpful in reducing complaints to a minimum on the lines of the Twin City Rapid Transit Company, Minneapolis, Minn. A. W. Warnock, general passenger agent and manager of the publicity department, visits each of the company's six carhouses every three weeks and delivers a fifteen minutes' talk to the extra trainmen and as many of the old employees as can attend. Usually the subject discussed relates to public complaints received during the period between the lectures. The cause of the complaint, its disposition and methods of preventing similar complaints in the future are discussed. Complaints afford a new subject for each lecture, and often being of a personal nature, are more interesting than would be a general discussion.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 to 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
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H. G. McConnaughy, Director of Transportation for the Convention, Announces the Appointment of Trainmasters for Different Sections of the Country—Program and List of Speakers for Convention Being Compiled—Activity of Various Association Committees

TRANSPORTATION ARRANGEMENTS FOR THE CONVENTION

H. G. McConnaughy, director of transportation for the convention, has announced the appointment of J. C. McQuiston, manager Westinghouse department of publicity, East Pittsburgh, Pa., as trainmaster of the Blue Special train; Frank H. Gale, advertising manager General Electric Company, Schenectady, N. Y., as trainmaster of the Red Special train, and L. E. Gould, Western manager ELECTRIC RAILWAY JOURNAL, Chicago, as trainmaster of the White Special train. The Red Special train will leave New York about Sept. 23 by way of the New York Central & Hudson River Railroad, thence to Chicago, and thence to St. Paul and Minneapolis over the Great Northern to Glacier Park, Spokane, Seattle, Portland and San Francisco. The Blue Special train will leave a day or two later over the Pennsylvania Railroad by way of Pittsburgh, Indianapolis, St. Louis, Kansas City and Denver, then through the Royal Gorge to Salt Lake City, Ogden and Lake Tahoe to San Francisco.

After the convention the Blue Special will follow the Red Special, visiting the Yosemite Park, Los Angeles, San Diego and Grand Canyon, then via Kansas City and St. Louis to New York. The White Special will be an especially fast train which will make the run for the convenience of those who cannot participate in the earlier tours. It will be a going trip only and will start from Chicago.

Western members who desire to make reservation on the White Special should do so through L. E. Gould, ELECTRIC RAILWAY JOURNAL, 1570 Old Colony Building, Chicago. Reservations for either of the other trains or reservations from Eastern members who wish to take the White Special from Chicago, and requests for information connected with the tours should be made through H. G. McConnaughy, director of transportation, Room 1002, 165 Broadway, New York City, except that members in New England can make reservations through H. E. Reynolds, chairman transportation committee for the New England territory, Bay State Street Railway, Boston, Mass.

The printed itineraries covering all special trains are now on the press and will be ready for mailing within the next week. The delay in getting these out has been caused by changes suggested by the Railway Association and the necessity of rearranging some of the details in connection with the tours. Every detail covering all tours has been carefully worked out, and arrangements at all points covering hotels, side trips as planned and shown in the itineraries have been completed. The ladies and children accompanying each party will have special care and attention. A maid, who will be at their service at all times, will accompany each train.

The requests received by the transportation committee for the different tours have been so heavy that it will be absolutely necessary for the members to make their reservations as soon after the receipt of itineraries as possible, as the number of people who can be accommodated on each special train is limited. Consequently, all assignments will be made in the order in which requests are received.

SPEAKERS AT THE SAN FRANCISCO CONVENTION

The office of the secretary of the American Electric Railway Association is busily engaged in completing the program for the convention in October. A feature will be addresses by a number of distinguished men. These will be in addition to the regular program of reports and papers upon matters of technical interest to the industry. The list of addresses is not completed yet, but a sufficient number of definite promises have been secured to mark the convention this year as an important one in the annals of the association. Several of these special features were announced by Secretary Burritt this week.

The address of welcome will be given by Hiram W. Johnson, Governor of California.

Ex-senator Jonathan Bourne, Jr., will speak on government ownership, a subject which his years of experience in the business of government at Washington peculiarly qualify him to discuss. While United States Senator from Oregon, Mr. Bourne, besides being the author of the parcel post law, was one of the most efficient forces in the national movement for the construction of good roads, and in other matters of countrywide importance. He is one of the most brilliant and forceful writers and speakers in America.

Another address of great interest at the present time will be on "The Fundamental Principles of the Valuation of Electric Railways" by Bion J. Arnold. Besides the office of chief engineer and chairman of the Board of Supervising Engineers, Chicago Traction, which Mr. Arnold has occupied since its establishment under the ordinance of 1907, Mr. Arnold has been consulting engineer of the Public Service Commission, New York City, on matters connected with subway and street railway properties; consulting engineer Detroit United Railway, consulting engineer for the cities of Pittsburgh, Providence, Los Angeles, San Francisco, Toronto, Cincinnati and Kansas City, Mo., member of the electric traction commission of the New York Central Railroad and president of the A. I. E. E. and has held other important offices.

Jesse W. Lillienthal, president of the United Railroads of San Francisco, will speak on "Welfare Work," a subject to which he has given a great deal of attention both before and since his election in 1913 as chief executive officer of the electric railway system in San Francisco. For fifteen years prior to his going to California he was one of New York City's most distinguished lawyers, and has occupied a place no less eminent at the San Francisco bar, of whose association he is the senior vice-president. He is also a director in many of the corporations that have played an important part in the industrial upbuilding of the Pacific Coast.

A fourth address will be given by Ivy L. Lee, recently executive assistant Pennsylvania Railroad and now a member of the personal staff of John D. Rockefeller. A number of Mr. Lee's addresses on different phases of the subject have appeared in previous issues of this paper, and he was the author of an article on "Principles Underlying Publicity" in the issue of Oct. 10, 1914. He will speak in San Francisco on "Putting Publicity Theories into Practice."

TRANSPORTATION STANDARDS

The new committee on standards of the American Electric Railway Transportation & Traffic Association met on July 14-15 and organized. There were present L. H. Palmer, chairman, C. V. Wood, Alexander Jackson and J. N. Shannahan. The committee formulated rules of procedure for the adoption of standards by the Transportation & Traffic Association, this being intended for submission before the 1915 convention. The form of procedure follows very closely, in so far as it is applicable, that of the Engineering Association. Provision is made in it only for two grades, (1) standards, and (2) recommended methods and practices, the former to include such recommendations of the association as bear its formal approval as standard. The latter grade will include all other definitely approved recommendations. The committee also drew up a syllabus covering the existing standards of the association, and it is expected that this will be issued in the early part of next year.

STANDARD STYLE FOR SPECIFICATIONS

A subcommittee of the committee on standards of the American Electric Railway Engineering Association, consisting of A. S. Richey, chairman, J. H. Hanna and S. H. Spalding, representing E. R. Hill, met last week and drafted tentative regulations to govern the style of specifications adopted by the association. These proposed regulations are intended for submission to the committee on standards at its meeting during the latter part of the month, and if approved at that time they will be presented before the association at the 1915 convention.

COMMITTEE ON BUILDINGS AND STRUCTURES MEETS

A meeting of the Engineering Association committee on buildings and structures was held in New York on July 7 with the following in attendance: C. S. Bedwell, Newark, N. J., chairman; H. G. Salisbury, Toronto, Ont.; R. C. Bird, New York, N. Y.; J. H. Frank, Philadelphia, Pa.; William Roberts, Akron, Ohio, and H. G. Throop, Syracuse, N. Y. A proposed form of contract for general construction work was revised and approved by the committee and will go to the committee on standards for approval as recommended practice. The general specification stands practically as it was except that the agreement portion has been greatly shortened and specific clauses have been added to cover the owner in matters relating to protection against mechanics' liens and actions for damages under the workmen's compensation law.

The sub-committee on the proper provision for expansion and contraction in concrete structures, together with provision for waterproofing joints, presented an illustrated report giving engineering data on the subject and suggested provisions as covered by the assignment. The report was approved for presentation to the association for discussion, with the expectation that the work would be continued.

The sub-committee on fire protection rules reported itself as being in accord with the National Board of Fire Underwriters in regard to the rules on the use of soldering and other heating equipment. The committee presented extracts from the Underwriters' building code as they apply to construction employed in electric railway buildings, with the idea of bringing out discussion on the recommendations.

A new sub-committee on the construction and design of substations submitted a report which the general committee recommended for presentation to the association along with the rules for standard construction prepared by the Board of Fire Underwriters. The committee will submit a plan showing an ideal substation of specified size and also rules and recommendations for details of fireproof construction.

BUREAU OF STANDARDS FOR INTERURBAN RAILWAYS

Ways and means by which a new bureau of standards may be established among interurban railways which are members of the American Electric Railway Association was the purpose of a conference held at Fort Wayne, Ind., the session being attended by James J. Brennan, Fort Wayne & Northern Indiana Traction Company; A. A. Schlessinger, Terre Haute, Indianapolis & Eastern Traction Company; J. A. Kelsey, Union Traction Company of Indiana; M. J. Kehoe, Ohio Electric Railway, and E. J. Burdick, Detroit United Railway. These men were representatives of the Central Electric Railway Association and they form a committee to confer with a committee from the American Electric Railway Association to ask the latter body to adopt a standard of operating interurban trains on the lines of the members of the C. E. R. A. which will be uniform.

Meeting of Canadian Electric Railway Association

The annual meeting of the Canadian Electric Railway Association was held at the Chateau Frontenac in Quebec on June 21 and 22. After the opening address by President C. B. King, manager London Street Railway, Secretary-Treasurer Acton Burrows, managing director *Canadian Railway and Marine World*, gave a detailed report covering the association's activities during the year and a wide variety of other topics. W. F. Graves, chief engineer Montreal Tramways and chairman of the special committee on the proposed standardization of steel rails for electric railways, presented a report which was referred to the new executive committee.

Copyrighted papers, to be distributed only to officials of member companies, were read as follows: "Development of Tourist Traffic on Observation Cars," by R. M. Reade, superintendent city division Quebec Railway, Light, Heat & Power Company; "A Proper Accident Department," by C. L. Wilson, assistant manager Toronto & York Radial Railway; "Jitney Competition," by E. P. Coleman, general manager Dominion Power & Transmission Company; "Coasting," by A. Gaboury, superintendent Montreal Tramways; "Economy in the Electric Railway Repair Shop," by E. A. W. Turbett, mechanical superintendent Quebec Railway, Light, Heat & Power Company, and "Methods to Minimize Fire Risks and Secure Reduction of Premiums," by J. H. Ryan, New York.

Officers for the ensuing year were elected as follows: President, James D. Fraser, director and secretary-treasurer Ottawa Electric Railway; vice-president, E. P. Coleman, general manager Dominion Power & Transmission Company; honorary secretary-treasurer, Acton Burrows. The new executive committee includes: A. Eastman, vice-president and general manager Windsor, Essex & Lake Shore Rapid Railway; A. Gaboury, superintendent Montreal Tramways; H. G. Matthews, general manager Quebec Railway, Light, Heat & Power Company; M. N. Todd, president Galt, Preston & Hespeler Street Railway; C. L. Wilson, assistant manager Toronto & York Radial Railway.

COMMUNICATION

Motor Ventilation

KANSAS CITY, MO., July 10, 1915.

To the Editors:

There have been several interesting and instructive articles on the advantages and limitations of ventilated motors published in the ELECTRIC RAILWAY JOURNAL within the past few months. Before the appearance of these articles the receivers of the Metropolitan Street Railway Company of Kansas City had contracted for fifty four-motor equipments of the ventilated type for cars which have since been delivered, and it has been suggested to the writer that perhaps the street railway operators generally may be interested in knowing what considerations affected the choice of these motors.

It is recognized that the service conditions under which motors are expected to perform have an important bearing upon the design selected, and as the conditions under which motors operate in the two Kansas Cities are very severe there are hereinafter given the service requirements under which the new motors are expected to perform, as well as the circumstances which guided the Board of Control of the Kansas City properties in deciding upon the selection of the ventilated type of motor for service under these conditions.

The specifications under which the motors were purchased set out the service conditions under which the equipment would be required to operate as follows:

Weight of empty motor car completely equipped without motors and gears and gear cases	32,500 lb.
Average load of passengers and crew	4,500 lb.
Maximum load of passengers and crew	18,000 lb.
Typical run	Troost Avenue
Length of round trip	10.6 miles
Morning rush-hour running time (excluding two-minute layover time)	66 minutes
Mid-day running time (excluding two-minute layover time),	63 minutes
Evening rush-hour running time (excluding two-minute layover time)	68 minutes
Average trolley voltage	525 volts
Average stops per round trip	77
Average length of stop	9 seconds
Diameter of wheel	30 in.
Maximum grade	9½ per cent
Other excessive grades	800 ft. of 8 per cent grade 4300 ft. of 3½ per cent grade 3100 ft. of 5 per cent grade
Average rate of acceleration and braking	1.75 m.p.h.p.s.

In addition, the manufacturer was required to guarantee that after continuous running, including both the morning and evening rush, carrying during the total time the average loads above indicated and also including two successive round trips during evening rush with loads of 80 per cent of the maximum indicated over the entire out-bound trip only, no part of the motors would show a temperature rise exceeding 70 deg. C. above the temperature of the surrounding air, excepting the commutator, which might show an 80 deg. rise.

As a result both of the bids received and of detailed investigation into the whole subject, as applying to local conditions, the following conclusions were drawn:

1. There is a very perceptible decrease in weight by use of the ventilated type of motor.
2. That the service or continuous capacity of the ventilated motor was from 40 per cent to 50 per cent above that of the non-ventilated motor, having the same one-hour rating, assuming that the proper balance of design exists in each.
3. That on a basis of the same continuous capacity, the cost of the total equipment of the ventilated motor type was from 20 per cent to 25 per cent less than that of the non-ventilated type of motor.
4. That the temperature was maintained more uniform throughout the motor in the ventilated type.
5. Owing to the elimination of hot spots, the maintenance of the ventilated type should be materially less.

As to the objections, the fact that water might enter the ventilated type of motor and put it out of commission was raised as a serious objection, in that we have many stretches of track located in low spots, subways, etc., subject to overflow, and were this objection well taken we would not have been able to use the ventilated type. However, it has been our experience that the non-ventilated type of motor being also provided with drain holes in the bottom of the frame cannot be operated through water with the current on. In other words, so far as the damage from water is concerned it is virtually on the same plane as the ventilated type of motor. The second objection was that of the possibility of dust accumulating in the air passages, preventing the dissipation of heat and causing ultimate breakdown. This condition was found to be more inherent to the duct type of armature, and difficulty was not expected from this source, as the motor was so designed as practically to eliminate dust pockets. Good maintenance demands that motors of all types should be regularly blown out and cleaned, and we expect to remove all possible difficulty by giving the motors the care they should receive when on the pits. It was also stated that snow would cause trouble, but we believe the design of the motor is such as to make it exceedingly difficult for even a slight amount of snow to enter, or only so little as would cause no trouble.

Therefore, so far as the bids received were concerned and in view of the guarantees given, it was our experience that we could get a lighter motor of greater service capacity with less maintenance cost at a 20 per cent to 25 per cent decrease in price. There could hardly be a question as to the choice made under these circumstances. PHILIP J. KEALY.

Specifications for Track Material

At the recent convention of the American Society for Testing Materials specifications were presented to cover heat-treated high-carbon-steel splice bars. These conform quite closely to the recommended specifications for untreated hard-steel splice bars of the American Electric Railway Engineering Association, except, of course, as regards the heat treatment. The practical points of difference in the two specifications are that the A. S. T. M. provide for a check analysis from finished bars by the purchaser if desired, with an increase in the phosphorous content of 25 per cent over the ladle analysis; that the bend-test arcs are 50 per cent greater in the A. S. T. M. specifications, and that a variation in size of hole of only 1/32 in. is allowed by the A. S. T. M. Provision is made for the retreatment of bars that failed in tests, one or more heat treatments being allowed.

At the same convention specifications were presented for heat-treated steel track bolts, and a revision was submitted for the existing standard specification of the A. S. T. M. for yellow-pine bridge and trestle timbers, this applying to solid members and not to composite members.

The Boston Elevated Railway has converted a small open car into a traveling display of scenes in parks on or near the local system and will operate the equipment over many routes during the coming months. On each side of the car are mounted three oil paintings illustrating scenes at Norumbega, Franklin, Marine and Lexington Parks, with large maps showing the location of these breathing spaces as well as the Blue Hills and Middlesex Fells. The canvases call attention to the natural and artificial attractions at these outing places. In place of the usual destination signs the car carries the designation "Trolley Outings."

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Experimental Open-Car Reconstruction in Atlantic City

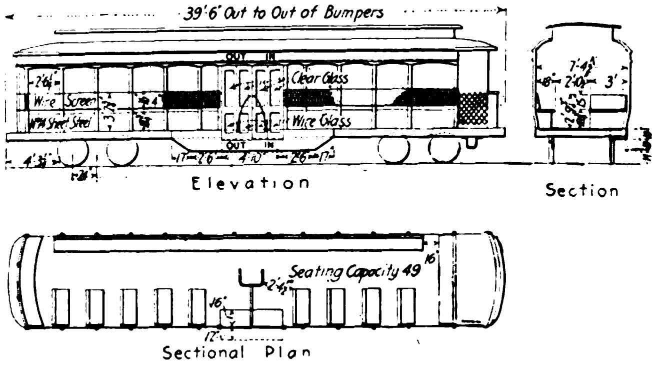
BY GEORGE F. FABER, GENERAL SUPERINTENDENT ATLANTIC CITY & SHORE RAILROAD

Two old-style, open, running-board cars were remodeled by this company for this season's traffic into center-entrance cars as shown in the accompanying illustrations. The open-car feature was retained as an absolute necessity in a seashore resort like Atlantic City, where the principal attraction to visitors, as far as car riding is concerned, is a ride down the coast in some kind of an open car. By the adoption of the plan described below it would seem possible to get every advantage of the pay-as-you-enter method of car collection and additional protection from accident hazard without sacrificing any of the advantages of the old type of car excepting seating capacity.

While it is not claimed that this construction is an entirely novel one, there are some features different from those previously described in the columns of the ELECTRIC RAILWAY JOURNAL.

The remodeled cars were twelve-bench cars, 39 ft. 6 in. over bumpers in length, 7 ft. 10½ in. over side-posts in width, the floor level being 2 ft. 10 in. above the rails. They were equipped with double trucks, 25 ft. 6-in. on centers with 30-in. wheels. The trucks were of the Brill 27G type.

In remodeling, one side sill was dropped at the center to provide three step heights, 10 in., 10 in. and 14 in. respectively. A drop girder was added to stiffen the sill. On one car we put a Prepayment Car Sales Company door with step-controlling mechanism, and on the other a J. G. Brill Company equipment. On each car a conductor's stand was located as shown in the drawing. In arranging for the seating, as shown, the rear bulkhead was removed and only the seat behind the front bulkhead was retained. The two plans used in inclosing the sides for a height slightly more than 3 ft. above the floors are shown in the accompanying half-tones. In one a sheet-steel sheathing was applied for half this distance and a substantial screen for the remainder. In the other the screen was used alone. The former plan gives a more finished appearance to the car, while the latter allows a somewhat better circulation of air.

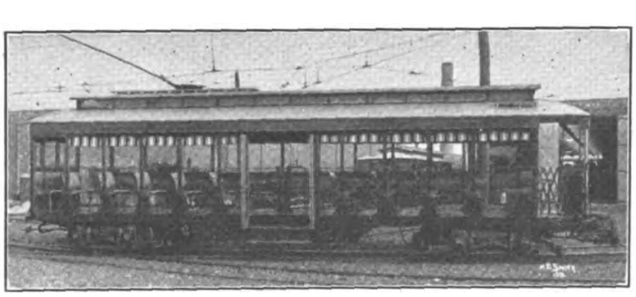


RECONSTRUCTED OPEN CARS—DETAILS OF ENTRANCE, SEATING, ETC.

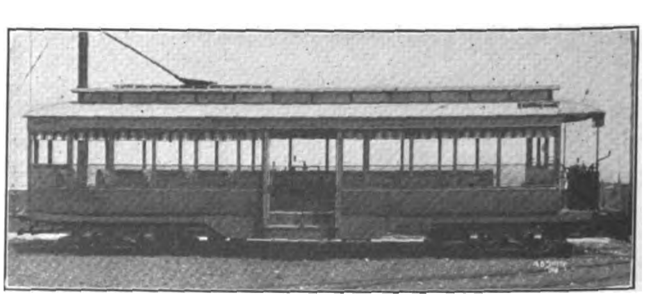
A specially-arranged spring seat is provided for the motorman which is removable when not in use. The register is operated by the conductor by means of a foot-lever-control mechanism running under the car floor. A Consolidated Car Heating Company buzzer system permits the passengers to signal to the conductor, who in turn signals to the motorman by means of a bell operated from a push-button arranged handily on the operating stand.

Conditions in Atlantic City are such that a larger car than that now in use could be operated to advantage, conditions being favorable to trailer operation, although the company does not favor such operation at present. While it is true that a larger seating capacity is desirable, it must be remembered that the Atlantic City season is short and the traffic very variable, so that a smaller type of car used in numbers to suit the traffic can always be operated to advantage. After all, a good, safe, service car with as many of the features of the open-bench car as can be obtained is what is most needed.

The Atlantic City & Shore Railroad has a large number of near-side cars in which the "in-and-out" plan is used, while on the experimental cars the "all out" and "all in" plan is used. The result is that there is a little confusion this summer on the part of passengers. This confusion was unavoidable, however, in the carrying on of the present experiment. The center-entrance plan was devised partly to avoid confusion and extra walking on the part of the passengers which would have resulted had the rear-entrance and front-exit plan been adopted. This would have been prefer-



RECONSTRUCTED OPEN CARS—REMODELED CAR WITH SCREENS ONLY



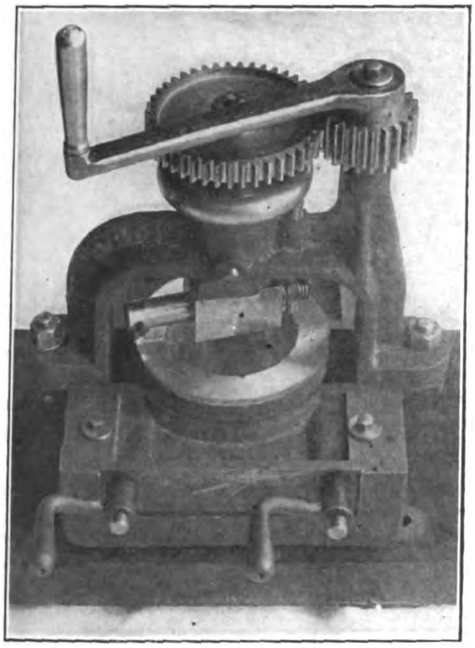
RECONSTRUCTED OPEN CARS—REMODELED CAR WITH STEEL SHEATHING able in many ways but it would not have worked in well with the use of near-side cars.

From the experience with the reconstruction of the two samples the cost records show that if the cars can be put through the shops in lots of ten the cost of remodeling each car will not be more than $550. These cars will be run during the present season experimentally before plans for remodeling additional ones are worked out.

Motor-Bearing Trimmer

BY E. L. STEPHENS, MASTER MECHANIC, LOS ANGELES (CAL.) RAILWAY

Having adopted a standard babbitt-lined motor bearing, special forms have been made by the Los Angeles Railway for use in rebabbitting them. All bearings are trimmed and oil-grooved before they leave the shops for the different divisions. However, owing to our company having a gage of only 3 ft. 6 in., we have no room for an axle collar. Hence it is necessary to face all wheels hubs for a motor brass collar bearing. As there is a slight variation of the distance between the motor and wheel hub, the motor brass collar cannot be completed for service at the shops. This slight variation is overcome by using a home-made motor-bearing trimmer, with which every division is furnished. This shop kink consists of a self-centering clamp attachment which holds the bearing firmly, and attached thereto is a rotary automatic self-feeding cutter which is operated by hand, to trim the collar to any desired length. This little machine eliminates all lathe work, and as it is automatic it can be operated by any employee. Its operation is such that the trimming of a pair of bearings can be completed on this trimmer in less time than it would take to center the bearings on a lathe.



MOTOR BEARING TRIMMER USED AT LOS ANGELES

Record time was made by the Chattanooga Railway & Light Company, Chattanooga, Tenn., in replacing the old cables on the Lookout Mountain incline. Heretofore several days have been required to complete the installation of the new cable. This year the exchange was made in two days. The cables have to be renewed about every two years.

Railway Motor Gearing

BY W. L. ALLEN, COMMERCIAL ENGINEER R. D. NUTTALL COMPANY, PITTSBURGH, PA.

As a result of the presentation of a paper by the writer on "Railway Motor Gearing" at the recent meeting of the Central Electric Railway Association, abstracted at length in the issue of the ELECTRIC RAILWAY JOURNAL for June 26, page 1201, a number of questions have been asked. In the belief that the answers to these questions may be of interest to railway men other than those who propounded the questions, these answers are given with the questions in the following paragraphs:

Question No. 1.—How will the railways which purchase gearing to specifications know whether the material so purchased meets the specifications?

Answer.—The railways with inspection and testing departments can arrange to have all material on order tested and inspected before shipment. In that case the manufacturer must provide the proper facilities for such testing and allow the inspectors free access to his plant at all times during the course of manufacture of the material. Properties not having such testing departments can have this work done for them by commercial testing laboratories, or can secure from the manufacturers test reports covering any materials shipped on their orders. If the number of pieces on order is sufficient to warrant a physical test, the report should show the physical properties of the piece selected to represent the lot, while the surface hardness of each piece can be identified by a serial number plainly stamped on each gear and pinion appearing in the report. For example, a typical test report might be as follows:

Customer's order No............

Date............

Invoice No............

	SERIAL NUMBER	SURFACE HARDNESS
	518-363	555 Brinell
	518-364	532 Brinell
	518-365	555 Brinell
Test Taken	*518-366	512 Brinell

If a physical test is made, the serial number of the gear or pinion from which the test piece was machined and the physical properties should be shown as follows:

Test Taken * Serial Number 518-366 Surface Hardness 512 Brinell

Ultimate tensile strength	125,425 lb. per sq. in.
Yield point	85,500 lb. per sq. in.
Elongation in 2 in	16.4 per cent
Reduction of area	41.9 per cent

Question No. 2.—Will the purchase of gearing to specifications increase the cost of this gearing?

Answer.—Each variation in the chemical composition of the steel used in the manufacture of gearing, or in the temperatures and duration of heating and cooling during heat treatment, or in fact any variation in the process, tends to produce non-uniformity in the resultant material. To insure against such non-uniformity the progressive, conscientious manufacturer has found that it is necessary constantly to test his product in practically the way described in the C. E. R. A. paper. The sale to specifications, therefore, should only require the additional work made necessary by the reporting of this test information to the railway and should not increase the purchase price of such gearing. It will, however, have a tendency to increase the cost of production of the unscientifically manufactured material, which increase will be more than compensated for in the increase of the life and efficiency of this class of material.

Question No. 3.—Will the purchase to specifications relieve the gearing manufacturer of his responsibility for breakage or poor life?

Answer.—The equitable adjustment of claims and complaints, which is of as much value to the purchaser as to the seller, requires first determining the exact cause of failure. The purchase of gearing to trade names, without a comprehensive knowledge of the characteristics of the material on the part of the purchaser, is apt to produce an unsatisfactory situation in the event of failure, due to the natural tendency of both parties involved to feel that the failure lies within the other's sphere. On the other hand, when supplies are purchased to specification the determining of the cause of failure is greatly simplified by following a natural course of inquiry. If, for instance, the unsatisfactory material failed to meet the specifications, placing the responsibility is not difficult. If it meets the specifications, the failure may be due cither to defective installation, operation or maintenance, or to a wrong application of the particular grade of material in the specific service. By a process of elimination an investigation may show that the failed material was only an isolated case due to some error as in the above list, or it may show that some inherent weakness exists in operation or maintenance methods which can be entirely corrected. If there should be an epidemic of such failures in a specific service and caused by operating conditions not possible of change, such an investigation may develop the fact that a grade of gearing of greater strength, toughness or surface hardness must be used.

Now, while an elaborate investigation is impracticable in each instance, the intelligent consideration of the above outlined phases of gearing operation and maintenance conducted by the manufacturer, together with the operator, cannot fail to educate the manufacturer as to the service to which his material must be subjected, as well as permit the operator to learn the requirements of gearing for his service. This mutual education will undoubtedly greatly minimize failures and increase possible economy through wise selection, as well as provide the necessary data for satisfactory adjustment. It would seem, therefore, that rather than relieve the manufacturer of his responsibility, purchase to specifications increases this responsibility and in reality leads to his rendering a service to the railway of unlimited value in the selection of that grade of gearing best suited to the specific service in question.

One-Man Cars at San Francisco

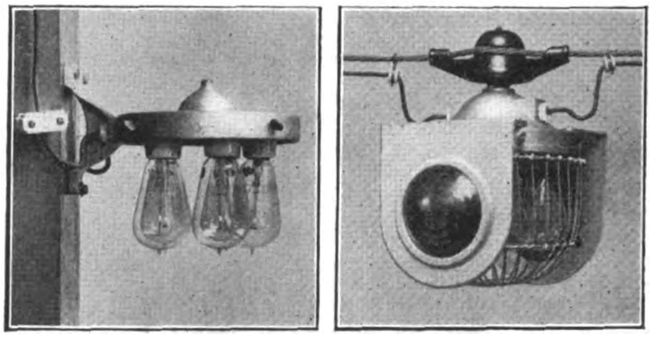
The United Railroads of San Francisco now has in operation three double-truck and six single-truck cars in one-man service. All are used on outlying lines where the receipts average less than $1 per car-hour. New cars were not bought for this service, old rolling stock being rebuilt for the purpose. The principal changes made in the double-truck cars were the locking of the rear platform, the installation of folding steps and air-operated mechanism for opening and closing the sliding doors. The same changes were made on the single-truck cars except that hand-operated mechanism was installed for the doors. The double-truck cars are fitted with Johnson fare boxes, while the single-truck cars have the customary register mechanism with overhead rod connections. The fenders at each end of the cars are lowered at all times, and double poles and bases also are provided so that the car operator need not leave the car when changing the running direction.

The first one-man cars were installed about two years ago, the service being gradually increased to the number previously mentioned. The company contemplates the conversion of the Pacific Avenue cable line, using seven cars, to one-man operation after the Panama-Pacific Exposition has been closed. Like the other one-man cars they will be rebuilt at the company's shops.

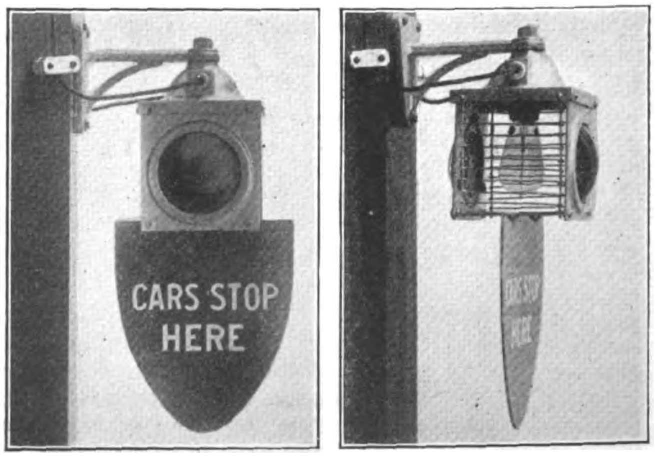
Out-Door Light Clusters

Because of the demand for light clusters that will stand all kinds of weather the G. E. Painter Company, Baltimore, Md., has brought out a number of improved designs of the five-lamp and single-lamp types which can be fitted with enamel signs and signal lenses for crossings, stations and similar locations where light is needed. All of them are made of cast iron of about 3/16-in. thickness, and as they are heavily galvanized they should have long life. The bodies are fitted with porcelain Edison receptacles, held in place by brass screws so that they can easily be replaced in the event of breakage.

The receptacles for the five-light clusters are connected in series to suit the 550-volt railway current, and are so arranged that they cannot become short-circuited or grounded by rain and snow, or damaged by lightning. In case it should be desirable to change the cluster to the three-light or four-light type, so as to use lamps from the series of five for other purposes, it is an easy matter to make the necessary connections without "bridging" the cluster receptacles.


SIDE-SUSPENDED FIVE-LIGHT CLUSTER AND TOP-SUSPENDED TYPE WITH LENSES AND LAMP GUARD

The lens holders or shields for the clusters are also made of galvanized cast iron, these being arranged to suit 4½-in. semaphore lenses, and porcelain enamel signs as shown in the accompanying illustrations, can be attached as desired. The holders or shields are held in position by means of brass screws, and the drilling is such that either one or two lens holders can be used in connection with the clusters. The lens holders are arranged to be placed on one of the three sides of side-supported clusters, and on four sides of the top-suspended type to suit the different conditions, but when two holders are used they must be placed opposite to each other, as the shield extends more than one-fourth around the body of cluster. The top-suspended clusters



SINGLE-LIGHT SIGNAL WITH LENSES AND SIGN may be hung either from a bracket or from a span wire, as most convenient, the side-suspension type being specially designed for attachment to a wall or pole.

Universal Register for Electric Railway Service

Ohmer's "Universal" register is the latest fare-protecting device manufactured by the Ohmer Fare Register Company. It has been built in response to the growing and insistent demand for an indicating and recording fare register which will handle all denominations of cash fares, whether the amounts be in odd pennies or not, and which will also register all tickets, mileage tickets, etc., according to their actual cash value.

010
TICK 1 61
FARE PAID
M1
OHMER FARE REGISTER CO.
DAYTON, OHIO, U.S.A.

VIEW OF UNIVERSAL TYPE OF REGISTER

The use of the register will permit interurban railway companies at any time to change their fare rates quickly and without the necessity of any change in the register mountings or mechanism. The register can also be used interchangeably on any division or can be operated even over the lines of another company without any mechanical readjustment whatever.

Notwithstanding its large capacity, the machine itself is compact in appearance and is simple and positive in operation. Any cash fare or ticket value from 1 cent to $9.99 inclusive can be quickly registered and simultaneously indicated and the amount thus indicated cannot be changed until a fare of a different denomination is registered.

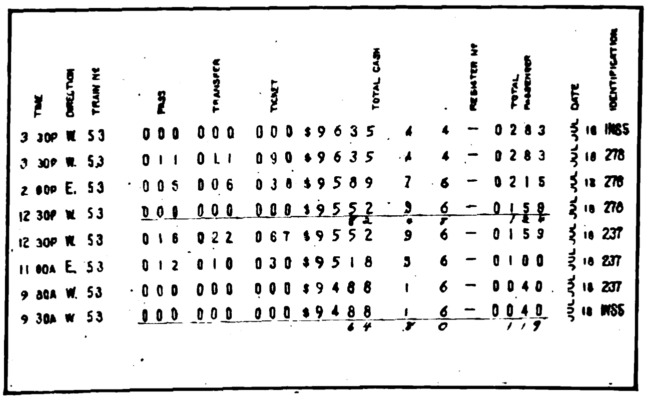
With this register tickets are recorded in two ways—as a ticket in the "ticket" column, and as cash in the "cash" column. These two registrations are made simultaneously and with no more trouble than a single registration, in fact, the operation really is a single registration. The turn-in is checked also in two ways, the number of tickets received being checked against the ticket column and the cash value of the tickets received being checked against the cash column. In this case the tickets are counted in as so much currency and according to their actual cash value. This method of registration and checking is the same in the case of mileage tickets. The strips lifted are registered as tickets and the cash value of each strip is added to the cash column by the register. The balance in the cash column after deducting all ticket values is the actual cash collected by the conductor.

Special attention should be given to the thoroughness and accuracy of the check secured by this method of registration and its effectiveness in preventing substitution of any kind. The register indicates exactly the kind of fare being registered and also its value, and the public indication is very plain and absolutely unmistakeable.

The new design contains a number of improved features not found in the earlier types of Ohmer registers and these make it absolutely foolproof. Among these are the following: At the completion of each conductor's run all printing counters are turned back to zero with the exception of the total passenger and total cash counters. This provides a check between the records of successive conductors, and between the closing figures of one day and the opening figures of the next. The register cannot be operated unless the detail counters are previously turned to zero. The conductor then takes an imprint with his identification key in the register. His identification key is locked in the machine with the registration of the first fare, and it cannot be removed until he has taken a final imprint to close his day's report. Neither can the conductor operate the register after he has turned the total passenger indicator to zero unless he takes an imprint of the fares registered up to that time.

A record sheet from the new register is shown in the accompanying illustration. From this will be seen the large amount of useful data contained in the small space. The time, the direction, the train or trip number, the date, and the conductor's and inspector's identification key numbers are regular Ohmer features and are self-explanatory.

The register from which this record is taken is mounted to record pass, transfer, ticket and cash. Reading from left to right the last print made by conductor 237 at 12.30 p. m. (the fourth line from the bottom) it appears that he registered sixteen passes, twenty-two transfers and sixty-seven tickets and cash or cash values amounting to $64.80, the latter being found by deducting the first from the last print in the total cash column. The deduction in the total passenger column shows that there were carried a total of 119 passengers. By deducting the total number of paper collections from the total passengers the number of cash-paying passengers is ascertained, which in this case is 14. In general the register has been built for practical utility and to produce a condensed report, rather than for elaborate headings and unnecessary data which would necessitate more complicated and a less easily operated machine.



TIME	DIRECTION	TRAIN No	PASS	TRANSFER	TICKET	TOTAL CASH			REGISTER No	TOTAL PASSENGER	DATE	IDENTIFICATION
3 30P	W	53	000	000	000	$9635	4	4	—	0283	JUL 18	WSS
3 30P	W.	53	011	011	090	$9635	4	4	—	0283	JUL 18	278
2 00P	E.	53	005	006	038	$9589	7	6	—	0215	JUL 18	278
12 30P	W	53	000	000	000	$9552	9	6	—	0158	JUL 18	278
12 30P	W	53	016	022	067	$9552	9	6	—	0159	JUL 18	237
11 00A	E.	53	012	010	030	$9518	3	6	—	0100	JUL 18	237
9 30A	W.	53	000	000	000	$9488	1	6	—	0040	JUL 18	237
9 30A	W	53	000	000	000	$9488	1	6	—	0040	JUL 18	WSS
						64	8	0		119		

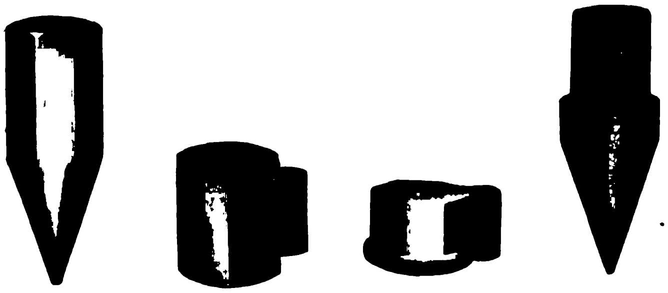
VIEW SHOWING TYPICAL REGISTER RECORD FOR TWO CONDUCTORS

In the operation of the register no ticket can be registered unless a cash value is also registered and indicated, the cash indication appearing adjacent to the word "ticket." For example, if a ticket valued at $1.61 is registered the indicator reads "Ticket $1.61." If the amount collected is actual cash the indicator reads "Cash $1.61" and the register is locked against operation if the indicator is made to read "ticket" or "cash" with no cash amount following. Where "Pass" or "Transfer" are registered and no cash value is assigned the indicator simply shows "Pass" or "Transfer" and the space for the cash indication remains blank. All indications appear in the face of the register and are duplicated in various parts of the car by the auxiliary indicators so that every passenger becomes immediately aware of each transaction. The auxiliary indicators are plain and easily read and follow the full reading of the register. The operating rod is equipped with sets of grips at convenient intervals and the process of selecting the fare to be registered is quickly and easily accomplished.

Ground Fittings for Lightning Arresters

The Electric Service Supplies Company has recently extended its line of Garton-Daniels ground fittings to include material for both ¾ in. and 1 in. pipe, and to take the various standard sizes of wire and cable used for grounding lightning arresters, pole and station apparatus, overhead ground wires, etc.

The brass cap shown in the accompanying illustration is furnished with a lug for soldering to the ground wire from the arrester. Certain types are furnished drilled to accommodate ¼-in. cable for grounding overhead ground wires. The pipe couplings are used for connecting two sections of ground pipe. They are particularly useful where the practice of the operating company calls for the extension of the ground pipe 8 ft. or 10 ft. up the pole, and under these conditions it is readily seen how much more convenient it is to drive first an 8-ft. length into the earth and then couple on the extension, than it would be to drive a 16-ft. length. The brass couplings, as illustrated, are employed in grounding lightning arresters on electric railway systems to accommodate either the wire or the free end of a stub-end terminal bond in tying in the lightning arrester ground to the rail.

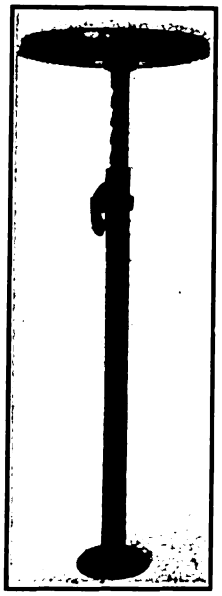

GROUND POINTS, COUPLING AND CAP FOR LIGHTNING ARRESTER CONNECTIONS

The ground pipe points are of malleable iron, heavily galvanized. The external type of ground point is generally to be preferred. It is of slightly greater diameter than the pipe and in driving opens a hole in the earth of a diameter slightly greater than the diameter of the pipe. This decreases the friction on the surface of the pipe as it is being driven, and allows the pipe to be easily driven to the proper depth without danger of bending or splitting. After driving, the earth gradually closes in tightly around the pipe, and in an hour or so a thoroughly efficient and reliable ground is secured.

Internal ground points are designed with a head suitably proportioned to fit snugly inside an iron pipe. Their external diameter is the same as that of the pipe. They may be used only in soft earths because the point, being of the same diameter as the pipe, does not open up the earth for its driving. The friction that is exerted on the outside of the pipe renders driving to the proper depth very difficult because the pipe itself will in many instances bend or open up. Where the soil is soft internal points may be used, but where there is much rock or clay in the soil external points should be used.

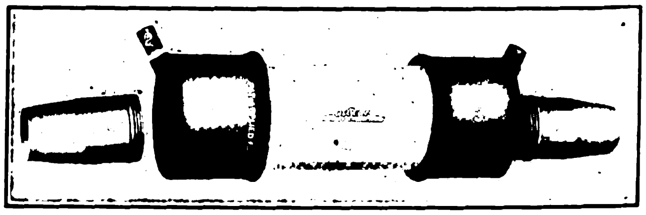
Quick-Acting Adjustable Seat for Motormen

The Railway Specialties Corporation, New York City, has brought out a new quick-acting adjustable seat for motormen which has been designed especially with regard to light weight, so that it can be transferred from one end of the car to the other with a minimum of effort. The adjustable feature of the seat is entirely new, and this permits raising it to any desired height merely by lifting it. The seat mast is notched, and a gravity dog is provided on the sleeve in which the mast slides, the point of the dog holding the mast in position by engagement with the notches on the mast. In order to lower the seat the gravity dog is touched, thus releasing it from the notch in which it is caught and permitting the seat to fall to its lowest position. The seat can thus be adjusted between a height of 24 in. and 31 in. from the floor. A dowel set in the side of the seat mast travels in a slot that is cut in the sleeve and prevents the seat from turning with relation to the sleeve. No other parts are involved in the construction so that its simplicity and ruggedness are obvious, the accompanying illustration showing these features to excellent advantage.


ADJUSTABLE SEAT FOR MOTORMEN

Combination Cable Insulator and Splicing Sleeve

A new type of insulator in combination with a splicing sleeve for underground cables has just been brought out by the Drew Electric & Manufacturing Company of Indianapolis. The device is especially valuable in reducing electrolysis troubles as it serves to destroy the conductivity of the cable sheath by dividing it into short sections insulated from each other. It also eliminates the danger of leakage at the splice and may be used to excellent advantage in manholes at building entries, preventing the cable sheaths from collecting stray currents from the pipes or other cables on the same support. It may be used also to separate cables that are grouped near power-house switchboards.


CABLE INSULATOR PARTLY DISSEMBLED

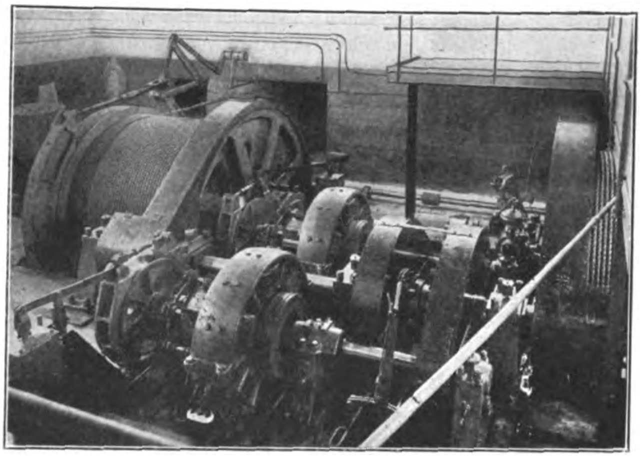
The device consists of a high-grade porcelain tube, 12 in. long, with malleable castings leaded onto the ends. Each of the castings has a ⅜-in. gas-pipe plug hole in it, and on the center line are cast-brass tubes which fit the cable sheath and screw into the malleable castings. To install the device the brass end tubes are unscrewed and slipped over the ends of the cables that are to be spliced. The main body of the insulator is then slipped over one cable end and the splice is made in the usual manner. The insulator is then drawn over the splice, the brass end castings are screwed into place, and wipe joints are made between the ends of the brass castings and the cable sheath. The insulator is then filled with splicing compound through the gas-pipe plug holes and the plugs screwed into place, leaving the splice protected absolutely from mechanical or electrical damage. The weight of the complete device is 17 lb., and it is made to suit any size of cable.

Hamilton Electric Incline Railway

A complete electric hoist equipment has recently been installed by the Hamilton Mountain Park Company, Ltd., Hamilton, Ont., Canada, to operate its incline railway for transporting passengers, freight, automobiles, trolley cars, teams, etc., up the "Mountain," as it is called. This incline gives access to a large tract of land owned by the company at the top of the mountain and also to the fertile country beyond. The "Mountain" is really the Niagara escarpment, as the high bluffs behind Hamilton are prolongations of the heights at Queenstown, over which the Niagara River originally flowed before cutting back the gorge to the present falls, the difference in elevation between the general level of the city and the plateau back of the bluffs being 325 ft. The railway was formerly operated by a steam-hoist equipment, but this had become inadequate to handle safely and quickly the rapidly increasing traffic, and had to be replaced with electric equipment which was furnished throughout by the Canadian General Electric Company, Ltd.

ELECTRIC HOIST

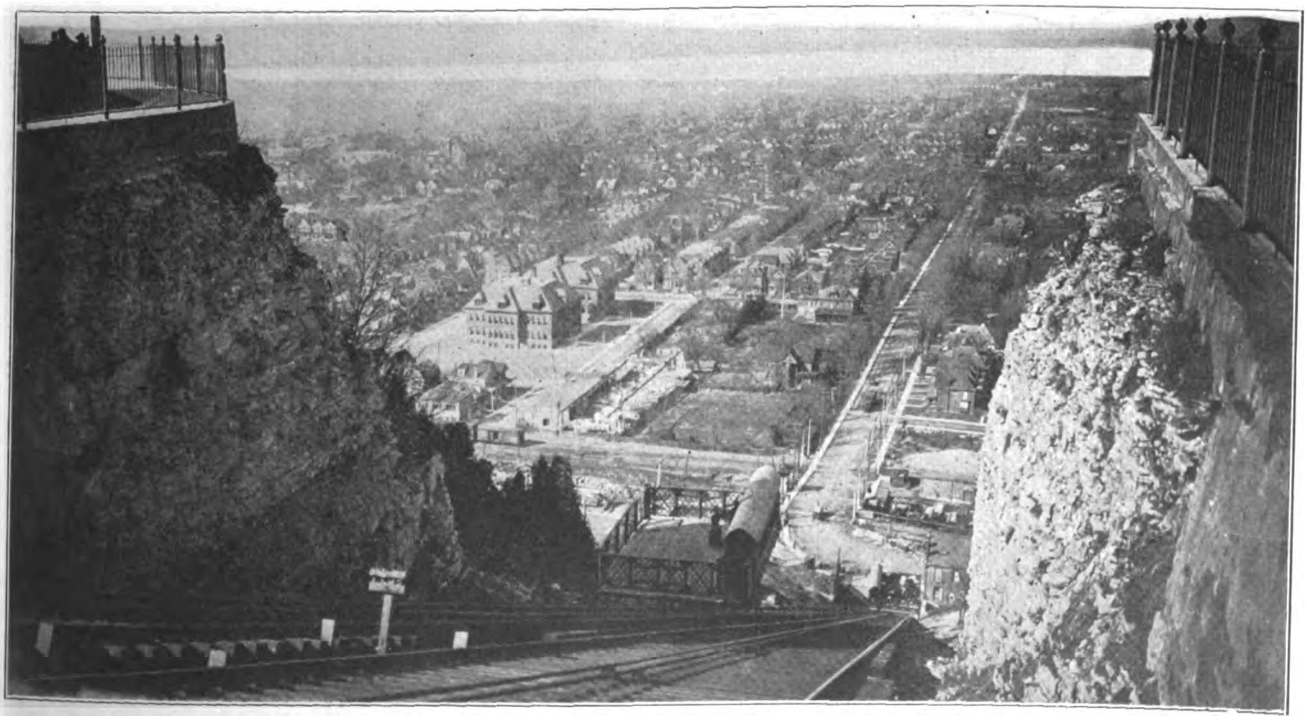
In this arrangement a special double fixed-drum, double-geared electric incline hoist, built by the Lidgerwood Manufacturing Company, New York, operates two large platform cars in balance on an incline 800 ft. long with a grade of 40 per cent. Each car weighs 30,000 lb. and runs on tracks having a gage of 12 ft. 1½ in., the distance center to center of the tracks being 20 ft. 3 in. The average load on the cars is about 20,000 lb., reaching a maximum of 30,000 lb.



HOIST MOTORS, SOLENOID BRAKES AND FLYBALL GOVERNOR

The time required for making a single trip is ninety seconds, and the rest period between trips is three minutes. Attached to each car are two ropes of 1⅝-in. diameter, one of these being used for hauling the car, and the other for the purpose of safety. The average rope speed during the run is 585 ft. per minute.

The hoist is located in a house part way up the slope and the control is placed in an operator's cabin at the level of the summit. The main rope from the right-hand car is wound over the top of the right-hand hoist drum. The main rope from the left-hand car is wound underneath the left-hand hoist drum. The safety rope from the right-hand car is led over suitable deflecting sheaves to the top of the left-hand drum, and that from the left-hand car is wound over suitable deflecting sheaves to the bottom of the right-hand drum. Each of these sheaves is 7 ft. in diameter. There are four head sheaves and four deflecting sheaves. The former are arranged vertically so as to carry the hoist ropes and safety ropes in a direct line from the cars; the deflecting sheaves are placed horizontally at such an angle that the rope will be led in a direct line either to the top or bottom of the hoist drums, as the case may be.



VIEW FROM TOP OF HAMILTON MOUNTAIN PARK ELECTRIC INCLINE

The reason for reeving the safety ropes as outlined is that in case of an accident to the left-hand side of the hoist, the safety rope on the left-hand car would take care of it properly, being wound on the right-hand drum. The same thing would apply if the other drum of the hoist should become disabled; that is, the main ropes and the safety ropes from each car lead to opposite drums. Further advantage is gained by the fact that each drum is equipped with an independent double-acting brake, and in case either of the main ropes should fail, the safety rope will hold the cars. Furthermore, the safety rope, if called upon to take the load, will be controlled by all the automatic brake features in exactly the same manner as when the load is being handled by the main ropes. In actual operation the length of the safety ropes is slightly more than that of the main hoist ropes, thereby relieving the safety ropes of any hoist stresses other than those required to keep the ropes themselves in motion.

OPERATION AND SAFETY APPLIANCES

The operator's cabin is fitted with an electric controller and two hand-brake levers. The levers will not be used ordinarily, as the hoist is equipped with solenoid brakes operating on the motor shaft. The hand brakes, therefore, need be used only for locking the cars at the top and bottom positions or for cases of emergency. In starting a run the operator releases the drum-post brakes by the hand levers, puts his foot on a small foot pedal located at the bottom of the master controller, and then, by moving the handle of the controller either to the right or to the left, as the case may be, will start the cars, automatic acceleration to the normal rope speed being provided. At a predetermined point on the incline the controller will be automatically turned to such a position that the speed will be cut down to one-tenth of the normal and finally be turned to the off position, thus setting the solenoid brakes and bringing the cars to rest. Should the operator become disabled during a run, he will of necessity remove his foot from the foot pedal, thereby cutting off the current and bringing the cars to rest.

In case the cars should stop short of their landing positions, due to the automatic overwinding mechanism, there are available two or three points on the controller so that the operator can bring them to their proper positions. Should the cars fail to stop, due to the fault of the controller, an overwinding device is attached which will shut off the current and set the solenoid brakes. Should the speed of the cars exceed the normal by a predetermined amount, an overspeeding device is so arranged that it will trip a weight of 570 lb., which will set the drum-post brakes. This overspeeding device, or governor, is of the flyball type, and it will be caused to operate by an excessive speed, whether due to the motor or a breakage of the hoist parts. The emergency weight may also be tripped manually from the cabin.

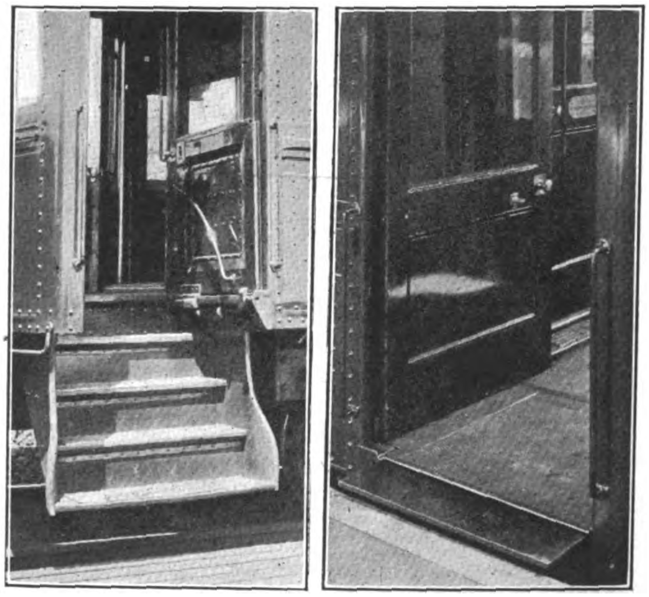
Power is supplied in the form of three-phase, twenty-five-cycle alternating current, and for changing this into direct current there has been installed a motor-generator set of sufficient capacity to supply the average demand of the hoist, plus some surplus for charging a large storage battery. The direct-current end of the machine is rated at 165 amp. continuously at 550 volts, the latter being the floating voltage of the battery, and it is designed with a special drooping characteristic by means of a reversed series field for the purpose of throwing load fluctuations on the battery. A small percentage of the load fluctuations falling on the machine will lower its voltage to such an extent that the battery must discharge and furnish the balance of the momentary demand. The regulation is, therefore, inherent in the design of the machine, and is entirely automatic. The hoist is driven through two gear reductions by a General Electric 180-hp. motor which is specifically designed to stand such voltage variations as come from a storage battery when it is frequently charging and discharging. A reserve 180-hp. motor and solenoid brake are provided.

STORAGE BATTERY

The storage battery was built by the Electric Storage Battery Company of Philadelphia. Its capacity is 200 amp. for one hour on a continuous discharge, and the makers estimate that it will operate the hoist under the average load conditions for nearly two hours with the power supply entirely cut off. Under normal conditions, with the motor-generator supplying the average load, the battery does not become exhausted, but receives back sufficient charge during the period of rest between trips to make up for the discharge while the hoist is in operation.

Extensible Trapdoor for Passenger Cars

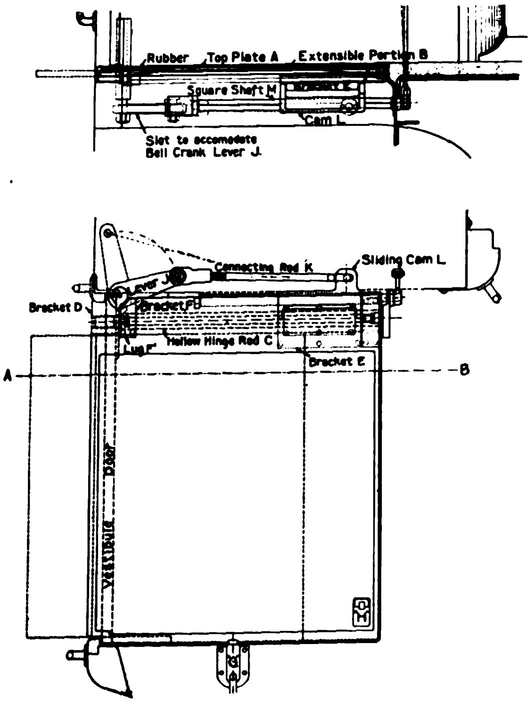
The Pennsylvania Railroad Company has built at New York Terminal, Manhattan Transfer, Rahway and North Philadelphia high station platforms, and has under construction at the present time similar platforms at Wilkinsburg and Johnstown, on its Pittsburgh Division, this being in line with the policy of obtaining the best of railroad features. The advantages of the high platform are, of course, obvious, but a difficulty has arisen in connection with it where the station is located on a curve, because a gap then exists between the ends of cars and the platform edge. In consequence, the company has equipped for trial a steel vestibule car with an extensible trapdoor as shown in the accompanying illustrations which is designed to bridge this gap. The design is patented by Ellwood H. Sickels of Narberth, Pa.



VESTIBULE TRAPDOOR IN RAISED AND EXTENDED POSITIONS

In operation when the trap is down, the opening of the vestibule door causes the sliding portion to extend, and the closing of the vestibule door retracts it. This arrangement is ideal in view of the fact that the extension of the trap is required simultaneously with the opening of the door, and, as the vestibule door is required to be closed when the train leaves the station, the trap is necessarily returned at the same time. Furthermore, the physical effort required to open the vestibule door is utilized to extend the trap.

There are, however, certain times when the trap should not extend when vestibule door is opened, as in the case when trap is to be raised so that the steps can be used or when the brakeman opens the door while the train is moving. To provide for this necessary feature, an ingenious, but still quite simple, arrangement is provided by which the connections can be thrown out of gear through the operation of a small handle set flush in the side of the vestibule at a convenient height. It is not necessary to provide extra trainmen to attend to the operation of the trap, because when the small hand lever is set in proper position (which is done by the brakeman before the train reaches the station) the opening of the vestibule door, whether accomplished by trainman or passenger, will cause the trap to be extended. Owing to the fact that the top plate does not slide, it is, of course, impossible for passengers to be thrown by the movement of the extension. Furthermore, it is impossible for passengers to stand on the trap while the door is being opened.



PLAN AND SECTION OF EXTENSIBLE TRAP DOOR

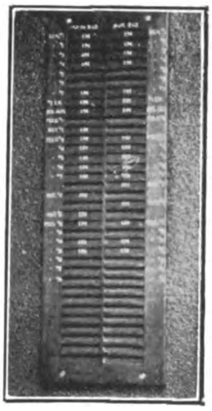
The trap is, in outward appearance, like the ordinary trap, and consists of a rubber-covered top plate and the extensible portion which is built in the familiar paneled pattern, and acts as a support for the top plate. The two parts are hinged on a hinge rod so that they act together when trap is raised for the use of the steps. The hinge rod is hollow and accommodates the flat springs which are adjusted at the usual bracket, to obtain the proper tension to raise the trap. The extensible portion of trap is supported by means of a bracket (marked *E* on the line cut) which slides on hinge rod, and also by means of lug *F'*, attached to top-plate bracket *F*. When the trap is extended, owing to the fact that it is supported at one side on lug *F'*, and at the opposite side on the usual angle-iron ledge, the extended portion cannot deflect when passenger steps on it. The usual spring catches, marked *G* and *H*, are used respectively to hold trap down when door is closed and to hold it up against vestibule door when trap is raised for use of steps.

The operating device consists of the bell crank lever *J*, which is attached to the vestibule door, the connecting rod *K* and cam *L*, which slides on the square shaft *M*. When the shaft *M* is tilted to place the sliding cam *L* in "off" position, the opening of the vestibule door causes the cam merely to slide on the shaft without any effect on the extensible portion of the trap. The shaft *M* is tilted by means of a small knob on the end of a vertical rod which is attached to a lever arm on the end of the square shaft, the knob being located in a recess at a convenient height in the vestibule wall. When the square shaft is thus tilted the sliding cam comes up in back of bracket *E*, on the trap, so that when the door is opened the sliding part of the trap is extended. The sliding cam is designed so that whether in "on" or "off" position, the front finger of the cam is always in position to hold the extensible part of the trap, so that it is absolutely impossible for the trap to be out with the door closed. Also, the trap is arranged so that it cannot be raised when extended, thereby preventing the obstruction of the handrail at the side of the car.

The trap is designed with a uniform extension to take care of the gap at platforms built on as sharp a curve as 6 deg. On lighter curves the extension may overlap the platform an inch or two, the station platform, of course, being kept at the height of a small step below the floor of the car.

Indicator Board for Disconnecting Switches

At the Manchester Street generating station of the Rhode Island Company, in Providence, R. I., a convenient indicator board is utilized to show incoming operators the positions of disconnecting switches between the various generators, rotaries, transformer units, etc., and the main and auxiliary buses. The board consists of a panel about 3 ft. long and 10 in. wide, carrying about thirty-six wooden strips indicating whether a particular knife switch is in or out of circuit. The strips can be slid in and out with ease, and whenever a disconnector is opened or closed, a notation is made to correspond on the board. In this way any operator coming on duty knows at a glance just what switches are open or closed, and does not have to rely upon another's memory or upon loose paper memoranda. The remote-controlled oil switches in the station are equipped with the usual pilot lights, but when disconnectors of the knife type are opened or closed no electrical indication is feasible, and the maintenance of such a bulletin board is a decided convenience. In this station all the disconnecting knife switches are equipped with locking devices which prevent their being blown open by magnetic reactions in case of a short-circuit or severe overload on any given feeder. The switches are mounted in concrete cells provided with wired-glass covers, so that inspection is greatly facilitated.



INDICATOR BOARD

The Interborough Rapid Transit Company proposes to install at the Fourteenth Street subway station platform for southbound express trains five additional space-filling devices, similar to the one already in service. The device is a movable platform edge which automatically fills the gap between the trains and the curved platform, and has been described and illustrated in the ELECTRIC RAILWAY JOURNAL.

News of Electric Railways

CHICAGO ARBITRATION AWARD

Summary of Award to the Surface Men Made by the Arbitrators on July 16

Mayor Thompson and State's Attorney Hoyne informally announced the arbitration award to the men on the Chicago Surface Lines on July 16, granting an increase in the minimum wage from 23 to 25 cents for the first year of the contract and 26 cents for the second year. The maximum wage is increased from 32 cents in the sixth year to 35 cents in the fourth year. This scale is to be increased to a 36-cent maximum in the second year of the contract. The award to men outside of the train service is not announced. The railway reiterates its intention to abide by the decision of the arbitrators. Mr. Sheean, representing the company on the board, will submit a minority report. The Chicago Elevated Railways not being bound to accept the award intends to conduct another arbitration.

Final arguments by both sides were made on July 9. To preserve the principle of arbitration both the railway companies and the men agreed to shorten the period required to submit evidence and the arbitrators agreed to render their decision promptly.

Dissatisfied with the manner in which the men presented their case, all the witnesses having been officials or committeemen of the union, the Mayor requested the railways to furnish him with the names and addresses of all employees. In round figures this list included 10,000 names and addresses, and from these the Mayor invited 360 to call at his office and discuss the need of increased wages and better working conditions.

On July 7 Mr. Weatherwax was cross-examined regarding the various positions he had held with the company. Mr. Weatherwax stated that he began service as a boy at day wages, and now received $10,000 a year as superintendent of transportation. He was also questioned regarding the wages of receivers at the car stations, and an effort was made to show that those who were taken into the union received more than those who were outside. In the dispatching system practically all switchboard operators were old trainmen. The question of vacations to clerical help and not to trainmen was also raised.

Several division superintendents' testimony was to the effect that working conditions had greatly improved and that five minutes was sufficient time for the conductors to turn in.

Thomas Blakely, superintendent of supply cars, explained the duties of the motormen working for him. He said that they rarely assisted in loading or unloading a car; they ran slowly, and were not required to stop as often as passenger cars, therefore could hold their place on a line without speeding. These motormen also had regular hours and were not required to wear uniforms. They were not on the street during rush hours, and were seldom asked to run their cars into the downtown district.

Edward W. Anger, general carhouse foreman, explained the duties of the various grades of repairmen. He stated that no particular skill was required in making running repairs. All heavy repairs were made at the shops. Most of the carhouse repairmen were ordinary laborers without previous training. Temporary promotion created bad feeling when the men were returned to their former positions. He said that to give up the right to use judgment in the promotion of men would interfere with good results. Promotion based on efficiency did not open the door to favoritism. Regarding the three grades of pay that carhouse repairmen receive, Mr. Anger stated that the men acquired skill with experience, and should be paid for it.

President Busby again took the stand on the evening of July 7, to introduce and explain a number of exhibits. These included tabulations of passenger-car miles and hours, etc. Another exhibit showed the relative cost of living in Chicago as compared with other cities. In this Chicago was taken as a basis, with 100 per cent. St. Louis was given 100.13 per cent, Detroit 100.20 per cent, Cleveland 105.59 per cent, New York 117.32 per cent, Pittsburgh 117.92 per cent, Philadelphia 119.46 per cent, Boston 127.86 per cent. Mr. Busby stated that these figures were compiled from an analysis of Bulletin 156, United States Department of Labor. He also introduced an exhibit showing $45,713 a year as the cost of additional time under the new agreement for fall-backs and dinner reliefs. If five minutes additional turn-in time was given, the cost to the company would be about $65,000 a year. Concerning the 37,143 accidents referred to earlier in the hearings, Mr. Busby stated that these included only 8400 liability cases, 600 of which went to suit. He also accounted for the fatal injuries to twenty-two employees mentioned in Mr. Mahon's testimony. He said that an examination of the records showed that some of these men were not on duty, others were injured through their own carelessness, and the remainder through negligence of fellow employees. He also introduced an exhibit to show that the number of accidents attributable to trainmen according to years of service was on a constant decline.

Mr. Busby next offered testimony regarding the finances of the company. He said that brokerage profits of all companies in eight years past were $3,679,000, whereas the discounts were $4,839,000, an excess of $1,160,000. The 10 per cent construction totaled $7,358,000, and after deducting the excess, a net of $6,198,000 was left. He explained that 6 per cent of this amount went to the railways company and was applied against excessive indebtedness over purchase price and 40 per cent to the City Railway for disbursement as profits. He also stated that the average return to the companies on the purchase price of all roads for the past seven years was 6.52 per cent. Mr. Busby quoted from the daily reports of receipts since Feb. 1, 1915, and showed that the income so far this year was about $460,000 behind a like period in 1913.

In recross-examination of Mr. Busby, the preparations made for resuming service in the recent strike were outlined. Mr. Busby said that thousands of experienced men were ready to go to work, and that 25,000 such men had been offered to him within forty-eight hours after the strike was declared. He said that he had arranged for a sufficient number to resume operation and was ready to board and lodge them. He did not care to state what he expected to pay them.

At a short morning session on July 8, the representatives of the employees announced that they would not put any rebuttal witnesses on the stand, but had arranged to argue their case at once. After a short session the hearings adjourned until July 9, when final arguments by Counsel Miller for the companies, and Counsels LeBosky and Alschuler for the employees were presented. Immediately following these the arbiters began to review the evidence.

SEATTLE-RENTON PURCHASE BY CITY ABANDONED

The City Council of Seattle, Wash., has decided to abandon plans to take over the Seattle, Renton & Southern Railway by condemnation proceedings within city limits, and to repeal an ordinance passed in October, 1911, providing for the prosecution of the condemnation suit. The condemnation case is now in the United States Supreme Court, and Assistant Corporation Counsel Ralph S. Pierce will move its dismissal. Both the Superior Court and State Supreme Court held that the city of Seattle had the right to condemn the railway, but an appeal was taken by Scott Calhoun and Joseph Parkin, receivers of the company. It is proposed now to turn attention to the improvement of Rainier Avenue in order to dispose of all other litigation prior to the calling to trial in the United States District Court of the suit of the Seattle, Renton & Southern Railway and its receivers against the city, seeking an order from the court to restrain the city from changing or in any way interfering with the present grades of Rainier Avenue. In an opinion handed down some time ago the Federal Court ruled that the Seattle, Renton & Southern Railway had a legal right to its franchise, which the Council holds has been revoked. Councilman Dale, who has been active in carrying on negotiations for the acquisition of the line by the city, said recently: "I believe that since the voters have authorized a bond issue to purchase, parallel or condemn a railway in Rainier Valley, the Council should keep faith with the voters and carry out the intent of the proposition authorizing the issuance of bonds."

The Council recently defeated a bill to purchase the railway on the terms offered by the receivers.

CLEVELAND TERMINAL AND SUBURBAN FRANCHISES GRANTED

The City Council at Cleveland, Ohio, took favorable action on the evening of July 12 on the franchises asked by the Cleveland, Akron & Canton Terminal Railroad and the Cleveland & Youngstown Railroad.

Under the franchise of the Cleveland, Akron & Canton Terminal Railroad the company is empowered to build an electrically operated, four-track subway under East Fifty-fifth Street from the lake to the southern city limits. The company is headed by Ohio C. Barber, Barberton, Ohio, well known throughout the country as the match king. The vote was twenty to five. As has been stated before, the franchise covers a period of seventy-five years. The minority members demanded a statement as to what interests were back of this proposition and demanded a bond guaranteeing that work would be begun on it within two years. Mr. Barber insisted, however, that his plans were all for the benefit of the city and if the people did not want the improvement he would abandon it before he would be tied down with conditions and requirements which he considered useless. Mayor Newton D. Baker supported Mr. Barber.

Under the franchise of the Cleveland & Youngstown Railroad, passed by a vote of nineteen to six, the company is empowered to establish a freight terminal near Broadway, S. E., about forty streets being vacated for the purpose. An amendment requiring that the terminal be operated by electricity was defeated, as were twelve other amendments proposed by the opponents of the measure. Councilman Bernstein insisted that action on the franchise be delayed until an agreement had been secured from the other railroads that they would build a new union station on the lake front. He also alleged that the New York Central Railroad was behind the company, although the attorneys for the New York Central had stated at the committee meetings that this was not so. The company was organized to build a rapid transit road for the entrance of both steam and electric railways to a point near the retail business district and to furnish service to a district on the hills southeast of Cleveland which is rapidly developing as a high-class residence section.

KANSAS CITY-CLAY COUNTY $1,500,000 VERDICT TO BE APPEALED

By gradual elimination the suits against the Kansas City, Clay County & St. Joseph Railway, operating between Kansas City and St. Joseph, Mo., and between Kansas City and Excelsior Springs, Mo., have been narrowed to one, that brought by the Interstate Railway for $2,000,000, in which a verdict for the plaintiff for $1,500,000 was awarded in the Jackson County Circuit Court on July 1, as noted in the ELECTRIC RAILWAY JOURNAL of July 10, page 78. Motion for a new trial in this case will be heard on Aug. 2. If the motion is denied, an appeal will be taken.

In the district north of Kansas City many different sets of options for the construction of interurban railways were secured at different times during the last twelve years. Most of the options were allowed to die, or were automatically extinguished by the failure of the companies to do the work required by law to the extent of 10 per cent of the capital stock in two years and completion of the road in ten years. It is alleged that only the Kansas City, Clay County & St. Joseph Railway had ever paid for rights-of-way, so that the present operating interurban is said by its owners to have the only effective rights to any options on its right-of-way.

Among projected interurbans in the district was the Kansas City-St. Joseph Electric Railway. This company secured options between St. Joseph and Kansas City, Mo., and did a small amount of work on the right-of-way above Dearborn. The line was to extend southward from St. Joseph to Kansas City. Another projected line was northbound from Kansas City to the north Missouri line, and some work was done on that right-of-way by the Interstate company. One of the earlier suits involving the right-of-way was brought by the Interstate company four years ago against the Missouri River & Camden Railway. This suit was dismissed without coming to trial. After the Kansas City, Clay County & St. Joseph Railway had begun operating, suit for $200,000 damages was brought against it by the Kansas City-St. Joseph Electric Railway on the charge that the defendant had taken possession and was using land on which it had active options. This suit involved the right-of-way southward from St. Joseph about half-way to Kansas City. Later the Interstate company brought suit for $2,000,000, making the same charge, this suit involving the right-of-way northward from Kansas City about half-way to St. Joseph. The Interstate case came to trial first. After the trial had begun, the suit of the Kansas City-St. Joseph Electric Railway was dismissed, and evidence was introduced in the Interstate case to show that the Kansas City-St. Joseph line had sold its rights to the Interstate company. This situation put the Interstate company in the position of having a presumptive series of options on the entire right-of-way of the Kansas City, Clay County & St. Joseph Railway between Kansas City and St. Joseph.

Ernest D. Martin, one of the plaintiffs and a promoter of the Interstate company, testified that he had renewed many of the original options with the consent of the property owners, while many of the property owners testified that they had never given their consent to such renewal.

The verdict for the flat sum of $1,500,000 was signed by nine jurors. Two jurors favored a smaller sum, and one held out for a verdict for the defendant.

Receivers have been appointed for the Kansas City, Clay County & St. Joseph Railway, as referred to elsewhere in this issue.

EMPLOYEES RAP ARBITRATION

Men Say Pleas of Company Impoverishment and Law of Supply and Demand Make Arbitration a Farce

At a meeting on July 7 of the joint conference board representing the sixteen divisions and 4200 employees of the Bay State Street Railway, Boston, Mass., it was decided that in future no arbitration proceedings would be agreed to by the men unless it was stipulated in advance that the factors of the company's financial condition and the "law of supply and demand" would be eliminated from all consideration in the proceedings. The following is the text of the resolution adopted:

"In the future no arbitration shall be held unless it is a fair arbitration. The Bay State Street Railway enjoys its franchise and the right to make money from the public, and except for the public it would not exist. The company is constantly reminding us of what we ourselves well know about the interest of the public in the operation of its cars. We realize that a failure to arbitrate and a strike might result in great inconvenience to hundreds of thousands of people, and a strike is not lightly undertaken. There never has been a strike on this system.

"The public should be reminded, however, that the company takes advantage of our recognition of the public interest by using against us in arbitration the law of supply and demand, and its financial condition. By agreeing to arbitrate we lose the only weapon we have to meet both these arguments, and unless they are both eliminated in the future we think arbitration, so far as we are concerned, will be a farce.

"After many years of hard work and the presentation of our claims concerning both these factors, many boards of arbitration have recognized the force of the argument that the law of supply and demand could only be invoked against us if we were given a fair chance to try it out, and as Chairman Storrow of the Boston Elevated Railway board of arbitration said, the only way in which it could be really tested would be to have a strike and see whether or not the company could at once secure the necessary number of competent men to prepare and operate its cars.

"If a street railway or other public service corporation was in the hands of a receiver because of its inability to pay interest on its bonds and people still wanted to ride, no one would say that the wages of the men should be inadequate because of the financial condition of the company. We again call the attention of the public to the award of Chairman Storrow of the Elevated board of arbitration concerning finances, in which he agreed that the contention of the men should prevail and that the financial condition of the company should not be taken into account in fixing wages. The expense of a thorough financial investigation and the disadvantage at which we are placed in making such an inquiry are altogether too great to warrant us in again including it as a subject matter of consideration by a future board of arbitration."

ALBANY DIFFERENCES STILL UNSETTLED

On July 15 the question of jurisdiction between the unions on the lines of the Hudson Valley Railway and the United Traction Company, Albany, N. Y., remained unsettled. C. F. Hewitt, general manager United Traction Company, still insists that the conferences be open and that the newspaper men be permitted to attend them. He says that W. D. Mahon, president of the Amalgamated Association, who arrived in Albany on July 14, assured him at a conference in Detroit in May, at which Warren S. Stone, representing the steam brotherhood, was present, that the dispute between the Amalgamated and the Brotherhood as to who would operate the lines would be held in abeyance until the September convention of the Amalgamated association.

The men issued a statement in which they said their committees were explaining the situation to Mr. Mahon. They said that there are involved the working agreements of four divisions on the properties of the Hudson Valley Railway and the United Traction Company and grievances and complaints affecting the New York State Railways. President Horace E. Andrews of the New York State Railways is said to have expressed his willingness to take up at once the complaints affecting that company.

REFUSAL TO REOPEN BOSTON ARBITRATION

Classification Under Boston Elevated Award Must Stand Until May 1, 1916

James J. Storrow and his associates on the board of arbitration that settled the wage dispute between the Boston Elevated Railway and its union employees in 1913, have refused, in a decision handed down on July 8, to reopen questions in the original award over which a misunderstanding has come between the road and its men. The board was appealed to last December to interpret its rulings on classifications in the "L" shops. A difference of opinion had arisen as to whether or not men in a lower-paid class are entitled to the same rate of pay of a higher-paid class if they are doing the same character of work as men in the higher-paid class. In its conclusion the board, consisting of James J. Storrow, James L. Richards, representing the company, and James H. Vahey, representing the men, said:

"Whether the company intends to hold a deserving man back or not, this system, in our judgment, has this effect. We think that no large corporation can be gifted with the stock of wisdom needed to administer with justice such a highly complex system. There should be a reasonable number of gradations, but we find in general that the present number is excessive. We have therefore sought in fixing the new scale of wages substantially to reduce these classifications, as appears in the schedules which have been annexed.

" 'For example, we have reduced the classification of blacksmiths from twelve to six. But this has an important effect upon wages. The only way these excessive classifications can be reduced is to give some men more increase than others so as to level up the differences. If we gave every blacksmith 6 per cent increase in pay, there would still be the same twelve classes of blacksmiths.'

"If the union is now free to raise this question again by a further examination of the character of the work being performed by the men under the present classification, it can only be for the purpose, at least in effect, of further reducing the number of these classes, or at least accomplishing a substantial portion of this result by taking a substantial proportion of the men out of one class and putting them into a higher class than that determined for them by the board of arbitration.

"Our conclusion is that this whole question of classification was raised in the arbitration proceedings and definitely determined in the award resulting from these proceedings, and that the question cannot properly or fairly be reopened before the expiration of the period for which the original award was made effective, namely, not prior to May 1, 1916."

Mr. Vahey, who concurred with the decision of his colleagues, issued a statement setting forth his exact position in the controversy and lauded Mr. Storrow, asserting that the chairman was in no way to blame for the conditions which exist.

PROGRESS WITH TOLEDO TENTATIVE FRANCHISE

At a meeting of the franchise committee of the City Council of Toledo, Ohio, on July 9, Henry L. Doherty, chairman of the board of directors of the Toledo Railways & Light Company, expressed the belief that a clause should be inserted in the tentative draft of the franchise now in preparation that will allow the company to name its own rate of fare pending the fixing of a permanent rate at the end of the proposed try-out period, if the earnings should fall below 4 per cent. Councilman Dotson suggested that if a rate is not agreed upon within ninety days from the close of the period the matter should be submitted to a board of arbitrators or the courts. Mr. Doherty said that if the city insisted upon control of the operating rate, it should be responsible for any possible losses as the result of the establishment of a rate too low. The present draft provides that when the return on the investment falls to 4 per cent there is to be a readjustment of fares under the terms of the agreement.

The probable rerouting of cars and abandonment of any lines found to be unprofitable were also discussed at this conference. In regard to appraising the property, Mr. Doherty said that if three impartial men were selected an agreement could be reached with them without submitting the matter to a board of arbitration. The property should be valued as it now stands, with any betterments which are made added to this.

Mr. Doherty submitted an amendment to the clause relating to the municipal bond ordinance initiated and passed last August. Mr. Dotson insisted that nothing be placed in the draft to indicate that it supersedes the municipal ordinance. He also argued that all franchise values should be excluded from consideration in making an appraisal of the property.

Mr. Doherty objected to the transfer provisions of the draft, especially the portion relating to transfers on transfers. He said that he believed the people of Toledo wanted good service and good cars rather than low fare. The idea, then, would be to simplify the system so far as possible.

Frank R. Coates, president of the Toledo Railways & Light Company, and Rathbun Fuller, attorney for the company, were present at the conference, but there were few people in the lobby.

At a conference on the afternoon of July 14 between Henry M. Doherty and Messrs. Redd and Dotson of the special franchise committee of the Council, Mr. Doherty announced that if the committee insisted upon the company purchasing 20 per cent of the municipal railway bonds, in case the city should at any time conclude to purchase the property, there would be no need of negotiating further. Only a cash transaction can be considered. He also informed the members that the company was entitled to a full attendance of the members of the committee when the proposed franchise is discussed.

The provision of the franchise relating to the bonds is that they shall be taken at par and accrued interest. It is said by some that a better price should be secured for the bonds.

A tentative agreement was reached to the effect that the section of the draft which provided that "the city of Toledo by adopting this ordinance shall not waive any of its rights which it may have by virtue of the ordinance adopted on Aug. 4, 1914," be eliminated. This is the municipal ownership bond ordinance.

DIRECTORS APPROVE DETROIT SALE

At a meeting of the directors of the Detroit United Railway, Wednesday, July 14, the proposed purchase agreement covering the company's property within the one-fare zone was approved. This agreement provides that the city, if authorized by a 60 per cent vote of the electorate, shall assume operation of the city lines, the price to be fixed by the Circuit Court of Wayne County. The directors decided to submit the new proposition to the stockholders, and an adjourned meeting of the latter has been called for Aug. 2.

On July 14 J. C. Hutchins, president of the Detroit United Railway, sent a letter to the stockholders reviewing the purchase proposals. This he concluded as follows:

"After several weeks of negotiation, the following plan was approved, viz.:

"The city personally to assume the payment of outstanding mortgages up to the claimed limit of its power under the constitution and laws of the State of Michigan, viz.: 2 per cent of the assessed value of the taxable property within the city, which would amount to approximately $11,000,000, and the balance, up to the limit of the price that would be fixed by the Circuit Court, by the creation of a sinking fund out of the earnings of the property to be taken over by the city, and so arranged that with the amount personally assumed by the city, the mortgage indebtedness referred to, up to the limit of the price fixed by the court, shall be paid in 1932, when the company's consolidated mortgage indebtedness matures, and any excess in price above the amount of outstanding mortgage indebtedness is to be secured in the same way and be payable at the same time.

"The proposed contract, modified as to the method of fixing the price to be paid for the property and the method of securing the payment of this price, you will recognize is materially different from the proposal originally made and upon which many of the stockholders sent their proxies, and while these proxies by their terms are unlimited and would authorize their use in voting upon the final proposition now to be acted upon, the holders are unwilling to use such proxies until all the stockholders, and especially those who gave such proxies, are advised as to the contract that is to be finally acted upon.

"The proposed modified contract has been fully considered in all its aspects by our board of directors in connection with existing conditions, and it has approved of such contract and unhesitatingly recommends to the stockholders the approval of the same.

"An adjourned meeting of the stockholders will be held at the company's office in Detroit on Aug. 2, at 3.30 p. m. for the purpose of considering such modified contract, and unless in the meantime advised to the contrary by the stockholders who gave the proxies referred to, the holders will feel, after this notice, warranted in voting the stock covered by such proxies in approving such modified contract and authorizing the board of directors and officers of the company to take such further steps in the direction of having the same carried into effect as may be necessary or proper.

"The contract cannot become binding on the city until approved by 60 per cent of the voters of the city voting upon the proposition at an election to be called for that purpose."

STRIKE DECLARED IN RHODE ISLAND

A strike of the union employees at the Rhode Island Company, Providence, R. I., was declared at midnight on July 14. Questions at issue between the company and its men had been the subject of negotiations for some time past, and all of the requests of the men had either been waived, settled or agreed upon except the question of wages. This the committee representing the union had agreed to submit to arbitration. The break came over the arbitrary stand taken by the representatives of the men with respect to the method of choosing arbitrators to consider this question.

Some time ago the company suggested to the men that the old schedule of wages be restored. The committee representing the union suggested that the old agreement, which expired on June 1, 1915, be continued for a period of two years with an additional clause providing that the company should discharge from its service or suspend employees who were members of the association until all sums due to the association had been paid. This was agreed to by both sides, with the understanding that the wage question should be decided by arbitration.

The men in the service of the Rhode Island Company now receive 28½ cents an hour after three years' service. They asked for 35 cents an hour as a maximum scale. The wage for the first six months is 23 cents an hour. The men asked 30 cents for the first six months. They also desired to eliminate the present system of graded rates. They maintained that a man is efficient after the first year's service and that he should receive the maximum wage at the end of the first year.

Curtailed service was established by the company on all the main city lines on July 15, but it was announced that the service would be suspended after 7 o'clock. A few minor disturbances were reported on the first day. More than 2400 men are said to be affected by the strike order, which also extends to the employees of the power houses.

Completion of Electrification Celebrated.—The first electric train over the London & Port Stanley Railway, London, Ont., which has just been electrified, started from St. Thomas at 6.30 p. m. on June 30 to Port Stanley, carrying a number of guests from London and St. Thomas, invited by Sir Adam Beck to celebrate the opening of the road.

Northern White Cedar Association Outing.—On June 25 the Northern White Cedar Association began its annual mid-summer outing, the members departing in a special car via the Northern Pacific Railway from Minneapolis, Minn., for Beaudette, Minn. From Beaudette the party was conveyed by a fleet of six launches to a camp on Sabaskong Bay, Lake of the Woods, approximately 60 miles north. The party remained there for four days, making a number of exploration and inspection trips to points of interest.

No Decision in Old Dominion Case.—The judgment in favor of the Westinghouse Electric & Manufacturing Company against the Washington & Old Dominion Railway obtained in the Circuit Court of Loudon County, Va., was not set aside by the Supreme Court of Virginia as stated in the issue of the ELECTRIC RAILWAY JOURNAL of June 19. The action taken was simply the routine procedure of issuing a writ of error to review the decision of the lower court. The case was appealed by the railway company and will be heard by the Supreme Court of Appeals next fall.

New York Compensation Law Constitutional.—On July 13 the Court of Appeals of New York upheld the constitutionality of the workmen's compensation law on three questions raised in suits brought to make the test. Judge Nathan Miller wrote the opinion in the cases of Marie Jensen against the Southern Pacific Company, a Kentucky corporation, and of William Alfred Walker against the Clyde Steamship Company. In the Jensen case, which was for causing death, it was asserted by the company that the statute was not intended to apply to employment in interstate or foreign commerce. The awards were affirmed.

Fifty-Mile Canadian Line to Be Electrified.—Martin N. Todd, general manager of the Lake Erie & Northern Railway, Brantford, Ont., and president of the Galt, Preston & Hespeler Railway, has confirmed the report that the Lake Erie & Northern Railway is to be electrified for the whole fifty-two miles from Galt to Port Dover. Mr. Todd expects cars to be running on the Galt-Brantford line by October, and to Port Dover by November. It is likely that Hydroelectric power will be used with substations at Galt, Brantford and Simcoe. It is stated that the two lines will shortly be amalgamated, with through electric railway service ultimately from Berlin to Port Dover.

Bids for Rails, Ties, Ballast, and Track Accessories Wanted.—Bids for about 35,000 tons of open-hearth rails were opened on July 16 by the Public Service Commission for the First District of New York, and between that date and Aug. 4 bids will be received for about 3000 tons of rolled manganese rails, more than 1,000,000 tie plates, about 356,000 cu. yd. of broken stone ballast, and about 30,000,000 ft. of ties and timber. This material will be sufficient to equip about 230 miles of single track. The city-owned lines in the dual system cover about 260 miles of single track, but the track materials for about 30 miles in the Fourth Avenue subway in Brooklyn and the Centre Street loop subway in Manhattan have been purchased.

Action on Norfolk Franchise.—The joint committee of ten and the representatives of the Virginia Railway & Power Company have agreed upon the three franchises which will be submitted to the City Council of Norfolk, Va., for approval and passage. Three ordinances will be framed and submitted to the Council, perhaps during August. The provisions of the grants include six tickets for a quarter, to be sold in thirty places and on the cars after three years; universal transfers; school tickets with an age limit of twenty-one years; taxes at the rate of 1½ per cent on the gross earnings for three years and 2 per cent thereafter; the substitution of six tickets for a quarter for labor tickets on the Bay Shore Line, and service from 6 a. m. to midnight, with owl service when the business justifies.

New Haven Recovery Suit Dismissed.—A suit of minority stockholders to recover $102,000,000 from former and present directors of the New York, New Haven & Hartford Railroad, who were charged with responsibility for alleged improper expenditures of funds, was dismissed by the Supreme Court of Massachusetts on July 8. William G. Rockefeller, Lewis Cass Ledyard, James S. Elton and Charles S. Mellen were among the defendants. The decision, which was written by Chief Justice Pugg, said in part: "It is an implied condition of becoming a stockholder in a corporation that its general policy shall be determined by the holders of a majority of the stock and that disagreements as to its dominating policy and as to details of its management shall be settled by its stockholders, and recourse cannot be had to the courts to adjust differences of this sort. It is only from actual necessity, in order to prevent a failure of justice, that a suit in equity for the benefit of the corporation can be maintained by a stockholder."

Summer School of Scientific Management.—The Pennsylvania State College will conduct a summer school of scientific management during the two weeks beginning Aug. 9. This summer session is planned for the accommodation of works managers, superintendents, heads of cost, stores, purchasing, planning, and production departments, and members of such departments. The time is restricted to two weeks to meet the needs of employees whose vacation period is limited to that time. The mornings of the session will be devoted to lectures and discussions on industrial organization and scientific management under the leadership of Prof. Hugo Diemer, head of the department of industrial engineering at the Pennsylvania State College. The afternoons will be devoted to applied methods of scientific management under the direction of W. H. Tabor. The shops of the Pennsylvania State College have been especially provided with means for teaching and demonstrating applied methods of scientific management. The fee for the course is $15.

Perpetual Franchise Issue Before New York Constitutional Convention.—Two votes have already been taken by the New York Constitutional Convention committee on legislative powers, of which William Barnes is chairman, on a proposal to erect a constitutional prohibition against perpetual franchises. Both times the proposal has been defeated. The votes were taken in connection with a proposal presented by Seth Low, New York, at the request of the Citizens' Union. Mr. Barnes has appointed a sub-committee to draft an amendment to meet the sentiment in his own committee. The proposal of Mr. Low would prohibit municipal authorities from granting franchises in perpetuity. It would provide for indeterminate franchises, but would permit municipal authorities to resume control of the franchise on terms to be defined in the original grant. On July 14 William M. Ivins urged that in the recapture of franchises by municipalities provision should be made for paying the retiring corporation a fair return on the money expended in operation and sufficient compensation to make up for the loss of the franchise.

PROGRAM OF ASSOCIATION MEETING

Colorado Electric Light, Power & Railway Association

The thirteenth annual meeting of the Colorado Electric Light, Power & Railway Association will be held at Glenwood Springs, Col., on Sept. 23, 24 and 25.

Financial and Corporate

ANNUAL REPORT

Tennessee Railway, Power & Light Company

The combined statement of operations of the Tennessee Railway, Power & Light Company, Memphis, Tenn., for the calendar year 1914 (all power sales to distributing and railway companies controlled and other inter-company transactions being eliminated), is as follows:

Gross earnings	$3,762,387
Operating expenses and rentals	1,959,183
Net earnings	$1,803,204
Taxes	311,806
Net earnings after taxes	$1,491,398
Interest, etc.	1,094,420
Net income	$396,978
Dividends paid on stocks of constituent companies not owned	109,048
Balance	*$287,929

*Of this balance $1,628 accrues to stock of constituent companies not owned.

The constituent companies had accumulated earnings from May 1, 1912, to Jan. 1, 1914, of $210,610, which, added to the above balance for 1914, showed a total of $498,539 from which dividends on the preferred stock of the Tennessee Railway, Light & Power Company were paid on March 1 and June 1, 1914, amounting to $306,336, leaving a balance of $192,203. The two principal causes for the unsatisfactory showing for the year 1914 were first, the depression in business which particularly affected industrial centers like Nashville and Chattanooga and resulted in economy in the use of electric light and power and street railway service. The European war increased this depression and its bad effect on financial and industrial conditions prevented the closing of several large power contracts. Second, the worst drought experienced in Tennessee since 1904 (the previous low record year), reduced the amount of hydro-electric power available for sale and forced the company to operate its steam plants to a much larger extent than ordinarily necessary, thereby greatly increasing operating expenses. This drought was broken in December. The prospects for 1915 indicate an improvement in every way. The large construction work has been completed, and very little will be required for capital expenditures during the year.

The 1914 operating figures for the controlled Nashville Railway & Light Company and the Chattanooga Railway & Light Company are shown below:

	Nashville Railway & Light Co.	Chattanooga Railway & Light Co.
Gross earnings	$2,240,307	$1,085,096
Operating expenses	1,159,523	616,966
Net earnings	$1,080,784	$468,130
Taxes	194,209	82,757
Net earnings after taxes	$886,575	$385,373
Interest	499,670	339,408
Surplus	$386,905	$45,965
Passengers carried	43,673,934	16,384,356
Kilowatt-hours sold	25,214,365	12,567,439

NO PRESENT DIVIDEND FOR THIRD AVENUE

The stockholders of the Third Avenue Railway, New York, are not to have a dividend on their shares before September at the earliest unless the directors of the company go over the heads of their special committee. The company's earnings for the year ended June 30 were made public on July 14, and at the same time it was announced that the special committee had decided to drop its inquiry into the question of whether a dividend was advisable, leaving it for a full board to take up at their meeting in the autumn, when the pamphlet report will be ready.

For the fiscal year just ended the company's gross operating revenues were $10,885,768, an increase of $27,552. The operating expenses decreased $27,590, and taxes increased $3,922. There was an increase of $5,912 in non-operating income and interest charges, and the sinking fund, etc., took $13,083 less, so that the net income amounted to $696,521, an increase of $70,215.

During the year the company spent for improvements a total of $1,009,931 not included in the income account. This was met by the net income for the year of $696,521, by a decrease of $62,416 in the balance of current cash, by $172,738 borrowed from the depreciation account, by $26,083 from the sale of obsolete property and by some other small adjustments.

The usual 2½ per cent semi-annual interest on the adjustment income bonds was voted at the meeting of the directors on July 14. It is payable on Oct. 1.

In a statement given out by President Whitridge, it was announced that the directors had decided to establish a system of pensions in connection with the employees' association.

REFEREE HOLDS COMPANY LIABLE

United Railways of St. Louis Liable for Claims Against Predecessor Company to Extent of $10,139,681 for Unpaid Subscriptions on Latter's Stock

A report filed in Judge Taylor's division of the Circuit Court by Referee Charles W. Bates upon the creditors' bill of J. Brooks Johnson against the United Railways of St. Louis and other stockholders in the St. Louis Transit Company, holds that the defendants are liable for judgments held against the transit company by the plaintiff, also for interest at the rate of 6 per cent since the judgments were rendered and court costs.

The defendants are declared to be liable individually to the extent of the difference between what they paid for stock of the St. Louis Transit Company and its par value, in satisfying the judgments, which were purchased by Johnson from persons who had won personal injury suits against the St. Louis Transit Company. These judgments originally aggregated $27,044, in addition to which the plaintiff seeks interest and court costs.

In setting forth the extent to which individual stockholders in the St. Louis Transit Company are liable, Referee Bates holds that only $41 was paid to the St. Louis Transit Company for each share of its stock, par value $100, thus leaving $59 per share unpaid. There is said to remain unpaid on the 171,859 shares of stock of the St. Louis Transit Company held by the United Railways of St. Louis, $10,139,681. In case the referee's report is approved by the lower court and upheld by the higher courts, the United Railways of St. Louis and other defendants would be obligated to pay only such claims as were found to be owing by the St. Louis Transit Company prior to its absorption by the United Railways. Attorneys for the United Railways have already filed a bill of exceptions.

COMPANY CLAIMS SURPLUS

United Railroads of San Francisco in Application for Rehearing Denies Allegations of Commission and Asserts Inability to Set Aside Improvement Funds

The United Railroads of San Francisco has filed an application with the California Railroad Commission for a rehearing of the case in which the commission ordered the company to set aside $550,000 a year from income for improving its system and in which it also directed the company to make certain changes in its system of accounting. This decision was abstracted in the ELECTRIC RAILWAY JOURNAL of May 22.

The company questions the jurisdiction of the commission, especially in the announcement that instead of a surplus the company has a deficit in its profit and loss account. It says:

"We do not understand that your board has authority to marshal liabilities, determine legal or equitable priorities or appropriate assets, or to redraft or reframe the company's books of account so as to show a deficit when we earnestly and honestly believe, and have been so advised by counsel and accountants, that this company was within the law when it reduced its capital stock, compromised doubtful claims, reduced its liabilities in the amount of money actually paid into the sinking fund and set up in a surplus account this money actually paid to the trustee, thus wiping out the deficit which your board has said exists."

The company goes on to say that it suffered a property loss in excess of $1,200,000 in the fire and earthquake, that it reduced its capital stock by this amount and its property account by $1,600,000, and charged the surplus with $1,200,000. The surplus was then credited with the net amount in excess of $400,000, and the result was that the capital stock and surplus were reduced $1,600,000 and the property account was reduced in like amount, which transactions the company believes correct from a legal and accounting point of view.

The company states that it will need its revenue from all sources for the payment of its operating expenses, taxes, sinking funds and interest, and that it will not be able to set aside $300,000 annually for three years, as ordered by the commission, as a special fund in bank to be used for extensions and additions. The company also declares that because of causes beyond its control which affect its revenues, it will not have the ability to set aside $45,833 a month within fifteen days after the first of each month following July 15.

MAINE COMMISSION REPORT

The sixth annual report of the Board of Railroad Commissioners of Maine contains returns from the fourteen electric railways in that State. The total mileage of street railways in operation on June 30, 1914, was 494.27 miles, an increase for the year of 9.18 miles. The gross assets of the several companies on that date were $33,661,037, while the gross liabilities and the capital stock totaled $32,869,742. The total amount of dividends declared during the year was $341,599, an increase of $113,122. The average dividend rate was 2.71 per cent. The combined reports of earnings for the year showed the following figures: Gross income, $3,744,069; operating expenses, $1,956,124; taxes, interest and other charges, $1,226,426; net income, $561,519; reserves and special charges, $123,815; dividends paid, $341,599, and surplus, $96,105. During the year eight persons were killed and eighty-four were injured.

NEBRASKA STATE RAILWAY COMMISSION

The seventh annual report of the Nebraska State Railway Commission for the year ended Nov. 30, 1914, contains the usual general review of the commission's activities during the year and the details of complaints, orders, decisions and reports made to and issued by the commission. The gross earnings from operation for all companies during the year amounted to $3,764,667, and the total operating expenses to $1,882,751, while the net income from operation was $1,907,589. Interest paid totaled $695,123; taxes, $293,865; dividends, $539,366; depreciation reserves, $294,605, and additions and betterments, $568,464. At the end of the year the surplus was $91,158. The total number of fare passengers was 68,234,000 and the total number of revenue car-miles run was 13,016,501.

Barcelona Traction, Light & Power Company, Barcelona, Spain.—The holders of the first mortgage fifty-year 5 per cent bonds of the Barcelona Traction, Light & Power Company at a recent meeting in June approved the proposed readjustment plan described in the ELECTRIC RAILWAY JOURNAL of Feb. 27 and May 1. A preliminary consent by the London holders was noted in the issue of May 29. H. F. Parshall, formerly chairman Central London Underground Railway, will have charge of operation, and E. R. Peacock, formerly vice-president Dominion Securities Corporation, Ltd., of financial arrangements.

Birmingham, Ensley & Bessemer Railroad, Birmingham, Ala.—The Cunningham independent bondholders committee of Boston in a recent circular stated that under an agreement dated June 14 between it and the New York committee of bondholders (C. H. Zender, chairman), the bonds deposited with the American Trust Company, Boston, have been redeposited with the Empire Trust Company, New York, depositary for the New York committee. This makes a total of about $2,500,000 of bonds deposited with the latter committee, which assumes the expenses incurred by the Cunningham committee in its investigation into the company's affairs. This action will not curtail the Cunningham committee's desire for an accounting in case of a deficiency judgment in the foreclosure proceedings.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—On July 7 Justice Brown of the State Supreme Court appointed George Bullock receiver of the Buffalo & Lake Erie Traction Company in the foreclosure suit instituted by the New York Trust Company, mortgage trustee. C. K. Beekman, counsel for the bondholders' committee, stated that the appointment was necessary in order to finance certain betterments through the sale of receiver's certificates.

Columbus, Delaware & Marion Railway, Cincinnati, Ohio.—Judge Kinkead on July 3 refused to authorize the Columbus, Delaware & Marion Railway to issue $150,000 of receiver's certificates to meet obligations falling due on Aug. 1. He authorized the receiver, however, to execute notes for one year or less to pay expenses amounting to $55,000. The court instructed the receiver to pay interest on all bonds in order to enable the consolidated bondholders to take such steps within a reasonable time as they may wish to reorganize and lift the receivership.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—Judge Bird in the Jackson County Court on July 12 sustained the plea of the Interstate Railway for receivers for the Kansas City, Clay County & St. Joseph Railway and appointed Edward J. Corrigan and Bayliss Steele to act as such. The application was made to protect the judgment for $1,500,000 damages recently rendered the Interstate Railway for the taking of right-of-way on which it held options. This judgment is practically arrested pending action on motion for a new trial on Aug. 2. A more detailed explanation of the situation involving these companies is published on page 119 of this issue. On July 14, after an agreement between counsel, Judge Bird rescinded his appointment of Messrs. Corrigan and Steele and named I. D. Hook and J. G. L. Harvey as receivers. Mr. Hook is son of United States District Judge William C. Hook. The agreement reached covers the continuation of the regular operating force of the company.

Michigan United Railways, Jackson, Mich.—New York interests connected with the Michigan United Railways and the Commonwealth Power, Railway & Light Company deny that there is any truth in the rumor that they are preparing to make a bid for the Père Marquette Railway when it is sold at foreclosure next autumn, for the purpose of electrifying it and adding it to their system.

San Francisco (Cal.) Municipal Railways.—In May, 1915, the cash receipts of the San Francisco Municipal Railways from all sources were $185,707, which, less transfer deductions of $2,392 and operating expenses of $107,177, leaves a balance in favor of operation of $75,138. In June receipts are reported to have been $199,261. If the average for the first five days of July is maintained, the receipts for that month will amount to more than $225,000.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—A recent circular issued by the San Francisco-Oakland Terminal Railways, explaining the default in the payment of interest coupons maturing during July, states that a committee of security holders has been organized for the purpose of studying the financial problems of the company, formulating plans for subserving the large values recognized by the California Railroad Commission and bringing about whatever readjustment may be necessary in order to put the finances of the company on a permanently sound basis. The committee has secured the co-operation of San Francisco and Oakland bankers, who have agreed to buy these interest coupons for the full face amount less the income tax. The Mercantile Trust Company, San Francisco, representing ten or twelve banks, has offered to purchase the coupons from the first consolidated thirty-year 5 per cent bonds, and also from all the other issues of the system accruing in July, provided the selling bondholders agree that the coupons shall be given prior rights under the several mortgages as against the principal of the bonds and any interest not yet matured.

Western New York & Pennsylvania Traction Company, Olean, N. Y.—W. R. Page, president Western New York & Pennsylvania Traction Company, and associates have taken an option on the line of the old Buffalo & Susquehanna Railway from Wellsville to Buffalo. If the option is exercised it will be done independently of the electric railway.

West Virginia Traction & Electric Company, Wheeling, W. Va.—On June 1 the West Virginia Traction & Electric Company issued and sold $1,500,000 of two-year 6 per cent gold notes, as stated in the ELECTRIC RAILWAY JOURNAL of June 9. Of these notes $1,250,000 has been used to purchase $1,250,000 of 5 per cent three-year convertible gold notes due on July 1. On this latter date the mortgage and deed of trust dated July 1, 1912, covering the first refunding and extension mortgage thirty-year gold bonds, dated July 1, 1912, and due on July 1, 1942, was cancelled and in its place there was created a mortgage and deed of trust dated July 1, 1915, under which there is a total authorized issue of $25,000,000 par value of first refunding and improvement mortgage thirty-year gold bonds dated July 1, 1915, and due on July 1, 1945. There has been issued and deposited as collateral for the $1,500,000 of two-year 6 per cent gold notes before mentioned $1,875,000 of these first refunding and improvement mortgage thirty-year gold bonds.

York (Pa.) Railways.—The directors of the York Railways have declared a dividend of 2½ per cent on the $1,600,000 of 5 per cent cumulative preferred stock for the half year ended Nov. 30, 1914, payable in cash on July 30 to holders of record on July 20. The previous dividend was paid in 5 per cent scrip.

DIVIDENDS DECLARED

Charlottesville & Albemarle Railway, Charlottesville, Va., semi-annual, 3½ per cent, preferred.

Denver & Northwestern Railway, Denver, Col., quarterly, one-half of 1 per cent.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

New Hampshire Electric Railways, Haverhill, Mass., 2 per cent, preferred.

United Railways & Electric Company, Baltimore, Md., quarterly, 50 cents, common.

York (Pa.) Railways, $1.25, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO						
1m., May,	'15	$36,149	*$20,356	$15,793	$10,993	$4,800
1 " "	'14	37,864	*19,771	18,093	11,068	7,025
5 " "	'15	149,187	*89,483	59,704	54,772	4,932
5 " "	'14	153,696	*86,268	67,428	54,858	12,570
GRAND RAPIDS (MICH.) RAILWAY						
1m., May,	'15	$92,056	*$70,070	$21,986	$13,739	$8,247
1 " "	'14	107,265	*70,215	37,050	13,344	23,706
12 " "	'15	1,243,271	*834,955	408,316	162,557	245,759
12 " "	'14	1,299,642	*831,997	467,645	159,828	307,817
HAGERSTOWN & FREDERICK RAILWAY, FREDERICK, MD.						
1m., May,	'15	$36,782	$21,823	$14,959	$9,415	$5,544
1 " "	'14	33,928	22,680	11,248	8,450	2,798
11 " "	'15	398,284	232,819	165,465	103,159	62,306
11 " "	'14	369,619	239,735	129,884	118,176	11,708
HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.						
1m., May,	'15	$462,256	*$194,341	$267,915	$211,767	$56,138
1 " "	'14	473,462	*194,762	278,700	208,969	69,731
5 " "	'15	2,324,164	*971,742	1,352,422	1,056,629	295,793
5 " "	'14	2,384,930	*982,610	1,402,320	1,040,169	362,151
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO						
1m., May,	'15	$114,031	*$74,255	$39,776	$36,055	$3,721
1 " "	'14	120,750	*76,599	44,143	35,322	8,821
5 " "	'15	505,339	*356,430	148,909	179,927	†31,018
5 " "	'14	530,903	*354,944	175,959	176,251	†292
NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.						
1m., May,	'15	$175,513	*$107,102	$68,411	$42,248	$26,163
1 " "	'14	192,144	*112,818	79,326	41,338	37,988
12 " "	'15	2,199,969	*1,289,261	910,708	492,029	418,679
12 " "	'14	2,236,642	*1,405,187	831,455	483,680	347,775
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO						
1m., May,	'15	$323,324	*$191,317	$132,007	$51,524	$80,483
1 " "	'14	323,036	*191,808	131,228	50,660	80,568
5 " "	'15	1,424,675	*900,768	523,907	255,962	267,945
5 " "	'14	1,403,920	*860,110	543,810	250,815	292,995
PORTLAND (ME.) RAILROAD						
1m., May,	'15	$84,316	*$55,932	$28,384	$22,877	$5,507
1 " "	'14	86,427	*52,946	33,481	20,177	13,304
12 " "	'15	1,046,804	*646,372	400,432	260,713	139,719
12 " "	'14	1,046,716	*650,100	396,616	238,632	157,984
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.						
1m., May,	'15	$446,149	*$253,738	$192,411	$188,440	$3,971
1 " "	'14	538,473	*287,288	251,185	183,643	67,542
12 " "	'15	5,794,271	*3,149,446	2,644,825	2,207,287	437,538
12 " "	'14	6,739,779	*3,353,244	3,386,535	2,103,753	1,282,782

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*Includes taxes. †Deficit.

Traffic and Transportation

THE JITNEY BUS

California Supreme Court Upholds San Francisco Ordinance Ruling—Georgia Commission's Plan for Regulation

The San Francisco jitney bus ordinance has been declared valid by the Supreme Court of California. The matter was brought before the court by a writ of habeas corpus issued in behalf of Paul Cardinal, a jitney bus driver, arrested in May and charged with violating those provisions of the measure which require a bus driver to qualify in a bond or insurance in the sum of $10,000 and also pay a license fee. The court dismissed the writ and remanded Cardinal into custody. In his writ Cardinal, through his attorney, attacked the ordinance on the ground that it was discriminatory in that it attempted to regulate by bond and other requirements an automobile driver who charged no more than 10 cents fare. The Supreme Court holds that the ordinance is a reasonable exercise of the police power vested in cities for the protection of citizens and that laws made by virtue of such power are not to be set aside by courts unless they are found to be unreasonable and unjust. The court sees no unjust discrimination in the not-more-than-10-cents-fare classification for the reason that such low fare puts the jitney driver in competition with the street car and tempts him to run at a high rate of speed to make his profit. It holds that the jitney business is one which, if negligently conducted, would be fraught with danger to passengers in the jitney buses and to persons in the public streets, and therefore particularly subject to special regulation.

The injunction sought by associated jitney-bus operators in Atlanta to restrain the Georgia Railroad Commission from proceeding further with its announced program of prescribing rules and regulations for the buses as common carriers was denied on July 10 by Judge W. D. Ellis of the Fulton Superior Court. No arguments were heard, the court having before it the petition of the jitney-bus operators and the answer of the Railroad Commission. The latter's position was that it had applied no rules, those which had been published being merely tentative and subject to discussion and permanent order at the hearing set for July 13 by the commission. The jitney-bus men indicated they would appeal to the Supreme Court from the decision of Judge Ellis, and the latter therefore granted a supersedeas allowing twenty days for such action to be taken. The commission's announced hearing, set originally for July 13, is stayed meanwhile. Some weeks ago Judge Ellis denied the jitney-bus men's petition to enjoin the city of Atlanta from enforcing its ordinance taxing them and regulating them under its police powers. This has been argued on appeal in the State Supreme Court.

Offering to establish auto-bus lines in East Bakersfield, Cal., and for Beale Park, A. G. Wishon, general manager of the San Joaquin Light & Power Company, appeared before the City Council of Bakersfield, Cal., urging that some action should be taken toward the elimination of jitney bus competition with the electric railway. He suggested that the jitney lines, as well as the auto-bus lines, to be placed in service by the street railroad, should be regulated, placed on certain routes and the public be given guarantees of service. In East Bakersfield he proposed that the street railroad bus lines should serve Baker and Niles Streets, making schedules so that connections would be made with the street cars. Transfers would be issued from the street cars to the auto-buses and vice versa, making a 5-cent fare over the entire route, the city's autos to run as late as the cars operated. In the Beale Park district it was proposed that the auto-bus service connect with every other car.

Andrew Linn Bostwick, librarian of the municipal reference branch of the St. Louis library, has devoted the July issue of the St. Louis Public Library *Monthly Bulletin* to the subject: "The Regulation of the Jitney Bus—A Discussion of City Ordinances." The publication is a welcome addition to the growing list of pamphlets which have as their major purpose the recording of the rise and regulation of the jitney.

The Mayor of Charleston, W. Va., has signed the ordinance passed by the Council of that city to regulate the jitney. The license fee is fixed at $24 for each machine. The jitney is described in the ordinance as a vehicle which carries passengers for hire at less than 10 cents each. The bond is fixed at $2,500 for each car.

Jitney buses will be declared common carriers and placed under State regulation if a bill introduced by the committee on corporations in the Wisconsin Senate becomes a law. The bill provides that jitney owners must file with the State Railroad Commission a schedule of their rates, service, and routes, and if they are approved by that body, and on the filing of a bond of $5,000 for payment of damages for personal injuries to passengers, the jitney men shall be entitled to permits to operate, subject to the supervision of State regulating authorities.

In applying to court for an injunction to restrain the enforcement of the jitney ordinance enacted in Pottsville, Pa., the owners contended that compliance was impossible. The ordinance requires jitney owners to get a certificate of public convenience, but the Public Service Commission has notified them that it will not issue such certificates at present, as the statewide regulation of jitneys is a matter which will be taken up with great care. The ordinance imposes a tax of $100 on each vehicle between Pottsville and Schuylkill Haven, which is claimed to be excessive. Decision was reserved.

The Board of Aldermen of Hartford, Conn., on July 19 will consider the jitney regulatory ordinance drawn up by the ordinance and police committee. The measure provides for the licensing of jitney operators by the chief of police at $10 each for one year, revocable for failure to comply with the provisions of the ordinance. Not more than two passengers in excess of the seating capacity are to be carried. The routes must be conspicuously posted on the machines. The tentative draft does not contain any bond regulation.

The Bristol (Tenn.) Traction Company is planning to install several motor-buses to traverse the principal residence streets not on the lines of the company, gather up passengers and transfer them to the regular cars, at the usual fare.

By furnishing one bond covering thirty-two jitneys, a local jitney association at Louisville, Ky., has complied with the terms of the law and is preparing to put that number of cars in operation, it is stated.

Councilman T. H. Bolton of Seattle has prepared a jitney ordinance which would require a city license or permit for each jitney driver, compel jitney operators to follow certain routes during certain hours of the day and night, make it unlawful to charge a higher fare than that specified in the ordinance and designate points at which passengers may be loaded and unloaded.

Officials of the Tacoma Jitney Bus Association have sworn out warrants for the arrest of fifteen automobile drivers who carried passengers for charge to the race track during the recent automobile races held in that city on July 3, 4 and 5. The warrants charge the drivers with operating without licenses. The prosecuting attorney's office announced that warrants would be issued for approximately thirty Seattle drivers, who operated motor trucks to the Tacoma speedway on the dates named, without a State license to carry passengers. The State law fixes the maximum penalty of $500 for each passenger carried in cases of such violations.

Motor-buses operating at a fare of 3½ cents have been introduced on North Monroe Street, Spokane, Wash., by the Green Security Company, which has five ten-passenger machines in service. J. W. Green, president of the company, promises a 2½-cent fare for North Monroe Street in the next few weeks, when two new forty-two-passenger cars and two thirty-one-passenger cars are delivered from St. Louis. Mr. Green is quoted as follows: "We began to issue books of 100 tickets for our first auto-buses at $3.50, thus reducing the fares purchased in this lot to 3½ cents. For those who do not care to invest in 100-book ticket we have another special rate ticket of twenty-five for $1. I wish to deny that the Green Security Company is being backed by the Washington Water Power Company, which operates the local electric railways."

COMMISSION SUBSERVIENT TO LEGISLATURE

New York Commission Lacks Power to Increase Rates Beyond Legislative Maximum

Refusing to permit the Ulster & Delaware Railroad to increase its mileage book rate from 2 to 3 cents a mile the Public Service Commission for the Second District of New York City on July 7 made one of the most important statements of principle since the passage of the public service commissions law in 1907. The majority of the commission holds that notwithstanding the broad rate-making powers granted by the Hughes statute and its subsequent amendments, the commission has not the power to permit a rate to be increased above a maximum set by the Legislature. Chairman Van Santvoord in the prevailing opinion, concurred in by Commissioners Hodson and Irvine, points out that should the commission assume that the power to permit such increases had been delegated to it by the passage of the public service commission law, not only the mileage-book law involved in the present case but such other statutes as the 3-cent maximum fare law, possibly even the 80-cent gas law for New York City, and other similar enactment might be in effect repealed by the commission's decisions. In an extended review of all the statutory sections involved he fails to find that the commission, either expressly or impliedly, has been granted such power.

Commissioner Emmet and Commissioner Carr dissent. Mr. Emmet holds that had not the Legislature intended to take the rate-making power out of the "often bungling" hands of the Legislature and place it for expert determination absolutely in the jurisdiction of the commission the whole battle of Governor Hughes for the regulation of public utilities would have been vain. As the power to lower rates irrespective of legislative enactment is expressly granted in the public service commissions law, Mr. Emmet finds that the power to raise rates is implied beyond reasonable doubt. Were this power to raise rates to afford a reasonable return on investment in accordance with the facts disclosed in each case not implied, Mr. Emmet holds that the intent of Governor Hughes and the Legislature which passed the law would have been anything but the distribution of even-handed justice, to the railroads as well as to the public.

The Supreme Court of Missouri, as quoted in the opinion of Commissioner Carr, has held that the Public Utility Commission of that State, by a statute delegating to it the rate-making power in the same words as does the Hughes law, was empowered to set aside the 2-cent fare law of that State. He holds that the mileage-book law of New York State is in effect but a legislative guide for the railroads which come under it until the rate which it prescribes can be passed upon by the Public Service Commission.

The mileage-book law was passed in 1895 and the commission holds that it was not repealed when the public service commissions law was enacted in 1907. On the contrary, it is pointed out that when the consolidated laws were enacted in 1910 the public service commissions law was made chapter 48 of the consolidated laws and the mileage-book law in its then precise form was made chapter 49 of the consolidated laws, the chapter numbers at least indicating that the mileage-book law, re-enacted thus subsequently to the public service commissions law, specifically escaped the effect of the clause in the public service commissions law repealing all other statutes contrary to itself.

The mileage-book law provides that wherever a railroad more than 100 miles in length sells regular tickets for more than 2 cents a mile up to the legal maximum of 3 cents a mile it must sell a mileage book at 2 cents a mile. The Ulster & Delaware Railroad pleaded that this was not a rate on which it could earn a fair return within the law and asked for permission to increase the rate to 3 cents a mile under the general rate-making powers of the commission. It was opposed by the State Council of the United Commercial Travelers and by the municipal authorities and civic bodies along the lines of the road. While the majority opinion seems to concur with the dissenting one in that the railroad on a basis of fair return is entitled to an increase and admits that in such a case the commission has a power to grant an increase, it holds that this power to increase does not extend to increases above a statutory maximum.

The direct question as to whether the commission has the power to raise rates in contravention of these older statutes has never been raised in New York State before, and the decision of the commission will undoubtedly be carried to the court of last resort for final determination. Not only the Ulster & Delaware Railroad but every railroad company in the State whose lines are more than 100 miles long and which has been incorporated since the passage of the mileage-book law or which has since that date been formed by consolidation of previously organized corporations and sells regular tickets for more than 2 cents a mile is now limited to 2 cents a mile for its mileage rate.

THIRTEEN KILLED IN GORGE

Of Eighty-four Passengers on Derailed Car Not One Escaped Injury

On the evening of July 8 a double-truck open car of the International Railway, Buffalo, N. Y., crowded with passengers, most of whom were women and children, skidded over the slippery rails in a heavy rain storm and dashed down the steep incline near the foot of the grade from Brock's monument overlooking the lower gorge of the Niagara to the boat landing at Queenstown, Ont., and after jumping the rails crashed into a tree and telegraph pole and partly overturned.

Of the eighty-four passengers on the car none escaped injury. Thirteen were killed and more than threescore were so badly injured that it is expected some will die. The accident was one of those unavoidable affairs caused partly by the weather and partly to the mad rush of the excursion party to board the car which was the first of four to leave the monument, thus greatly overcrowding the trolley despite the efforts of the crew who urged a number to take the three following cars down the steep incline through the lower end of the gorge. Every effort was made by the motorman to keep the overloaded car under control. Preliminary investigations by the Dominion government and by representatives of the railway company show that the brakes were securely set; that the power had been reversed and that every effort was made by the motorman to stop the trolley from skidding over the slippery rails caused by the rain storm.

The passengers were members of two Toronto, Ont., Sunday school excursion parties who had spent the day in the grove in the vicinity of the monument overlooking the great gorge of the Niagara. The boat on which they were to cross Lake Ontario from Queenstown was to leave at 7.15 o'clock in the evening. Four cars were sent to the monument from the Whirlpool carhouse and the first car left the monument for the return trip at 6.40 o'clock, twenty-five minutes before the boat was scheduled to clear. It had been raining and the entire party tried to board the first car for the boat. The car was of the large open type with fourteen cross-seats, with a seating capacity of five on each seat, and with a running board on the river side of the car. Every seat was taken and the passengers crowded into the available standing room between the seats, while some stood on the running board despite the efforts of the car crew to persuade them to wait for the other three cars which were to follow within a few minutes.

The car was started while passengers were still trying to climb aboard. It was kept under control from the monument down to the Lewiston Bridge spanning the river between Queenstown, Ont., and Lewiston, N. Y., and here it was brought to a stop to allow the conductor to throw a switch leading from the main line to a spur track running along the Canadian side of the river to the boat landing. The worst of the grade had been covered up to this point. After turning the switch the conductor collected the remainder of the fares and gave the motorman the signal to proceed.

From this point the car gained momentum, and despite the efforts of the motorman to check the speed the car skidded, entered the last curve, which is a right-angle turn, and jumping the rails, crashed into a tree, which knocked every support from under the roof on one side of the car, and then struck a pole and partly overturned.

As soon as the car left the rails the conductor jumped. He hurried to Queenstown about an eighth of a mile away and summoned aid. The roof collapsed on the passengers. Of the thirteen who died many were killed outright. The others died while being removed to the hospitals at Niagara Falls, Ont., and Toronto, Ont.

Investigation showed that both trucks left the rails; that the brakes worked and held the wheels; that the sand box was half full of sand; that the controller was reversed; that the car skidded over the slippery rails at a great speed before it struck the sharp curve which sent it into the air and toppled it over into the ditch. The grade from the monument down to the point where the car stopped so as to allow the conductor to turn the switch is much greater than at the point where the accident occurred.

Officials say this is another bit of evidence that shows the value of controlled entrance and exit cars. The car crew was powerless to check the mad rush of the excursion party to board the car. It is pointed out that if the car had been of the new controlled-entrance type, only as many passengers as could be seated would have been allowed aboard. This would have prevented overcrowding and the car might have been kept under control.

This is the first accident of a serious nature on the gorge line in years. The line from Niagara Falls, Ont., to Queenstown along the Canadian river bank is owned by the International Railway, and while operated as a part of the Great Gorge Route Company is not owned by the latter, which operates and owns the line through the American Gorge. The accident was not on the gorge route, but on a spur track leading from the main line to a boat landing. The rails and ballast were found intact after the disaster.

WASHINGTON BUS REFUSED INCREASE IN FARES

The Metropolitan Coach Company, now in the hands of a receiver, applied recently to the Public Utilities Commission of the District of Columbia for permission to increase its rate of fare from the present rate of six tickets for 25 cents to a flat rate of 5 cents per ride, contending, among other things, that it was unable to continue to furnish service under the present rate of fare. An investigation was made and a formal hearing was held on May 20. At the hearing the representative of the Metropolitan Coach Company reiterated the request, and referred the commission to the annual reports of the company for information concerning its finances. No objection to the increase in fare was made at the hearing, nor has any written protest been received. The company owns no unincumbered real property, and such expenditures as it has made for garage and plant facilities have been made upon leased land. The company owns six coaches, the cost price of which was $3,749 each, making a total cost price of $22,494. There is a balance still due thereon of $2,894. The commission estimated the fair value of the property of the company at $11,000. In its opinion the commission said:

"Since the company, during a large part of the calendar year 1914, was operating over a longer route than at present, and was operating four large buses which have since been disposed of, the operating conditions of the company for 1913 approximate more nearly to the present conditions than do those for the year 1914, and therefore the report of the company for the year 1913 is selected for purposes of comparison. The net operating revenue for that year was $1,080. Assuming that the revenue passengers will number the same as in 1913, the annual revenue will be increased by $4,172 over that year by an increase of fare to 5 cents, and assuming that the operating expenses will remain the same as in 1913, the annual net operating revenue will be $5,252.

"Assuming the life of the coaches to be six years, the company should be setting aside annually for depreciation $3,750, and, assuming yearly taxes at 1½ per cent on a valuation of $11,000, the company should provide $165 annually for taxes. This total annual charge of $3,915, with a net operating revenue of $1,080 when operating under the conditions for the year 1913, would leave a deficit of $2,834, but with a net operating revenue of $5,252 when operating under the same conditions except for an increase of fare to 5 cents, it would leave a gross income less operating expenses and taxes of $1,337. However, the service furnished by the company is unsatisfactory. There are not enough coaches to handle the traffic, the [illegible] present coaches is poor, and the schedules filed with the commission by the company are not being regularly maintained. These conditions have been repeatedly brought to the attention of the company. In view of these facts, the commission is of the opinion that while a 5-cent flat rate of fare would be just and reasonable if reasonably satisfactory service were furnished by the company, it is not justified under the present conditions."

The commission has denied the petition of the company to increase its rate of fare to a flat rate of 5 cents and has announced that it will give further consideration to a petition for an increase in fare after reasonably satisfactory service has been established by the company.

EFFECT OF LOW FARES AT VANCOUVER

As announced in the ELECTRIC RAILWAY JOURNAL for May 15, the British Columbia Electric Railway inaugurated on May 10 an eight-tickets-for-25-cents rate for non-transfer rides in Vancouver and Victoria. This reduction from the 5-cent fare, made primarily on account of jitney competition, resulted by the following month in an increase of 25 per cent in Vancouver passenger travel and 3 per cent in revenue. At the same time the revenue per car-mile has remained practically stationary. The principal travel area of Vancouver is a 3-mile zone around the center of the city.

On May 17 the company also inaugurated a reduction of interurban fares on its lines between Vancouver and Westminster by changing the round-trip rate from 50 cents to 35 cents. The routes vary in length from 12 miles to 17 miles, so that the fare is practically 1 cent per mile. The reduction in this case produced a large increase of through travel, the increase in passengers being 9 per cent and in revenue about 20 per cent. The increased travel in both cases has been at the expense of competing jitneys.

SAN FRANCISCO INJUNCTION INOPERATIVE

An injunction against the Municipal Railways, San Francisco, Cal., was issued on July 6, as reported in the ELECTRIC RAILWAY JOURNAL of July 10, page 76, to prevent the city from operating cars running direct to the exposition over the lower Market Street tracks. The city, however, secured a twenty-four-hour stay of the injunction, and later a further delay of two days and a reassignment of the case to another judge. This means that the cars will continue to handle the exposition traffic until there are further developments. Meantime city officials are trying to establish the right of the municipal lines to the business that will be lost if the injunction is served. Thomas A. Cashin, superintendent of the Municipal Railways, has estimated that the exposition traffic over the municipal lines will be cut 50 per cent if the direct cars from the ferry have to be taken off. On this basis the loss would be about $150,000 per annum. On the strength of this estimate the bond of the United Railroads was fixed at $110,000.

REGULATION OF JITNEY ASKED IN INDIANA

A petition and brief was filed on July 13 with the Public Service Commission of Indiana by the Terre Haute, Indianapolis & Eastern Traction Company, seeking to require that the operation of jitney buses in the State of Indiana shall be subject to the regulation of the Public Service Commission as in the case of other common carriers, and that the owners of such vehicles shall be compelled to obtain franchises to operate them as common carriers. While the petition of the company specifically refers to conditions in Terre Haute, Ind., where it operates the city lines as part of its system, and where the competition of the jitney buses has become quite a factor, the request is made that the order of the commission shall cover every city in the State.

The company, through its attorneys, sets forth that the owners of jitney buses have held themselves out to the public as common carriers, and with this understanding solicit business on the basis of transporting passengers from one place to another within the city for a 5-cent fare. The same points are also reached by the cars of the traction company. The company says that the owners of the jitney buses are obtaining without any regulation or license the business for which the company is compelled to maintain expensive lines of street railroad. The [illegible] of such automobiles operate only at times when profitable, and thus are not required to maintain service at a loss as is the traction company. They are thus depriving the company of legitimate revenue which is needed to pay the expenses of improving the right-of-way of the company. This expense in Terre Haute amounted to $150,000 for the past two years, and taxes amounted to approximately $30,000 per annum. The fact that jitney buses as common carriers do not provide a flagman to protect the automobiles at railroad crossings is mentioned in the petition.

The Public Service Commission has appointed July 22 as the date when a hearing will be held in the Senate chamber of the State capitol at Indianapolis on the matter of regulation of jitney buses by the commission.

INCREASE IN FARE ALLOWED

The increase in the interurban fares of the Idaho Traction Company beyond Randall on the southern division and Collister on the northern division has been allowed by the Public Utilities Commission of Idaho in a decision just handed down. The commission, however, has refused to permit an increase in the fares on the Hill Crest loop and Collister and Cole school lines, has refused to permit an increase in the price of commutation tickets, and has refused to allow an increase in the 1-cent a mile fare charged on school children's tickets.

The commission based its opinion and order on the book valuations of the company. The total valuation of the properties of the company is shown by the commission from the books to be $2,640,285. This includes 85.54 miles of road, all terminals, stations, equipment, paving, etc.; also the Pierce Park and Natatorium properties. The total operating revenue, including $7,940 net earnings from the Natatorium, amounted to $366,984 for last year. The total operating expense amounted to $267,370 and the net revenue to $99,614. This does not provide any allowance for depreciation, which, the commission says, should be about $30,000. The earnings of the company for the year, not counting depreciation, amounts to less than 4 per cent. By making the allowance for depreciation and calculating the earnings as permitted under the order, the net will be a little better than 4 per cent. The commission some time ago granted a reduction in the power rate to be charged the company by the Electric Investment Company. This will result in a saving of about $14,000 additional.

Taking the present one-way rates within the 5, 10, 15, 20-cent, and other limits, the following increases are allowed: 25 cents one way, now 45 cents round trip; 30 cents one way, now 55 cents round trip; 40 cents, now 75 cents; 45 cents, now 85 cents; 50 cents, now 90 cents; 55 cents, now $1; 60 cents, now $1.05; 65 cents, now $1.15; 70 cents, now $1.35; 80 cents, now $1.45; 85 cents, now $1.50. The first figure named in each instance is the fare charged one way. The figure named in the second instance is the round-trip fare to be charged under the increase.

TENNESSEE JITNEY DECISION APPEALED

The city of Memphis has appealed from the decision of Judge A. B. Pittman of the Third Division of the Circuit Court in the jitney case, mentioned on page 41 of the issue of July 3. The case will probably be heard by the Supreme Court of Tennessee early next September. The case came before the Circuit Court through a writ of habeas corpus, charging unconstitutionality of the act on jitneys for the violation of which the relator, S. B. Ryals, was held in restraint of his liberty. Judge Pittman declared unconstitutional Sec. 3 of the act, which required a bond of not less than $5,000 for every jitney car operated. He did not pass on Secs. 1 and 2 of the act, which declared the jitneys to be common carriers and made it illegal for them to operate until they had been licensed by the city authorities and which also empowered the city authorities to fix the terms and conditions upon which jitneys may operate.

Uniformity in Car Operation Desired.—The City Council at Cleveland, Ohio, has adopted resolutions providing for the appointment of a committee to investigate the manner and method of payment of fares on the city railway lines and manner [illegible] of entering and [illegible] cars. The idea of Council is to establish uniform methods in both particulars.

Car Capacity Order Rescinded.—The Health Department of New York has officially suspended the operation of its order limiting the number of passengers on the cars of the Third Avenue, the Flatbush-Seventh Avenue, the Smith Street, the Graham Avenue and the Gates Avenue lines of the Brooklyn Rapid Transit Company. The order of the board fixed the maximum carrying capacity of the cars at one and one-half times their seating capacity.

Cincinnati Service Crippled by Storm.—Street car and interurban railway service in Cincinnati, Ohio, and near-by towns in both Ohio and Kentucky was crippled for hours by the heavy wind and rain storm which passed over that section on the evening of July 7. No great damage was done to the properties of the Cincinnati Traction Company and the Cincinnati, Newport & Covington Street Railway, but the streets were strewn with debris from unroofed and wrecked houses and buildings, rendering it impossible for the cars to make their way safely over the lines until the tracks could be cleared. Interurban lines were tied up for a time for the same reason.

Efficiency Awards of $23,269 in Washington.—Following a custom inaugurated by the Capital Traction Company, Washington, D. C., seven years ago, $23,269.50 was distributed recently among 196 motormen and 160 conductors who, for the year ended June 30, have lived up to the regulations of the company and had records for efficiency that entitled them to share in the benefits of the generosity of the company. Sixty motormen and twenty-five conductors, who have served the company ten years or longer, were each presented with $100. Fifty-five motormen and thirty-three conductors, five years in the employ of the company, received $75 each. Fifty-three motormen and sixty-five conductors, who came in the two-year class, received $50 each, and twenty-eight motormen and thirty-seven conductors, who have been on the merit roll for a year, were awarded sums varying from $27.08 to $47.88. Since the merit system was started by the Capital Traction Company, in 1909, $139,610 has been distributed among the conductors and motormen as an award for faithful and efficient service.

Free Transportation in Manila.—The question as to whether members of the city police force of Manila, P. I., are entitled to free transportation on the lines of the street railway has been the cause of a recent controversy between the Manila Electric Railroad & Light Company and the city of Manila, according to a newspaper dispatch dated June 5. It appears that the company insists on the collection from the city of $1,150 alleged to be due as the result of the illegal enjoyment by policemen of free rides on the company's cars between Sept. 15, 1914, and April 15, 1915. A decision of the Supreme Court is said to have made compulsory the conspicuous display by policemen of their badges of office in order to be entitled to free transportation on the cars. The company contends that this ruling was not complied with during the period named and that in consequence it lost in uncollected fares the amount demanded from the city. On the other hand the city is suing the company for $21,000 for fares paid by police officers the last eight years, during which period it is claimed they were entitled to free transportation.

Union Men Sign Lexington Participation Plan.—Several concessions made by the Kentucky Traction & Terminal Company, Lexington, Ky., to its union trainmen have resulted in their signing virtually the same three-year contract as that already signed by the non-union trainmen individually. The union's demand for a closed shop was rejected absolutely by the company, and the open shop principle, now in force, will be continued. The union men, however, may wear their union buttons, a privilege denied under the former contract, and may maintain a bulletin board at headquarters. The shopmen receive a flat increase of 1 cent an hour. Wages of the trainmen, union and non-union, will be governed by the condition of the contract heretofore described in the ELECTRIC RAILWAY JOURNAL, by which the company sets aside a fixed percentage of its earnings to pay damage claims, the residue to be divided among the men as an increase, in addition to a 1-cent general increase effective on July 15 with the new contract. [illegible]y has agreed to provide the men with seats.

Personal Mention

Mr. E. Burt Fenton has been appointed manager of a new publicity department for the various properties operated by W. S. Barstow & Company, New York.

Mr. G. S. Henry has resigned as general superintendent of the Chicago & Milwaukee Electric Railroad, Highwood, Ill. A successor to fill this vacancy has not been appointed.

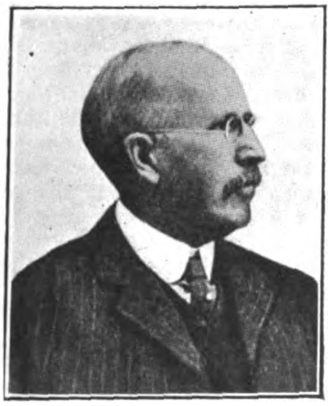
Mr. William M. Guy, who recently accepted the appointment of general traffic manager of the London & Port Stanley Railway, London, Ont., electrification of which has just been completed, tendered his resignation on July 3 to return to the service of the Pere Marquette Railroad, for which he has been chief clerk in London for years.

Mr. Irving M. Frost, for three years a director of the Rutland Railway, Light & Power Company, general manager of this concern, and also general manager of the Western Vermont Power & Light Company and the Pittsford Power Company, has forwarded his resignation to W. S. Barstow & Company of New York City, corporate managers of these companies.

Mr. G. R. G. Conway has resigned as chief engineer of the British Columbia Electric Railway, Vancouver, B. C., to enter consulting engineering practice in the East. He was honored at an elaborate farewell banquet at the Hotel Vancouver on June 28, tendered by the company, and highly complimented in a cablegram from the board of directors in London, England. He will continue relations with the company as its consulting engineer.

Mr. John F. Trumbull, formerly chief clerk to the chief engineer of the New York, New Haven & Hartford Railroad, has been appointed chief engineer of the Public Utilities Commission of Connecticut, succeeding Mr. C. C. Elwell, who resigned several months ago to become a member of the commission. Mr. Trumbull was graduated from Sheffield Scientific School, Yale University, in 1902, and has engaged continuously since that time in railroad work on the forces of the International Railroad of Mexico, those of the Connecticut Company and the New York, New Haven & Hartford Railroad.

Mr. James Dewar Fraser, secretary-treasurer of the Ottawa (Ont.) Electric Railway, was elected president of the Canadian Electric Railway Association at the annual meeting of the association held in Quebec on June 21 and 22. Mr. Fraser is a son of the late Andrew Fraser, of Martintown, Glengarry. He spent his youth in Glengarry and entered the employ of W. McClymont & Company, Ottawa, lumber dealers, in 1871, as an accountant and a telegraph operator. He remained with this company until 1882. He was then appointed secretary-treasurer of the Ottawa City Passenger Railway and continued in that position until 1891, when the company was merged with the Ottawa Electric Street Railway as the Ottawa Electric Railway. He has been secretary-treasurer of the company ever since and in 1913 was elected a director of the company. He is also an officer of the Ottawa Car Company, Ltd., and the Wallace Realty Company, Ltd.


J. D. FRASER

OBITUARY

O. W. Jasper, Sr., one of the engineers engaged in the construction of the Northern Electric Railway, Chico, Cal., died recently at Sacramento, aged fifty-seven years. He was born at Wheatland, Cal., and was graduated from the University of California in the class of 1881. Mr. Jasper was well known on the Pacific Coast. He had been engaged in various important railroad engineering projects of the West.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

East Georgia Railway, Savannah, Ga.—Chartered in Georgia to build an electric or steam railway from Glenville, north via Hagan to Adabelle, about 30 miles, with an extension from Hagan to Claxton. Capital stock, $212,000. Headquarters, Savannah. Incorporators: H. P. Talmage, C. J. Baldwin and E. Leffler. [April 3, '15.]

FRANCHISES

Los Angeles, Cal.—On July 7 the Council of Los Angeles sold to P. D. Cornelius, president Malabar District Improvement Association, the franchise for the extension of the Brooklyn Avenue line on Evergreen Avenue to the east city limits for $100. The franchise will be turned over to the Los Angeles Railway at once without charge so that the extension may be built.

Los Angeles, Cal.—The Pacific Electric Railway has asked the Council for a franchise to double track its line to San Pedro via Gardena.

East St. Louis, Ill.—The East St. Louis & Suburban Railway has asked the Council for a franchise to extend its lines in East St. Louis to Nineteenth Street and Baker Avenue.

Lafayette, Ind.—The Lafayette & Northwestern Railway, through its failure to file a written acceptance with the auditor of Tippecanoe County, has forfeited the franchise granted by the Council on Aug. 7, 1914. [April 3, '15.]

Henderson, Ky.—The Evansville, Henderson & Owensboro Railway will ask the Council for a twenty-year franchise to operate its cars on the city streets, and proposes to construct interurban lines to Owensboro, Morganfield and Providence, Ky., if granted the franchise.

Haverhill, Mass.—The Bay State Street Railway has received a franchise from the Council to relocate its tracks on Main Street, between Fourth Avenue and Kenoza Avenue; on Water Street, east of Haverhill Street, and on Lincoln Avenue at the City Farm.

Haverhill, Mass.—The Massachusetts Northeastern Street Railway has received a franchise from the Council to relocate its tracks for 240 ft. on Main Street and also at the curves into White Street and to Kenoza Avenue.

North Andover, Mass.—The Bay State Street Railway has asked the Council for a franchise to extend its double tracks from Merrimac Street, North Andover, over the new Shawsheen Bridge into Sutton Street.

Corpus Christi, Tex.—The Council of Corpus Christi has passed the franchise applied for by J. H. Caswell to construct a railway from Corpus Christi to Ward Island. The franchise will be voted on by the people on July 30. [June 10, '15.]

TRACK AND ROADWAY

Marin County Electric Railway, Mill Valley, Cal.—The Railroad Commission of California has issued an order authorizing this company to pay a sales commission of 15 per cent on the portion of its stock remaining unsold, such commission to be paid only when stock has been fully paid up. The company was authorized on Nov. 23, 1914, to issue and sell 185½ shares of stock at the par value of $100 a share for the purpose of constructing a railway in Sausalito. [July 10, '15.]

Peoria & Chillicothe Electric Railway, Peoria, Ill.—Surveys of this company's line from Peoria to Chillicothe have been completed and the promoters are now ready to go ahead with the financing of the proposition. It is expected that the construction will be begun within a short time. [March 13, '15.]

Kankakee & Urbana Traction Company, Urbana, Ill.—This company is making surveys for the extension of its line from Ludlow to Paxton. A natural grove about midway between these points will be developed into a park by Paxton capitalists.

Sterling, Dixon & Eastern Electric Railway, Dixon, Ill.—This company has about completed the extension of its line in Dixon north on Crawford Avenue from Fellows Street to the grounds of the Illinois State epileptic colony.

La Salle County Electric Railroad, Ottawa, Ill.—Stockholders of this company have been called to meet on Aug. 17 to authorize the completion of the line between Ottawa and Mendota. O. D. Weaver, Jr., 37 South Wabash Avenue, Chicago, Ill., president. [May 22, '15.]

Union Traction Company of Indiana, Anderson, Ind.—A number of important changes have been made by this company at Anderson, including heavier rails and bridges for interurban traffic and a change in the routing of interurban cars in and out of the city. The company has placed 90-lb. rails on all of its right-of-way on Madison Avenue and Sixteenth Street, and the bridge at Sixteenth Street near Locust Street has been rebuilt of heavier material.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company has received an extension of time from the Board of Public Works of Indianapolis to Sept. 15 in which to begin the construction of a line on West Tenth Street from Bismarck Avenue to Tibbs Avenue. The time for completion is now set for Dec. 1.

Winona Interurban Railway, Warsaw, Ind. — A report from this company states that it has a good proposition for an amusement company for next year. Correspondence may be addressed to J. C. Schade, assistant treasurer.

Hutchinson (Kan.) Interurban Railway.—A report from this company states that it expects to construct ¾ mile of new track in Hutchinson.

Orleans-Kenner Electric Railway, New Orleans, La.—Operation has begun on this company's line from New Orleans to Kenner. E. A. Stanford, New Orleans, president. [Feb. 6, '15.]

Winnipeg (Man.) Electric Railway.—This company is building a 1-mile extension of its tracks on Marion Street, St. Boniface, to the Union Stock Yards. Plans are also being made to reconstruct ½ mile of track on Osborne Street from Kylemore Avenue to River Park.

Boston (Mass.) Elevated Railway. — This company will extend its Hardware Square-Central Square line to the Kenmore Street entrance of the Boylston Street subway via Pearl Street, Brookline Street, Cottage Farm Bridge, Commonwealth Avenue and Beacon Street. The line, which is now operated from Hanover Street to the Cottage Farm bridge via Massachusetts Avenue and Pearl Street, will be run between Hanover Street and Central Square.

Holyoke (Mass.) Street Railway.—On account of the increase in traffic from Holyoke to the Chicopee Falls section, this company is double-tracking its line from the Holyoke-Willimansett Bridge to Margaret Street.

Union Street Railway, New Bedford, Mass.—A petition has been presented to the Board of Aldermen of New Bedford to have the tracks of the Union Street Railway on Dartmouth Street moved to the center of the street. The railway is willing to change its tracks provided the city resurfaces the street.

Worcester (Mass.) Consolidated Street Railway.—Work has been begun by this company relaying its tracks on Main Street from Lincoln Square to Chandler Street. The rails weigh 126 lb. to the yard.

Worcester & Warren Street Railway, Worcester, Mass.—Citizens of West Brookfield have presented to the Council a petition for the relocation of this company's tracks on Main Street, West Brookfield.

Metropolitan Street Railway, Kansas City, Mo.—The city commissioners have awarded a contract to the American Bridge Company to construct a 1500-ft. viaduct at Eighteenth Street, Kansas City, Kan., over the yards of the Rock Island Railway. The viaduct will be a steel and concrete structure with roadbed for wheel traffic, car tracks and sidewalks. The cost, which is estimated at $115,000, will be shared by the Rock Island Railway, the Union Pacific Railroad and the Metropolitan Street Railway.

United Railways, St. Louis, Mo.—Plans are being made by this company to extend its Tower Grove line on Arsenal Avenue and Ivanhoe Avenue, St. Louis.

Springfield (Mo.) Traction Company.—This company plans to extend its State Street line from New Street to Fort Street and south on Fort Street to Grand Avenue, Springfield.

Moncton Tramways, Electric & Gas Company, Ltd., Moncton, N. B.—This company plans to construct an extension of its line on Bonaccord Street from Main Street to Church Street, about one mile.

Public Service Railway, Newark, N. J.—This company has made application to the Board of Public Utility Commissioners of New Jersey for permission to abandon its line in the borough of Kenilworth extending from a point at Westfield Avenue and Grand Street, near Aldene station, to South Twentieth Street and Boulevard, New Orange. As an alternative to abandoning the line the company asks permission to operate for a single fare of 5 cents for a ride anywhere on the road without giving or receiving transfers from any other line with which the Kenilworth line is connected.

Trenton, Lakewood & Seacoast Railway, Trenton, N. J.—Representing himself and a number of other bondholders of the Trenton, Lakewood & Seacoast Railway Company, George O. Vanderbilt, Princeton, has applied to the Board of Public Utility Commissioners of New Jersey to reopen the proceedings under which the board authorized the company to issue $190,000 of bonds and $85,000 of stock. The contention of Mr. Vanderbilt is that the permission granted by the board would permit the exploitation of an over-issue of bonds for the purposes to which the proceeds are to be devoted, and that the result would be to depreciate the value of outstanding bonds. The petition set forth that a competent engineer employed by the bondholders had estimated that only $135,000 would be required to construct 10 miles of line between Lakewood and Point Pleasant. [June 26, '15.]

Binghamton (N. Y.) Railway.—The Public Service Commission for the Second District of New York has ordered the Binghamton Railway to extend its lines from the present terminus to the northern village line of Port Dickinson.

Brooklyn (N. Y.) Rapid Transit Company.—The Public Service Commission for the First District of New York has received a report from the chief engineer giving the footings of the bids which were opened on July 9 for the installation of tracks on the New Utrecht Avenue elevated railroad in Brooklyn. This is a city-owned line, connecting through Thirty-eighth Street with the Fourth Avenue subway, and running over the route of the so-called West End line to Coney Island. The steel structure is nearly completed, and the commission will soon let the contract for the installation of tracks. Steel rails and other track materials for this line have been already purchased by the commission, and the bids opened July 9 were for the laying of ties, tracks and doing all other work required to put the railroad into operating condition except the work of installing the third-rail and electrical signal apparatus, which will be done by the New York Municipal Railway Corporation as a part of the equipment under the dual system contracts. The work will cover only the elevated part of the line, beginning at about Thirty-eighth Street and Tenth Avenue and extending through New Utrecht Avenue, Eighty-sixth Street and Stillwell Avenue to a point near Avenue Y. The three lowest bids were as follows: Ward & Tully, Inc., $71,355; Joseph A. McElroy, $75,183.20, and W. F. Jordan, $78,525.

Buffalo & Depew Railway, Depew, N. Y.—This company reports that during August and September it expects to build 4000 ft. of track along Ellicott Road and Central Avenue to the passenger station of the New York Central Railway, Lancaster. It has just completed rebuilding 850 ft. of double track on Genesee Street. The company expects to continue the work of rebuilding and ballasting its track during the entire summer.

***Tiffin, Ohio.**—Chicago and New York financiers are interested in a proposition to build a railway between Tiffin and Bucyrus. Much territory for the right-of-way has been offered free of charge. The most favorable route is one via Oceola, Lemert, Benton, Plankton and Melmore.

Berlin & Northern Railway, Berlin, Ont.—This company reports that it is extending its line ½ mile from Bridgeport.

London (Ont.) Street Railway.—This company is reconstructing its single track on Ridout Street from Horton Street to Garfield Street, 4000 ft., with 80-lb. A. S. C. T. rail, supplied by the Algoma Steel Company.

Sarnia (Ont.) Street Railway.—This company is in the market for ½ mile of rails, trolley wire, ties, etc., for use in the construction of an extension of its line from the corner of Christiana Street and St. Clair Street to Clifford Street, Sarnia.

Toronto (Ont.) Civic Railway.—The Mayor and the Board of Control of Toronto have received assurance from the Ontario government that if the work of constructing a permanent civic line on Bloor Street is proceeded with legislation will be forthcoming at the next session, provided the expenditure does not exceed $125,000. The rails for the line are on the ground and the application was made to the government following the discovery that the city had not received approval for the project. Work on the line, which has been at a standstill for weeks, will now be resumed.

Johnstown & Somerset Street Railway, Johnstown, Pa.—Grading has been begun on the Johnstown end of this company's line from Kelso southward. Owing to a controversy over the rights-of-way through Boswell, it is probable that the line will extend along the edge of the borough instead of through the heart of the town. Plans are being considered to extend the line from Somerset to Berlin, where connection could be made with Meyersdale. G. C. Winslow, general manager. [May 15, '15.]

Philadelphia, Pa.—Bids are desired until Aug. 16 by A. M. Taylor, director Department of City Transit, Philadelphia, for the construction of concrete column foundations and piers for about 26,000 ft. of elevated railway on Front Street, Kensington Avenue and Frankford Avenue, known as Contract 501. Plans and specifications are on file at Room 748 Bourse Building, or may be secured on a deposit of $10, pending return.

Scranton & Binghamton Railroad, Scranton, Pa.—This company reports that it plans to construct an extension of its lines from Foster to Brooklyn, about five miles.

Montreal (Que.) Tramways.—This company is changing the location of its tracks on Notre Dame Street between First Avenue and Dominion Park to the center of the street and is building an extension of 1.1 miles. The line between Dominion Park and Bernard Avenue, about 4.3 miles of single track, is also being reconstructed. The company has just built about 1 mile of single track from the "Y" at Bernard Avenue to the westerly limits of Montreal East. The rail being used is No. 97 L-399 section.

Rhode Island Company, Providence, R. I.—Arrangements are being made by this company for the laying of tracks on Fountain Street, Providence, and it is expected that cars will be running from Aborn Street to Exchange Place during August.

Chattanooga (Tenn.) Traction Company.—Work has been begun by this company on the construction of a new line on Second Street between Walnut Street and Broad Street, which will connect with the belt railway.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company has begun a considerable amount of improvement work in connection with the city's paving operations. In most cases creosoted ties imbedded in concrete are being used, with a concrete-wearing surface between the rails and on the outside. Wood blocks have been laid on Gay Street. The Cumberland Avenue line will be rebuilt from Ninth Street to the city limits. Plans are being made to build an extension of its line from Fountain City to Smithwood, 1 mile.

Brownsville (Tex.) Street Railway.—Following the granting of a franchise for the extension of its lines, this company has announced that it will establish storage-battery cars on its lines in Brownsville. Service, which was suspended three months ago, will be resumed with the arrival of new equipment in a month. The extension will be made to effect a connection with the Rio Grande Railway to Point Isabel. It is reported that the company plans an interurban service to the coast towns.

Corpus Christi Railway & Light Company, Corpus Christi, Tex.—This company announces the expenditure of $100,000 on extensions and improvements to its line. Two of the most important of these extensions are a line about 3 miles long following the bluff line of Nueces Bay to a new residential section of the city and an extension from Epworth-by-the-Sea, the present terminus, to the Nueces County Causeway, about 1 mile.

Dallas Consolidated Electric Street Railway, Dallas, Tex.—This company has practically completed the double-tracking of its line on Bryan Street, Dallas.

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—It is reported that this company plans to begin work soon on the construction of its proposed railway from Fort Worth to Denton.

Beaumont, Liberty & Houston Traction Company, Houston, Tex.—Surveys have been made of this company's proposed line from Beaumont to Anahuac and Houston. J. H. McCracken, general manager. [May 29, '15.]

Petersburg & James River Railway, Petersburg, Va.—A report from this company states that construction on its proposed railway from Petersburg to City Point will be begun about July 19. The line will consist of 9½ miles of single track, standard gage. Power will be supplied by the Virginia Power Company. J. Walter Long, 110 Bollingbrook Street, Petersburg, president. [June 12, '15.]

Princeton (W. Va.) Power Company.—Operation has been begun to the foot of South Walker Street on this company's line leading toward Bluefield. Work on the extension of the line up Brush Creek Valley is proceeding rapidly.

SHOPS AND BUILDINGS

United Traction Company, Albany, N. Y.—It is reported that officials of this company, the Schenectady Railway and the Albany-Southern Railway will meet in the near future for the purpose of promulgating plans for jointly erecting a terminal station in Albany. It is planned to have a terminal station that will be suitable to all three companies, and to which the companies can jointly contribute for erection and maintenance. The cost of the terminal has been taken into consideration and although no specifications have been drawn, it is estimated to be more more than $100,000.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—This company plans to construct a station at Niagara-on-the-Lake, Ont., the terminus of its line from St. Catharines to the Niagara River. The structure will be 47 ft. x 25 ft., with an open shed 48 ft. x 20 ft. The building will be of stone up to 5 ft., the balance being shingle construction. The shed will be carried on pillars resting on stone pedestals 5 ft. high. Oak wainscoting with metallic side walls and ceiling will be used for the interior of the building.

Springfield (Ohio) Railway.—During the past year this company has expended about $300,000 in erecting its new carhouse at East Street and Clifton Street, Springfield, and improving its power plant. The contract price of the new carhouse was $90,000, exclusive of equipment. The old power plant has been practically rebuilt. New engines and dynamos have been installed and two new boilers are now being put in place. The cost of the improvements being made at the power plant is estimated at $185,000. Two old frame carhouses on adjoining grounds have been torn down and a third one reroofed for use as a supply room.

Toronto (Ont.) Civic Railway.—The Toronto Board of Control has recently asked for bids for the machine shop equipment of this company's new carhouse at Danforth Avenue, consisting of a 14-in. lathe, 150-ton wheel press, shaper, radial drill, vertical drill, 3000-lb. portable crane, double emery stand, vise, hack saw and a 35-hp. induction motor.

Charlottesville & Albemarle Railway, Charlottesville, Va.—This company reports that the contract has been awarded to the King Lumber Company and work has been begun on the construction of its office building and substation in Charlottesville. The company has also purchased a 200-kw. rotary converter.

Manufacturers and Supplies

ROLLING STOCK

London (Ont.) Street Railway is having a number of its old cars remodeled at Preston, Ont., for pay-as-you-enter service.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., is considering the adoption of pay-as-you-enter cars. One car has been changed for a few weeks' experimental trial.

Michigan Railway Company, Kalamazoo, Mich., has ordered two more all-steel, 70-ft. limited parlor cars from the St. Louis Car Company for the Kalamazoo-Grand Rapids line.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., has this month placed in service four interurban cars built by the Cincinnati Car Company, the details of which, as compared with the cars formerly placed in service, are as follows: length, 59 ft., with truck centers 37 ft. instead of the previous 35 ft. 6 in.; seating capacity, sixty-eight instead of sixty-four persons; aisles 4 in. wider; smoking-car seats finished with fabrikoid instead of leather; fabrikoid curtains; flat window glass instead of curved in curved rear ends of cars; outside door for motorman; prism instead of leaded glass above windows; steel window sash; all double windows; larger toilets; Baldwin trucks; Peter Smith heaters; quadruple equipment Westinghouse 100-hp. motors for operation on 600 volts or 1200 volts; double-end Type H.L. control Westinghouse air-brakes, of the straight and automatic.

TRADE NOTES

U. S. Metal & Manufacturing Company, New York, N. Y., has been appointed railroad sales agent for the injector sand-blast apparatus manufactured by J. M. Betton.

Westinghouse Traction Brake Company, New York, N. Y., has received orders for air-brake equipment for the eight cars recently ordered by the Corpus Christi Railway & Light Company, Corpus Christi, Tex., and the six cars ordered by the New York & Queens County Railway, New York, N. Y.

F. W. Roth, who was formerly secretary and director of the J. N. Johns Manufacturing Company, has been recently appointed general manager of the Railway Specialties Corporation, 29 Broadway, New York City. This concern is manufacturing a motorman's new quick-action, adjustable seat.

Wasson Engineering & Supply Company, Milwaukee, Wis., has just shipped a repeat order for ten air-operated trolley bases to the Michigan United Traction Company, Jackson, Mich. These trolley bases are to be used on the new all-steel, high-speed cars of the Michigan Railway, running on the 2400-volt, third-rail line between Kalamazoo and Grand Rapids, Mich.

Esterline Company, Indianapolis, Ind., has just closed a record-breaking month for its graphic meter sales. In addition to a large list of industrial companies, the following electric railways have purchased instruments during the month of June: Public Service Commission of Indiana, utility watt-meter and volt-meter; Terre Haute, Indianapolis & Eastern Traction Company, ammeter; Virginia Railway & Power Company, Norfolk, Va., watt-meter.

Southern Car Company, High Point, N. C., was erroneously noted in the ELECTRIC RAILWAY JOURNAL of June 10 as having received an order from the Little Rock Railway & Electric Company, Little Rock, Ark., for three buses. The name of the purchasing company should have been the Argenta (Ark.) Railway, which operates on the north side of the Arkansas River. The buses will be used for the transportation of passengers from the cars of the Argenta Railway over the bridge into Little Rock to the cars of the Little Rock Railway & Electric Company, and vice versa.

ADVERTISING LITERATURE

Kernchen Company, Chicago, Ill., has issued a folder describing its siphonage ventilators.

Railway & Industrial Engineering Company, Pittsburgh, Pa., has issued a folder on its suspension lightning arrester.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued a sheet describing its car mover for moving heavily-loaded cars.

Sprague Electric Works of General Electric Company, New York, N. Y., have issued a folder on their "Sprague-duct" enameled conduit.

Beaudry & Company, Inc., Boston, Mass., has issued a catalog describing its hammers for light and heavy railroad machine and general forging work.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin E-36 superseding No. E-29, which describes and illustrates its Duntley electric grinders.

General Electric Company, Schenectady, N. Y., has issued a catalog describing its various types of street-lighting brackets and center-span fixtures for mazda lamps.

Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has issued a catalog which contains various magnified sectional views and lists of the composition of its alloys for aluminum and other standard bronze castings.

Dielectric Manufacturing Company, St. Louis, Mo., has issued a booklet on its various types of paint varnish and insulating compounds. The booklet contains tables and data relating to the insulating qualities of these various materials.

Trussed Concrete Steel Company, Youngstown, Ohio, has issued a folder describing a remarkable test which led to the installment of its United steel sash in the plant of the Edison Company. In the test two window sashes were placed on opposite sides of a brick furnace. The furnace was then subjected to a fire of unusual intensity for 35 min. In addition to this ordeal a stream of water from a 3-in. hose was played on the sash structure. After neither test was any sign of weakness discernible.

Stone & Webster Engineering Corporation, Boston, Mass., constructing engineers, have issued a tastefully prepared booklet which describes pictorially the numerous shops, factories, warehouses, mills, offices, educational buildings, power stations, etc., recently constructed by this company. The work includes a wide variety of construction problems which in most instances had to be met within brief time limits. Among the illustrations are included those of hydroelectric power stations of the Mississippi River Power Company and the Pacific Light & Power Corporation.

Westinghouse, Church, Kerr & Company, New York, N. Y., has issued a sheet which contains a potpourri of illustrations of buildings designed and constructed by this company. To show the scope of this work the illustrations are so arranged as to give the appearance of a bird's-eye view of a large city. Such a city, it is said, would cost $50,000,000. There would be only thirty-three cities as large in the whole United States. To present the idea of size in other ways the sard states that all the wage earners of Hartford, Conn., could find employment there; over 56,000,000 sq. ft. would be under roof; the building and materials made over 1,000,000 tons of freight, which to haul at once would require a solid train 530 miles long.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued Leaflet No. 3823, describing the construction and operation of rotary converters of the commutating-pole type. A number of construction details are illustrated including a diagram of the brush-lifting device. A number of installation views are also shown. Leaflet No. 3760 describes a.c. remote hand-control switchboards. The leaflet goes into detail in describing the application of this type of switchboard together with the different methods of mounting, such as frame, wall, ceiling, etc., and a typical wiring diagram is given of the connections. Leaflet No. 3820 describes Westinghouse a.c. heavy duty slip-ring motors, type CW. This motor is especially adapted for constant and varying speed applications where continuous service and strong starting effort are required, and where squirrel-cage motors would not be adaptable. Large squirrel-cage induction motors are described and illustrated in Leaflet No. 3787. These motors and their features, adapting them for heavy work, are thoroughly described and illustrations are given of the detail parts.

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OUTDOOR SUBSTATION DESIGN

Outdoor substations are advantageous from several points of view in electrical distribution systems of moderate voltage. Low cost is one of the chief merits of this class of construction where the line potential does not run up much above 22,000 volts; but economy of investment may be pushed too far. There is room for improvement in some cases, notably in connection with the arrangement of circuits with respect to adjacent structures such as metal stacks; in the provision of wider clearances between lines of different voltage, and in the facilities for disposing of transformer oil in case it has to be drained out of the casings under emergency conditions. In this case a small outlay for pipe connections to a sewer or to a point of discharge at a safe distance from near-by buildings is well made. At least two entrances to the inclosure containing the transformer and oil switch banks are desirable in case trouble in one part of the installation threatens to cut off ingress and egress in entire safety, and the best mechanical construction for pole fixtures is none too good even in an outdoor substation designed for operation at 11,000 volts and over. Double cross-arms, well-secured strain insulators, clean-cut runs of wiring and adequate space around the bases of transformer and switch casings are worth all they cost, and the interests of both safe and convenient operation call for a standard of engineering design and construction not always appreciated by those who erect these structures. In fact, the margin between good work and a down-at-the-heels installation is too small to justify excessive economies in these plants.

LOCOMOTIVE COAL CONSUMPTION

In the discussion on W. S. Murray's paper on the New Haven Railroad's operating costs which was published in abstract in last week's issue, the statement that the steam locomotive required twice as much coal as the electric machine seemed to be something in the nature of a storm center. The problem presented is, of course, decidedly involved, but from such evidence as has been made available the electric locomotive requires some 2.5 lb. of coal for every horsepower-hour produced at the drawbar, making the steam locomotive consume 5 lb. if Mr. Murray's basis of comparison is accepted. As opposed to this there were cited in the discussion the results from a number of laboratory tests in which the coal consumption of a steam locomotive ranged from 5 lb. all the way down to 2.5 lb. per horsepower-hour. However, the laboratory test of a locomotive can hardly be accepted as equivalent to road conditions. In the first place, no standby losses are included. In the second place, the laboratory test gives the coal consumption at a fixed cut-off, a condition that does not exist in practice. As a matter of fact, the most economical loading is that under which the steam locomotive is loaded right up to its limit so that it works at full cut-off on the ruling grade, and this condition would not be likely to produce a coal rate much less than 5 lb. of coal per horsepower-hour even aside from standby losses. Unfortunately, the different characters of the respective services do not permit accurate comparisons of the coal consumption for the steam and electric locomotives on the New Haven Railroad. However, it is of certain interest to note that the annual coal consumption is about 1,800,000 tons, while the ton-mileage is of the order of ten billions, making a rough average figure of 0.36 lb. of coal per ton-mile. As the average power consumption for the electric locomotives is close to 60 watts per ton-mile, this gives a coal consumption of 0.165 lb. per ton-mile, or actually less than half of that of the steam locomotives.

THE CHICAGO ARBITRATION AWARD

The Chicago arbitration decision will be a disappointment to all who believe in the principles of real arbitration. We expressed the hope at the time the arbitrators were selected that the verdict would not be a mere compromise on the questions at issue but would be based on the merits of the case. But the decision shows that the majority of the board did not take into consideration either the average wages paid for the same work elsewhere or the average wages paid in the building trades and similar trades in Chicago. We see no excuse for a decision, supposed to be fair for both sides, which gives wages higher than those in other large cities east of the Rocky Mountains, when the evidence at the hearing showed that the cost of living is less in Chicago than in St. Louis, Detroit, Cleveland, New York, Pittsburgh, Philadelphia or Boston, the latter city exceeding Chicago by more than 27 per cent. Nor is there any logic in the requirement that the company should pay its trainmen so much more than skilled workmen in Chicago earn in such lines as the carpenter trade, as shown in the statement of Mr. Sheean, or the wages paid to the employees of the city itself in such duties as foremen in the street department, officers in the health department, laborers, motor drivers, etc. An unfortunate feature of the arbitration was the action of the Mayor in taking independent testimony during the hearing by calling in some 200 employees whose wages were directly involved in the arbitration, and questioning some himself and having others questioned by representatives of the corporation counsel's office with reference to the issues involved, without the principals being present or represented. If such action had been taken in a jury trial, and some of the jurors had listened to evidence independently of the other jurors, the case would be thrown out of court, and according to the Illinois Supreme Court action of this kind is equally improper in an arbitration hearing. Nevertheless, the company has announced that it would accept the decision and carry out its provisions faithfully, and it has appealed to the public and the trainmen to co-operate with the management in every way possible to give a better service than ever before. This attitude should command the support of the public in Chicago, and as the city is a partner in the profits of the surface lines to the extent of 55 per cent, it has a vital interest in their financial success. Some of the broader questions raised by the decision of the arbitration board in Chicago are considered in an editorial on the opposite page.

UNEVEN WEAR IN INSERT SPECIAL WORK

Perhaps the principal criticism to be made against the general use of insert special work is the uneven wear which predominates, particularly in insert work in curves over which a dense heavy service is operated. Here the manganese steel insert and the rolled rail or cast-steel arms of frogs are subjected to excessive wear, and the insert, being made of a metal of high abrasion resisting qualities, does not wear as rapidly as the arms. Frequently rather serious variations in the curve alignment occur, due to excessive flange wear, and coincident with this the insert surface is found to be above that of the adjoining rails. Where this takes place, uniform wear throughout the layout is, undoubtedly, desirable. To obtain it, heavy traffic curves should be laid with one kind of material, either open-hearth steel rails and special work throughout or solid manganese steel rails and special work. Some engineers, however, have been successful in obtaining uniform wear and reasonably long life, even where the rails join manganese steel special work, by specifying a high carbon content. If this produces the desired result, it should be practised particularly where greater economy may be obtained by reason of the low first cost.

Frequently the question is raised as to the value of renewable as opposed to non-renewable inserts. No doubt some engineers draw the conclusion that renewable inserts are useless because the work of renewing them is difficult, especially when the frog arms have become considerably worn. This objection is well founded, but other more important reasons govern the use of renewable inserts. We believe that track engineers generally favor this type of insert because it permits replacements in case an insert fails early in the life of a frog or crossing and because the insert can be reset in the field if it should become loose under traffic. These two advantages of the renewable insert are certainly sufficient to make it economically desirable. In many instances where the company's repairmen have become skilled in resetting the various types of inserts, success in replacing is obtained even where they are badly worn. On the other hand, most insert renewals due to excessive wear are in right-angle crossings. In these the wear on the running rails is slight while that due to impact blows at the intersecting flangeways is great.

In all cases where inserts are renewed, the tolerances in the setting should be measured to provide for thinner plates when necessary. It is possible, however, where the variation is slight, to surface the insert with a grinder after it has been set in position. In connection with the renewability of inserts, it must also be borne in mind that although this is a desirable quality, the fastenings can be such as to make replacements too easy. This may reduce the effectiveness of the fastenings which, in turn, may shorten the service life of the piece. To guard against a weakness of this kind, track and roadway engineers should not specify that their insert fastenings should be designed to make replacements easy, but should insist primarily on a design which will hold the insert secure.

SPARKING AND FLASHING IN RAILWAY MOTORS

The very interesting study of motor commutation by R. E. Hellmund, printed in last week's issue of this paper, must have served to remind users of railway motors of the fact that present conditions in this line are in marked contrast to those of the early days. In the light of the present knowledge of the causes of sparking and flashing the younger generation of master mechanics may have difficulty in realizing how progress was made step by step. The three big and conspicuous steps in this progress were these: The introduction of the carbon brush; the application of saturation in the magnetic circuit to control flux displacement by armature magnetomotive force, and the introduction of the commutating pole. Smaller intermediate steps involved details of design incident to all progress.

The railway motor is inherently inclined to good commutation because, being a series motor, its flux increases with the load. Hence armature reaction, the bane of good commutation, has less effect than in shunt machines because the armature teeth become saturated under heavy load and limit flux distortion. On the other hand, necessary reversibility in direction of rotation prevents the shifting of brushes to the position best for commutation, and space limitations force designers to bring "live" parts closer together than is ideal from the insulation standpoint.

The carbon brush was introduced so early in the history of the commercial railway motor as now to seem a matter of course, but its adoption in place of the earlier copper brush contributed tremendously to success in electrifying horse railways. It provided a simple and cheap means for choking down the currents in the armature coils during the period of reversal. In stationary motors this could be done by shifting the brushes backward from the neutral axis, i.e., against the direction of rotation, but not so in car motors. With surface-wound armatures, and consequent long air gaps between pole faces and armature cores, the carbon brush could have controlled the sparking evil alone. The field ampere-turns were large compared with those of the armature, and air-gap flux distortion was not serious. But when slotted armature cores, with short air gaps, came in, the case was different. It then became necessary to saturate the teeth heavily to prevent the production of a strong magnetic field along the brush axis, in a position to be cut by the short-circuited coils and in a direction to resist commutation. More recently the commutating pole has been introduced to supplement the effect of saturation and to reduce the necessity for it by providing a reversing flux in a definite location varying with the armature current. In this way it has greatly extended the range of non-sparking and non-flashing operation.

The above is in merest outline the history of commutation in the railway motor. Along with these large developments have gone others only slightly less important. The slotting of commutators, the expert manufacture of carbon brushes and the determination of the proper relation of armature and field turns, of the allowable voltage per commutator bar, etc., have all contributed to relieve the operating man's mind of what was once a bugbear to him. All of the items mentioned have contributed to pave the way for the higher-voltage motor.

LABOR DISPUTES AND ARBITRATION BOARDS

In discussions relating to the wages to be paid to railroad trainmen we think that the public often misses one very important point which distinguishes controversies of this character and those of the same kind between private employers and their employees. The private employer figures upon a certain amount of profit between the price at which he can sell his goods and the cost of producing them, and if the latter is increased because of the necessity of paying higher wages, there are three things which he can do. He can raise the price of his goods to cover the additional cost of production, or he can stop manufacturing entirely and sell his factory at comparatively small loss to someone to conduct some other industry there, or he can sell his factory and move to another place where the wages which he has to pay are lower. The railway, in common with most other public utilities, does not have this choice. It cannot stop operation even if it is not making enough money to pay operating expenses and the interest on its investment, and usually it cannot increase its fares. The business of electric railway transportation in most cities is conducted on a very narrow margin of profit, whose continuance depends on the maintenance of existing conditions. On this basis it has assumed certain burdens, such as pavement charges, street sprinkling, street cleaning, etc., and, in Chicago, enforced extensions with no earning capacity to justify them and the expense of rebuilding the track whenever water pipes, sewers or other underground city utilities are built across them or along them. With any radical change in the basic conditions of operation the close balance between income and outgo to yield a profit no longer obtains, and if expenses for labor are increased the extra-operating expenses just mentioned should be decreased. No railway manager begrudges an increase of pay to his men where the evidence shows that such an increase is warranted according to the wages paid elsewhere for similar work under similar conditions. But they recognize the economic fact that unless in some way a sufficient margin is maintained between gross receipts on the one hand and operating expenses and fixed charges on the other, present stockholders suffer an injustice and no additional capital for needed extensions and improvements can be secured.

The Chicago arbitration case teaches several important lessons. One of these, and perhaps the main one, is the supreme importance of the choice of the third or impartial arbitrator. In an arbitration case there is legally no obligation on the part of the arbitrators to be governed by the evidence, and in many cases they do not even discuss the evidence in their verdict but simply give their conclusions. We are not prepared to say that this is necessarily wrong, but we mention it to show the difference between a case decided by arbitration and a case decided by law. Cases at law may be decided erroneously as often as cases before a court of arbitration, but the judge in the former case feels obliged to justify his view of the case by an extended statement in which he attempts to prove that his verdict is justified by the evidence presented. Again, while an arbitration board consists nominally of three persons, it really consists of one judge and two counsel, one for each side. This leaves the "third" arbitrator in a position where he is unable to consult with any impartial persons upon the decision. Where the interests involved are large, this is a position of great responsibility, often too great for one man to fill properly, especially when he is in public life and has political ambitions. The whole tendency in modern government where decisions have to be reached from which there is no appeal is to provide more than one arbiter. This is the case with public service commissions, where there are always three and usually five members. It is also the case with the higher courts and the federal commissions. One remedy suggested is an increase in the number of "impartial arbitrators" from one to two or three. Such action would be a step in the right direction. Several men, under such circumstances, would not only be of assistance to each other in arriving at a proper decision, but would be of help in justifying the decision after it was announced. For the same reason, a further improvement, in our opinion, would be a change from one to two in the number of representatives from each side. A single representative has necessarily to be largely a partisan. To be otherwise would seem to be neglectful of the interests of those who had selected him. But with two arbitrators representing a side one would give moral support to the other in reaching a decision based on the merits of the case, even if it did not give all that was sought by those whom he represented.

Long Island Railroad Adopts Light, Steel Trailers

These Cars are Intended for Summer Use Exclusively—Unusual Features of Construction Are Provided for Combining Strength with Lightness

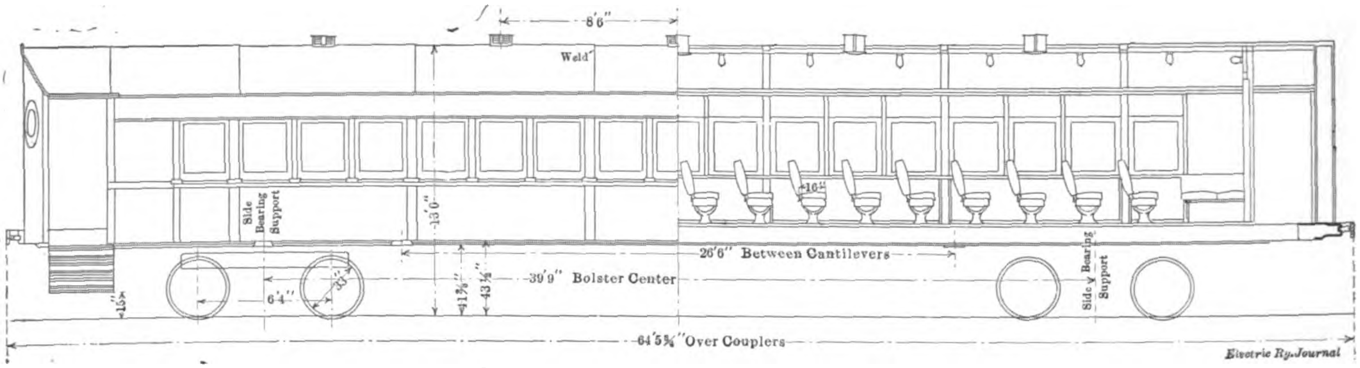
The Long Island Railroad, in order to provide for its heavy suburban passenger traffic during the summer, has ordered from the Standard Steel Car Company twenty new all-steel trailers, the design of which reveals a marked reduction in weight, while preserving a neat appearance and securing unusual strength at the points desired. The new cars were delivered recently, in time for operation during the heavy summer season. They are based in general on the dimensions and specifications of the "MP-54" car, the standard steel, 64-ft. 5¼-in. (over couplers) motor car now in suburban electric service on the railroad, and are now being operated in trains with these cars.

The general dimensions are as follows:

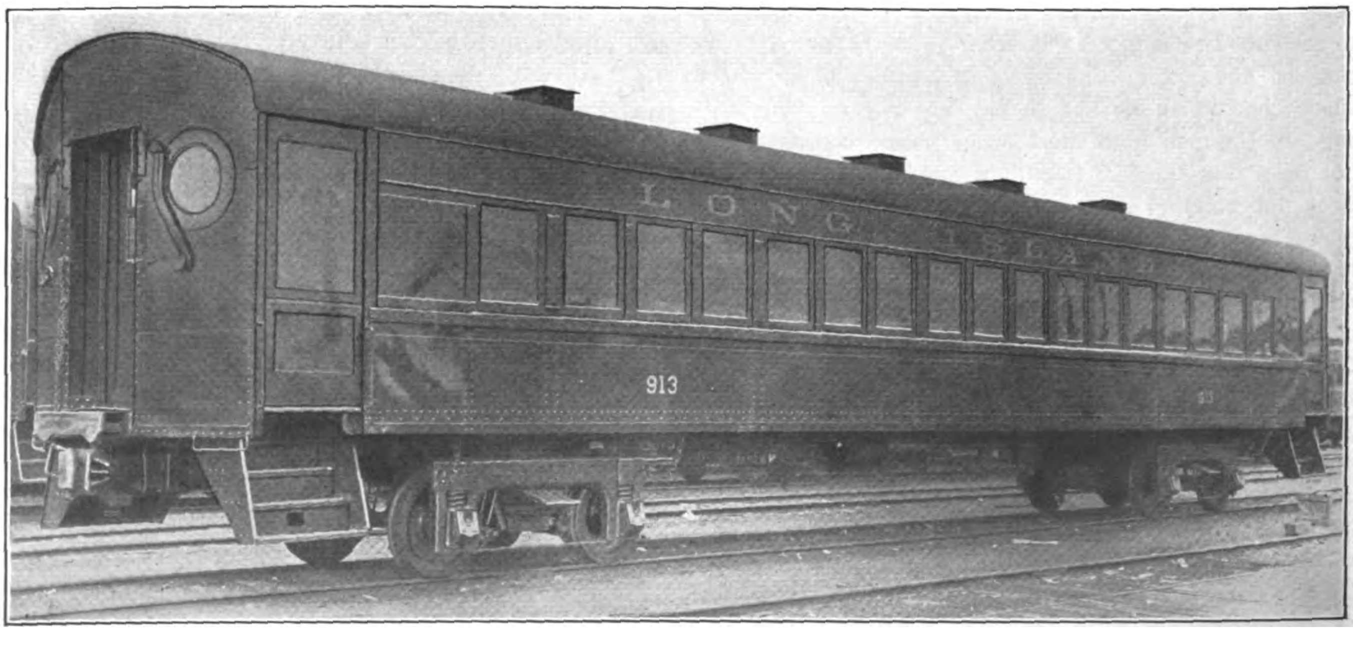
Length over body corner posts	54 ft. 9¾ in.
Length over couplers	64 ft. 5¾ in.
Distance between truck centers	39 ft. 9 in.
Wheelbase	6 ft. 4 in.
Height, rail to top of roof	13 ft.
Width over side sheets	9 ft. 8¾ in.
Width over belt rail	9 ft. 10¾ in.

The cars, complete, including trucks, brake rigging and interior equipment, are estimated to weigh only about 68,000 lb., as compared with 87,000 lb., the approximate weight of the motor car without electrical equipment. The trailer car bodies, fully equipped, weigh about 49,000 lb., as against the motor car body weight of about 54,000 lb., not including electrical equipment.

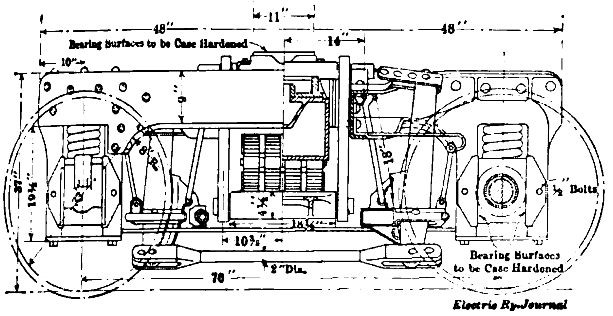
As the trailers are exclusively for summer service, neither heaters nor headlining are installed. The car body is further lightened by the use of a rather flat-arched roof. The 3/32-in. roof sheets are riveted and welded together in such a manner as to eliminate leakage. The roof is supported directly by combined posts and carlines spaced on 8-ft. 6-in. centers. Opposite carline sections are welded together at the center of the roof, thus forming one continuous inverted U-shaped member. In order to support the low arch without an excessive number of carlines the roof is reinforced in an unusual way by means of two parallel lines of steel purlins, consisting of sections but continuous in effect, running longitudinally from end to end of the car. Each purlin is located 22 in. from the center line of the roof. The purlin sections at carline intersections meet and terminate in flanges shaped around under and riveted to the carline. The purlins transmit extraordinary longitudinal stresses to the roof and sides of the car, a strong vestibule and body end construction being provided.



LONG ISLAND TRAILER—ELEVATION OF CAR

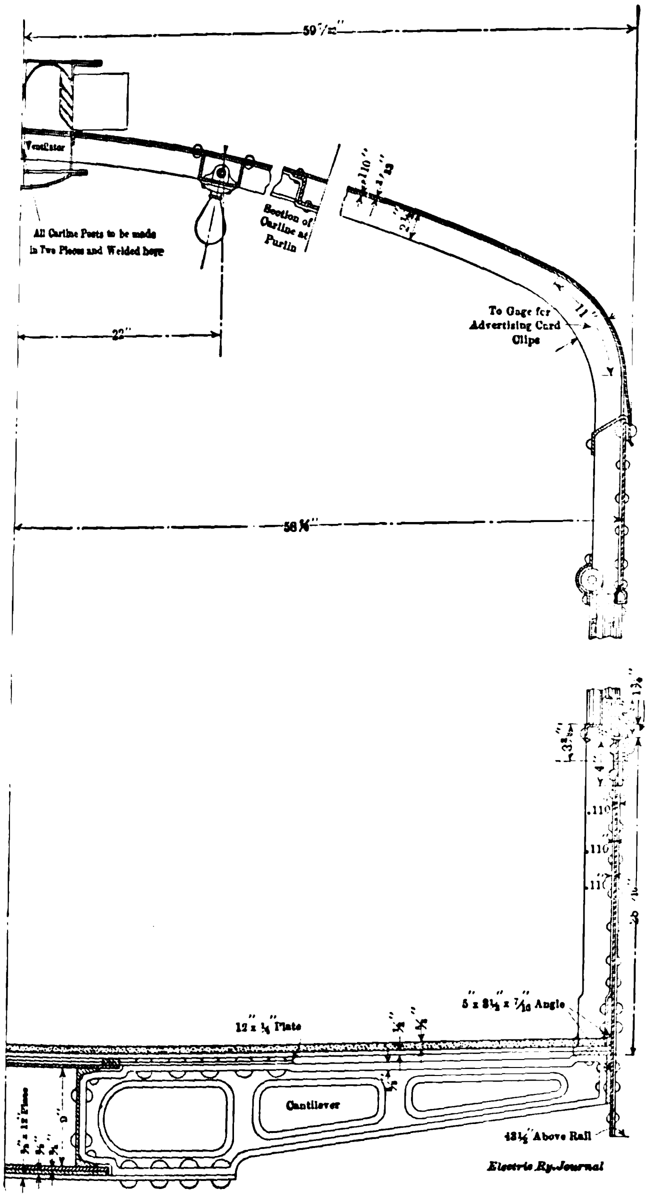


LONG ISLAND TRAILER—SIDE VIEW

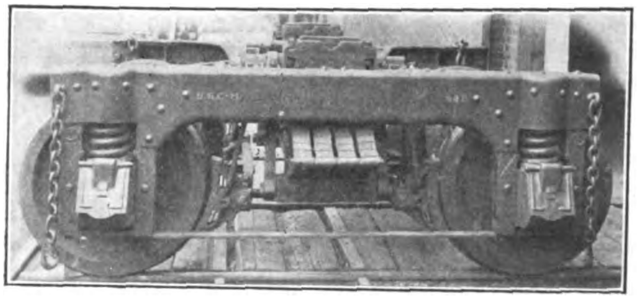

48"
11"
14"
48"
Bearing Surfaces to be Case Hardened
10"
½" Bolts
10½"
18"
2" Dia.
78"
Bearing Surfaces to be Case Hardened
Electric Ry. Journal

LONG ISLAND TRAILER—SIDE ELEVATION AND SECTION OF TRUCK

The purlins receive extra support at each body end by means of two vertical pressed-steel posts 4 in. wide, flanking each side of the 36-in. wide bulkhead door opening. The posts are riveted to the end sills and are tied together by a steel section running across the top of the door opening. The vestibule end posts, shown in the accompanying vestibule plan, are unusually strong and consist of two 12-in. I-beams weighing 31.5 lb. per foot. The purpose of this combination carline, purlin, vertical post and I-beam framing is to distribute the shock of a head-on collision among the members forming the structure as a whole.


59⅞"
Ventilator
All Carline Posts to be made in Two Pieces and Welded here
Section of Carline at Purlin
22"
To Gage for Advertising Card Clips
58⅜"
12 x ¼" Plate
5 x 3½ x 7/16 Angle
Cantilever
43¼" Above Rail
Electric Ry. Journal

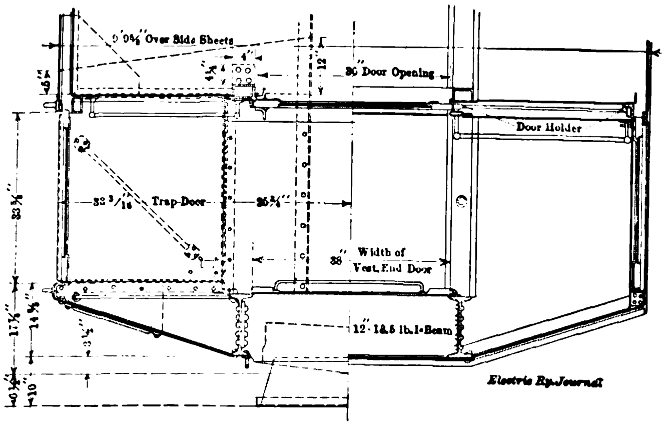
LONG ISLAND TRAILER—VERTICAL CROSS-SECTION OF CAR



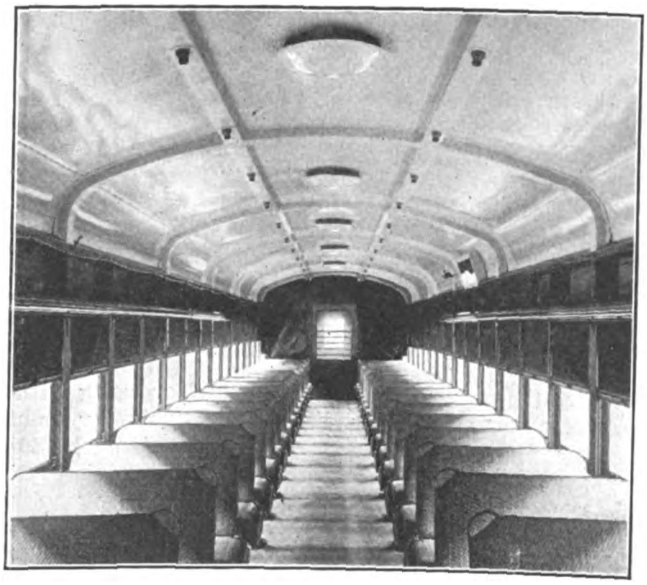
LONG ISLAND TRAILER—SIDE VIEW OF TRUCK

The underframe crossings consist of a number of 5-in. channels and two cantilevers, spaced 26 ft. 6 in. apart, each 14 ft. 1⅞ in. from the outside of body posts. These cantilevers, together with the body end sills, take the place of the usual body bolsters. No body bolsters are installed, the center plates being attached to the center sills, which extend across the space between the cantilever and the body end sill in the form of a heavy box girder. The extension of this box girder supports the platform. The end corners of the underframe have been specially reinforced by horizontal pressed steel sections in order to protect the body corner from injury by side swiping.

The same principle of combining lightness with strength has been followed in the truck design. The weight of the new truck, including brake rigging nor-


9' 9⅜" Over Side Sheets
36" Door Opening
Door Holder
33 3/16"
Trap-Door
26¾"
Width of Vest. End Door
38"
12" 18.5 lb. I-Beam
Electric Ry. Journal

LONG ISLAND TRAILER—FLOOR AND UNDERFRAMING PLAN OF VESTIBULE



LONG ISLAND TRAILER—INTERIOR VIEW

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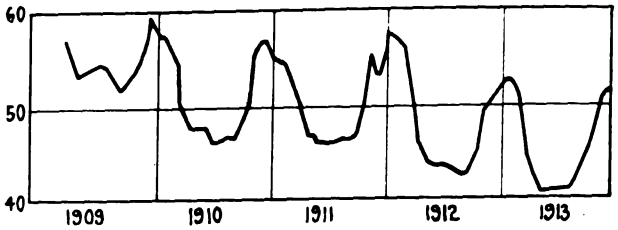

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The increase in total cost is due to the larger primary charge, due in turn to the decreased load factor. The change in load factor is shown in an accompanying diagram, and it is explained in the report by reference to the rush-hour conditions which have become more acute each year. The addition of cars during the rush-hour period increases the peak load during that period and correspondingly decreases the load factor. The maximum demand has therefore grown at a greater rate than the total energy consumed.

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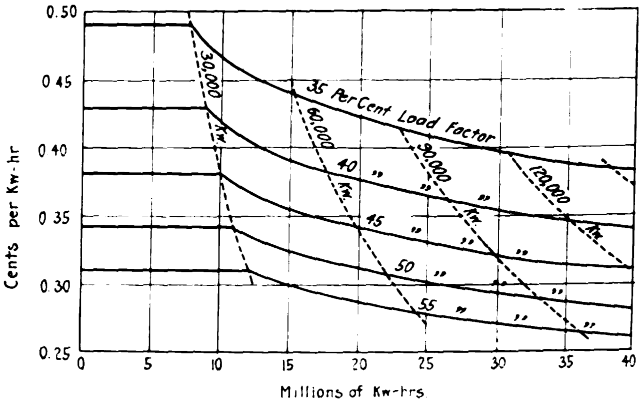

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Pittsburgh Railways Claim Department

A Co-operatively Functional Type of Organization, with the Five Separate Bureaus, Has Been Built Up—Details of the Various Systems Used Are Published

The claim department of the Pittsburgh (Pa.) Railways, under the supervision of Cecil G. Rice, superintendent, is an excellent example of the application of modern business principles to the work of settling claims. To be more specific, it deserves description on account of its functional type of organization and its recognition of the value of fixed principles, definite policies and psychological essentials in every-day claim work. This article will be confined to a description of the organization itself, and the psychological and other features will be discussed in a later issue.

TYPES OF MANAGEMENT

When Mr. Rice took up the reorganization of the Pittsburgh Railways' claim department more than five years ago, he resolved not to base the practices of his department upon mere imitation of those in the claim departments of other companies or gradually to work out a system for Pittsburgh by means of the "trial and error" process. Instead, it was decided that of the three types of management, "autocratic," "autocratic-divisional" and "co-operatively functional," the last and most modern was best suited to solve the existing problems. According to this decision, active work was immediately begun along the five factors of such management, as follows:

1. Investigation and standardization.
2. Planning of organization to carry the chosen standards into effect.
3. Selection of staff for organization.
4. Provision for compensation, discipline and development.
5. Provision for understudies and recruits.

PRINCIPLES OF STANDARDIZATION

After investigation of the conditions the management evolved six distinct fixed principles of standardization, or standards, in accordance with which every claim employee in so far as possible must bring his thoughts and actions.

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Of allied importance with the co-operatively functional organization of the department is, of course, the personnel selected to carry on the work. One of the most difficult problems for claim departments to solve effectively is the public feeling that claim agents and their employees are all "thugs," "roughnecks" and tricksters. The first act in selecting employees for the new organization in Pittsburgh was the employment of several college men of pleasing personality for the purpose of influencing the opinion of the public. All the new members of the department came in without previous experience in claim work, but they were rapidly developed along the proper lines and from the beginning helped to inspire in the public a better confidence in the gentlemanliness and integrity of claim employees. The present number of employees is fifty-five, of which eleven are college-trained men. Others were selected from among the platform men or because of some special fitness. Everything else being equal, college men are preferred, but they are always selected in competition with other applicants and not solely on account of their qualification of college training.

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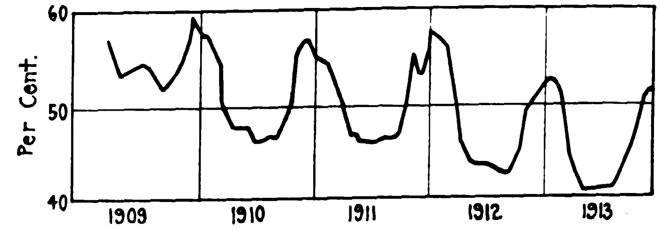

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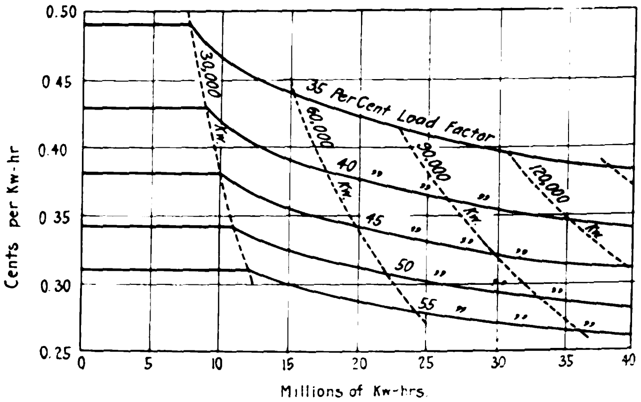

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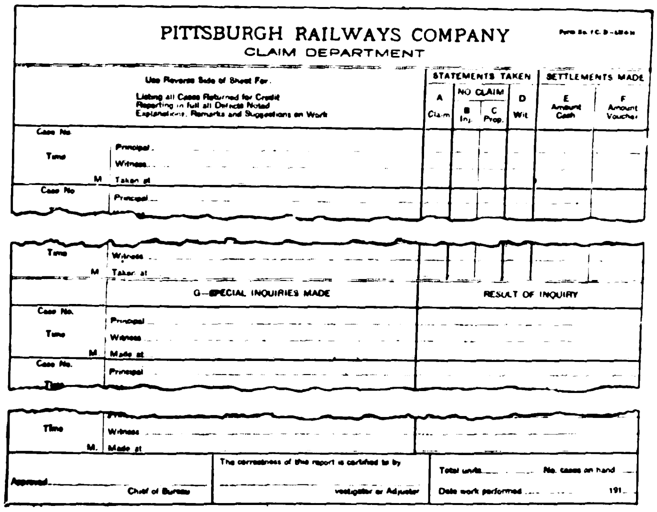


PITTSBURGH RAILWAYS COMPANY
CLAIM DEPARTMENT

Use Reverse Side of Sheet For
Listing all Cases Returned for Credit
Reporting in full all Defects Noted
Explanations, Remarks and Suggestions on Work

	STATEMENTS TAKEN				SETTLEMENTS MADE	
	A Claim	NO CLAIM B Inj.	NO CLAIM C Prop.	D Wit.	E Amount Cash	F Amount Voucher
Case No. ____ Time ____ M. Principal ____ Witness ____ Taken at ____						
Case No. ____ Principal ____						
Time ____ M. Witness ____ Taken at ____						

	G—SPECIAL INQUIRIES MADE	RESULT OF INQUIRY
Case No. ____ Time ____ M.	Principal ____ Witness ____ Made at ____	
Case No. ____ Time	Principal ____	
Time ____ M.	Witness ____ Made at ____	

Approved ____ Chief of Bureau

The correctness of this report is certified to by ____ Investigator or Adjuster

Total units ____ No. cases on hand ____
Date work performed ____ 191__

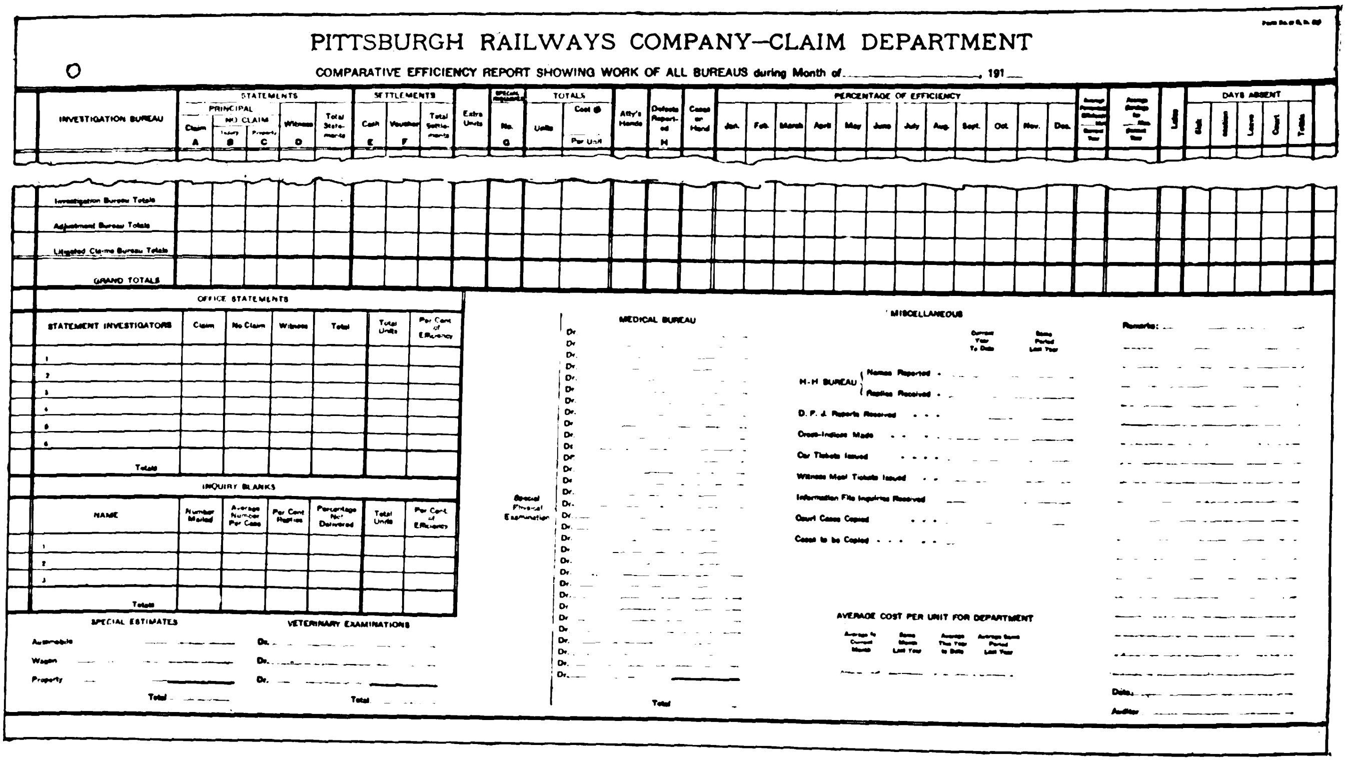
PITTSBURGH RAILWAYS CLAIM DEPARTMENT—FORM 1—BLANK USED BY INDIVIDUAL CLAIM EMPLOYEES FOR MAKING DAILY REPORT

ment bureau and the litigation bureau, with separate lines for the individual employees. The illustration shows merely the bottom of the sheet, beginning with the summary for these bureaus, the column rulings and headings being the same as used above.

Different units are granted for different classes of work; for example, two for every release, two for every signed statement, one for every special inquiry and one extra unit for any work after 7 o'clock in the evening. By actual trial it has been found that to be 100 per cent efficient a man should have to his credit 300 units per month, or 3600 units per year. Any number of units less than these amounts would indicate that the employee was only proportionately efficient. Frequently the average of several men is higher than 300 units. Of course, when the number of units of work performed by any man falls below the standard, the management is most careful to ascertain the cause for such inefficiency. Sometimes, for instance, it might be found that the work presented to an entire bureau for a certain period was slack.

If ten outside inspectors are paid on an average of $90 per month, the work done by these men costs $900 per month. When $900 is divided by the total number of units of work credited to these men, the quotient in reality gives the cost of each unit of work, but the management reverses the point of view and considers this to be the amount of money earned by the employees for a unit of work. Each person's total units are multiplied by the average cost per unit, the result equaling what he has earned for the month. This may be more or less than his payroll rate. The salaries do not fluctuate monthly in accordance with these figures, but if a man can earn on this basis more than he is being paid and continues to do so for a period of four months or more, his salary is automatically increased on the basis of his record. If a man runs lower than the standard for four months, or even for a shorter time if the deficiency is great, the management takes steps to find out the reason. Inquiries are made from the chief of the bureau, or, if no explanation is forthcoming here, from the man himself, the management in all its interviews working with the intention of keeping its efficient employees permanently in the organization if possible.

In general, this unit system has resulted only in increased efficiency. For example, during the year following its installation the efficiency of the outside men was increased 20 per cent. Experience has shown, too, that the cost of supervision is less on the high-unit men. Maximum supervision is provided with a minimum number of outside men. The salaries have, of course, increased. During the five years when the unit plan has been in operation, the salaries in the claim department have increased $1,500 per month for the fifty-five employees now there. At the present time, however, with more work, the department has six less men than a year ago, and the total payroll is less. No employee ever thinks of asking for an increase in salary, for he knows that he will get it if he can prove by the sustained character of his work that he merits it.



PITTSBURGH RAILWAYS COMPANY—CLAIM DEPARTMENT
COMPARATIVE EFFICIENCY REPORT SHOWING WORK OF ALL BUREAUS during Month of ____ 191__

INVESTIGATION BUREAU	STATEMENTS: PRINCIPAL Claim A	NO CLAIM Injury B	NO CLAIM Property C	Witness D	Total Statements	SETTLEMENTS Cash E	Voucher F	Total Settlements	Extra Units	Special Inquiries No. G	TOTALS Units	Cost @ Per Unit	Atty's Hands	Defects Reported H	Cases on Hand	PERCENTAGE OF EFFICIENCY Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Investigation Bureau Totals																											
Adjustment Bureau Totals																											
Litigated Claims Bureau Totals																											
GRAND TOTALS																											

DAYS ABSENT

OFFICE STATEMENTS

STATEMENT INVESTIGATORS	Claim	No Claim	Witness	Total	Total Units	Per Cent of Efficiency
1						
2						
3						
4						
5						
6						
Totals						

INQUIRY BLANKS

NAME	Number Mailed	Average Number Per Case	Per Cent Replies	Percentage Not Delivered	Total Units	Per Cent of Efficiency
1						
2						
3						
Totals						

SPECIAL ESTIMATES
Automobile ____
Wagon ____
Property ____
Total ____

VETERINARY EXAMINATIONS
Dr. ____
Dr. ____
Dr. ____
Total ____

MEDICAL BUREAU
Special Physical Examination
Dr. ____ (repeated lines)
Total ____

MISCELLANEOUS

	Current Year To Date	Same Period Last Year
H-H BUREAU Names Reported		
H-H BUREAU Replies Received		
D. P. J. Reports Received		
Cross-Indices Made		
Car Tickets Issued		
Witness Meal Tickets Issued		
Information File Inquiries Received		
Court Cases Copied		
Cases to be Copied		

AVERAGE COST PER UNIT FOR DEPARTMENT

Average for Current Month	Same Month Last Year	Average This Year to Date	Average Same Period Last Year

Remarks: ____
Date ____
Auditor ____

PITTSBURGH RAILWAYS CLAIM DEPARTMENT—FORM 2—MONTHLY COMPARATIVE EFFICIENCY REPORT SUMMARIZING WORK OF INDIVIDUALS AND BUREAUS

In the foregoing manner the management keeps the employees of the claim department in a satisfied frame of mind as regards their salaries. Occasionally, however, there is found a man who does not find himself suited to claim work. Although the management offers every inducement to permanent employment, yet if any competent employee really desires to change to another line of work, the superintendent is at all times ready to use his best influence to place the employee in another position. Just how tangible this aid is can be judged from this—out of forty-seven previous employees, twenty-two now have good positions secured chiefly through Mr. Rice's influence and efforts. Five men are chief adjusters for casualty companies, and the others hold such varied positions as parole officer and assistant parole officer of Allegheny County, parole officer of western Pennsylvania, chief clerk in the county tax collector's office, superintendent of schools in a New Mexico city, investigator for the Carnegie Hero Fund, practicing attorneys, doctors, secretary to a bank president, city editor of a Pittsburgh newspaper, etc. The attitude that Mr. Rice takes toward these men is exactly that which a university feels toward its graduates. At a meeting of the claim department in December, 1914, held as a testimonial to Mr. Rice, these outside men were present as the "alumni" of the department. They all are still loyal to the department and in every action testify to the spirit of good fellowship that exists between the management of the claim department and the employees, past or present.

PROVISION FOR CO-OPERATION AND DEVELOPMENT

The basis of the co-operative work of the department is a meeting between the superintendent and the members of his staff, held every Saturday at 2 p. m. Besides the bureau chiefs, there are present the auditor and the principal adjuster, whose duties are later explained. At each meeting the work of the last week and the immediate future is discussed, and each staff member is held responsible for knowing as much about the business as the superintendent. The rotating appointment as senior chief and the possible necessity of acting in Mr. Rice's absence makes this responsibility an important one. Those meetings are reported, and copies of the minutes furnished to each member. Later these minutes are bound and preserved in the department library.

To bring about closer co-operation among the employees of each bureau and between them and the management, a meeting of one of the bureaus is held once a month. At this the policies and the acts of the bureau are discussed and all questions put forth by the employees answered. When these meetings are about half over, Mr. Rice usually joins the group for a short talk to the men. The last Friday of each month is devoted to a general meeting of all the employees of all the bureaus, and this meeting is sometimes addressed by attorneys, doctors, executive officers of the company and other prominent persons. Once a year a meeting is set aside for the consideration of suggestions turned in by the department members. Another meeting, a sort of informal reception, is attended by relatives of employees. All meetings are fully reported in typewritten form.

The general meeting of December, 1914, was in charge of the members of the staff and the program was arranged by them. Each bureau chief read a paper in the nature of a review of the changes made in his branch of the work under the present superintendent. In addition, each member of the different bureaus addressed a letter to Mr. Rice, commenting upon the advancement made as an individual and as a unit of the department. These papers and letters were bound in limp leather and presented to the superintendent. At a meeting held in 1913 an embossed resolution signed by each member of the department was presented to Mr. Rice. This meeting was addressed by the then vice-president and general manager, S. L. Tone.

The work of developing the men is carried on not only through the talks given by the superintendent, the chiefs and the outside experts, but also by the papers which the men read at the meetings. Most papers are read at the general monthly meeting, but some are read in the bureau meetings on subjects relating to particular practices and policies of each bureau or even to more general topics, such as the experiences of delegates attending the American Electric Railway Association conventions, visits to other claim departments, etc. All papers are made out in duplicate, and copies are bound each year and added to the library. Besides the presented papers, the department also has in its library various inspirational books, works on practical psychology, efficiency, scientific management and claim work, as well as many periodicals and all paper books of attorneys. Furthermore, it reprints certified copies of Pennsylvania Supreme Court and Superior Court decisions for distribution to the men, in order that they may at all times be conversant with the final legal decisions in matters relating to claims and allied subjects.

PROVISION FOR PROMOTION, UNDERSTUDIES AND RECRUITS

New men entering the claim department are usually started in clerical bureau work, inasmuch as this requires the least experience and can be most readily learned. The next step is to the inspection bureau, then to the litigation bureau and finally to the adjustment bureau. The medical bureau members, of course, are doctors. In general, the chief of each bureau gives his personal attention to each man under him. If a high-priced man leaves the department, an effort is made to move the men up all along the line. If his work, however, can be transferred to the other members, the pay of the man who left, or a portion of it, is distributed among those who thus increase their efforts.

The plan of organization of the department provides for understudies in all its branches, or men trained to handle the work of their immediate superiors. They are tested during the vacation period. This not only protects the work of the department during absences but also marks out a definite program of advancement for the men if they keep up to and above the standard and if they are fitted for the advanced work. The time for progress from one bureau to another varies with conditions and with men. Some have made the rounds in less than a year, while others may never reach the highest position.

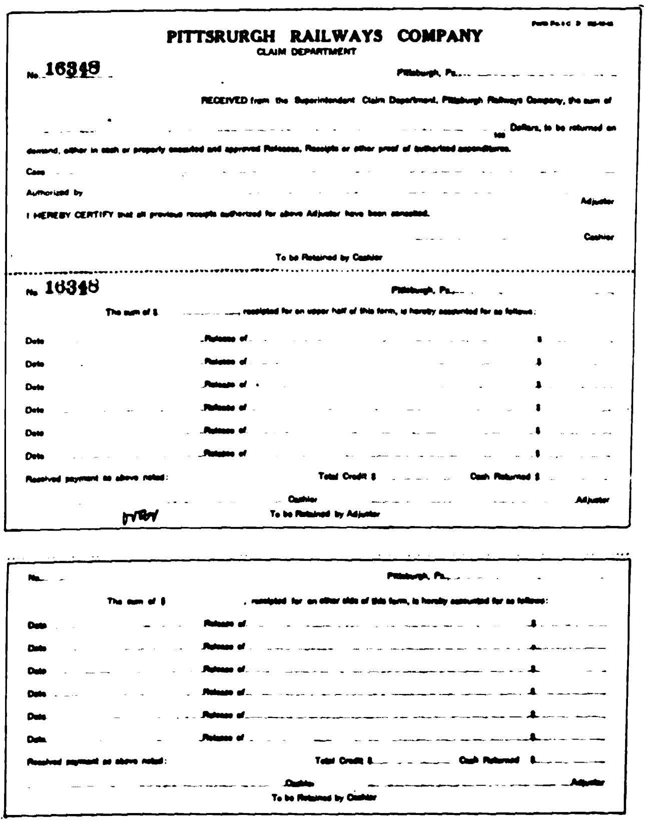
Besides the understudies the department has recruits, or men on the waiting list for employment. Applications for employment in the claim department come from widely-scattered sections of the United States, such as New York, Illinois, Washington, etc. These are all systematically listed for future reference as the way is opened up for new men.

SUPERINTENDENT'S OFFICE

The supervision of the entire claim department is in the hands of the superintendent. He receives a copy of every typewritten letter, memorandum and report received or sent out, and he signs all letters, although they are dictated by the bureau chiefs. The superintendent has in his own offices a stenographer, who is the only one not under the supervision of the chief of the clerical bureau. Directly under the superintendent's control there is also the auditor, who handles all the accounting records for the claim department and in turn supervises the work of the cashier and the release clerk.

The cashier keeps a card index for all disbursements and all sums paid in the settlement of claims. Cards are kept under the name of the individuals when money is paid to them directly, or under the names of the individuals and their attorneys when payments are made to the latter. The release clerk keeps a record of all cases released and sends word of this final settlement to the proper persons for filing and for preventing any possible duplication or needless assignments. A release taken by an outside adjuster is approved by the chief of the adjustment bureau and checked by the release clerk, the cashier and the auditor before being finally approved by the superintendent.

The two most important records used by the cashier are shown in Form 3 and Form 4. Form 3 is the receipt that is filled out by an adjuster when he receives money needed for the settlement of current claims. He stands charged with the amount turned over to him and must account for it all in cash, properly executed releases, receipts or other proof of authorized expenditures. An adjuster is not allowed to have more than one receipt outstanding against him at any time. The bottom half of the form is retained by the adjuster and is filled in by him before he turns back his remaining money to the cashier. The back of the top half contains similarly-ruled divisions in order that the cashier may place on her record a list of the releases secured and the balance returned. A general requisition is issued by the claim department upon the auditor of disbursements of the company in order to be reimbursed for amounts expended for the releases listed in the requisition.

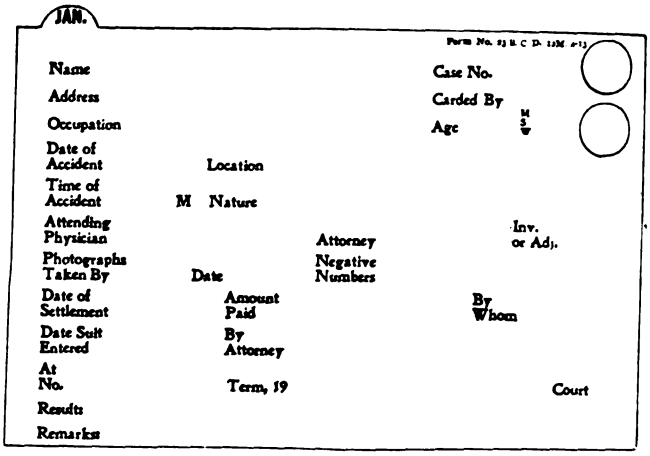


PITTSRURGH RAILWAYS COMPANY
CLAIM DEPARTMENT
No. 16348
Pittsburgh, Pa.
RECEIVED from the Superintendent Claim Department, Pittsburgh Railways Company, the sum of
Dollars, to be returned on demand, either in cash or properly executed and approved Releases, Receipts or other proof of authorized expenditures.
Case
Authorized by
Adjuster
I HEREBY CERTIFY that all previous receipts authorized for above Adjuster have been cancelled.
Cashier
To be Retained by Cashier

No. 16348
Pittsburgh, Pa.
The sum of $, receipted for on upper half of this form, is hereby accounted for as follows:
Date Release of $
Date Release of $
Date Release of $
Date Release of $
Date Release of $
Date Release of $
Received payment as above noted: Total Credit $ Cash Returned $
Cashier Adjuster
To be Retained by Adjuster

No.
Pittsburgh, Pa.
The sum of $, receipted for on other side of this form, is hereby accounted for as follows:
Date Release of $
Date Release of $
Date Release of $
Date Release of $
Date Release of $
Date Release of $
Received payment as above noted: Total Credit $ Cash Returned $
Cashier Adjuster
To be Retained by Cashier

PITTSBURGH RAILWAYS CLAIM DEPARTMENT—FORM 3—ADJUSTER'S BLANK FOR RECEIPTING MONEY AND ACCOUNTING FOR DISBURSEMENTS



JAN.
Name
Address
Occupation
Date of Accident Location
Time of Accident M Nature
Attending Physician Attorney Inv. or Adj.
Photographs Taken By Date Negative Numbers
Date of Settlement Amount Paid By Whom
Date Suit Entered By Attorney
At No. Term, 19 Court
Results
Remarks
Case No.
Carded By
Age M S W

PITTSBURGH RAILWAYS CLAIM DEPARTMENT—FORM 4—CARD USED IN GENERAL INDEX FILE OF CLERICAL BUREAU

One of the most novel creations of the present management is the "satisfaction book." This book contains a record of all cases which have been decided in court for less than the claimant had originally been offered by the company in settlement, or in which verdicts were returned in favor of the defendant. The cases are indexed according to the character of the accident, the street and geographical location of the claimant and the attorney involved. The adjusters have access to this book and each chief has a copy. It is very useful in showing claimants that certain attorneys "who have won every case" have lost particular cases perhaps like the one in question, in furnishing claimants with names of neighbors who can testify as to the foolishness of taking cases to court, and in offering concrete proof that the company has itself in so many cases in its first offer exceeded what the courts later held to constitute a fair settlement.

The superintendent maintains in his own office an index of all the attorneys in the three counties served by the company and also files the reports from the several bureaus and all statistical reports. Aside from the regular periodic statistical reports showing the work of the department, there might be mentioned as one example of special statistical investigation the time study that was conducted to ascertain the most agreeable hours of calling for various classes of men who come to the company offices to discuss claim subjects. It was found that the time generally preferred by claimants was from 10 a. m. to 4 p. m., while attorneys could most conveniently call from 8 a. m. to 10 a. m. and from 3:30 p. m. to 5 p. m., and employees were able to report at any time. This investigation made it possible to arrange the calling hours so as to cause the least conflict between the first two classes, the employees being used mostly to fill up any light periods.

The superintendent also keeps a file giving the complete records of all the men employed in the claim department. Moreover, he has a pocket list showing the names of the men, their telephone numbers, the time required for each man to reach the office after notification and also the time required to reach the nearest carhouse. Each member of the staff has a copy of this list.

Now and then, under the superintendent's direction, a check is made with comptometer cards to see how much time is being spent upon some particular operation in the bureaus, such as indexing different papers, dictation, transcribing and similar acts. This is done in order to keep efficiency up to the proper standard and to divide the time rightly between different operations. Each of the seventy forms in use is original, and, before a supply is reordered, is checked by the superintendent and the chiefs for improvements or changes. Furthermore, twice a year suggestions are solicited from every employee in the department as to changes in the methods of doing the work or the elimination of any feature. Suggestions, however, are welcome at any time. In these ways waste motion is avoided and errors are corrected. Accuracy and speed are the ends sought.

ADJUSTMENT BUREAU

The adjustment bureau of the Pittsburgh Railways contains the chief of the bureau, the principal adjuster and four outside adjusters. Under the original plan of organization the principal adjuster was not included, but as the work developed this office was created. All claimants calling at the department offices are received by the principal adjuster, who works in close harmony with the outside adjusters and the bureau chief. During 1914 he alone settled 2900 claims, an average of eight a day. The chief of the adjustment bureau has to do with cases that are settled on the outside and has charge of the four outside adjusters. The principal adjuster is really a master adjuster handling a particular class of cases, and he has no more authority than the chief of the adjustment bureau. Both of these men report directly to Mr. Rice, and neither would ordinarily pay more than $300 in settling a case without consulting him.

At 8 a. m. the adjusters report at the office, where they have a separate desk and the services of a typewriter operator, who takes their dictation directly on the machine. Every act in connection with any case is a matter of record. During most of the day the adjusters are outside and report by telephone four times. The process of adjusting cases is largely a matter of judgment on their part. No adjuster, however, would think of paying more than $100 without an authorization from the chief of the adjustment bureau. There are, in general, four steps in adjustment work, as follows: (1) The adjuster settles by using his own judgment; (2) the next morning, if the case is not settled, the adjuster turns it over to the chief of the adjustment bureau for decision; (3) if the chief does not desire to pass upon it, it is put up to the superintendent of the department, and (4) if the superintendent should be in doubt, the case is presented to the "board of claims review," composed of the president, the superintendent of the claims department, the general attorney and the general manager. The number of cases presented to this board is a matter to be determined by the superintendent of the claim department.

The chief of the adjustment bureau maintains a follow-up file of every current claim pending and is at all times in possession of all essential facts. During 1914 three-fifths of all settlements made were effected in the offices of the claim department, an increase of 50 per cent over 1912. This shows the growing tendency of the public to handle claims as "a matter of business" instead of "a matter of law," as well as the fact that the prejudice of the public against the department is being speedily overcome.

INSPECTION BUREAU

Besides the chief, the inspection bureau is composed of a statement inspector, who takes statements from all persons calling at the offices; a photographer; a night inspector, who is on duty from 6 p. m. to 6 a. m.; an estimator, a veterinary surgeon, safety inspectors with offices at selected carhouses, secret service operatives and six inspectors. It is the function of these men to secure all particulars regarding accidents. The estimator inspects damages to physical property, the veterinary examines injured animals and the photographer takes assignments in duplicate from the chief of the bureau. The safety inspectors at the various carhouses interview trainmen, typewrite statements and inspect equipment involved in accidents. The claim department is open twenty-four hours a day, and after business hours the night inspector sends out inquiry blanks, clips newspapers, receives all telephone reports of accidents and notifies the chief or the superintendent in the event of a severe accident.

LITIGATION BUREAU

When a claimant enters suit against the company, the department receives a notice from the general attorney. After being reviewed by the superintendent, the case then goes to the litigation bureau. If all witnesses have not been seen, however, it is referred to the inspection bureau for such action and is then returned to the litigation bureau for preparation for trial. Under any conditions the case goes finally to the litigation bureau when it is placed upon the court calendar.

Under the chief of the litigation bureau are the principal court investigator, the principal locator, the court investigators, four locators and the court clerk. The locators are used to see that witnesses are in court when needed. They act as investigators when court is not in session. The court clerk each evening secures from the clerk of the court a list of the cases to be called the next day and a list of suits entered that day. He also obtains a summary of all damage suits entered in the county against anyone and a summary of all verdicts rendered against any defendant, which are made a matter of record in the claim department.

The litigation bureau keeps a card file for every suit entered and also an index of legal opinions. Transcripts of testimony, records of appeal, etc., are filed in this bureau. It also maintains a record of all witnesses for and against the company in the cases that arise. The witnesses in new cases are then checked up by any existing testimony in other cases, so that "ringers" cannot be used.

MEDICAL BUREAU

The medical bureau proper of the company consists of a chief, an examiner and a stenographer-nurse. The men spend most of their time in the offices of the department. For any special injury the chief arranges to call in the best expert in that particular line. The company maintains an examination room where claimants are examined and sometimes emergency treatment is given. The bureau has a separate medical library, charts, skeleton, operating chair, instruments and complete surgical and examining equipment. The chief co-operates with the trial attorney in arranging the medical defense in litigated cases and with the chief of the adjustment bureau in current claims.

In the medical bureau there is a card file of all doctors with whom the company has had or may have dealings. This list is indexed by doctors and by subjects. The verbatim reports of court testimony are secured where doctors who make a practice of testifying against the company are called. The list at present contains the names of about 3000 doctors, showing their hospital and other connections and a summarized record of all the cases in which they have been interested either in making examinations or in giving treatment. The company receives medical magazines from all parts of the world and clips these for important articles.

CLERICAL BUREAU

Besides the chief of the bureau, there are several clerks performing various duties in this and other bureaus. All mail is opened and dispatched in the clerical bureau. Moreover, with the exception of the special files kept in the superintendent's office, the litigation bureau and the medical bureau, all other files are kept in the clerical bureau, so that the main duties of the clerks there have to do with the making and the filing of records.

The only two permanent files in the clerical bureau are the general index and the information file. The general card index is for every person involved in any kind of accident with the company or with any other company for which reports are available. Newspaper reports and reports from other companies and claim departments in regard to fraudulent claims are included. Form 4 shows the character of the index card used. The main divisions of the classification are according to the surnames and the subdivisions according to the first names of claimants. Under each division and subdivision the cards are separated according to a tab showing the month in which each accident occurred. The cards used for males are gray; for females, pink, and for property damages, yellow.

The other permanent file referred to above, the information file, is a record of any person, connected with any company, who is known, either favorably or otherwise, to any employee of the railway; a record of the residences of all attorneys, etc. This file is divided in the following manner: (*a*) an index according to streets—that is, cards for the blocks numbered from 100 to 200, from 200 to 300, etc.; (*b*) an index by companies; (*c*) an index by occupation, and local trade and other organizations, and (*d*) an index of all employees of the Pittsburgh Railway, the Duquesne Light Company, the Beaver Valley Traction Company and the Philadelphia Company. These are arranged geographically in order that an employee may be found who lives on the same street as any claimant. The first three indices are cross-referenced with the general index file to show any case with the company in which the individuals may have been involved.

RECORDING OF ACCIDENTS IN CLERICAL BUREAU

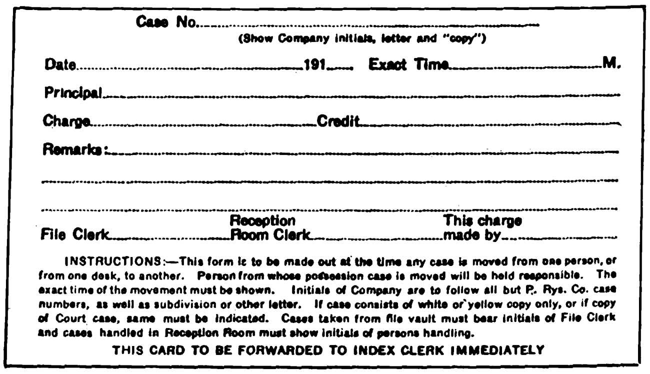
In the clerical bureau there is also an accident register in the form of a loose-leaf book, run by days of the week. This book takes sheets 17 in. x 26⅜ in., ruled alike on both sides. From left to right columns are provided to show the consecutive numbers of the accidents, the time, the car and division numbers, the location, the nature of the occurrence, the principals and their addresses, the names and numbers of the motorman and the conductor, the classification number of the accident, and the original assignment to an adjuster or an investigator. A note is made at the bottom of the sheet in regard to the weather conditions existing on the day in question.

Accident reports are made out by car crews or the safety inspectors in triplicate and forwarded to the clerical bureau, where they receive classification numbers, are checked up with the general index and the information file and then go to the chief of the adjustment bureau. The latter reads them and assigns such as he thinks should go to adjusters. The others he sends to the chief of the inspection bureau, who assigns them as he sees fit. If any information along medical lines is needed, a memorandum is sent to the medical bureau.

Probably nine-tenths of the accidents reported by crews have previously been reported by telephone by inspectors, dispatchers, or local or division superintendents. If none of these officials is met and the line is not tied up by stopping, the accident is reported over the telephone by the motorman and the conductor themselves. For instance, if a woman at 9 o'clock in the morning had an accident and this was telephoned, five copies would be made, one for the superintendent and copies to the clerical, medical and inspection bureaus. The inspection bureau would in a short time be seeing witnesses and learning the essential facts, the medical bureau would ascertain by examination or inquiry the extent of the injury, an adjuster would be informed as to the name and address of the woman in order for him to secure her statement of the occurrence, and the clerical bureau would search the records and consolidate the information secured by the other bureaus with the crew's report. Final decision as to adjustment could then be made by the chief of the adjustment bureau.

CARD "KINKS" IN CLERICAL BUREAU

Besides the general index file and the information file previously described, the clerical bureau of the Pittsburgh Railways has three original card "kinks" that have been developed by the management to aid in the general smoothness of the work. These are the "cherry" card, the "reminder" card and the "reception room" card.



Case No.……………………………………
(Show Company initials, letter and "copy")

Date……………………………191…… Exact Time……………………M.

Principal……………………………………

Charge…………………………Credit……………………………

Remarks:……………………………………

File Clerk……………… Reception Room Clerk……………… This charge made by………………

INSTRUCTIONS:—This form is to be made out at the time any case is moved from one person, or from one desk, to another. Person from whose possession case is moved will be held responsible. The exact time of the movement must be shown. Initials of Company are to follow all but P. Rys. Co. case numbers, as well as subdivision or other letter. If case consists of white or yellow copy only, or if copy of Court case, same must be indicated. Cases taken from file vault must bear initials of File Clerk and cases handled in Reception Room must show initials of persons handling.

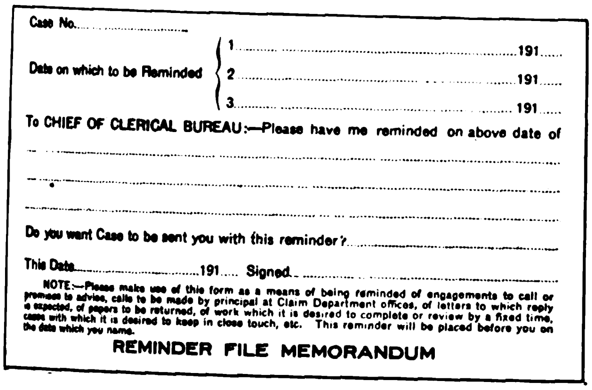
THIS CARD TO BE FORWARDED TO INDEX CLERK IMMEDIATELY

PITTSBURGH RAILWAYS CLAIM DEPARTMENT—FORM 5—CHERRY CARD USED TO KEEP TRACK OF CLAIM DEPARTMENT DOCUMENTS

The cherry card was devised by Mr. Rice in order to keep track of case files and documents. One of the most troublesome office problems in claim departments is to know at any time where the records of any case are located. By the use of the cherry card, shown in Form 5, this problem is easily solved. Every time a case is moved from one person or one desk to another, one of these cards must be filled out, the person from whose possession the case is moved being held responsible for the recording of the transfer. The card provides for case number, name of principal, date, exact time of movement, name to be charged with the case data and name to be credited, remarks and spaces for initials of charging person. A constant messenger service is kept up around the department to collect all the cherry cards. These are filed by case numbers in the central file, and the clerk in charge of this can at any minute of the day tell exactly where any document is located.

The reminder card is a unique scheme to call certain things to the attention of employees at the proper time without them being burdened with constant memory in the meantime. Any employee desiring to be reminded of any engagement to call, appointment at the company's office, letters to be expected, papers to be returned, work to be completed by a certain time, cases to keep in touch with, etc., simply reports such facts to the proper stenographer or else himself fills out a reminder card, as illustrated in Form 6. This provides for three dates on which the employee will be reminded as requested. The cards are filed in the clerical bureau according to reminder dates, and each employee at the proper time has the stated matters brought to his attention.

The reception room card furnishes information for bringing callers into a more intimate relation with the claim department and putting them into a better frame of mind by telling them in a cordial and perfectly casual way that they are expected. Each employee who expects a visitor at the company's office fills out a reception room card (see Form 7), which goes to the clerk at the desk in the reception room. Each morning this clerk sorts out the cards for appointments on that day and carries the names in his mind. When one of the expected callers arrives, he is met with the statement: "Mr. ——— is expecting you. If you will just sit down for a moment, I'll take your name right in," and he is properly impressed thereby. The reception room clerk also keeps a daily list of all callers, showing the names, time of arrival and admission, men visited, references to other officers, time consumed in calls, case numbers or names concerned, and total number for day.



Case No.........................

Date on which to be Reminded
1...191.....
2...191.....
3...191.....

To CHIEF OF CLERICAL BUREAU:—Please have me reminded on above date of
....
....
....

Do you want Case to be sent you with this reminder?.........................

This Date.........................191..... Signed.........................

NOTE:—Please make use of this form as a means of being reminded of engagements to call or promises to advise, calls to be made by principal at Claim Department offices, of letters to which reply is expected, of papers to be returned, of work which it is desired to complete or review by a fixed time, cases with which it is desired to keep in close touch, etc. This reminder will be placed before you on the date which you name.

REMINDER FILE MEMORANDUM

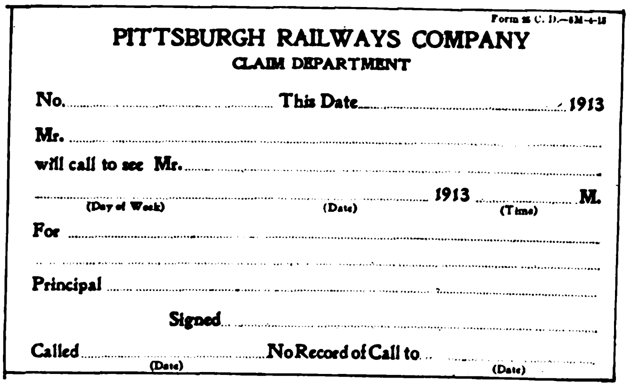
PITTSBURGH RAILWAYS CLAIM DEPARTMENT—FORM 6—REMINDER CARD FOR CALLING MATTERS TO ATTENTION OF EMPLOYEES AT DESIRED TIMES

DIVISION OF LABOR IN CLERICAL BUREAU

To show the careful division of labor in the clerical bureau among the different employees, it may be noted that there is a general index clerk to handle the general index and an information clerk to look out for the information file. The classification clerk classifies all accidents according to twenty-two general divisions and 125 subdivisions and gives each one the number that shows on the accident register and in the case records. The index clerk operates the cherry-card file and the reminder-card file. The trace clerk is used to hunt up the data on past cases, locate files and number and dispatch incoming letters and memoranda. The reception room clerk receives callers, records the time and keeps the reception room card file. The photographer's clerk classifies all photographs, assignments and photographic records. The copy clerks work in the litigation bureau, and, when a suit is entered, make two copies of all documents, one going to the general attorney, one to the men in the litigation bureau and the original back to the vault. This general vault is in charge of a separate file clerk, who is responsible for recording on the cherry cards all documents that leave the vault. The record clerk has charge of the accident register. Besides these and a messenger, there are five clerks and stenographers who are located in the various bureaus but are under the supervision of the chief of the clerical department.

NOVEL LIBRARY FEATURE

A novel and original feature has recently been added to the department. A hallway, 8½ ft. x 50 ft., has been partitioned off, the walls decorated and lighting fixtures installed. The room is fitted with "Crex" rugs, bookcases, easy chairs, magazine racks and telephone, and made generally but inexpensively attractive. It is used during the day as a reception room for callers, and the framed pictures advantageously placed add attractiveness and at the same time serve to impress certain facts upon claimants. As compared with the old idea of having the first room visited by a claimant represent poverty by its bare floor and wooden furniture, this feature of reversing the impression into one of comfort, attention, courtesy and resources for defense against unfair claimants, is a distinct departure. After business hours this library-reception room is used by the members of the department as a place in which to work, read, study, lounge or meet their friends. Hereafter the various meetings of the department will be held here.



Form 25 C. D.—5M-4-13

PITTSBURGH RAILWAYS COMPANY
CLAIM DEPARTMENT

No......................... This Date.........................1913

Mr. ....

will call to see Mr. ....

.......................(Day of Week) ....(Date) 1913 ....(Time) M.

For ....

....

Principal ....

Signed.........................

Called.........................(Date) No Record of Call to.........................(Date)

PITTSBURGH RAILWAYS CLAIM DEPARTMENT—FORM 7—RECEPTION ROOM CARD NOTIFYING RECEPTION ROOM CLERK OF EXPECTED CALLERS

GENERAL FACILITIES

The department occupies fifteen rooms and vaults, all neatly and attractively equipped and maintained. All filing and other equipment is modern and sanitary. Washstands, individual towels, sanitary water coolers and drinking cups, shoe shining cabinets, telephone booths, scientific lighting fixtures and general neatness serve to impress employees and others that this is a modern business organization which gives and demands respect. Intercommunicating telephone equipment with a loud-speaking master station in the superintendent's office allows him to get in instantaneous touch with any bureau or all of them at once.

The library of the Bureau of Railway Economics, Washington, D. C., has recently prepared an exceptionally complete list of references in current periodicals to the jitney bus and to regulatory measures that have been introduced to curb the irresponsible factors in the movement. There are about 140 articles indexed in the list, of which nearly 40 per cent are from the ELECTRIC RAILWAY JOURNAL. The bibliography is dated July 15 and is in mimeograph form, a limited number of copies being available for distribution.

Employees Receive Increase in Chicago

Reduction in Number of Years to Reach Maximum Wages Also Made by Decision — James M. Sheean, the Company's Representative, Files Dissenting Opinion

Mayor Thompson and State's Attorney Hoyne, representing the majority of the Chicago Board of Arbitration, handed down an award on July 16 granting a uniform increase of the maximum and minimum wage of 3 cents for the first year and 4 cents for the second year of the contract, and also a reduction of the graduated scale from a five-year to a four-year term. Employees outside of the train service also received substantial increases, and the award includes some concessions in the working conditions. Attorney James M. Sheean, representative of the surface lines, filed a dissenting opinion which shows that, despite the preponderance of evidence presented by the railway companies tending to show that the demands of the employees were excessive, the majority of the board of arbitration granted wage increases and improvements in working conditions. One compensating fact in the decision is that the city must share 55 per cent in the increased operating expenses and that the employees' demand that a graduated scale be abolished was not sustained but reduced from a five-year to a four-year term.

FINDINGS ON SEVEN QUESTIONS SUBMITTED

The decisions of the board of arbitration regarding the seven questions submitted are as follows:

To Question 1—Percentage of straight runs and consecutive hours in which swing runs shall be completed. The arbiters decided that all runs on Sundays should be straight time and should not exceed nine hours.

To Question 2—Hours of service, including week days, Sundays and holidays, for employees other than trainmen provided for in the agreement. The arbiters decided that the existing system should be continued except as it might be modified by the other points decided in this arbitration.

To Question 3—Number of years to receive maximum wage scale and wages for all trainmen, including trainmen on cinder, sprinkler, supply and other cars. The arbiters decided that during the period fixed by this award the following scale of wages should govern:

FIRST YEAR OF CONTRACT

	Old Scale, Cents	Offered by Company, Cents	Demanded by Men, Cents	Award, Cents
First year:				
First three months......	23	25	33	26
Second three months....	25	26	33	28
Second six months......	26	27	33	29
Second year:				
First six months........	27	28	36	31
Second six months......	28	29	36	31
Third year	29	29½	36	32
Fourth year	30	30	36	33
Fifth year	31	31	36	35
Sixth year and thereafter..	32	32	36	..

SECOND YEAR OF CONTRACT

	Old Scale, Cents	Offered by Company, Cents	Demanded by Men, Cents	Tentative Draft of Award, Cents
First year:				
First three months......	23	25½	33	27
Second three months....	25	26½	33	29
Second six months......	26	27½	33	30
Second year:				
First six months........	27	28½	36	32
Second six months......	28	29½	36	32
Third year	29	30	36	33
Fourth year	30	30½	36	34
Fifth year	31	31	36	36
Sixth year and thereafter..	32	32	36	..

The scale of wages shown in the foregoing table also applies to motormen of sprinklers, cinder, supply, mail and other cars. Trolley boys or conductors on sprinkler, cinder, supply, mail and other cars will receive a wage of $2.30 per day. All men working on snow plows and on snow sweepers will have a wage rate of 36 cents per hour. The wages of other employees decided by the board of arbitration are as follows:

	Month
Car repair foremen (day)........	$125
Car repair foremen (night)........	110
Receivers	105
Tunnel and bridge men........	75
Flag and crossing men........	65

Mechanics in west side shops not under union contract will get a 3 cent an hour increase.

Car repairers, motor repairers, inspectors, dopers and body repairers will receive $2.40 in the first year of service, $2.70 in the second year, and $3 in the third year.

Car placers, $2.40 in the first year of service, after that $2.75 a day.

Cleaners, janitors, washers and other line men, $2.10 a day in the first year of service and $2.40 thereafter.

To Question 5—Allowance for turning-in time. The arbiters decided that all trainmen should be allowed to have seven minutes after finishing the day's run for turn-in time, which was an increase of two minutes.

To Question 6—Seniority and efficiency with men outside of train service. The arbitrators found that in all cases where men were laid off to reduce the force, this should be done according to seniority primarily, but consideration might be given to their capacity and fitness. When these men are again put to work they should be reinstated according to their seniority standing at the time they were laid off.

To Question 7—Night car hours and wages. The arbitrators found that the men operating night cars should receive $3 per night for eight hours or less, and all-night car runs should be straight and not more than eight hours. The night-car wages and hours specified in this award become effective on Jan. 1, 1916.

DISSENTING OPINION OF JAMES M. SHEEAN, THE COMPANY'S REPRESENTATIVE

"I dissent from the award made by the majority of the board.

"My position throughout this arbitration has been that the employees are entitled to a fair wage fully commensurate with the work performed, but I submit that these men are already paid not only a fair wage but a liberal wage when the wages in the same employment and the living conditions in other large cities are taken into consideration, or when comparison is made of annual earnings of these men with the earnings in any comparable line of work in Chicago.

"The evidence in this case shows beyond all question that the wage scale paid the trainmen in Chicago, taking into account the bonus time, including time for meals allowed, is higher than the wage scale in any other large city east of the Rocky Mountains. The scale in Chicago, taking into account the bonus time allowed the men, gives a higher average wage than that paid in any of the twenty cities the wage scales of which were submitted to the board of arbitration.

"Sixty per cent of the trainmen in the employ of the company are now receiving the maximum rate of 32 cents per hour, and their average earnings are in excess of $1,000 per annum. Many of these men are now earning in excess of $100 per month, or more than $1,200 per annum. Compare these earnings with the earnings of carpenters in Chicago, who are employed only about 160 days a year, and whose earnings are about $800 per year.

"This situation is shown by the following extract from a letter dated April 23, 1915, written by John A. Metz, president of the carpenters' arbitration board, to the State board of arbitration:

"'Now, a few years ago the average carpenter worked about 200 days per year, but now by reason of the evolution in the building industry, this average is cut down so that the average carpenter now earns little more than $800 per year.'

"The same basis of annual earnings applies also to the other building trades in Chicago.

"Or, take the compensation received by men employed by the city. The evidence shows that the average monthly wage of 4589 employees upon the payrolls of Chicago for the month of May, 1914, including such men as foremen in the street department, officers in the health department, laborers, motor drivers, etc., was $55.18.

"The evidence in this case shows and, in fact, there is no dispute, that the cost of living in Chicago is materially lower than the cost of living in such cities as New York, Boston and Philadelphia, although the wages paid trainmen in Chicago are higher than the wages paid trainmen in any of those cities.

"The evidence is also uncontradicted that the cost of living since the last award three years ago has not increased as fast as the wages of the employees. The record shows that the wages of the trainmen have increased during the past three years 9.2 per cent, while the cost of living, according to the statement submitted by Mr. Mahon in 1912, and compared with a similar statement filed by him in this arbitration, has increased only 5.34 per cent.

"In 1909 the men voluntarily agreed with the companies upon a five-year scale. This was submitted to arbitration in 1912 and again fixed at the period of five years. Experienced operating men called on behalf of the company stated that the best results from every standpoint were obtained from a five-year scale and that the purpose of this scale was to compensate the men for their gradually increasing efficiency and give them a reward for remaining in the service.

"Evidence introduced shows that the average length of the scale in twenty of the principal cities of the United States is over five years. In fact, a graduated scale for teachers in force in our public schools ranges from five years to ten years. Notwithstanding this, however, the majority of the board reduced the scale from five years to four years.

"Prior to 1912 there was a limited night car service in effect on the north and west sides of the city. These men worked six hours and were paid a bonus or extra rate for this service. No such arrangement has ever existed on the south side. The effect of the night car bonus was to penalize and make still more costly an unprofitable service. The result was that on the south side lines, where no penalty was imposed, the night car service developed to a far greater extent than on the north and west sides.

"In the 1912 arbitration the night car bonus was abolished throughout the city, and Judge Carter in discussing this question, in his opinion, said:

"'Extra pay or a bonus for night car service has been in force for years on the north and west side lines of this city, but it has not been on the south side lines in recent years, or to any substantial extent since electricity was introduced as a motive power. Whatever might be said in justification of this plan in the days when horse cars were in use, I can find no evidence in this record that furnishes a valid reason why the men who operate the cars between twelve o'clock midnight and six in the morning under the present operating conditions, should receive more pay than the men who operate the cars at other hours of the twenty-four. Electricity so lights up the streets that it is practically as easy for the motorman to see the track ahead of him at night as in the daytime. Then, too, the evidence shows that the character of the traffic during the night in recent years has changed materially. I am of the opinion that greater skill and experience is required in the operation of cars during the rush hours of the morning and evening than for the operation of night cars.'

"The majority of the board, however, has restored the old plan of paying a bonus for the operation of night cars. The result of this will be to impose a heavy additional burden upon the company and in such a way as to retard rather than to develop this class of service.

"The majority of the board has also given a corresponding increase to the carhouse men and shop men. The evidence in the record shows that the pay already received by these men is materially in excess of the wages now being paid even by the steam roads for the same class of service. The majority of the board has also, by its ruling, still further increased the bonus or dead time allowance for which the men are at present paid, and which already amounts to more than $1,000,000 per annum. All of these matters must be taken into account in determining the actual pay which the employees of the company will receive under this award, and the actual amount as shown is very materially in excess of the actual figures appearing in the scale.

"Common observation and experience show that the present is no time for drastic wage increases in any business. This is particularly true with reference to the company, which has been affected to a greater degree than most institutions by the general financial and industrial depression now existing in Chicago. Last year the receipts fell more than $500,000 below the receipts of the preceding year, and during the first five months of the present year the company's receipts have dropped more than $600,000 below the receipts for the same period last year.

"The company is carrying fewer passengers this year than last year, and its receipts per car-hour have decreased accordingly. On the other hand, as a result of the graduated scale under which the men are now working, their wages are automatically increased the longer they remain in the service, so that the company is now facing not only a heavy deficit in its gross receipts and decreasing receipts per car-hour, but a constantly increasing wage.

"In the face of this, however, the majority of the board has not only shortened the scale from five years to four years, which in itself operates to increase the wages of the men, but has further increased the maximum wage per hour during the first year of the new contract from 32 cents to 35 cents, and during the second year of the contract from 32 cents to 36 cents. The maximum demand of the men in 1912 was 35 cents an hour, and the maximum demand at this time was 36 cents an hour. In other words, the men have been given substantially all they asked for, yet no one will seriously contend that the men in making a demand for 36 cents an hour expected to receive that amount, or anything like that amount.

"It must not be forgotten that the situation with the company is very different from that of a manufacturing concern, or even that of a steam road. An increase in the wages among the employees of manufacturing concerns means an added cost to the manufactured product. An increase in wages to the employees of our great stores means only that the purchaser will pay an increased price for the articles purchased, and even a steam road has some opportunity to increase its rates; but not so with the company.

"The fare received by the company for the service rendered by it is 5 cents and no more. The company's compensation is fixed. On the other hand, the cost of rendering the service, the increasing cost of wages, the increasing expense of maintenance and operation are constantly narrowing the margin left for the return upon capital.

"Recognizing, as I do, that the service rendered by the company is the joint product of labor and capital, and believing, as I do, that both labor and capital should have a fair return, it has seemed to me that this award so unfairly increases the proportion of the one at the expense of the other that its result must be to make Chicago an unattractive field for capital.

"Chicago needs capital and must compete with other cities in procuring capital for its development, and in the last analysis the determining factor will be the fairness or unfairness with which investments already made in this city are treated.

"One difficulty with which the arbitrators have had to contend was lack of time to enable the board to take up and properly analyze this record, which contains a vast amount of facts, figures and details. We have had but four conferences in this entire matter, and at only two of these conferences were the merits of any of the men's demands discussed, and then only those with reference to wages and length of the scale for trainmen. No discussion whatever was had with reference to the other six propositions submitted to the board of arbitration.

"The agreement under which this arbitration is had provides that the board shall meet and organize, set the time and place for hearings, and continue 'until all evidence and arguments have been heard and rulings rendered.' This means that whatever evidence was heard should be submitted before the board at a regular meeting, at which all parties were represented. Contrary to this, and to all established principles of arbitration, the Mayor, against my protest and the protest of Mr. Hoyne, the representative of the men, saw fit to call in some 200 employees whose wages were directly involved in the arbitration, and questioned some of them himself, and had others questioned by representatives of the corporation counsel's office with reference to the issues involved in this arbitration—all without the principals being present or represented.

"In the case of Moshier vs. Shear, 102 Ill., 173, our Supreme Court said:

" 'After being selected, it is the duty of an arbitrator, like a juror, to act fairly and impartially between the parties and on the evidence adduced before them on the trial, and entirely independent of all outside influences, and what will be misconduct on the part of a juror will, as a general rule, be such on the part of an arbitrator. Neither has a right to learn facts except as brought to his attention on the trial. It is gross misconduct for either to seek evidence or the opinions of others in regard to the case, or anything material to its decision in another mode.'

"The company, in view of the great public interest involved and the possible effects of such course upon the best interests and welfare of this community, has decided not to avail itself of its legal rights in this particular.

"I have endeavored to state my views frankly. I cannot concur in this award. I cannot concur in the method by which the award was reached; but, notwithstanding this, the company which I represent, wishes it distinctly understood that this award will be accepted and faithfully carried out. The company has stood, and will continue to stand, for the principle of arbitration, regardless of whether the outcome in any particular arbitration favors one side or the other."

(Signed) JAMES M. SHEEAN.

Statement by Chicago Surface Lines

As an aftermath to the arbitration award the Chicago Surface Lines ran an advertisement in each of the Chicago papers under the caption, "Car Men Win." In this the company accepts the victory of the employees "like a good sport" and takes advantage of this propitious occasion to take up the question of complaints, and asks the public to criticise and commend. The text of this advertisement is so unusual that it is printed in full as follows:

CAR MEN WIN

In the most sweeping award ever made by an arbitration board, our employees have just won an increase in wages which makes them by far the most highly-paid street railway men in the United States.

This award has imposed an enormous additional burden upon the company—approximately $1,500,000 per year. We have accepted the award and shall carry out its provisions faithfully. This company always has stood for and will continue to stand for arbitration, regardless of whether the outcome in any particular instance favors one side or the other.

What the Result Should Be

The men have been given substantially everything that they asked for—and far more than they expected.

This removes all possibility of complaint on the part of the men that they are not being fairly treated by the company, or that they are not getting a fair share and more than a fair share of the joint product of labor and capital.

There should be, and there will be, a better feeling on the part of the men toward both the public and the company. This ought to bring about, among other things, better service to the public.

Where the Public Comes In

Four-fifths of the complaints received by the company have to do with the treatment of the public by our employees—complaints involving the personal equation—such as discourtesy, running by passengers, starting too quickly, not waiting for passengers at transfer points, etc.

Every complaint of this nature should now be eliminated. We shall appeal to every man in the train service to co-operate with the management in every way possible to give a better service than ever before, and particularly to be mindful at all times to extend to our passengers every courtesy and consideration to which they are entitled. We believe that the great majority of our men will respond loyally to this appeal.

The Public Must Help

We ask the public to keep us advised constantly of the kind of treatment they are receiving from our employees.

A part of the service for which the public pays is courtesy and consideration on the part of the trainmen. These are just as essential to good service as keeping the cars on regular schedule.

We therefore ask the public to help us improve the service along these lines—first by calling our attention to acts of courtesy or consideration for the welfare of passengers which they consider worthy of mention; and, second, by calling our attention to every act of *dis*courtesy or *lack* of consideration.

If the public will co-operate with us fully in this regard, we will undertake to see that credit is given where credit is due and that all complaints are investigated promptly and the proper remedies applied.

Effect on Other Chicago Lines

It has been decided that the award to the employees of the surface lines will not affect the negotiations between the Elevated Railways of Chicago and its employees. By a separate agreement this company consented to arbitrate all disputed questions with its employees and that Mayor Thompson should act as umpire. Negotiations to eliminate some of the minor problems are being conducted by President Britton I. Budd and the union officials. Mayor Thompson will not return from a trip to the Coast until early in August, hence it will be at least until that time before actual arbitration hearings can be conducted. In the meantime the company is collecting data, but as yet neither it nor the employees have announced the names of their representatives on the board of arbitration. Practically all the questions which were submitted to the surface lines' board will be taken up in the arbitration of the elevated railways' difficulties, but in addition to these many other classes of employees are involved, therefore the evidence to be presented will be more complicated.

By prior agreement the Chicago & West Towns Railway will accept the award granted the employees of the Chicago Surface Lines in so far as it affects the question of wages and the term of contract. In this agreement working conditions were considered as a local problem and will be disposed of this week in a conference between General Manager F. L. Butler and representatives of the employees. Approximately 230 employees will be affected.

The Evanston Railway Company, Evanston, Ill., also by prior agreement with the employees, is bound to accept the Chicago Surface Lines' arbitration award in so far as wages and term of contract are concerned. The working conditions in this case were also considered a local problem and will be negotiated as quickly as possible. Forty-five employees will be affected.

Advertising Car in Boston

For the purpose of stimulating traffic during the summer months the Boston Elevated Company is conducting an interesting publicity campaign that includes some original ideas. The most unusual feature is a single-truck car on each side of which are carried three large oil paintings more than 6 ft. square that are both striking and artistic.

These paintings advertise points of interest in the vicinity of Boston reached by lines of the Elevated Railway Company and connecting companies. The pictures are done in poster style by Fred C. Sanborn, a well-known decorative artist of Boston, and are of a higher order of artistic excellence than is ordinarily found in advertising paintings. Out-of-door life and attractions, that make a strong appeal to most people during the summer months, furnish the theme for each of the paintings, and the work has been done with a few strong, harmonious colors that produce a highly decorative effect and compel attention.

Animals, Birds and Fishes

Interesting collection of birds and animals may be found at Franklin Park, Norumbega Park, Lexington Park and Middlesex Fells. A remarkable collection of brilliant hued fish may be found at the Marine Park Aquarium. These are all delightful places for spending a summer afternoon or evening.

CHILDREN'S OUTINGS

Take the children to see the animals and birds at Franklin Park, Norumbega Park and Lexington Park and the fishes at Marine Park. These parks are beautiful, cool and safe for children.

GO TO THE WOODS

There are many beautiful tracts of woodland within a few miles of Boston famous for their charm, including Middlesex Fells, Stony Brook Reservation, Norumbega Park, Blue Hills, Dorchester Park and Lexington Park.

TYPICAL CARDS CARRIED IN BOSTON DAILY PAPERS

Franklin Park, a city-owned recreation park, contains among other attractions three performing elephants that were purchased by Boston's school children and given to the city. These have been used for the subject in the picture advertising that resort. Norumbega Park on the Charles River is represented by a young couple paddling a canoe, together with a circular insert showing a brightly costumed dancer in the spotlight on the stage of the open-air theater.

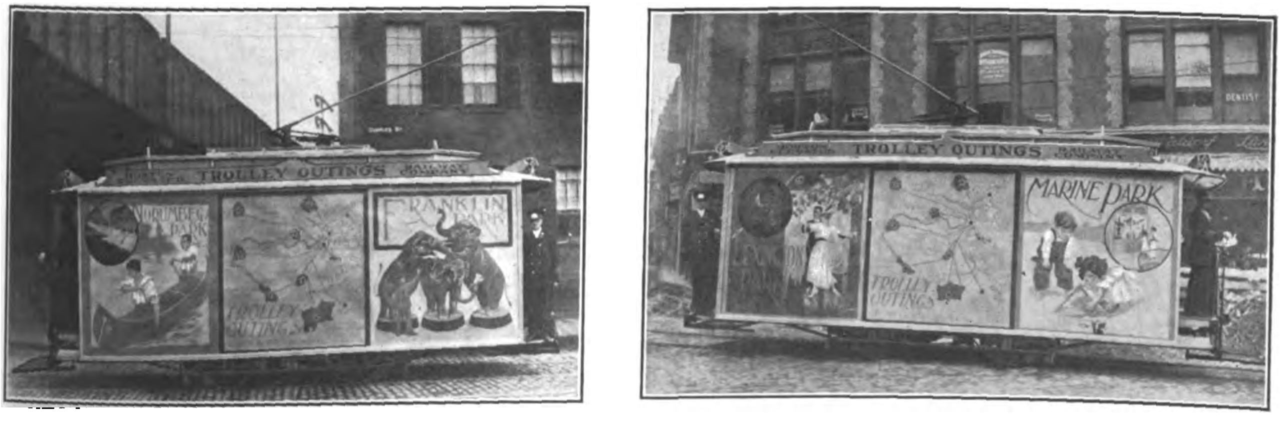
Two children playing in the sand on the beach at Marine Park, South Boston, is the principle subject of another painting, in which there is inserted a striking picture showing the brilliantly hued tropical fish that are exhibited at the aquarium included in this park. Another picture advertises Lexington Park and shows a young couple dancing in the pavilion and contains in one corner a picture of the head of a buffalo of the zoo. On each side of the car in the central square is a large map showing points of interest that may be conveniently reached by short trolley trips and indicating the route and connection by small lines in the usual style of map drawings.

The car is illuminated by a row of overhead lights at night and although put in operation for the first time Tuesday, July 13, has already attracted a great deal of attention and resulted in extensive newspaper notices.

Besides the advertising car the company is publishing a series of small 1-in. single-column display advertisements on the front page of the Boston daily papers. These advertisements are run every Sunday and every other day on week days in each of the papers. They call attention to places of interest in short, pithy sentences in simple, direct language.

The company is also using large 5-ft. x 7-ft. printed posters mounted upon upward of 150 billboards owned by the company on different parts of the system. These posters enumerate various points of interest on the company's and connecting lines and announce the attractions to be found at each place. The posters are changed monthly.

The newspaper and billboard advertising campaign was begun about June 1 and will be continued during the months of extensive pleasure riding.



ADVERTISING CAR USED IN BOSTON TO STIMULATE SUMMER TRAFFIC

American Association News

Director of Transportation McConnaughy Gives Further Details Regarding Convention Trains — Manila Company Section Meeting—T. & T. Association Committee Discusses Uniform Definitions

CONVENTION TRAINS

In connection with the distribution of detailed information regarding the Red and Blue Specials (tour trains) and the White Special (one-way train) which will be given in circulars to be mailed on July 26, H. G. McConnaughy, director of transportation, calls attention to the following points:

Each special is limited as to the number of passengers, consequently it is most important for those who intend joining any of the tours to make their reservations immediately upon receipt of the itineraries. The requests already received from railway officials assure the success of the convention. The fact that arrangements have been made in cities en route for meetings with officials of the local railway companies makes this an exceptional opportunity for Railway Association publicity and gives the manufacturer and his representatives an opportunity of making new friends and renewing old acquaintanceships.

The members of the Railway Association and those of the Manufacturers' Association should keep in mind that this is the first opportunity that these associations have had to visit, as associations, the member companies in the Far West.

The transportation committee hopes that the railway officials and manufacturers will divide the men whom they contemplate sending between the Red and the Blue special trains, and that the members of both associations will take their families with them. Special arrangements have been made for the comfort and convenience of ladies and children. For the convenience of the members hotel accommodations en route (but not including San Francisco) have been provided for and the cost included in the prices of the tours.

Members and guests living in cities and towns not shown in the itineraries can make transportation arrangements from and to their home towns on any of the tours.

Information regarding costs or routing can be obtained by addressing the director of transportation, Suite 1002, 165 Broadway, New York City.

MANILA COMPANY SECTION

The regular meeting of the joint A. E. R. A. and N. E. L. A. company section No. 5 was held in Manila on June 1.

W. A. Seten of the electrical department presented a paper entitled "How to Increase the Sale of Electric Appliances, or Getting Business for the Electric Department," and W. D. Calfee, night carhouse foreman, presented one on "Personal Efficiency." After the discussion of the papers, C. N. Duffy, vice-president Manila Electric Railroad & Light Company, announced that the company will award substantial cash prizes for the best three papers read before the company section during the calendar year 1915, under conditions to be determined by the section. Company officials and managers of departments are not eligible to compete. The secretary, W. A. Smith, announced the program for the July meeting, consisting of papers on "How a Claim Agent Earns His Salary," "The Electric Motor vs. All Comers," and "The Necessity of Shouldering Your Own Responsibility." The names of several leaders in the discussion of each paper were also announced.

In his paper Mr. Calfee first quoted Harrington Emerson's definition of personal efficiency as "the mental and physical ability to find and take the best, easiest and quickest way to the desirable things of life." He then proceeded to apply this to the practical work of the railway man, stating that exact knowledge, guesswork and efficiency will not pull together. "Precision," said he, "is impossible without prevision." The railway man should get the best papers and magazines on his particular business and see what is being done elsewhere, whether his own practice is up to standard or not. The personal efficiency of an individual is affected by his environment, his aptitude and his mental attitude. When men realize that efficiency never has to go begging for advancement, and that the man who masters his trade goes to the top, we will see more efficient men. Personal efficiency is also personal independence. Mr. Calfee's paper illustrated the principle of efficiency and it brought out a lively discussion.

T. & T. ASSOCIATION COMMITTEE ON UNIFORM DEFINITIONS

A meeting of the committee to develop uniform definitions of the American Electric Railway Transportation & Traffic Association was held in New York on July 13. Further consideration was given to the definitions in pursuance of the plans made at the meeting on June 25. H. C. Donecker, the chairman, and William C. Greenough were present. Additional work on the definitions will be done by the members of the committee by correspondence.

Pamphlet Issued by Secretaries' Society

The Society of Technical Associations' Secretaries, to the formation of which reference was made in earlier issues of the ELECTRIC RAILWAY JOURNAL, has issued a pamphlet containing the proceedings of the meeting held in New York on Feb. 27, 1915. Membership in this society is open only to individual secretaries of technical associations, but for all practical purposes the result is the same as if the associations were members, with the advantage that official action is not necessary in connection with the deliberations of the society. Harry D. Vought, secretary New York Railroad Club, is president; F. L. Bishop, secretary Society for the Promotion of Engineering Education, is first vice-president; Charles W. Hunt, secretary American Society of Civil Engineers, is second vice-president, and Bradley Stoughton, secretary American Institute of Mining Engineers, 33 West Thirty-ninth Street, New York, is secretary. The names of E. B. Burritt, secretary American Electric Railway Association; F. L. Hutchinson, secretary American Institute of Electrical Engineers; C. W. Rice, secretary American Society Mechanical Engineers, and Edgar Marburg, secretary American Society for Testing Materials, appear in the list of twenty-three charter members.

The Leuk-Leukerbad electric railway in Switzerland was put in operation on July 3. It is 6½ miles in length and construction was begun in 1912. The road cost $600,000 to build.

COMMUNICATION

The Jitney vs. the Trolley

SARANAC LAKE, N. Y., July 7, 1915.

To the Editors:

James E. Hewes' paper "Jitney Bus Competition," an abstract of which appeared in your July 3 issue, will without doubt be taken by the jitney interests as sure proof that the bus is a cheaper method of city transportation than the trolley car. However, cost of operation per car-mile is not the only factor to be considered. Earning capacity is one of as great if not greater importance. Otherwise the Ford jitney would surely drive out the trolley and would as surely be driven out in turn by the jitney motorcycle or side car.

Even assuming Mr. Hewes' figure of 21.8 cents per bus-mile and his sixty-seat trolley car that operates at 27.3 cents per car-mile, including taxes and fixed charges (the average figure for the United States as obtained from the last census report) it can be shown that the bus is the more expensive to operate. Let N represent the number of car-miles operated on the system per hour for eighteen hours daily and three hours for the rush period when all the seats of the car will be required. Then for three hours a day the bus will have to operate three times as many car-miles as the trolley, due to its small seating capacity of twenty-two. For the whole day the bus operating charges in cents will be $21.8(60/22 \times 3N + 15N) = 505N$. For the trolley the costs will be $27.3 \times 18N = 492N$, which gives the trolley a saving of $13N$ cents a day. If during the rush period more car-miles an hour are run, as is usually the case, or if for more than three hours at least 37 per cent of the seating capacity of the trolley is used, then the saving will be still more marked, as I have used figures that give the bus every advantage.

As is so often the case, London has been cited as an illustration of the profitable operation of buses. Referring to the ELECTRIC RAILWAY JOURNAL for May 8, page 869, we find actual working figures as given by three British municipalities 32 cents, 25.4 cents and 28.8 cents per bus-mile. "Authentic figures lower than this are not available. The London bus company refuses to give its costs because of competition." These figures would not seem to indicate that bus operation in England was as profitable as supposed, although London, because of its narrow and congested streets, offers an exceptional field for the bus.

The estimate of 21.8 cents per bus-mile, as given in Mr. Hewes' paper, seems low in the light of English experience. Taking the figures given in the article on cost of bus operation in the ELECTRIC RAILWAY JOURNAL for Feb. 27, page 414, and changing them to conform with values given by Mr. Hewes for first cost of bus and for cost of gasoline, there is obtained an average of 24.9 cents per bus-mile for nineteen companies. Accordingly 21.8 cents per bus-mile seems very optimistic.

Likewise in taking $35,200 as the cost of a trolley car ready to run a high figure has been used, except for interurban service. In the case of Massachusetts, where the percentage of interurbans is low, and where capitalization represents actual costs because of regulation, there appears a total cost of construction and real estate of $194,677,690 for 7208 cars equipped with motors ready to run. This gives a cost of $27,000 per car.

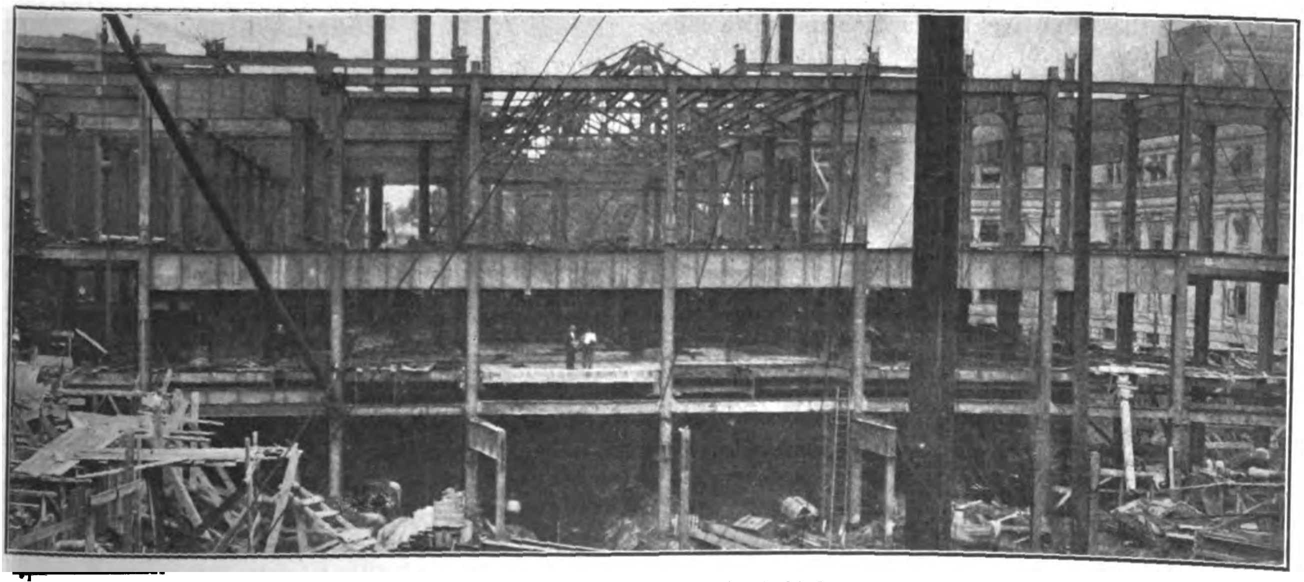
In the light of these facts the 5-cent motor-bus companies should have some difficulty in proving their case of more economical operation than the trolley. And since the several recent failures of motor-bus companies capital ought to require more than guess-work figures before investing.

F. DEWEY EVERETT.

Newark Terminal Cornerstone Laying

On July 20 the cornerstone of the $5,000,000 terminal, which is under erection in Newark for the Public Service Corporation of New Jersey, was laid by President Thomas N. McCarter with appropriate ceremonies in the presence of a distinguished audience. The plan of this terminal was fully described in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 28, 1914, page 1190, and an illustrated progress report was given on page 793 of the issue for April 24, 1915. After depositing a dash of mortar with a silver trowel and rapping the great stone with a mason's mallet Mr. McCarter said: "I have truly laid the cornerstone of this building which, when completed, it is hoped will serve this community and others for years to come." Music for the occasion was furnished by a large band of trainmen of the Essex division of the Public Service Railway.

After the exercises at the building site the 200 or more guests were served with luncheon at a near-by restaurant and brief addresses were made by Mr. McCarter, Mayor Raymond, Senator Austen Colgate, ex-Senator James Smith and ex-Governor Franklin Murphy. At the luncheon were also other prominent public men and financiers, making a remarkable local civic gathering.



NEWARK TERMINAL—PARK PLACE TERMINAL, SHOWING GENERAL REAR VIEW OF BUILDING

Equipment and Its Maintenance

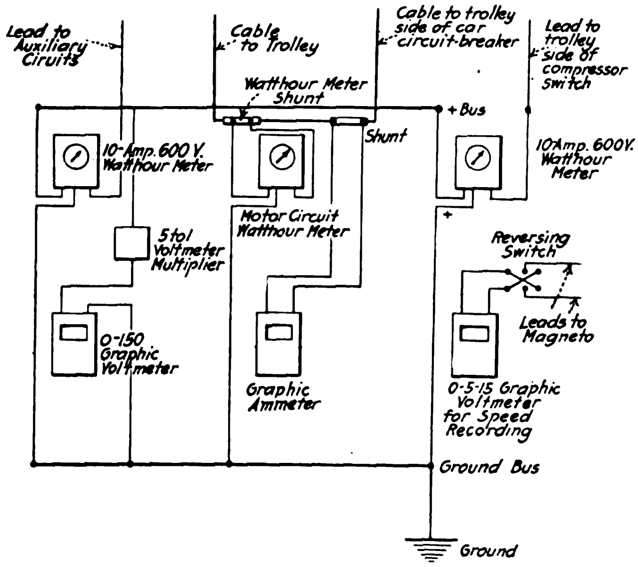
Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Portable Car Testing Set

BY D. D. EWING, ASSISTANT PROFESSOR OF ELECTRICAL ENGINEERING, PURDUE UNIVERSITY

A convenient and compact car-testing set has been used at Purdue University in making a number of tests on electric cars within the last couple of years. This set, which was designed for compactness, portability and convenience of connection, consists of three graphic recording instruments and three watt-hour meters mounted on a suitable test stand. The wiring, a simplified diagram of which is given below, is placed on the back of the board upon which are mounted the watt-hour meters. The graphic meters are mounted on a spring-suspended shelf. Felt pads are fastened to the bottoms of the stand legs to further minimize vibration. The stand is of such size that it may readily be placed in the baggage compartment of an interurban passenger car, thus permitting tests to be made on the car while it is operating in regular service. When used in testing city cars, a section of the car in which the stand is placed is blocked off to prevent passengers from getting in the way of the test crew and to keep them away from the live circuits.


Lead to Auxiliary Ciruits
Cable to Trolley
Cable to trolley side of car circuit-breaker
Lead to trolley side of compressor Switch
Watthour Meter Shunt
+ Bus
Shunt
10-Amp. 600 V. Watthour Meter
10 Amp. 600 V. Watthour Meter
+
Motor Circuit Watthour Meter
5 to 1 Voltmeter Multiplier
Reversing Switch
Leads to Magneto
0-150 Graphic Voltmeter
Graphic Ammeter
0-5-15 Graphic Voltmeter for Speed Recording
Ground Bus
Ground

CAR-TESTING SET—DIAGRAM OF CONNECTIONS FOR METERS AND SWITCHES

Esterline graphic meters are used. One graphic voltmeter is used to measure the voltage between trolley and ground, and another, in connection with a magneto generator, is used to measure the speed of the car. As usually connected the graphic ammeter measures the motor-circuit current only, although the connections can easily be arranged so that it measures the total car current. By means of a system of change gears in the chart drive, ten chart speeds, ranging from ¾ in. per hour to 12 in. per minute can be secured. While the timing with the higher speeds is not at all accurate these speeds are of particular value in studying "notching up" operations and starting-resistance adjustments. By means of flexible couplings the chart-driving rolls of all three meters can be mechanically coupled together thus insuring synchronous chart movements. The ammeter is provided with several shunts, that shunt being selected for a given test which will give on the car starting current an indication over about three-fourths of the meter scale.

The magneto generator which forms part of the speed-recording apparatus is of the low voltage d.c. type. It is mounted on the truck and is chain-driven from a sprocket wheel mounted on an extension of one of the car axles. This method of magneto drive has proved successful for car speeds as high as 70 m.p.h. The speed-recording apparatus is also quite accurate. During tests the accuracy is occasionally checked by timing the distance between mile-posts with a stop watch. In all of the tests that have been made so far the two methods have given results that have agreed very closely.

Sangamo railway-type watt-hour meters with special reset dials are used. These dials have a high large-hand speed and the large hand may be reset at the end of each run without interfering with the small-hand dial records. The meter which is used to measure the energy input to the motor circuit is provided with several shunts, the shunt used in a given test depending on the capacity of the electrical equipment of the car under test. As shown in the wiring diagram, one of the 10-amp meters is used to measure the input to the air-compressor motor and the other the input to the remaining auxiliary circuits. Obviously the meter connected in the compressor circuit might be used to measure the energy input to any other auxiliary circuit.

Data taken with this set enable accurate conclusions to be drawn relative to the adequacy and efficiency of the electrical equipment of the cars and distribution system of an electric railway.

An Inexpensive Method of Treating Boiler Feed Water

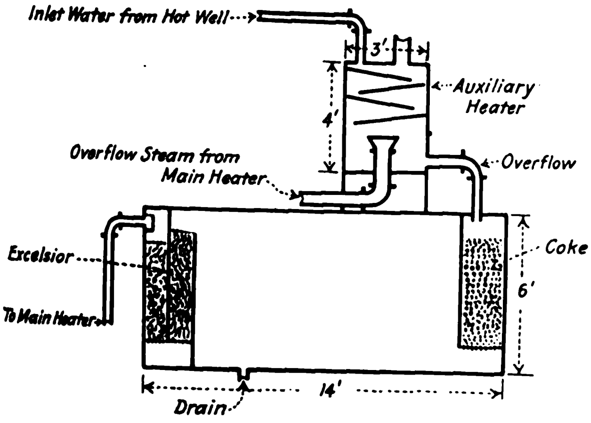
BY T. R. CRUMLEY, SUPERINTENDENT OF MOTIVE POWER EVANSVILLE RAILWAYS

The Hatfield power house, which furnishes a part of the power used by the Evansville Railways, is equipped with a barometric type of condenser, an open type of feed-water heater and two 400-hp. Babcock & Wilcox water-tube boilers. The water for condensing purposes was originally secured from a small stream, but several months ago it became necessary to abandon this stream and to drive wells in order to secure an adequate supply of condensing water. Due to an increase in the station load, the feed-water heater became too small and it was possible to heat the boiler feed water to a temperature of only 170 deg. Fahr. A part of the exhaust steam entering the heater was not condensed.

Soon after the wells were placed in operation trouble was experienced from an excessive amount of scale deposited in the boilers. A chemical analysis of the water was made in order to determine the kinds and amounts of scale-forming impurities contained, and the amounts and kinds of chemical reagents required to precipitate these impurities before the water entered the boilers. This analysis proved that the water was very hard, the principal impurities being the carbonates and sulphates of magnesium and lime. It was further determined that the necessary amounts of chemical reagents required to soften the water were as follows: 1.56 lb. hydrated lime per 1000 gal., and 0.2 lb. soda ash per 1000 gal.

As it was not considered advisable to install an expensive softening plant at this time, it was decided to build a tank in which to treat the water used for boiler purposes. This tank, shown in the accompanying diagram, was built of tongued-and-grooved cypress 2 in. thick. It is 14 ft. long, 6 ft. wide and 6 ft. deep. In order to utilize the surplus exhaust steam not condensed in the hot-water treater, it was also decided to build a small auxiliary heater, also shown in the diagram. This auxiliary heater serves the double purpose of increasing the temperature of the water at the time it receives chemical treatment, thereby making the treatment much more effective, and also raising the final temperature of the water entering the boilers.

The auxiliary heater was constructed of 1/4-in. x 2-in. x 2-in. angle iron and No. 12 gage galvanized sheet iron. The surplus steam from the main heater enters at the bottom of the auxiliary heater and circulates through and around perforated, removable trays. The water from the hot well is pumped by means of a small tank pump into the top of the auxiliary heater, where it is distributed over and filters through the perforated trays, thereby coming in contact with the steam. The water leaves the auxiliary heater at a temperature of 170 deg. Fahr., and falls by gravity into the treating tank. It is first caused to filter through a chamber packed with coke from which it passes into the main section of the tank. This chamber has a capacity equivalent to a two-hour supply for the boilers, so that the water is circulating very slowly at this point and time is secured to allow complete precipitation to take place. The water passes from this settling chamber through two small chambers packed with excelsior which catches the precipitated particles still suspended in the water. The water then falls by gravity into the main heater, where it is heated to a temperature of 205 deg. Fahr.



HOME-MADE PLANT FOR TREATING BOILER FEED WATER

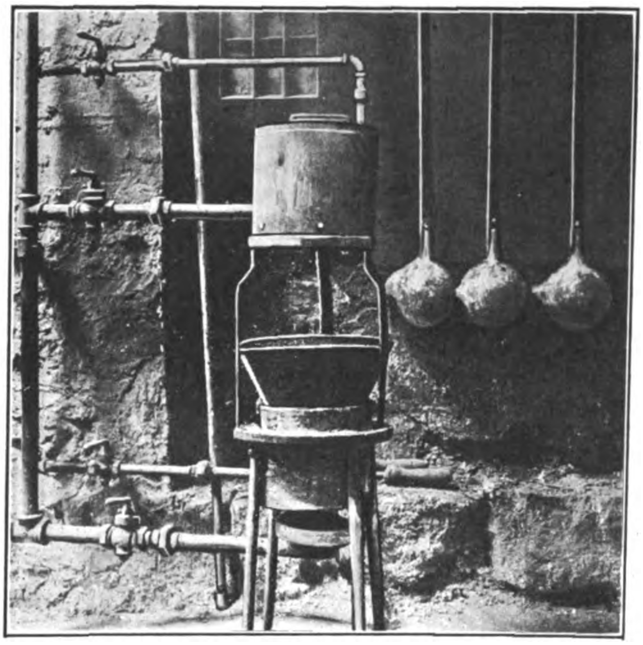
The soda ash is fed into the water as it enters the small tank pump, which pumps it into the auxiliary heater, and the lime is fed at the point where the water leaves the auxiliary heater. Both chemicals are fed by means of small pumps connected to the valve stem rocker arms of the boiler-feed pumps, so that the amount of chemicals used is proportioned to the amount of water fed into the boilers.

The work of building the treating tank, auxiliary heater and chemical pumps was done by C. O. Maxwell, chief engineer, at a cost of approximately $160. The temperature of the water entering the boilers has been raised from 170 deg. Fahr. to 205 deg. Fahr., which represents a saving of 3½ per cent in fuel. A much greater saving has been effected, due to the decreased maintenance of pumps, piping and boilers. This treatment has almost eliminated the scale formed in boilers and is costing us less than 1 cent per 1000 gal.

Bearing-Babbitting Furnace

BY J. C. DONOVAN, MASTER MECHANIC UNION ELECTRIC COMPANY, DUBUQUE, IOWA

A gas bearing-babbitting furnace which has proved particularly valuable in reducing the costs of first quality bearings is being used in the shops of the Union Electric Company, of Dubuque, Ia. As shown in the accompanying illustration, the furnace consists of two parts. The upper surrounding shield contains a cylindrical burner over which old bearings are set to melt the babbitt. The melted babbitt falls into the lower pot, which is heated by a circular gas burner. The usual method of pouring the babbitt into the bearing mold is followed.



DUBUQUE RAILWAY—BEARING-BABBITTING FURNACE

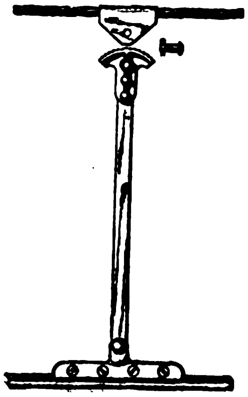
As is also shown in the illustration, air and gas are fed through mixers to each burner, insuring a quick, hot flame. The hot flame in direct contact with the babbitt metal in the old bearing consumes all combustible foreign matter and insures that only clean babbitt falls into the melting pot below. In addition to the foregoing advantage the hot flame insures a minimum loss in babbitt through oxidation.

The Union Railway, which operates street surface cars in the Bronx, New York City, has notified the Public Service Commission for the First District that it has completed the standardization of bumpers on its cars. The improvement was made at the request of the commission after a collision on the 149th Street line in September, 1914, when some persons were injured. The seriousness of the accident was due to a difference in the height of the bumpers on each car, permitting one car to crush the dashboard of the other.

A New Type of Catenary Hanger

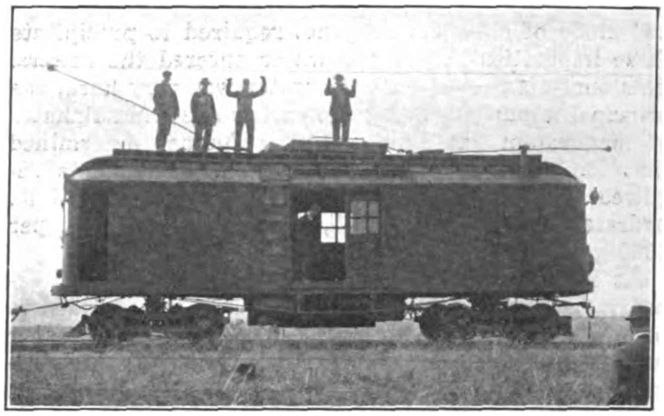
BY W. H. CREVISTON, ILLINOIS TRACTION SYSTEM

Recently the Illinois Traction System tested a new type of catenary trolley hanger invented by C. H. Robertson, one of the oldest motormen on this road. The claim is made that this hanger, which is shown in one of the accompanying illustrations, will catch or lock the broken ends of the trolley wire to the messenger. This prevents the rest of the hangers from sliding along the messenger, a condition which frequently results in wrenching the mast-arms from the poles or in tearing down the trolley-wire suspension. As shown in one of the illustrations, the top of the hanger is an arc with teeth which grip the messenger when the angle of the hanger is changed from the vertical. The trolley ear is pivoted to the hanger, thus when the wire breaks the hanger swings from the vertical position and brings the clamp into play. Where an ear is not pivoted to the hanger it is held in a vertical position, and a strain on the trolley wire slips the hangers along the messenger.



SAFETY TROLLEY HANGER

The halftone illustrations show a test made on one of the lines of the railway. In this test the trolley wire was cut at an ascending grade in the track so that the pull on the wire would be greater than that exerted by the weight of the wire only. Approximately ½ mile of five-point catenary construction was equipped with the new type of hangers and the trolley wire was cut between the third and fourth hangers between mast-arms. As will be noted in one of the halftone illustrations, when the ends of the trolley wire were again raised approximately to their original position, they were only about 12 in. apart. In another of the illustrations the cut wire is shown swinging, while the trolley beyond the first two hangers each side of the cut is approximately at normal position. In other words, the first hanger on each side of the break took practically all of the strain, while the second hangers beyond were found to be very little, if any, out of their normal position. Aside from the effect of the hangers retaining about their normal position on the messenger, the swinging position of the trolley wire is such as to eliminate a ground and also permits trains to operate under the break. Line repairs may also be easily made since there is no damage to the rest of the catenary construction, and the ends of the broken wire when restored to their normal position are only a short distance apart. These clinch hangers are manufactured by McConkie & Robertson of Peoria, Ill.

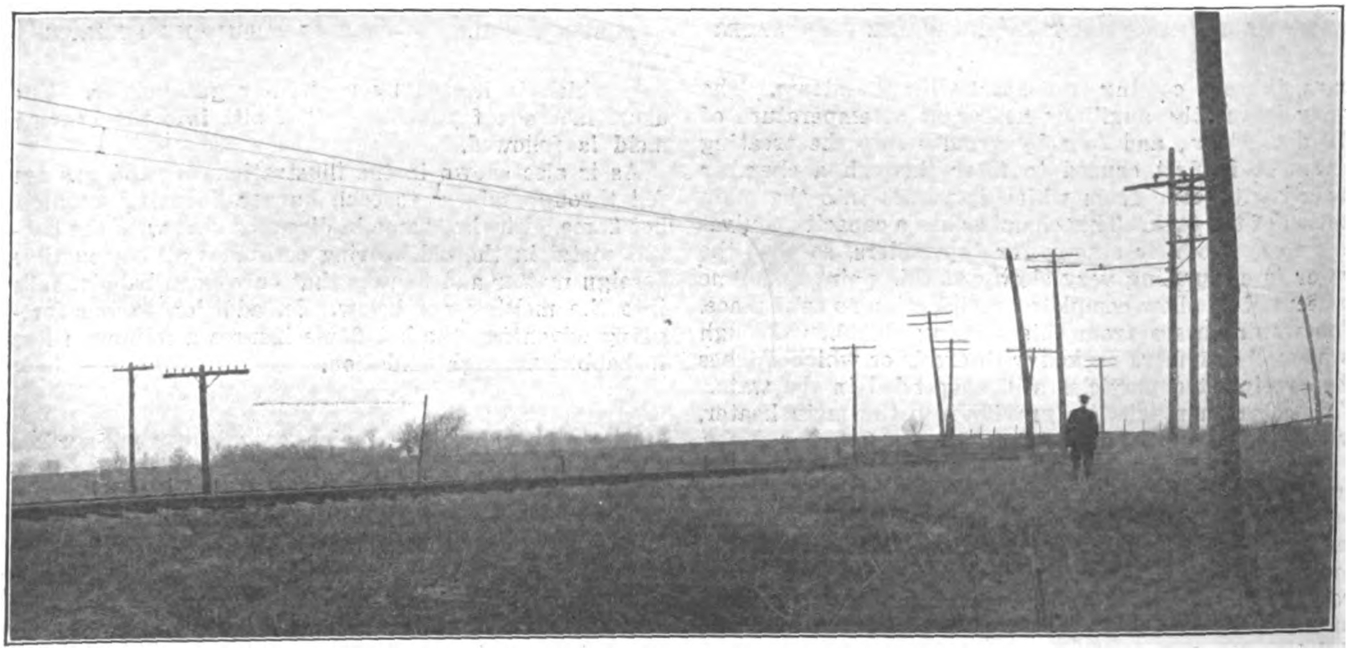


SAFETY TROLLEY HANGER—BROKEN TROLLEY WIRE HELD IN ORIGINAL POSITION

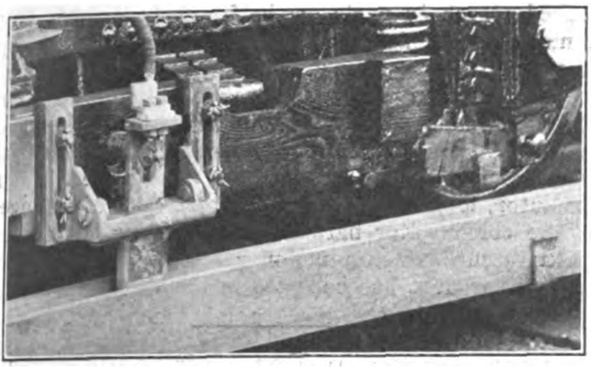
Novel Contact Rail Installation in England

There will shortly be placed in commission on the division between Manchester and Bury, Lancashire & Yorkshire Railway, a novel form of 1200-volt third-rail contact system which is the invention of the general manager of the company, J. A. F. Aspinall of Liverpool. The distance between Manchester and Bury is 9½ miles. A reference to this installation, noted on page 62 of the issue of the ELECTRIC RAILWAY JOURNAL for July 10, was made by H. M. Hobart in connection with the discussion of contact systems at the recent Deer Park convention of the American Institute of Electrical Engineers.

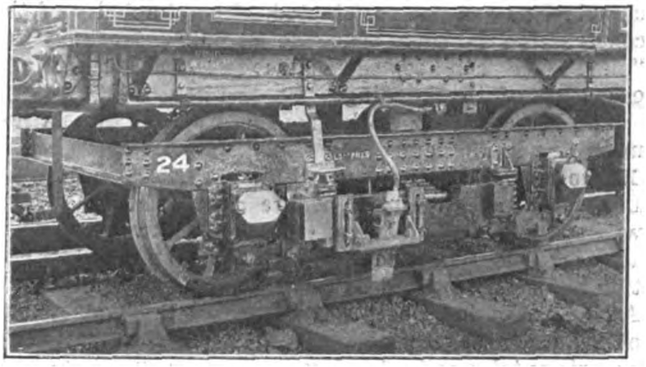
The essential features of the invention are clearly shown in the accompanying illustrations, the most novel



SAFETY TROLLEY HANGER—CUT TROLLEY WIRE HELD BY HANGER



NOVEL CONTACT RAIL SYSTEM—ASPINALL PROTECTED THIRD-RAIL, MANCHESTER & BURY RAILWAY



NOVEL CONTACT RAIL SYSTEM—FORM OF SHOE FOR ASPINALL PROTECTED THIRD-RAIL

ones having to do with the side bearing of the contact device upon the rail and the method of surrounding the rail with wood guards.

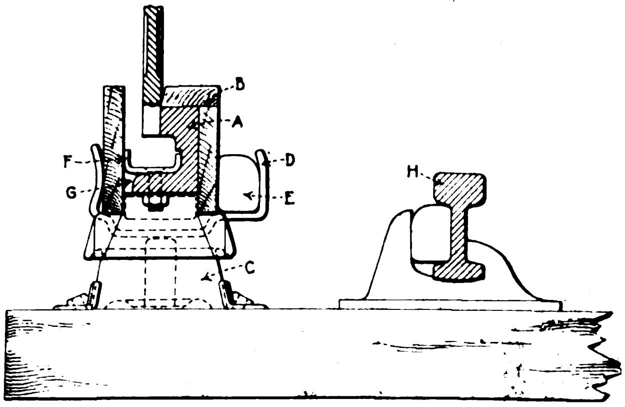
Referring to the cross-sectional view, which shows the preferred form of contact rail, it will be noted that a channel form of rail is used with a head sufficiently thick to provide a wide contact surface on the side. The form of rail was selected to provide a low center of gravity to prevent overturning even when the rail is not fastened down. While any form of rail can be used, this one is also well adapted to inclosing with protecting wood guards.

The contact rail is set upon insulators provided with lugs to prevent lateral movement. It is almost entirely inclosed with boards of Australian Karri timber which cannot be set on fire. The only openings around the rail are a slot at one side of the cover for the accommodation of the current collector, and drainage holes, as *G*, are provided to prevent accumulation of water in the groove formed between the guard and the collector rail. There is not a nail or bolt anywhere in the protecting guards.

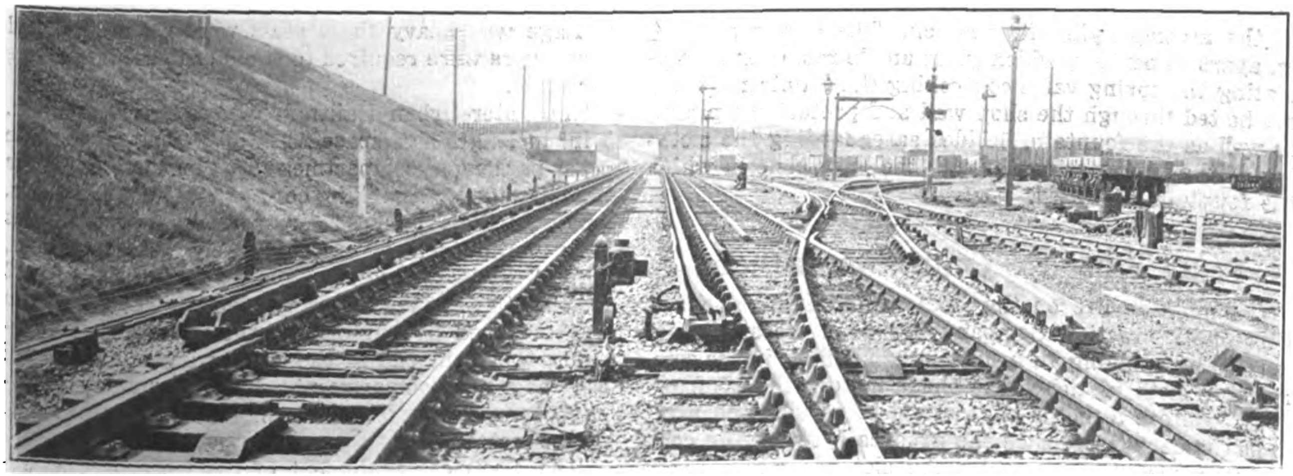
The angle-shaped guard, *B* in the illustration, rests directly against the rail surface, but the invention covers insulation therefrom if such be found necessary. The guard on the slot side is spaced away from the rail by means of a wooden filler block, termed by Mr. Aspinall a packing or distance piece. Over the rail base is a bent metal distance piece, *F*, secured in place as shown. The guards are attached to the collector rails without bolts by means of detachable metal clamps, *D*, placed between insulators. In connection with these are used wooden keys, *E*, preferably similar to those used in fastening the running rails in their chairs. In the diagram one of the running rails is shown at *H*, with the wedge holding it in its chair. The relation of the running and conductor rails, in regard to heights and spacing, are incidentally brought out in this figure.

The contact device, which with its mounting is shown in the accompanying halftones, is hinged and is pressed against the contact rail ~~by means~~ of a coiled spring. The method of mounting upon an insulating support is clearly shown. The halftones also show details of the protected rail with approaches, and an unprotected fourth-rail used for the return, as in standard British practice.

The advantages of this novel construction over the usual one appear to be that very complete protection can be furnished and provision can easily be made for considerable vertical variations in the relative positions of rail and collector. Under the climatic conditions found in England difficulties with sleet ac-



NOVEL CONTACT RAIL SYSTEM—CROSS-SECTIONS OF PROTECTED THIRD-RAIL, "A," AND RUNNING RAIL, "H"

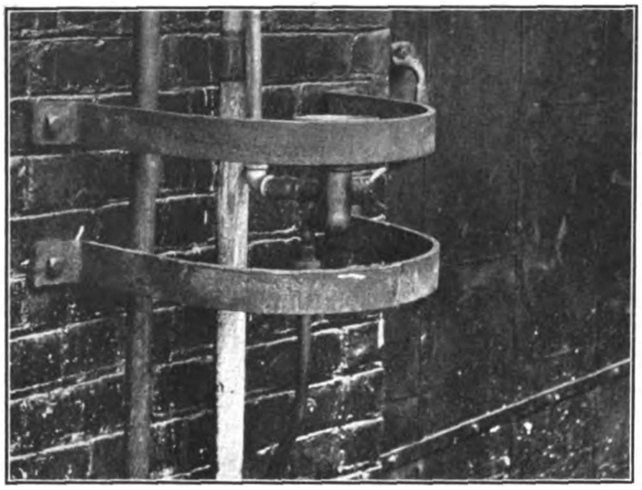


NOVEL CONTACT RAIL SYSTEM—ASPINALL PROTECTED THIRD-RAIL WITH ENTERING RAMP FOR SHOE AND THE RETURN FOURTH-RAIL CONSISTING OF A PLAIN RECTANGULAR BAR cumulations are not anticipated. The simplicity of the construction is such that the ordinary trackman or "plate layer" can keep the contact rail in order, with the exception of the bonding.

The Lancashire & Yorkshire Railway was the earliest main line in England to be electrified. Third-rail, with 600 volts, was used on the original installation between Liverpool and Southport where a very heavy service was operated. The average distance between stops is 1.32 miles and the schedule speed 30 m.p.h. This section has been operated electrically for many years. Mr. Aspinall has long been interested in the employment of higher voltages and in 1913 put into operation an experimental 4-mile, 3500-volt, d.c. line with overhead conductor, between Bury and Holcombe Brook. The operation was satisfactory but problems connected with tunnels and bridges prevented the extension of the experimental line and the 1200-volt third-rail was selected for the present electrification. These facts are mentioned to indicate that the chosen construction was adopted after long experience with electrical operation under local conditions.

Inexpensive Drinking-Fountain Guard

In the new shop of the Holyoke (Mass.) Street Railway a sanitary drinking fountain is located in the repair shop between doors leading into the stockroom and the forge department. To guard the "bubbler" from injury in the handling of material, two 3/8-in. x 2-in. straps of wrought iron have been installed, as shown in the accompanying illustration. The straps are 6½ in. apart on centers, which gives ample room for manipulating the spring valve controlling the fountain. They are bolted through the shop wall and protect the piping as well as the fountain, besides safeguarding the clothing of the men passing through the busy aisle in which the fountain is located.



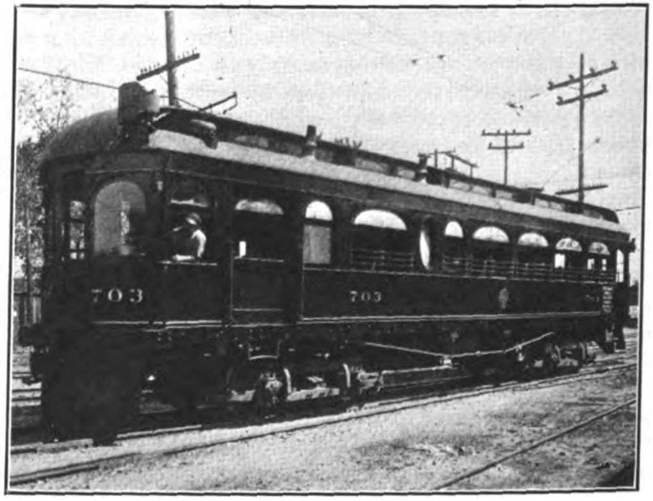
DRINKING FOUNTAIN GUARD AT HOLYOKE (MASS.) STREET RAILWAY SHOPS

Paste Filler for Commutator Slots

Commutator life on the lines of the Indianapolis & Cincinnati Traction Company has been materially increased by applying an insulating-paste filler in the commutator slots of the single-phase motors the company uses. Before a motor is returned to service and after it has undergone repairs the grooves between the commutator segments made by the slotting machine are filled with a mixture of dental plaster of paris and hard-cooked starch in parts one-half each by weight. This is made into a paste by adding gum shellac and stirring to a uniform consistency, after which it is spread over the commutator bars, particular attention being given to fill the slots. Experience of the last four years has shown that this paste filler prevents carbon and copper dust from collecting in the slots. The paste is a fair insulator, hence eliminates the destruction of the edges of the commutator bars caused by arcing, a condition which occurs after a motor has long been in service and copper dust has collected in the slots.

Improvements in Des Moines Interurban Cars

Recent improvement in the cars of the Inter-Urban Railway Company of Des Moines, Iowa, have done much to eliminate difficulties experienced in the past. Perhaps the most important of these, made principally for the comfort of patrons, is the provision of a separate baggage compartment. In the past the baggage and express was loaded in the smoking compartment. When baggage shipments were heavy this entailed discomfort to the passengers, and at the same time the baggage and express matter was under the control of no one. This was also true of mail bags which were transported in this compartment. When the full capacity of the baggage compartment was not required, folding seats which were placed along the sides of the car were lowered for the use of passengers. When baggage and express haulage was heavy these seats were not available and passengers were required to stand or to use the baggage for seats.



VIEW OF DES MOINES INTERURBAN CAR, SHOWING AIR-OPERATED LOCOMOTIVE BELL

The Inter-Urban Railway passenger cars are 54 ft. 5 in. in length. A space 23 ft. 9 in. long serves as the main passenger compartment, and on the original cars the baggage and smoking compartment was 13 ft. 10 in. long. In the remodeled car the main compartment has been maintained at approximately the same length, while 8 ft. ½ in. has been allotted to the baggage and 8 ft. 2 in. to the smoking compartment. The extra length was obtained by eliminating the motorman's compartment, the front end of the car serving as a cab as well as a baggage compartment. By this arrangement baggage, express matter and mail is put under the control of the motorman.

The electrical equipment of these cars includes GE-73-C motors with a 2.12 to 1 gear ratio obtained by using a twenty-four-tooth pinion and a fifty-one-tooth gear. These motors are rated at 55 m.p.h. at 600 volts and they are controlled through GE Type M control. To make the removal of dust which collected on the reversers and contactors of this equipment an easy task, they were varnished with a mixture of orange shellac and oxalic acid. This provided a smooth, hard surface which was much more easily cleaned than the bare metal.

During the Iowa winters considerable trouble has been experienced with snow collecting in the contactor boxes. This was obviated by providing an asbestos-board bottom in the boxes with an opening across the end away from the motorman's position. This arrangement permitted the snow which collected in the contact boxes to be drawn from them by the air suction created when the car was in motion.

A setting and tripping switch in the motormen's cabs has been substituted for the relay. This has been found to be a more dependable device and furnishes better protection to the motors. Solid fingers on the reversers have been replaced by split fingers and more satisfactory results have been obtained. Also, a piece of fiber inserted between the forward and reverse segments has been found advantageous because it permits the fingers to slide more easily when the reverser is being used.

The laws of Iowa provide that a bell must be sounded continuously whenever a train passes a highway crossing. To conform to this meant to place a burden on the motorman, which this company believed diverted his attention from his other duties. In order to relieve him, all cars have been provided with air-operated standard locomotive bells. As shown in the accompanying illustration, these bells are mounted above the motorman's cab, and they weigh, complete with air ringer, approximately 29 lb. A rather interesting feature in connection with the bells is the use of windshields in front of them. This was found necessary to reduce the air pressure required to ring the bell, and it has also been found that the shield tends to diffuse the sound to better advantage.

Rear Wheel Fenders for New York Buses

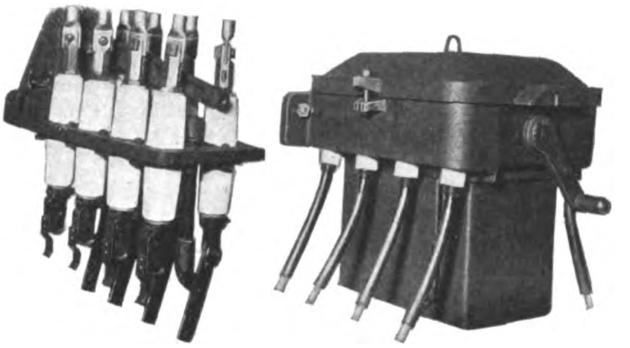
Long wooden safety fenders have been hung beneath the bodies of all motor buses operated by the Fifth Avenue Coach Company, New York City. These are located on either side of the buses, between the front and rear wheels, and curve outward toward the rear, so that rear wheels of each vehicle are thoroughly protected. Oddly enough, the majority of accidents to pedestrians in the streets of both New York and London on account of the motor bus have been rear-wheel accidents. People have a way of waiting for the front wheels of the bus to pass them and then heedlessly walking into the path of the rear wheels. In New York all classes of bus accidents are surprisingly few, the record last year being on the basis of one pedestrian injured to more than 1,500,000 miles of service. This excellent showing is largely due to the fact that the company is exceedingly careful in the selection and training of its chauffeurs, so that avoidable accidents to pedestrians have been almost wholly eliminated. With the installation of the fenders it is believed that mishaps to persons in the streets will be practically a thing of the past. These fenders, it may be said, were provided on the company's own initiative, its safety record having been such that its equipment has never been unfavorably criticised by the public authorities. The new fender is of the same type as that recently adopted by the London bus company with successful results.

Oil Knife Switches

An extensive line of oil switches for voltages up to 7500 has recently been brought out by the Westinghouse Electric & Manufacturing Company. These are non-automatic and are suited for a wide range of application, being made for indoor service in switchboard-mounting, direct wall-mounting, and remote-control styles, and for outdoor service on poles or in subway.

The direct wall-mounting style is particularly adaptable to motor installations on account of the facility with which it may be mounted on any support convenient to the motor operator. The lever and handle extend outward over the oil tank so that the switch may readily be mounted against a wall, post or other vertical support. The remote-control wall or pipe-mounting style allows the switch to be mounted at a convenient point away from the switchboard and operated from the switchboard or other point.

The outdoor oil switch is particularly adapted for controlling lines entering buildings, branch feeders from the main lines, sectionalizing feeders, or any of the numerous purposes for which an outdoor type of switch may be utilized on distribution systems. The subway-type oil switch is for mounting in places where a switch may be required to be operated submerged. It is made with two, three or four poles, and either single or double throw, and is designed for voltages up to 4500 and capacities up to 200 amp.



INDOOR TYPE OF OIL KNIFE SWITCH WITH TANK REMOVED, AND OUTDOOR SWITCH FOR POLE MOUNTING

Characteristic features of this type of switch are: Knife-blade contacts submerged in oil; live parts carried on insulating supports, affording a high quality of permanent insulation between adjacent poles and between the frame and live parts; small space required for mounting; accessibility of parts for purpose of inspection and repair; inclosure of all live metal parts, and low first cost. Knife-blade contacts are used because they insure the best contact for low temperature rise in a non-automatic switch. Each contact jaw has attached to it an arcing piece which takes the final break, thus preventing any burning of jaws. These arcing pieces are inexpensive and readily replaced when worn or burnt away.

With the exception of the 1500-volt switches, the contacts are mounted on all-porcelain insulation. In switches for 7500 volts and above the insulation is of the pillar porcelain type, similar to that of the best accepted standard form of circuit-breaker construction. In the 4500-volt type up to 200 amp. the contacts are mounted on a sturdy horizontal porcelain base, with molded porcelain barriers between all live parts. In general this form of construction gives these switches the same characteristics ordinarily looked for only in the highest grades of oil circuit-breaker construction, but these are obtained at a more moderate price than could apply to the non-automatic form of oil circuit-breaker.

Prepayment Car Apparatus

Since the United States Circuit Court of Appeals for the Second Circuit rendered an adverse decision on certain patents of the Prepayment Car Sales Company and the Supreme Court of the United States declined to review this decision, there has been considerable interest about the future plans of the company. An announcement on this point has now been made by Thomas W. Casey, president of the Prepayment Car Sales Company. According to Mr. Casey, while this decision was unfavorable, it was on two patents only and in one district only. The company believes these patents still valid, and it is expecting to have them adjudicated in other districts.

The Prepayment Car Sales Company will make certain changes in its organization, and in future will devote itself to the patent features of its business only, and after Sept. 1 the manufacture and sale of door and step operating mechanism will be carried on by the National Pneumatic Company.

The company's business began, of course, with the development of the "pay-as-you-enter" car in Montreal some ten years ago. The idea was introduced in the United States shortly after. At first it met with considerable opposition but soon proved very popular. Later, other patents were secured, notably those of the Pay-Within Car Company and rights for prepayment cars under the door and step mechanism patents of the National Pneumatic Company. During late years, therefore, the company's business has consisted in the issue of licenses to use its basic patents covering the location arranged for the conductor in relation to the entry and exit of passengers and also in the sale of mechanism for controlling the operation of the doors and steps, etc.

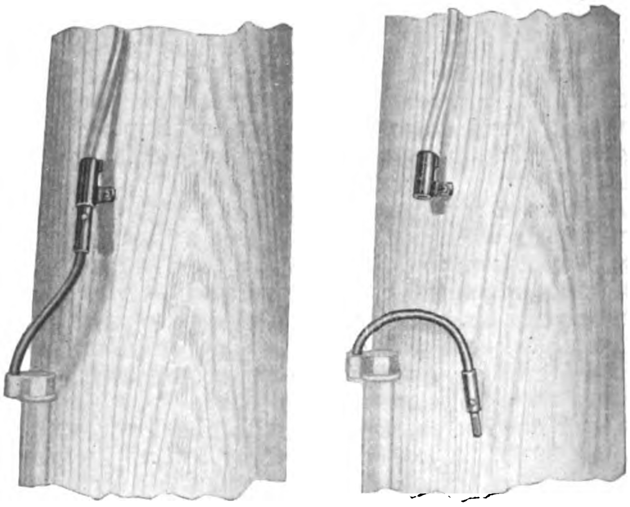
According to Mr. Casey, the only patents so far litigated have been those covering the location arranged for the conductor in relation to the entry and exit of passengers. The many advantages of the prepayment car have been evidenced by its almost universal adoption in one form or another, and while many companies feel that the electric railway industry owes a heavy debt to those who originated and introduced the idea, whether the basic patents will stand all the tests of legal validity or not, in justice to all, it will be the policy of the company not to accept royalties under these patents on any cars hereinafter put in service until the basic patents have been finally declared valid. In the meantime the mechanism, which has heretofore been manufactured for the Prepayment Car Sales Company by the National Pneumatic Company will be sold direct by the National Pneumatic Company for prepayment cars of all types, just as that company has sold mechanism in the past for elevated, subway and interurban cars. While the company has no right to guarantee against the basic prepayment patents which are still owned by the Prepayment Car Sales Company, its customers will be on the same basis, so far as this fact is concerned, as customers of competitors.

The National Pneumatic Company is well known as manufacturer of pneumatic door devices used so largely on subway, elevated and interurban railways, as well as manual door and step operating mechanism for electric railway cars, and it is said that the company is in a position to continue this work on a very large scale. The development of the prepayment car opened a new field for door mechanisms, and these will now be available on the conditions already described.

To carry out the new plan, which will be put in effect on Sept. 1, Mr. Casey will be elected a director and also vice-president and manager of sales of the National Pneumatic Company. Harold Rowntree will continue as president of the company and P. R. Forman as general manager and engineer.

Ground-Wire Disconnector

A new ground-wire disconnector is being manufactured by the Electric Service Supplies Company, Philadelphia, Pa., which eliminates the element of danger to linemen involved by grounded connections on a pole line. It is well known that lightning disturbances, owing to their relatively high frequency, will not travel far along a line in order to reach a lightning arrester and so be dissipated to earth. It is, therefore, self-evident that in order to afford maximum protection to apparatus lightning arresters should be installed as close to the apparatus as possible. This has been advocated for years. With transformers it is usually done by installing arresters to protect every transformer, or to protect every transformer whose capacity is above a certain minimum, arresters being installed on the transformer pole and grounded at this pole. In such cases the ground wire presents an element of danger for a lineman, who must, for example, climb the pole on a wet night to replace a blown transformer fuse, because he may accidentally cross himself with the lightning-arrester ground wire and with a live wire or live piece of apparatus.



GROUND-WIRE DISCONNECTOR IN CONNECTED AND DISCONNECTED POSITIONS

To avoid this danger the Garton-Daniels ground-wire disconnector has been designed. It consists of a brass casting that is screwed to the side of the pole. At the top a lug is provided into which a No. 4 or No. 6 solid wire running from the lightning arrester may be soldered. At the bottom another lug is provided into which a split brass plug slides. This plug is furnished with 12 in. of No. 6 flexible copper cable, the free end being soldered into a standard brass cap screwed to the end of the lightning-arrester ground pipe. With this method the ground pipe, as shown, is usually extended 8 ft. or 10 ft. up the pole to prevent the plug being withdrawn by any unauthorized person. A lineman who desires to work on the pole top for any reason simply pulls out the plug as he ascends, thereby disconnecting the upper wire and lightning arresters from ground, and so rendering work on the pole comparatively safe.

These ground-wire disconnectors are very useful where lightning arresters are tested by connecting them between opposite phase wires. The pulling of the plug disconnects the ground terminals of the arrester from earth, making unnecessary the removal of the ground wire from the ground binding post to prevent momentarily grounding one phase of the system while making the test.

News of Electric Railways

WILKES-BARRE ARBITRATORS REPORT FINDING

Employees Receive Increase of 9½ Per Cent—Sliding Scale Based on Profit Sharing Adopted for Two Years

The Wilkes-Barre board of arbitrators, Samuel D. Warriner for the Wilkes-Barre (Pa.) Railway, Thomas D. Shea for the Street Car Men's Union, and Dr. John Price Jackson of the State Department of Labor, as umpire, made public its findings on July 10. The previous history of this case was published in the ELECTRIC RAILWAY JOURNAL of April 10. Under the award the men have secured an increase in wages of about 9.5 per cent and a sliding scale based on a profit-sharing plan during the fiscal years of 1916 and 1917. If, instead of resorting to a strike last April to enforce impossible demands, the men had accepted the compromise offer of 26 cents per hour, they could have avoided the loss of nine days' work, besides the loss of revenue to the company and the inconvenience experienced by the general public. The award seems clearly to establish the fact that the claims of the company were fully sustained by the majority of the arbitration board.

The wages to be paid for a period of the three years beginning with Jan. 1, 1915, to motormen and conductors, in lieu of the present flat rate of 24 cents per hour, are to be: First-year men, 24 cents per hour; second-year men, 25 cents per hour; third-year men, 26 cents per hour; fourth-year men, 26½ cents per hour, and fifth-year men, 26¾ cents per hour. Moreover, the motormen and conductors are to participate in the increased passenger revenue received by the Wilkes-Barre Railway per car-hour in 1916 and 1917 in the following manner: The passenger revenue per car-hour for the fiscal year ended Dec. 31, 1914, which was $2.78, is to be the basis. For each 2½ cents of passenger revenue per car-hour in excess of this basis received by the company during the current fiscal year, each motorman and conductor shall receive an additional compensation of one-fourth of 1 cent per hour for his services during the next fiscal year.

The arbitrators state that the wages paid to trolley employees in the region adjacent to Wilkes-Barre show many conflicting discrepancies. An effort was made to adjust the wages of the Wilkes-Barre Railway employees in such a manner as to take into consideration the averages of the wages paid to employees of other companies of the same class and operating under the same conditions, and to award a reasonable increase over and above these averages. The testimony regarding the increase in living conditions was of so conflicting a nature as to be of little value, but it is felt the proportional increase awarded fairly not only represents comparative conditions of labor, but also gives weight to the increased cost of living reasonably to be expected during the period of the present contract.

RAILROADS FILE MAIL PAY CLAIMS

New England Roads Seek to Recover from Government Large Losses Caused by Acts of Postal Department

Alleging that they have lost large sums through carrying the mails under the present system of weights and that their compensation at the present rate fixed per mile is unreasonable, unjust and confiscatory and hence unconstitutional and void, seven New England roads filed printed petitions on July 17 in the Court of Claims in Washington in an effort to obtain from the government the sums of money which they contend they have lost in the last six years by reason of the postmaster-general's alleged arbitrary mandates and the operation of the present system.

The roads filing these petitions and the amounts claimed from the government are as follows: New York, New Haven & Hartford, $4,524,713; Boston & Maine, $3,676,823; Maine Central, $1,839,740; Bangor & Aroostook, $490,194; New York, Ontario & Western, $305,000; Sandy River & Rangeley Lakes, $30,968, and Bridgeton & Saco River, $13,425; total, $10,880,865. This is an average annual loss of $1,813,477 for the last six years.

The petitions filed by these New England railroads claim: (1) That the annual increase of mail has not been paid for at all; (2) that the carrying of the parcel post has been without adequate compensation, and (3) that the deficiency created by loss of mail compensation must be made up from the freight, passenger and express receipts. Two causes of action are set up in the petitions filed, one with respect to the system of quadrennial weighing, declared to be illegal, and the other with respect to the rate of pay per mile and the increasingly expensive demands made from time to time by the postmaster-general upon the railroads for facilities, for which no adequate compensation has been made.

With respect to the weighing of the mails every four years as a basis for the mail payments to them, the railroads assert that such weighing has been done exclusively by the post-office department and that they have been prohibited from fully inspecting and verifying such weighing. They repeatedly requested and demanded of the postmaster-general that the mails carried be weighed annually or that the weights be taken at the beginning and end of the four-year period and averaged, but such demands were "ignored and refused." With regard to the effect of the parcel post law on them, these railroads point out that the increased mail resulting from these packages has not been included in any weights ascertained by the department and no compensation has been paid them for it upon any basis of weight. Regarding the acts of the postmaster-general by which they allege that their burdens have been increased, the railroads allege that he has from time to time during the existence of outstanding quadrennial contracts made large additions thereto and increased requirements therein; he has made greater and more expensive demands for rooms and equipment for handling the mails and carrying them to post-offices, and he has made other illegal and onerous exactions.

SAFETY CONDITIONS IN BOSTON SUBWAYS

An Interesting Report Just Rendered to the Public Service Commission by William L. Puffer

In accordance with a vote of the Massachusetts Public Service Commission resulting from the accident to the electrical distribution system of the New York subway on Jan. 6, 1915, an investigation of the conditions of safety on the subway and rapid transit lines of the Boston Elevated Railway has been completed by William L. Puffer, consulting engineer, Boston, who has addressed an extended report to the board on the subject.

At the outset of his report the author states that early in his investigation he was informed by M. C. Brush, second vice-president, that a conference of officials was held immediately after the New York accident as to the possibility of a similar accident in the Boston subways and tunnels. As a result of the studies then made and also of certain suggestions made by Mr. Puffer during his examination a number of the recommendations in his report have been adopted and others are under advisement. In acknowledging this, Mr. Puffer says: "A report of this kind must necessarily appear critical and perhaps unfriendly because it cannot go into all details of the good things so self-evident in the service and equipment which continuously and safely transports thousands of passengers." After contrasting the conditions in New York and Boston, the report points out that in the latter city the liability of the system to derangement is diminished by the radial character of the service, the shorter distance between stations, and the fact that there are several power houses feeding energy toward the city from different directions, and generally over more than one route.

Regular inspections bearing upon the prompt elimination of combustible materials and rubbish are recommended, with the storage of such combustibles as may be absolutely necessary for operation at stated places where thorough automatic fire protection can be had. All permanent construction should be fireproof, and combustible rubbish from construction or repair work removed at once.

The author commends the block signal installations in the Cambridge and Boylston Street subways and states that that of the Washington Street tunnel, while not the equal of the two former, was fully up to date at the time of its installation and able to give a fair degree of safety. The automatic train stop is used in these tunnels and is desirable. In place of the simple home signals used in the East Boston tunnel, Mr. Puffer recommends the installation of a system similar to that in the Boylston Street subway, extending through all stations from portal to portal. The report states that all of the apparatus relating to signals and train stops on the rapid transit lines appears to be of the best kind, well installed and carefully maintained.

The report recommends the reconstruction of the lighting distribution center at Boylston Street, in the Tremont Street subway, which contains three large transformers for the supply of emergency lighting in a large portion of the subways and tunnels of the city, the transformers being placed in an air-tight fireproof room with the exception of an outdoor smoke vent. Transformer oil drains and the inclosing of all high-voltage circuits in ducts are advised, with abandonment of the chamber as a workroom and storeroom, and the removal of all combustibles to a special room provided with automatic sprinklers or otherwise protected against fire.

The report recommends that efforts be made to devise a scheme whereby the third-rail can be provided with a suitable insulating and protecting cover. The author holds that the location of the bare third-rail about 19 in. to one side of and 6 in. above the running rail constitutes a dangerous obstruction in case of a hurried exit of a carload of passengers from a train, even assuming the tunnel lights were of full brilliancy. Experience at New York with the covered third-rail is cited as proof of its success, although the author realizes the difficulties of designing a covering and contact shoe suitable for all engineering and operating requirements. He believes it possible to lower the third-rail 2 in. and set it about 3 in. farther away from the running rail. Then the present walks if raised a few inches would become a very efficient cover for the rail and at the same time serve as a walkway. Should it be found too costly to provide a covering for the third-rail, the report recommends that all woodwork in the floors of all cars to be operated by third-rail power be replaced with non-combustible materials until such time as all-metal cars can be used. It also recommends that all third-rail section switches not now situated at stations be provided with remote-control from the same point or points where the switches are located for the sections adjacent to the stations.

In connection with the other conductors, the report emphasizes the undesirability of grouping lead-covered cables, on account of the susceptibility of such coverings to melting at relatively low temperature in case of breakdown. Such breakdowns are not serious when they occur in a properly constructed duct line, but are serious as well as more liable in manholes where the unprotected cables may be injured when resting on sharp corners, or by careless handling. In future installations it is desirable that no power cables be placed in subways other than actual connections to third-rails, trolley wires and switches, but much can be done in the way of prevention, such as separation of the different types of service by considerable distances, much greater use of concrete or earthen barriers, better protection and support where there is a change of level of cables, removal of pipes or other conductors from the vicinity of cables. The mechanical protection of all splices and exposed cables by wrappings and split tiles is recommended. It also favors a separation of ground return cables from feeders and highly commends the practice of the Boston company in making but slight cross-connections between the lead sheathings. Small rubber-covered wires used in signal, lighting and telephone service need classified separation for service continuity, but are not factors that are to be considered of moment in relation to safety.

The continuous use of the ventilating fans originally installed for subway service at Boston has been found unnecessary, except in the East Boston tunnel, which passes beneath Boston Harbor. The report recommends the reversal of the direction of air flow in the latter tunnel so that air will be forced in emergencies from stalled cars toward the stations, and the provision of remote-control for fan motors. Distant control from one or more points on each side of the fan and a reserve source of power are advised.

The frequent installation of telephone stations with blue-light markers and duplicate circuits placed near the subway roofs is also advised, the lamps to burn constantly. The report also recommends the clearer marking of exits and the use of fastenings at the gratings and doors of emergency exits which can be opened without any special skill, knowledge or strength. The present provision for emergency lighting of subways and tunnels is commended, but it is suggested that some of the older installations can be improved, both as to the location of lighting cables and safety from interruption by accidents. Two red tail lights are recommended for all cars and trains entering subways, with the exception of certain short loops. Special oil or storage-battery lighting in the cars has been carefully considered, but where the distances are so short seem unnecessary, provided the emergency lights and the blue-light markers are intelligently planned and installed. The clearer indication of the location of fire protection apparatus is favored, with the use of entirely fireproof car construction in the East Boston tunnel and in all new rolling stock equipment for tunnel service, with the provision of non-combustible flooring for wooden or partly wooden cars in the Washington Street tunnel, together with the use of automatic stops in the East Boston tunnel and other minor improvements.

BOARD REPORTS ON GRADE CROSSINGS

Interurban Line in Los Angeles Should Elevate or Depress Tracks—City Line Should Use Viaducts or Subways in Business Districts

The Board of Public Utilities of Los Angeles, Cal., has issued a report dealing with grade crossing elimination, transportation and congestion. The report concludes that the problem as it concerns electric carriers is brought down to this: (1) Interurban railway to be elevated or depressed, as the particular locality requires, and to be removed from the street surface, such elevated or depressed tracks to lead to suitable terminals or to a loop subway with no terminal; (2) viaducts at all principal thoroughfares across the industrial district to accommodate vehicles and street cars, and (3) street railways to use viaducts across the industrial district, subways through the congested retail district and rerouting. The conditions necessitating such expenditures are said to be not chargeable to any one party and the costs should be distributed among the interests affected.

In regard to the interurban system of the Pacific Electric Railway, the report states that as long as the company is occupying the city streets, it would seem that the public right for such use could, on demand, require that all cars should accept local passengers and stop at all intersecting streets in order to provide for the fullest accommodation of the local public.

Continuing, it says: "This would inconvenience and seriously interfere with the interurban traffic for which this road is primarily designed. The province of the interurban lines is to connect the interurban population and freight with the city. Cars of 35 to 40 tons, geared for high speed, cannot be operated economically or safely on the surface of the streets, calling for stops at every corner; they should reach the city limits in the shortest space of time and with as few stops as possible. This can never be accomplished while interurban lines occupy the surface of the city streets, alone or jointly with the local city lines, at least in the congested parts of the city. They should be required to elevate or depress all lines, above or below the street surface, throughout the congested district, with liberal allowance for increase in the area of this district, or, better still, to the city limits; or to use a private right-of-way involving few grade crossings of streets or other railroads. There are no serious difficulties presented as to physical construction, and the money saved in the operation of these cars through the congested district, the economy in operation and maintenance—especially in the renewals to the surface of streets, cheaper roadbed construction and freedom from accidents due to surface conditions—would pay a fair rental and interest on the cost of construction."

Many of the troubles of the local Los Angeles Railway are said to be due to the blocking and congestion of traffic by the interurban cars in the congested district and to the numerous railroad crossings that have to be flagged. It is believed that studies now under way for rerouting and subways would solve the remaining congestion.

MINNEAPOLIS LINE WANTS NEW FRANCHISE

Street Railway Takes Initiative—Asks for Valuation and Proposes Transportation at Cost

On June 8 C. G. Goodrich, president Minneapolis (Minn.) Street Railway, addressed a letter to the City Council of Minneapolis asking that steps be taken for the renewal of its franchise, which still has eight years to run. The request was referred to the special committee on street railway matters, which was instructed to negotiate with the railway for the purpose of drawing up a franchise ordinance to be submitted to the people.

The committee met on July 14 for its first formal session, at which time a letter was submitted from Mr. Goodrich briefly outlining the franchise features which he deemed fundamental. In general outline the plan closely resembles the one which has been in operation in Cleveland for four years and is known as the "transportation at cost" plan. Though not worked out in detail, the suggested plan contemplates: 1. A fair valuation upon the company's property. 2. Assurance of a fair and reasonable return to the company upon this valuation. 3. The turning over to the city of the net surplus earnings after this charge has been taken out; the city's portion to be used, after it has sufficiently accumulated, in the reduction of fares or for other transportation purposes as the city may determine.

The plan also embodied the following statements relative to purchase, improvements and depreciation:

"The enabling act which was passed by the last Legislature permits the city to enter into an agreement that will give it the right to purchase at the end of any five or ten-year period. This company has no objection to giving the city this right to purchase at any time upon reasonable notice and on a fair basis to be agreed upon.

"At the present time there is a strong demand for the building of new lines and the extension of old lines to keep pace with the city's growth. Such new lines and extensions will require additional cars and power-house equipment, and this demand will continue naturally every year. The money expended for such necessary improvements can be added to the value agreed upon.

"Funds should be set aside for depreciation and renewals, as this is as much to the interest of the city as it is to the company, for the highest state of efficiency can only be obtained by maintaining the property in the best possible physical condition."

RHODE ISLAND MEN TO ARBITRATE

The strike inaugurated at midnight on July 14 by the Street Car Men's Union against the Rhode Island Company, Providence, R. I., when the officers of the latter corporation refused to accept as arbitrators three men named by the union, was ended at 1.15 a. m. on July 17, when an arbitration agreement was signed by both parties to the controversy and the men were ordered back to work. All the cars were in operation on the morning of July 17 after the two-day tie-up of practically all service in Rhode Island.

On July 15 Mayor Gainer offered his services to both parties in an endeavor to bring them together in the matter of arbitrators. After a series of conferences with the Mayor the union men withdrew their ultimatum regarding arbitrators, and, adopting as their own the proposal made by the trustees of the Rhode Island Company on July 14, suggested that the board of arbitration be made up of one man appointed by the union, one man appointed by the Rhode Island Company, and Mayor Gainer, who should be the chairman.

On July 20 the board of arbitration was agreed upon as follows: Mayor Gainer, chairman; Michael J. Houlihan, representative for the company, and Henry T. Baldwin, representative for the union. Public hearings will begin on July 26. When all evidence is in, the board must report within thirty days.

The questions to be arbitrated are the rate of wages to be paid by the company to all members of the association and the determination of the number of hours, if any, to be guaranteed extra men for a minimum day's work. It is specifically provided in the agreement that the arbitrators shall have no right to fix any scale of wages made conditional upon any co-operative plan or upon any plan based upon future earnings of the company, and that the wage scale, as fixed by the board, shall date back and become effective as of June 1, 1915.

The board of directors of the company met on July 17 and passed a resolution approving the action of President A. E. Potter during the events leading up to the declaration and the ending of the strike.

ELECTROLYSIS TESTS IN LORAIN, OHIO

The suit of the Cleveland, Southwestern & Columbus Railway against the city of Lorain, Ohio, filed some time ago in Common Pleas Court at Elyria to prevent the enforcement of an electrolysis ordinance passed by the City Council, was recently withdrawn, since extensive tests showed that its road was now being operated well within the ordinance requirements. When the ordinance was passed it seemed likely that changes entailing the expenditure of a large amount of money would be necessary to put the equipment in shape to comply with all the requirements. Later the company concluded that such changes as were shown to be necessary would result in a saving to itself as well as a benefit to the city. The changes were, therefore, made, and the real outlay proved to be comparatively small in the end.

The tests, covering a period from April 19 to April 27, 1915, were made by A. P. Lewis, representing the Cleveland, Southwestern & Columbus Railway; Albert F. Ganz of Stevens Institute of Technology, representing the Logan Natural Gas & Fuel Company; Samuel S. Wyer, consulting engineer of Columbus, Ohio; Elam Miller and H. S. Warren, New York, representing the American Telephone & Telegraph Company, and E. S. True, Chicago, representing the general group of Bell Telephone Companies. Mr. Herrick represented the Lake Shore Electric Railway in the tests and E. W. Moore, F. W. Coen and Mr. Herrick were present at a number of the conferences. The interests indicated above joined in making the tests.

The ordinance requires among other things that all metallic conductors forming parts of current-carrying circuits be insulated from the ground wherever it was practical to so insulate them; that the average potential difference during any ten consecutive minutes between any two points 1000 ft. apart on such metallic conductors should not exceed 1 volt, and that the average potential difference between any two points more than 1000 ft. apart should not exceed 7 volts; that insulated potential wires be installed from an adequate number of points on the insulated metallic conductors, together with voltmeters, so arranged that the potential differences between these points on the metallic conductors could be readily and accurately measured. Very careful tests were made with respect to these points and the voltage drop of the tracks was noted for various distances on all the lines in the city. The data were all gathered in a report that was submitted to the interested parties.

NEW FRANCHISE GRANTED IN CLEVELAND

The franchise granted the Cleveland & Youngstown Railroad by the city of Cleveland last week provides specifically for the entrance of any interurban railways whose tracks may be crossed by the tracks of the new company. It is understood that this means that any interurban road that desires access to the central part of the city by means of its tracks may build to it for that purpose. The company is required to co-operate with such roads in every way possible when they wish to use its tracks for this purpose, or make any change that may be found necessary. It is said to be the purpose of the company to provide a double track to be operated at high speed for the accommodation of the interurban lines. If terms for this service cannot be agreed upon between the interested companies it is provided that the matter shall be submitted to a board of arbitration.

The city reserves the right to use a strip of land approximately 50 ft. wide at the present location of East Twenty-third Street for a subway for street railway traffic, but the company may build over it and use it as may be necessary for its own benefit above the point required by this reservation.

It is the intention of the company to build a joint steam and interurban passenger station at a point near the business district where land has already been acquired for the purpose, but the amended franchise passed has little to say about this. In fact the greater part of it applies to the freight terminal, over which there was rather bitter contention.

The Citizens' Referendum League, an organization recently formed, is preparing petitions for a referendum vote on both this franchise and the one granted at the same time to the Cleveland, Akron & Canton Terminal Railroad, which is planning to build a four-track electrically operated freight subway under East Fifty-fifth Street from the lake to the southern city limits. Friends of the referendum movement claim both companies have been allowed too much liberty in the franchises and that the city has failed to provide for proper supervision of operation, especially as respects the Cleveland, Akron & Canton Terminal Railroad. They also oppose the franchise to the Cleveland & Youngstown Railroad on the ground that it is closing too many streets where its freight terminal is to be established.

COURT REFUSES TRANSIT DELAY

Judge Sulzberger on July 17, after a hearing in Common Pleas Court, refused an injunction asked by David E. Dallam, a real estate dealer, to restrain the city of Philadelphia from issuing bonds for $6,000,000 authorized for the Broad Street subway and Frankford elevated systems. The court, however, issued a cautionary order holding the litigation *in statu quo* until after a decision of the State Public Service Commission, which will hold a special meeting on the project at Harrisburg on July 26.

City Solicitor Ryan said no actual work would be commenced under Director Taylor's plans until a decision was obtained from the commission. Judge Sulzberger, however, ruled that the Department of Transit may proceed with its advertisement for bids, Mr. Ryan asking that these preliminaries be not interfered with, as such a condition would deter bidders and tend to raise prices because of a suggestion of uncertainty.

As the preliminary step incident to the construction of the Broad Street subway, Director Taylor on July 14 awarded the contract for the building of a sewer under Buttonwood Street, between Thirteenth and Broad Streets. The work is to begin on Aug. 4 and must be completed in two months. The building of the sewer was said to be in no way affected by the taxpayer's bill in equity attacking the legality of the $6,000,000 loan. Separate proceedings would be necessary to stop the construction of the sewer.

TOLEDO FRANCHISE CONFERENCE CONTINUED

In the discussion of the proposed Toledo Railways & Light Company franchise at Toledo, Ohio, Henry L. Doherty, chairman of the board of directors, told the special franchise committee of the City Council on July 16 that the two points in the present draft which will make it difficult to secure funds for improvements, are the time for making a valuation and the requirement that the company accept bonds as part payment for the property. He said that conditions are bad at this time and he doubted whether it would be possible to raise $2,000,000 for that purpose under the conditions proposed in the franchise. When questioned for his reason for objecting to the acceptance of bonds in part payment for the property, Mr. Doherty suggested that the committee consult with some of the local brokers for a reply. He proposed that the clause giving the city an option to purchase the property be eliminated from the draft altogether. Members of the committee agreed to consider this. Mr. Doherty said further that he could not see how the company could be termed a "going concern" unless some value is placed on the franchise. The committee objects to allowing anything for the franchise in case the city decides to purchase the property.

At a conference on the day previous clauses in which changes are to be made were discussed and in some cases agreements were reached. Mr. Doherty insisted that the question of valuation of the property should be settled before going any further, but some of the members argued that this should be among the last things to be considered. Mr. Doherty objected to extending the 3-cent fare privilege which is now allowed for the benefit of workers. Member Dotson conceded the point that the city should make good any losses the company might suffer from an unreasonably low fare during the try-out periods. Mr. Doherty then suggested that these periods should not be too long, as the company might be bankrupted before their termination, when a settlement with the city could be made.

OLD ALBANY CONTRACT RENEWED

On July 20 C. F. Hewitt, general manager United Traction Company, Albany, N. Y., renewed the old working and wage agreement with the employees, under the same terms as to working conditions and wages, for a period of one year from July 1, 1915.

The demand of the United Traction Company employees that they receive the runs of the members of the Brotherhood of Locomotive Engineers operating Hudson Valley Railway cars over United Traction Company's rails between Waterford and Troy, N. Y., has been deferred until after the annual convention of the Amalgamated Association to be held in Rochester, N. Y., commencing on Sept. 13. At this time it is expected that the convention will appoint a committee to confer with a committee from the Brotherhood of Locomotive Engineers to adjust the situation satisfactorily between the two unions and relieve the United Traction Company of responsibility in the matter.

The settlement of the matter in this manner is considered a complete victory for the company, as it won all of the points at issue in the recent controversy.

NO CONSENTS NEEDED IN CLEVELAND

According to a decision of the Ohio Supreme Court, rendered on July 20, the Cleveland (Ohio) Railway may now build tracks on any street in Cleveland on which Council may authorize it to do so, without the consents of owners of abutting property. Under this decision the provision of the city's new charter, conferring this power on the City Council, supersedes the State law as far as Cleveland is concerned, although it does not change matters in cities and towns which have no charters or whose charters do not contain this provision. This was the case of Charles F. Brush and others against the city and the Cleveland Railway to prevent the invasion of a section of Euclid Avenue, locally known as "Millionaires' Row." The case of residents of Reading Road, Cincinnati, against the city of Cincinnati and the Cincinnati Traction Company, resulted in a decision in their favor, since Cincinnati has no charter.

The Cleveland Railway began the construction of tracks on Euclid Avenue, between East Twenty-second and East Fortieth Streets, at 4 a. m. on July 21. About three weeks will be required to complete the track. The company has not announced details of car routing when this section is placed in operation, but it is probable that all regular Euclid Avenue cars will be routed over it, while Wade Park cars and some others may continue to go over the Prospect Avenue track. Euclid Avenue cars will save about five minutes in running time by going over the new track, it is estimated. There is a possibility that the Prospect Avenue track may be extended from East Fortieth Street over Carnegie Avenue to East Fifty-fifth Street, but this has not yet been definitely decided.

New Electrification Project Reported.—It is reported that it is proposed to electrify the Schomburg & Aurora Railway, which extends from near Bond Lake to near Lloydtown, Ont. Part of the material has been ordered.

Rehearing Denied in Ulster & Delaware Case.—The first step in the appeal from the recent decision of the Public Service Commission for the Second District of New York denying the Ulster & Delaware Railroad permission to raise its mileage rate above the 2-cent maximum set by the Legislature, as noted in the ELECTRIC RAILWAY JOURNAL of July 17, was taken on July 16 when the commission formally denied the company's application for rehearing.

Commissioner Disfavors Civic Car Line Shops.—In reply to a request for an estimate of cost, Works Commissioner Harris on July 16 reported to the Board of Control that in his opinion it would be unwise to proceed with the establishment of civic car line shops in Toronto. He did not think the city could build cars as economically as a private company serving the whole of Canada. The reply was not considered satisfactory and the matter was referred for more details.

Change in Name of Oregon Commission.—On July 1 the name of the Railroad Commission of Oregon was officially changed to the Oregon Public Service Commission. Recognizing that the name "Public Service Commission" more correctly defines the powers possessed by this branch of the State service, the Legislature last winter passed an act providing for a change of name on July 1. There is no change in the jurisdiction of the commission. The commission has established an office in Portland.

Company Presents New Franchise in Waukegan.—The Chicago & Milwaukee Electric Railroad, Highwood, Ill., has presented a new franchise to the city of Waukegan, Ill. In this franchise it agrees to pay all back taxes but asks to be relieved of building the loop in the North Side residence districts within a period of one year. According to the franchise there must be at least three through cars in each direction. The company asks to be allowed to assume the franchise of the Waukegan, Fox Lake & Western Railway on certain streets until its expiration.

Iowa Section of N. E. L. A. to Meet at Dubuque.—The 1916 convention of the Iowa section of the National Electric Light Association is to be held in Dubuque instead of Ames, as previously announced. The former selection has been declared void on account of the illegal inclusion of votes by class "C" members, the choice of Dubuque being later made by a mail canvass among the qualified voters. It is considered probable that the Iowa District Gas Association and the Iowa Street and Interurban Association will hold their conventions at the same time and place.

Car Tax Proposed in Kansas City.—An ordinance has been introduced in the City Council taxing street cars of the Metropolitan Street Railway, Kansas City, Mo., $60 each a year. The measure is intended to become operative in case the reorganization of the street car system is effected, in which event the income to the city under the present "peace agreement" would cease. The city now receives 8 per cent of the company's gross income. Last year this amounted to $430,000, which paid the company's taxes, $274,000 and left about $160,000. Under the new franchise the city would receive no cash from the car fares until all revenue above 6 per cent, by being put into extensions and improvements, had raised the physical value of the property to $30,000,000.

Company Appeals Against Forced Extensions.—Counsel J. B. Howe of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has filed in the Federal Court a formal appeal from a decision recently rendered by Federal Judge Frank H. Rudkin upon the company's application for an injunction against the Public Service Commission enforcing its order to extend its Alki Point, Fauntleroy Park and Ballard Beach lines beyond the termini provided by the company's charter. The company contends that the order violates the provision of the federal constitution forbidding the impairment of contract obligations, and also that it deprives it of vested rights without due process of law, for the reason that to comply with the order will mean a large financial loss upon these lines that cannot be offset by the operation of its other lines.

Financial and Corporate

ANNUAL REPORT

American Railways

The board of directors of the American Railways, Philadelphia, Pa., has changed the end of the fiscal year from June 30 to Dec. 31. For this reason the annual report recently issued shows only the operations for the six months to Dec. 31, 1914, as compared to the similar six months of the preceding year.

The total number of passengers carried was 54,461,989, a decrease of 837,941, or 1.51 per cent. The gross receipts of the subsidiary companies were $2,881,875.21, a decrease of $5,523.80, or 0.19 per cent. After payment of all operating expenses, interest and taxes, the net income was $294,087. Dividends were paid amounting to $254,615, leaving a balance of $39,472 to be added to surplus.

The subsidiary companies spent on maintenance of track, roadway and equipment, including sums set apart to cover depreciation, an amount equal to 18.81 per cent of the gross receipts. There was charged out of earnings to payments into sinking funds $19,554 and also paid and retired $15,000 of maturing car trust certificates, series A. Taxes accruing to state and federal governments amounted to $134,813, or 4.67 per cent of the gross receipts. An amount of $997,875 was expended for new capital purposes during the period.

In discussing individual companies the report notes that the Altoona & Logan Valley Electric Railway, Altoona, Pa., secured gross receipts of $319,335, a decrease of $16,119, or 5 per cent. Net receipts were $118,208, a decrease of only $5,285, a saving of $10,834 having been effected in operating expenses. The receipts of the Bridgeton & Millville Traction Company, Bridgeton, N. J., were reduced more than 7 per cent by the curtailment in general business. The gross receipts of the Chicago & Joliet Electric Railway, Joliet, Ill., were $306,181, a gain of $2,007, while the net receipts decreased $5,338. There was a slight falling off in the gross receipts of the railway, electric light and gas departments of the Lynchburg Traction & Light Company, Lynchburg, Va. Altogether it was but $2,088, or less than 1 per cent. The operating expenses in all three departments increased $24,817. There was set aside for reserve for depreciation of way and structures and equipment an additional sum of about 5.5 per cent of the gross receipts.

The Ohio Valley Electric Railway, Huntington, W. Va., reports gross receipts of $358,848, an increase of $30,356, or about 8.5 per cent. The railway earnings increased $12,222 and the lighting earnings $18,134. The gross receipts of the Peoples Railway, Dayton, Ohio, were $221,819, as compared to $243,681 in the prior period, a loss of 10 per cent. The net receipts increased $4,886. This reduction in operating cost was brought about largely by reason of improvement made in the operation of the power house. The Roanoke Railway & Electric Company, Roanoke, Va., had gross business of $321,977, an increase of $8,812, or about 2.75 per cent. There was a net increase in lighting customers of 421 and a gain of 125 hp. in motors. The gross receipts of the Scranton (Pa.) Railway were $760,274, an increase of $18,395, or about 2.5 per cent. The Springfield (Ohio) Railway reported gross receipts of $178,405, a loss of $17,682, or 9 per cent.

LUMP VALUATION CRITICISED

The Missouri Public Utilities Commission was temporarily enjoined by Judge A. S. Van Valkenburgh of the United States District Court on July 7 from lowering the rates of the Springfield Gas & Electric Company, a subsidiary of the Federal Light & Traction Company. The practice of state commissions in making a lump valuation of a public utility property, and fixing a rate on this valuation without going into details, received a blow from the decision.

As reported in the ELECTRIC RAILWAY JOURNAL of July 11, 1914, page 87, the commission placed a valuation of $300,000 on the property of the company used in electric service, ordered a reduction of 30 per cent in rates and held that 7 per cent was an adequate return on the investment as fixed. The restraining order is now granted evidently on the assumption that the valuation made by the commission was not in all respects a fair one, and the findings of the commission not made as required by law. An indemnifying bond is required of the company to protect consumers in case the courts finally uphold the rates as made by the commission.

In its decision granting the temporary injunction the court said: "The court has been embarrassed in its review by the form of the decision of the commission and its findings, which enumerate in general terms the items included but fail to specify the amount allowed for each. It may be doubted whether a decision and findings which state nothing but the total valuation fixed by the commission, without showing the amount allowed for each item included, would be a compliance with the manifest purpose of the law to permit the parties to test in court the questions involved." A determination of the merits of the case will be reserved for final hearing.

TAX VALUES SET IN WEST VIRGINIA

The announcement of the State Board of Public Works of West Virginia, made on July 19, showing the valuation of public properties for tax purposes, indicates an increase of $1,135,000 in the valuation of electric railway and power lines over the figures for 1914. The list of roads, wth the valuations that have been fixed by the State board for 1915, follow:

Appalachian Power Company	$240,000
Charleston Interurban Railroad	1,150,000
City Railway (Wheeling)	400,000
Charleston-Dunbar Traction Company	160,000
East Liverpool Traction & Light Company	210,000
Elkins Electric Railway	25,000
Fairmont & Mannington Railroad	400,000
Grafton Light & Power Company	130,000
Lewisburg & Ronceverte Electric Railway	40,000
Monongahela Valley Traction Company	5,000,000
Morgantown & Pittsburgh Railway	6,000
Morgantown & Wheeling Railway	175,000
Newell Bridge & Railway Company	125,000
Ohio Valley Electric Railway	1,075,000
Panhandle Traction Company	650,000
Parkersburg & Marietta Interurban Railway	1,000,000
Princeton Power Company	100,000
Steubenville, Wellsburg & Weirton Railway	350,000
South Morgantown Traction Company	35,000
Tyler Traction Company	225,000
Union Traction Company	110,000
Wheeling Traction Company	2,000,000
Wellsburg, Bethany & Washington Railway	40,000
West Virginia Traction & Electric Company (Wheeling)	1,100,000
West Virginia Traction & Electric Company (Morgantown)	425,000
Total assessments	$15,171,000

LOSS IN INDIANA VALUATIONS

The report of the Indiana State Board of Tax Commissioners shows a loss in electric railroad valuations of $188,347 over the 1914 totals. A large part of the decrease, however, resulted from changes in classification of the mileage reports of Indianapolis properties because of conditions made necessary by State regulation. The following shows the increase of values placed on electric railroad properties in Indiana for the past seven years: 1909, $21,536,041; 1910, $22,376,238; 1911, $23,524,951; 1912, $24,703,253; 1913, $25,701,134; 1914, $27,173,747; 1915, $26,985,400. The losses and gains in the trackage of the interurban roads are published in detail in the following table:

	1914, Miles	1915, Miles	Loss, Miles	Gain, Miles
Main track	2,137.25	2,087.20	50.05	....
Second main	91.65	148.02	....	56.37
Side track	108.50	109.77	....	1.27
Rolling stock	2,214.98	2,164.93	50.05	....
Totals	4,552.38	4,509.92	100.10	57.64

Some of the tax officials believed that some of the decrease in the electric railroad valuations might be attributed to jitney bus service in some of the cities, but it is probable that this is more or less a negligible consideration this year.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont.—The Hydro-Electric Power Commission of Ontario is negotiating with the Canadian Northern Railway for the purchase of the Chatham, Wallaceburg & Lake Erie Railway, which runs from Erie Beach to Wallaceburg.

Chicago (Ill.) Surface Lines.—The Illinois Public Utilities Commission has granted the application of the Chicago City Railway for permission to issue first mortgage 5 per cent gold bonds to the amount of $1,492,000. Permission has also been granted to the Calumet & South Chicago Railway to issue bonds of a similar character to a total amount of $500,000.

Detroit, Almont & Northern Railroad, Detroit, Mich.—An amount of $400,000 of first mortgage 6 per cent gold bonds of the Detroit, Almont & Northern Railroad, dated Feb. 1, 1915, is being offered by Eversz & Company, Chicago, at par and interest. The bonds are guaranteed and assumed as a direct obligation, by endorsement, by the Detroit United Railway.

Gary & Interurban Railroad, Gary, Ind.—Plans are being worked out for the financial relief of the Gary & Interurban Railroad. The City Council has refused to allow the line a straight 5-cent fare and insists that the 3-cent rate be maintained. It is said that the refusal of the Council to allow the increase will be brought to the attention of the Indiana Public Service Commission. There is some probability that the road will go before the commission and give up its Gary franchise. The company defaulted on its interest payments Jan. 1. Previous references to the condition of this company were made in the ELECTRIC RAILWAY JOURNAL of Jan. 9 and March 6.

Kansas City Railway & Light Company, Kansas City, Mo.—The committee of which John B. Dennis is chairman, has notified holders of certificates of deposit representing the 6 per cent five-year collateral gold notes of the Kansas City Railway & Light Company, due on Sept. 1, 1912, that the time in which depositors of such notes will be entitled to receive new securities or cash pursuant to a sale or a plan of reorganization of the company, or have the deposited notes or the proceeds thereof returned to them, has been extended for one year from Aug. 15, 1915.

Lancaster & York Furnace Street Railway, Millersville, Pa.—The Lancaster & York Furnace Street Railway has defaulted the July 1 interest payment of $2,750 on its $150,000 of first mortgage 5 per cent twenty-year gold bonds. It is reported that the failure of the company's bankers, Woelpper, Crawford & Company, Philadelphia, was the cause of the default.

London & Port Stanley Railway, London, Ont.—The lease of the London & Port Stanley Railway to the Père Marquette Railway terminated on June 30, on which date the property passed under the control of the Port Stanley Railway Commission. This is now operating the line as part of the proposed system of radial railways to be controlled and operated under the jurisdiction of the Hydro-Electric Power Commission of Ontario. The formal opening of the road as an electric carrier was set for July 22.

Merrill Railway & Lighting Company, Merrill, Wis.—The Merrill Railway & Lighting Company has announced that it will surrender its charter on account of not being able to operate except as a losing proposition. No cars are at present running.

Montreal (Que.) Tramways.—It is reported that the Montreal Tramways will issue $1,000,000 of new common stock which will be offered for sale to present stockholders at the par value thereof.

Rock Island Southern Railway, Rock Island, Ill.—The Rock Island Southern Railway, which operates the electric line from Monmouth to Rock Island, is to be reorganized and have its bonded indebtedness readjusted. On July 1 the "north line" was unable to pay interest due and also faced necessary repairs and extensions. A meeting of a number of bondholders was held and a plan of adjustment decided upon, request for approval being sent to other bondholders. In an interview, A. Walsh, president of the line, said: "I am confident that the plan of readjustment will be of great advantage to Monmouth. It will put the north line in excellent financial condition and in a position where it can give even better service than heretofore. Every bondholder is fully protected in the full amount of his holdings. For each $1,000 bond he receives a new first mortgage bond for $400, first preferred stock for $600 and $100 of bonus common stock. This common stock is given from that held by the present stockholders. The value to Monmouth which is to come from this readjustment will be in many added improvements to the property, especially to the terminals at Rock Island. There will be added some electric locomotives to take the place of the present steam locomotives, thus increasing freight facilities and the general service." A complaint by minority stockholders was noted in the ELECTRIC RAILWAY JOURNAL of May 1.

San Joaquin Light & Power Corporation, Bakersville, Cal. —The San Joaquin Light & Power Corporation has filed a supplemental application with the California Railroad Commission, asking for authority to pledge a portion of the $1,582,000 of 6 per cent bonds which it was recently authorized to sell. The corporation proposes to pledge a portion of these bonds as collateral security for short-term notes of $809,000. It is proposed by the corporation that the new notes shall run for a period not to exceed two years, and that the money received therefrom shall be used to pay off the two-year collateral trust notes of the company which mature on Aug. 1, 1915.

Springfield (Mass.) Street Railway.—It is reported that plans for merging the Springfield Street Railway and the Worcester Consolidated Street Railway, which according to reports have been under consideration for the last five months, will probably materialize this year. It is believed that the plan under consideration is to consolidate the two companies into one large system with one set of officers and to establish a large general office in either Springfield or Worcester. These two companies are now owned and controlled by the New England Investment & Security Company, which is the holding company for nearly all the trolley lines formerly owned and operated by the New York, New Haven & Hartford Railroad in Massachusetts.

Tidewater Southern Railway, Stockton, Cal.—It is reported that the Tidewater Southern Railway has sold $100,000 of bonds to banks at Modesta and others, which has enabled it to commence construction to Turlock. In November, 1914, the company was operating 33.5 miles of single track between Stockton and Modesta.

Toledo, Ann Arbor & Jackson Railroad, Toledo, Ohio.—Application has been made to the Public Utilities Commission of both Ohio and Michigan by the Toledo, Ann Arbor & Jackson Railroad for permission to issue $385,000 of bonds. The company is laying track between Deerfield and Dundee and it is reported that a freight service may be established between Toledo and Detroit, as well as an interurban passenger business.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—The Tri-State Railway & Electric Company has received permission from the Ohio Public Utilities Commission to sell its property in Ohio, a section of track in Steubenville, to the Steubenville Railway for $9,000. The latter company has been authorized to issue capital stock for that amount to pay for the track.

United Gas & Electric Corporation, New York, N. Y.—Through the purchase of $1,000,000 of its $5,500,000 of three-year 6 per cent notes, the sale of which was noted in the ELECTRIC RAILWAY JOURNAL of March 6, the United Gas & Electric Corporation has anticipated the retirement of $500,000 of the notes on July 1, 1916, and $500,000 on Jan. 1, 1917, as provided in the indenture covering the notes.

United Railways of St. Louis, St. Louis, Mo.—The quarterly report of the United Railways of St. Louis for the three months ending June 30, filed on July 15 with City Register Witter, shows the street cars carried about 2,160,000 more passengers in that quarter than in the previous three months. The statement also shows that the cars carried about 5,000,000 less than in the corresponding three months of last year, which was before the jitneys began to operate in St. Louis. Officials familiar with the conditions assert that a portion of the 5,000,000 decrease in passengers was due to the operation of jitneys and the remainder was due to business conditions. The increase in the last quarter indicates that the business of the jitneys is decreasing and that general business is becoming more active. The cars made a total of 1,535,366 trips and traveled 9,699,118 miles in the last three months. A total of 54,522,328 full-fare passengers were carried and 1,112,985 half-fare, making a total of 55,635,313 passengers. The total number of passengers transported in the preceding three months was 53,475,810. The number in the corresponding three months last year was 61,959,691.

DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1¼ per cent, preferred and common.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, quarterly, 1½ per cent, preferred.

Montreal (Que.) Tramways, quarterly, 2½ per cent.

Philadelphia Company, Pittsburgh, Pa., 5 per cent, preferred.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS, PHILADELPHIA, PA.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '15	$444,033	......	......	......	......
1 " " '14	477,789	......	......	......	......
6 " " '15	2,575,604	......	......	......	......
6 " " '14	2,673,349	......	......	......	......

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

1m., May, '15	$77,502	*$64,276	$13,226	$17,124	†‡$3,763
1 " " '14	86,037	*70,610	15,427	17,014	†‡1,294
11 " " '15	872,665	*779,974	92,691	189,462	†‡95,236
11 " " '14	908,492	*790,687	117,805	187,778	†‡68,106

CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m., May, '15	$687,528	*$455,724	$231,804	$104,964	‡$163,238
1 " " '14	720,692	*474,825	245,867	93,368	‡174,014
11 " " '15	7,274,970	*5,265,413	2,009,557	1,087,674	‡1,174,493
11 " " '14	7,347,174	*5,353,249	1,993,925	984,003	‡1,248,673

FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY, FORT WAYNE, IND.

1m., May, '15	$141,502	$82,278	$59,224	$54,608	‡$4,896
1 " " '14	154,514	92,192	62,322	53,953	‡8,727
5 " " '15	707,782	406,383	301,399	268,479	‡34,519
5 " " '14	761,209	438,809	322,400	259,455	‡64,225

KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.

1m., May, '15	$66,220	$35,035	$31,185	$19,758	‡$14,135
1 " " '14	68,091	36,163	31,928	20,639	‡14,093
11 " " '15	738,410	393,342	345,068	219,507	‡158,825
11 " " '14	707,261	374,284	332,977	225,501	‡137,769

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m., May, '15	$61,014	*$37,677	$23,337	$15,611	$7,726
1 " " '14	58,572	*37,390	21,182	15,660	5,522
12 " " '15	698,453	*459,753	238,700	187,112	51,588
12 " " '14	679,179	*455,935	223,244	184,116	39,128

NEW YORK (N. Y.) RAILWAYS

1m., May, '15	$1,138,652	$714,040	$424,612	$357,179	‡$107,748
1 " " '14	1,199,849	766,741	433,108	348,800	‡118,904
11 " " '15	12,265,626	7,843,631	4,421,995	4,100,368	‡801,915
11 " " '14	12,684,866	8,066,814	4,618,052	4,089,333	‡897,482

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

1m., May, '15	$32,228	*$25,953	$6,275	$7,991	†‡$1,676
1 " " '14	33,451	*25,326	8,125	7,964	‡188
11 " " '15	340,796	*281,903	58,893	87,052	†‡27,746
11 " " '14	334,509	*273,526	60,983	85,265	†‡23,866

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m., May, '15	$43,000	*$41,199	$1,801	$5,976	†‡$4,104
1 " " '14	39,230	*38,737	493	4,806	†‡3,878
11 " " '15	409,509	*476,641	†67,133	69,584	†‡134,985
11 " " '14	364,644	*518,802	†154,158	61,966	†‡210,818

RHODE ISLAND COMPANY, PROVIDENCE, R. I

1m., May, '15	$404,577	*$321,295	$83,282	$117,558	†‡$33,436
1 " " '14	487,006	*302,726	184,280	111,264	‡73,891
11 " " '15	4,668,386	*3,629,383	1,039,003	1,296,807	†‡163,108
11 " " '14	4,891,423	*3,603,923	1,287,500	1,191,963	‡213,254

VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.

1m., May, '15	$407,694	$203,572	$204,122	$136,683	‡$74,451
1 " " '14	433,496	203,492	230,004	135,672	‡100,764
11 " " '15	4,679,421	2,263,584	2,415,837	1,499,170	‡991,010
11 " " '14	4,717,587	2,252,466	2,465,121	1,479,631	‡1,062,667

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

1m., May, '15	$22,644	*$22,036	$608	$1,464	†‡$836
1 " " '14	23,516	*18,542	4,974	1,110	‡3,872
11 " " '15	235,700	*246,828	11,128	14,633	†‡25,635
11 " " '14	228,579	*233,330	†4,751	12,208	†‡16,764

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*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

TRAVELS WITH THE JITNEY

Philadelphia Ordinance Enjoined—Union Men in Norwalk Petition for Jitney Control—Jackson Company Affected by Competition

A preliminary injunction restraining the Mayor, Councils and other city authorities of Philadelphia from enforcing the jitney ordinance was granted on July 15 by Judge Sulzberger. The injunction holds until Sept. 20, when the Court of Common Pleas No. 1 may be applied to for a further hearing by either the city or the jitney operators. In the meanwhile, the court decrees, both sides may gather further evidence which will aid in arriving at a just decision on the whole question. Judge Sulzberger stated that the operation of the ordinance involves serious danger to the jitney, and would at least cut the business from 100 to 40 per cent, but that if the ordinance is declared valid, the delay will not have caused the city any pecuniary loss. A committee of three has been appointed to confer with Director Porter and agree on a set of temporary traffic regulations during the term of the temporary injunction.

Two of Philadelphia's jitney organizations, representing more than 700 operators, have decided to issue strip tickets at six for a quarter. They will be accepted in lieu of 5-cent fares by drivers of all cars operated by members of the Auto Service Association and the South Philadelphia Jitney Owners' Association. The only organization which has not signified its intention to issue strip tickets is the Jitney Association, whose president has announced that he would put the question up to his associates.

A committee representing the Norwalk Division of the Amalgamated Association of Street and Electric Railway Employees of America has petitioned the Council on behalf of the union that favorable action be taken on an ordinance presented by them to control and regulate the jitney business in Norwalk, Conn. The ordinance is strict and provides for annual fees of $100 and $200, fixed routes with transfers and indemnity bonds of $10,000. The ordinance was tabled for consideration at a future meeting of representatives of the union, jitney drivers and Council.

The draft of a jitney ordinance, submitted by Commissioner Arthur R. Denman to the Board of Works of Newark, N. J., on July 15 and laid over for further discussion, provides that car owners or licensees must report to the board the route and hours of service of each jitney, seating capacity, and what other facts may be required, as often as the board may so demand. The board receives the power to designate routes and hours of service, which shall not be less than ten hours daily; terminal points and the fixing of regulations for turning at the terminal.

B. W. Arnold, superintendent of traffic Chicago, Ottawa & Peoria Railway, Ottawa, Ill., has presented a copy of the Joliet ordinance to the La Salle City Council, with the request that they adopt it or some similar measure to regulate jitney buses. Mr. Arnold gave a short talk to the Council, in which he said that the interurban company had spent almost $25,000 for paving in the twin cities, La Salle and Peru, in two years. He also said the company had an annual payroll of $24,000 in La Salle and Peru. He asked that the jitney buses be licensed, forced to pay a fee of $200 per year and compelled to publish and maintain a regular schedule. The petition was referred to a committee for investigation.

H. H. Davell, chairman of the board of governors of the Maryland Autobus Protective Association, formed to adopt some method of perfecting the jitney system in Baltimore, states that the association aims to amalgamate all the jitney service into one large corporation. It is stated that 300 buses can be put on the streets. Immediate steps are to be taken in the courts to test the validity of the ordinance just passed whereby each jitney owner will be required to pay an annual license of $25 a seat.

One hundred and twenty-six jitneys have succeeded in passing municipal inspection in Portland, Ore., according to Municipal Jitney Inspector Gallup. Cars are being examined at the rate of twenty-five per day. The State Supreme Court has taken under advisement the suit instigated by A. A. Thielke against Mayor Albee of Portland, to restrain enforcement of an ordinance regulating jitney buses in Portland. The ordinance was attacked in the Circuit Court on the ground that it was submitted to the people under a city ordinance, instead of under a State law; that it was discriminatory, gave the Public Utilities Commission arbitrary power, and violated the federal constitution, in that it would permit property to be taken without due process of law.

According to the report of L. H. Bean, general manager Tacoma Railway & Power Company, the jitney buses operating in Tacoma, Wash., have cut down the company's revenues $70,000 for the first half of 1915. The city of Tacoma will lose $1,500 in its share of gross receipts for this period. The police department in Tacoma has been instructed by Commissioner of Public Utilities Mills to arrest jitney passengers and drivers who violate the anti-smoking ordinance recently passed by the Council. This ordinance affects street cars and jitney buses alike and is being rigidly enforced on the cars.

The Jackson Light & Traction Company, Jackson, Miss., has filed with the City Commission an earnest protest against the insufficient character of ordinances regulating jitney traffic, and the unfair competition it has been forced to meet since the jitney became popular. In a letter to the commission Manager Raymond H. Smith insists that all jitneys should be placed under bond, in order to guarantee damages in case of accidents, and offers to furnish bonds for each street car operated by his system.

Some time since the commission passed an ordinance regulating jitney traffic, but Manager Smith says that it is not in any sense a regulation; that jitneys are not required to carry signs showing the routes they cover; they do not cover regular routes, it being their custom to traverse the busiest sections of the streets, turning around directly in front of trolley cars where people are waiting to pick up passengers, withdrawing the jitneys from service whenever they feel like it and otherwise avoiding the responsibilities of a common carrier.

Manager Smith admits that the jitneys have cut heavily into the revenues of the street railway and advises the commission that the company has been compelled to ship some of its larger cars out of town, to cut down the number of cars operated and to discontinue the services of a number of employees.

Automobile owners operating a jitney line between Texas City and Galveston, Tex., have filed two suits in the Fifty-fifth District Court at Galveston asking for an injunction to prevent city officials of Galveston from enforcing an ordinance adopted on April 9, regulating the operation of motor buses in that city. It is claimed by the plaintiffs that they are immune from provisions of the ordinance because their buses are not operated between points in Galveston or to any designated point within Galveston.

A petition for an election to recall Mayor Tyra and Police Commissioner Hudleston of Fort Worth, Tex., has been prepared by the jitney men of Fort Worth and will be presented to the City Commissioners within a few days. The petition, signed by about 3000 voters, is a result of the jitney ordinance now being enforced.

The Savannah AutoBus Company, with an authorized capital of $250,000, has been incorporated by Savannah men for the purpose of operating autobuses on Savannah streets. The company has asked for a charter and will begin operations in August with ten buses of a capacity of thirty-five passengers each. There will be definite routes and schedules for the vehicles.

An ordinance has been passed by the Minneapolis (Minn.) City Council for the purpose of regulating jitneys in that city and signed by Mayor Nye. The ordinance provides for a license fee of $15 a year for each car, indemnity bonds from $5,000 to $10,000, regular routes and schedules, with a limit of two passengers above seating capacity, inspection of cars and other regulations. It will take effect on Aug. 1.

Jitney bus owners in Flint, Mich., have obtained a temporary injunction restraining the city from enforcing the new jitney ordinance. It was asserted that the $5,000 to $20,000 bond and $25 license fee were excessive. There are 151 jitney buses in Flint, sixty in service continually. The others operate only during rush hours.

HALT FOR KANSAS CITY JITNEYS

Buses of Jitney Corporation Seized on Note—Touring Cars Decreasing—One Line Raises Fare to 10 Cents

The jitney transportation situation is rapidly coming to a head in Kansas City, Mo. The Studebaker Corporation on July 18 took possession of fifteen buses furnished by it on a forty-bus order from the Kansas City Jitney Transportation Company, for failure of the company to meet a note due on a first mortgage. The National Jitney Association is quiescent, the offices are closed and no definite plans in hand. The White Star line of buses, embracing thirteen cars, individually owned and co-operating on schedules, began on the night of July 19 at the rush hour to charge 10 cents instead of the previous 5 cents a trip. Many individual buses have been eliminated, and the touring cars now in service on routes number only about sixty.

The embarrassment of the Kansas City Jitney Transportation Company is a serious blow to the industry. Its president is W. H. Miller, the leader of the movement in the West. Mr. Miller said of the situation: "We are now working on a plan of reorganization, and hope to get the buses back soon. We are compiling statistics of operation and management which will show where we have fallen short of the profitable operating plan."

It is said that the trouble was caused by large overhead expenses, as well as by the obvious difficulties encountered where a transportation company must hire men to collect money and handle expensive machinery. An officer of the Studebaker branch at Kansas City said that the buses were in good condition, showing 14,000 to 15,000 miles in the three months since they were put in service. He expressed confidence that jitney buses would pay at 5-cent fares when individually owned and carefully handled.

The White Star line owners have had a smaller overhead than the organized company, but they were glad of the chance to increase the fare to 10 cents. Their cars are mostly of the more expensive types. They confine themselves to routes to the southeastern part of the city. They admit only buses to their organization, contending that the touring cars are profitable only for popular priced livery service.

One local livery service, the outgrowth of the split between the private owners and the company organized by Mr. Miller, is said to be making good profits. It now has the stand and the telephones vacated when the Kansas City Jitney Transportation Company gave up its downtown headquarters.

The national association seems falling to pieces because of the failure of the local associations to pay dues for the support of the offices and to carry on the organization work. The National Indemnity Exchange, an insurance organization formed to protect jitneys, has not yet qualified, but may get its license soon.

JITNEY MOVEMENT IN OHIO

Jitneys Used in Many Ohio Cities—Meeting Ordinance and Regulatory Restrictions

The operation of jitney buses in Ohio is perhaps more extensive than might be anticipated. They have made little headway, however, in the largest cities.

In Columbus their operation seems to have been fairly successful. There operators have provided themselves with large cars with longitudinal seats. They operate over certain streets on regular schedules and sell tickets at the rate of six for 25 cents.

Toledo bus owners have asked the City Council to allow them to receive and discharge passengers at the same points at which the street cars stop. Up to the present time they have been compelled to observe the traffic rules and make stops at the safety zones, which are about 100 ft. from the street crossings.

Twenty-two bus operators paid the license fee required by the ordinance recently passed by Council at Youngstown, although the payment was made under protest. Operators in that city must obey the traffic ordinance.

In Lorain the bus operators have formed the Lorain Jitney Association and are now endeavoring to establish a schedule on the streets occupied by car lines, so they may have a five-minute headway. The street railway company recently inaugurated a ten-minute service and found that a gain of patronage was the result.

At Ashtabula thirty buses were put out of business on July 13 by the decision of Common Pleas Judge A. G. Reynold sustaining the regulatory ordinance passed by the City Council some time ago. The ordinance fixed an annual tax of $25 and required a bond of from $3,000 to $5,000, depending upon the size of the car. The jitney owners consider the ordinance prohibitive.

For a time quite a number of buses were operated in Cleveland, but for the most part they consisted of disreputable cars that people would not patronize. Since no one came forward with money to furnish the right kind of cars, it must appear to be a losing proposition in the face of the low street railway fare. Little comment is now heard in regard to the matter.

The Mahoning & Shenango Railway & Light Company brought matters to a climax at Youngstown on July 18 by refusing all jitneys entrance to Idora Park, which is owned and controlled by railway interests. An admission fee was also charged all visitors who entered the park in vehicles other than street cars. Those who paid, however, received street railway tickets for the return home. Owners of jitney buses retaliated by having three park employees arrested on the charge of violating Sunday closing laws. Vice-President Randall Montgomery of the company signed bonds for the employees and then announced that every jitney bus would be stopped and every store closed in Youngstown next Sunday unless the suits against the men are dropped. The fight between the railway and the jitneys promises interesting developments in the enforcement of the blue laws.

On July 19 the Ohio Electric Railway requested the city of Lima to return $5,000 which it had deposited for the right to transport passengers to intercity points. The company says its business has shown a decline of 50 per cent at that point since jitney buses began operation within the city limits, and that as a consequence there must be reduced service until regulatory ordinances are adopted.

BRIDGE TRAFFIC IN NEW YORK

The Public Service Commission for the First District of New York has received from the bridge department the result of the annual count of passengers using the East River bridges in one period of twenty-four hours. The count was made on Nov. 5, 1914, from midnight to midnight. It shows a total traffic in both directions over all bridges of 763,982, which is an increase of 20,090 over the previous year. This is a gain of about 3 per cent, and much smaller than the gain of 1913 over 1912, which was more than 12 per cent. The Williamsburg Bridge still continues in the lead, carrying more passengers than the old Brooklyn Bridge. The latter is the only one of the four bridges which shows a positive falling off in the number of passengers using it. The figures include passengers in surface and elevated cars, in all kinds of vehicles, and pedestrians using the promenades. The following table shows the number of passengers passing in each direction over the four bridges:

	Williamsburg	Brooklyn	Queensboro	Manhattan
Eastbound	162,859	151,334	45,915	26,591
Westbound	164,275	142,372	43,932	25,804
Totals	327,134	293,706	89,847	52,395

Total traffic: 1912, 659,591; 1913, 742,992; 1914, 763,082.

The Brooklyn Bridge led all other bridges in traffic until the Center Street loop subway was opened in August, 1913, and connected with the elevated lines passing over the Williamsburg Bridge. This resulted in a large increase of the traffic over the Williamsburg Bridge.

Rockland Transfer Petition Granted.—The petition of the selectmen of Rockland for free transfer privilege on the Bay State Street Railway, Boston, Mass., has been granted by the Public Service Commission, with the understanding the company may soon ask for a readjustment of fares.

Near-Side Stop Approved for New Bedford.—The Massachusetts Public Service Commission has approved a regulation, passed by the Board of Aldermen on Oct. 22, 1914, that near-side stops be used in New Bedford after Aug. 1. The commission also approved the clause requiring a safety stop to be installed on all street cars passing Bedford and County Streets.

Wage Increase Granted in Waterville.—It was announced on July 16 by Manager Patterson of the Waterville, Fairfield & Oakland Street Railway that a general advance of 1 cent per hour had been made in the pay of all men employed on the system. Bonuses for efficiency make a possible increase beyond this of about $1 per week.

Petition for Fare Increase Withdrawn.—The Berkshire (Mass.) Street Railway has withdrawn its petition for a 6-cent fare over certain of its lines and a readjustment of its fare limits. The company is studying some other systems of fare arrangements and needed more than the three remaining months of life of the petition to complete its investigations. Ultimately another petition will be filed with the commission.

Good June Record in Louisville.—The Louisville (Ky.) Railway is holding up before its trainmen for their emulation in future months the excellent June record, in which only two collisions between cars were reported. These collisions were inconsequential and concerned bumping together of empties in the carhouses. During the same month the mileage was 963,939 car-miles for the city lines and 210,156 car-miles for the interurban lines, or a total of 1,173,095 car-miles.

Teaching Patrons in Elgin.—Patrons are being taught how to board street cars properly in Elgin, Ill., an experiment having been inaugurated on the Grove Avenue line. A white line has been painted a few feet from the track, and the patrons are asked to stay within this space and to line up in the same orderly way in which they approach a ticket window. There has been successful regulation of taxis and other motor vehicles in Elgin by the City Council, and the street railway wishes to carry the safety campaign further.

Tariff Supplement Issued to Cover Cummins' Amendment.—The baggage committee of the Central Electric Traffic Association at its recent meeting in Fort Wayne, Ind., decided to issue a supplement to the tariff in compliance with the Cummins' amendment to the interstate commerce act. Under the new system persons desiring to check for interstate movement baggage that is valued at more than $100, will be required to pay an insurance fee. Persons who refuse to sign the slip giving the valuation cannot check their baggage.

Railroad Asks for Rescission of Service Order.—The Hocking Valley Railroad, Columbus, Ohio, filed a petition with the Ohio Public Utilities Commission on July 7, asking that the order requiring electric car service between Jackson and Hamden be rescinded. The following day the original complainants filed charges to the effect that the company is not now complying with the order, that steam cars are being used instead of electric cars and that they stop at the stations instead of in the center of the towns, as in the past. Previous reference to this order was made in the ELECTRIC RAILWAY JOURNAL of April 17.

New Summer Car Being Tried in Toronto.—The Toronto (Ont.) Railway is trying out a new type of summer car in compliance with the order of the Ontario Railway Board to place fifty new cars, which are to be approved by the board, the Toronto Railway and the city engineer. The new car is fitted with longitudinal seats on the devil-strip side and cross-seats on the open side. Instead of the side steps there is a wire grilling to protect the public. Passengers enter at the rear platform and leave by the front door as in the winter cars. Of the fifty cars included in the board's order, twenty have already been built on the plan previously in use, except that they are 3 in. wider. These cars, which are the widest that it is possible to operate on the present lines, will have to be changed if this test car meets with approval.

Accidents Have Decreased in Detroit.—W. E. Cann, chairman of the general safety board of the Detroit (Mich.) United Railway, in reporting the progress of the safety campaign to the safety committeemen, stated recently that since the organization of the movement there has been a continual decrease in the number of accidents. The number of collisions has decreased more than 40 per cent; running over steam and street railway crossings, nearly 50 per cent; derailments, more than 10 per cent, and platform accidents to passengers, nearly 40 per cent. The only marked increase in accidents are those where automobiles have been struck, and Mr. Cann takes the position that it is entirely reasonable to lay the burden of this increase upon the increased number of automobiles and the carelessness of the drivers.

Fillmore Street Hill Operation for the "Movies."—Moving pictures have been made illustrating the operation of two-car trains on the United Railroads of San Francisco Fillmore Street hill line and are being shown with a popular "News of the Week" series in Pacific Coast cities. The reels start out with the diagrams of the cable connection details and safety devices, and show in proper order the methods of coupling, signaling and operating the trains. The most striking feature is the operation over the hill of two two-car trains coupled together and counterbalanced by a single two-car train. The four cars are stopped and held stationary on the 25.4 per cent grade. The underlying idea of the film is the advertisement of the absolute safety of the hill line since the recent installation of new safety devices.

Mr. Harmon Reports Accident Decrease.—James Harmon, general claim agent of the Insull lines in Indiana, while in New Albany on July 16 gave out a statement to the effect that the accident roll of the Louisville & Northern Railway & Lighting Company, the Louisville & Southern Indiana Traction Company and the Interstate Public Service Company, altogether making about 120 miles, and the Columbus (Ind.) city lines as well, showed a decrease of seventy accidents for the first six months of 1915, as compared with the last half of 1914. This decrease in casualties is attributed practically altogether to the safety-first efforts which have been made by the companies listed. The list for the last six months contains two fatalities resulting from an accident on the Louisville & Southern line, an accident, however, which was caused by reckless driving of the victim's automobile.

Skip-Stop to Be Tried in Chicago. — Plans have been carefully perfected by the Chicago (Ill.) Surface Lines for the installation of an experimental skip-stop line on North Clark Street, one of the heavy trunk lines out of the loop district to the north side of the city. This line is 10.7 miles in length, and the skip-stop schedule will begin about 0.5 mile outside of the loop district. The Chicago plan differs from that adopted in Cleveland and Kansas City in that the stops were designated as a result of a traffic survey. The total number of 120 stops on this line will be reduced to seventy, and it is contemplated that the skip-stop schedule will reduce the running time fifteen minutes for each round trip. All stops will be designated by a white band painted around the company's tubular-steel poles. If the experiment proves satisfactory, the skip-stop idea will be extended to other lines.

Pension System Established for Third Avenue Employees.—Frederick W. Whitridge, president Third Avenue Railway, New York, has announced the establishment of a pension scheme for the employees of the company and its subsidiaries. Pensions to be granted will range from $20 to $40 a month, the amount being based in part on the length of service and in part on the monthly pay received by the employee. Only those employees will be eligible who become members of the Third Avenue Railway Employees' Association and whose membership is continuous up to the time of the granting of the pension. The money for the payment of the pensions will be obtained by applying the interest of funds of the benefit association, and from the treasury of the Third Avenue system, which will pay whatever additional sum may be necessary. Any employee who has reached the age of seventy years, whether incapacitated or not, and who has been in continuous service of the system for at least twenty years will be entitled to a pension. Provision also is made for pensions for employees who have reached the age of sixty-five who have been incapacitated after being in the service for twenty years.

Personal Mention

Mr. Thomas Lynch, formerly superintendent of employment of the Detroit (Mich.) United Railway, has been appointed superintendent of trainmen's records. Mr. Lynch has been employed by the company continuously for thirty-five years.

Mr. Francis X. Disney, Elmira, N. Y., has been named secretary of the Public Service Commission for the Second District of New York, to succeed Mr. Frank H. Mott, whose selection for the counselship is elsewhere noted. Mr. Disney has been assistant secretary for the last two years.

Mr. Ledyard P. Hale, counsel for the Public Service Commission for the Second District of New York since its organization, has received a leave of absence without pay until Sept. 1 on account of the press of his duties as chairman of the public utility committee of the constitutional convention.

Mr. E. R. Giaque, formerly carhouse foreman at the Fourteenth carhouse of the Detroit (Mich.) United Railway, has been made assistant superintendent of the Fourteenth, Crosstown and West Warren lines to succeed Mr. Albert Bath, who has been appointed superintendent of these lines.

Mr. Arthur F. Brown has been appointed superintendent of employment of the Detroit (Mich.) United Railway. He has been in the company's employ for twenty years in various capacities, serving as inspector, carhouse foreman, chief inspector, assistant superintendent of both city and interurban divisions, and for the last twelve years as superintendent of various city lines.

Mr. Frank H. Mott, Jamestown, N. Y., formerly a deputy attorney-general and for the last two years secretary of the Public Service Commission for the Second District of New York, has been named counsel of the commission during the leave of absence until Sept. 1 of Ledyard P. Hale, noted elsewhere in this column. It is understood that upon Mr. Hale's return Mr. Mott will resume his private practice of law.

Mr. Albert Bath has been appointed superintendent of the Fourteenth, Crosstown and West Warren lines of the Detroit (Mich.) United Railway, to succeed Mr. Arthur F. Brown, whose appointment as superintendent of employment is elsewhere noted. Mr. Bath had been assistant superintendent of these lines for the last five years, previously for three years being employed as night and day carhouse foreman at various carhouses.

Mr. J. D. Cornell has been appointed traffic manager of the Joplin & Pittsburgh Railway, with headquarters at Kansas City, Mo. Mr. Cornell in 1904 was attached to the Southwestern Tariff Committee at St. Louis, and later as an adjuster traveled over much of the territory. Five years ago he took up electric railway traffic specialization, when he went to the Rock Island Southern Railroad as general freight and traffic agent to develop the traffic industry of that composite line, which handled freight chiefly by steam trains and passengers by electric.

Mr. Walter Jackson, associate editor ELECTRIC RAILWAY JOURNAL, has been appointed business manager of this publication. Mr. Jackson was born in 1882. He left public school at the age of thirteen, but entered the Cooper Union Night Schools within the following year, graduating therefrom as bachelor of science. In 1903, following service with several machinery companies, he joined the editorial staff of this paper. In connection with his editorial work, Mr. Jackson has traveled extensively, including several trips abroad. He has also acted as consulting editor with the McGraw-Hill Book Company in addition to preparing for that firm a "Handbook of Electrical Methods" and "Electric Car Maintenance."

Mr. G. R. G. Conway, for the last four years chief engineer of the British Columbia Electric Railway, Vancouver, B. C., has resigned that position to take up work as general consulting engineer, with offices in Toronto. In connection with his new engineering work Mr. Conway has been appointed consulting engineer for the British Columbia Electric Railway. Mr. Conway's term of service with this company covered a period of very rapid development, during which he carried out for the company many large undertakings. Among these were the construction of the great dam at the outlet of Lake Coquitlam; the enlargement of the company's existing power house on the North Arm of the Inlet, and the construction of the new No. 2 power house, increasing the output of the Coquitlam-Buntzen hydraulic project to more than 85,000 hp.; the construction of a 130-ft. dam on the Jordan River, Vancouver Island, and the consequent enlargement of the Jordan River power plant to a capacity of 20,000 hp.; the construction of a steam auxiliary plant at Brentwood Bay; the enlargement of the Vancouver steam auxiliary plant, and the laying of many extensions of lines on both the mainland and the island. Mr. Conway received his early training in Great Britain. There he was connected with many large engineering projects and performed important work for the cities of Birmingham and Aberdeen. Later he went to Mexico, where he carried out engineering projects for the Monterey Railway, Light & Power Company. Mr. Conway is a member of numerous engineering organizations in Europe and America, and has contributed many valuable addresses and papers for the records of these societies. The retirement of Mr. Conway was marked by a dinner tendered him by officials of the company at the Hotel Vancouver, Vancouver, on June 26. Mr. George Kidd, general manager, presided and read a cablegram from the London board expressing regret at the retirement of Mr. Conway and appreciation of his work for the company. The office staff presented Mr. Conway with a mounted solid silver rose bowl.

Mr. William A. Del Mar has resigned from the electrical engineering department of the New York Central & Hudson River Railroad to accept a position on Aug. 2 as assistant electrical engineer of the Interborough Rapid Transit Company of New York. Mr. Del Mar has been connected with the New York Central Railroad since 1904, engaged in technical problems connected with the electrification. He has also taken a prominent part in committee work with various technical associations, particularly in connection with standardization, being a member of the A. I. E. E. standard committee in 1914 and 1915, chairman of the 1914 railway standard committee which prepared the Institute's present railway standards, chairman of the 1915 wire and cable committee which is engaged in the standardization of cable stranding, and a member of the 1914 wire and cable sub-committee which prepared the wire and cable standards. He has also been chairman for the past three years of the wire and cable committee of the Association of Railway Electrical Engineers. The specifications of this committee have been adopted largely by the American Electric Railway Association and the American Society for Testing Materials. He has also been secretary of the joint rubber insulation committee and has contributed papers on the question of standardization, as well as upon other subjects, to the columns of this paper and to those of the *Electrical World*. Mr. Del Mar is a native of San Francisco, where he was born on Dec. 15, 1880. He went to Europe in 1887 owing to the desire of his father, who is the author of numerous historical books, to be near the libraries and archaeological collections of Europe. He was educated in France and England, and was graduated in 1900 from the City and Guilds' College of London. After coming to this country he joined the testing department of the General Electric Company in 1900, and in 1902 entered the engineering forces of the Manhattan Railway, where he remained until he became associated with the engineering force of the New York Central Railroad. He is the author of "Electric Power Conductors" and of some of the sections in Penders' "American Electrical Engineers' Handbook" and is a member of the A. I. E. E., the A. E. R. A. and the A. R. E. E., and is an associate member of the I. E. E. of England.

OBITUARY

Louis F. Beckert, a salesman with the Westinghouse Electric & Manufacturing Company, died on July 7 in Pittsburgh. Mr. Beckert was born in Pittsburgh in 1886, and he was graduated from Pennsylvania State College in 1907.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Peoria & Chillicothe Electric Railway, Peoria, Ill.—Incorporated in Illinois to build an interurban railway from Peoria to Chillicothe, 18 miles. Incorporators: E. A. Mitchell, E. V. Mattice, John F. Lynch, Chillicothe, and A. C. Black, Peoria.

***South Brownsville Street Railway, South Brownsville, Pa.**—Application will be made by this company for a charter to construct an electric railway from Brownsville to South Brownsville. Among those interested are W. E. Moore, J. S. Jenks, H. L. Mitchell, D. I. McCahill and E. T. Brashear.

***Mitchell Street Car & Interurban Railway, Mitchell, S. D.**—Incorporated in North Dakota to construct an electric railway. Plans are being made to construct three miles of city line this year. Capital stock, $200,000. Incorporators: O. F. Cassem and A. N. Hill, Mitchell, and D. N. Hill, Lake Hills, Iowa.

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has received an ordinance from the Council of Los Angeles granting permission to discontinue service and remove the tracks on its Colgrove Line on Santa Monica Boulevard approximately 150 ft. east of the center line on Avery Street; thence northwesterly over private property and intersecting streets, to a point in Vermont Avenue north of Sunset Boulevard; thence northerly along Vermont Avenue to a connection with its Hollywood Line at Vermont Avenue and Hollywood Boulevard.

Bridgeport, Conn.—The Connecticut Company has asked the Council for a franchise to relocate its tracks on North Avenue from North Main Street to Trumbull Road, Bridgeport.

Amherst, Mass.—The Holyoke Street Railway has asked the Council of Amherst for a franchise to extend its tracks on South Pleasant Street to land which the company bought last year for the erection of a new power house and carhouse.

Wakefield, Mass—The Bay State Street Railway has asked the Council for a franchise to alter and relocate its tracks on Main Street, Wakefield.

Pontiac, Mich.—The Detroit, Pontiac & Owosso Railway has received a franchise from the Council to construct a railway in Pontiac, with the choice of Oakland Street, Baldwin Street, Elizabeth Lake Avenue and Huron Street. [June 19, '15.]

Buffalo, N. Y.—The International Railway has asked the Council for a franchise to lay special tracks on Ohio Street, Buffalo, for the accommodation of travelers on lake boats.

Cleveland, Ohio.—The Cleveland, Akron & Canton Terminal Railway has received a franchise from the Council to construct a subway under East Fifty-fifth Street from the lake to the southerly limits of the city. This is part of a plan to construct a railway from Cleveland along the old Ohio Canal to Dresden. [May 8, '15.]

Columbus, Ohio.—The East Linden Electric Railway has asked the Council for a twenty-five-year franchise for the construction of its line over two sections of the city. The first begins at Hayes Avenue and Leonard Avenue and extends via Hayes Avenue, Mount Vernon Avenue and Champion Avenue to Long Street. The second begins at the corporation line where it cuts Hudson Street, extending west on Hudson Street to Neil Avenue, North on Neil Avenue to Dodridge Street and thence west to the Olentangy River. [June 12, '15.]

St. Clair, Pa.—The Eastern Pennsylvania Railways and the Schuylkill Electric Railway have received a franchise to construct an electric railway in St. Clair, which will connect the southern part with the northern part of Schuylkill County.

TRACK AND ROADWAY

Little Rock Railway & Electric Company, Little Rock, Ark.—Plans are being made to widen and strengthen the bridge across the Arkansas River so as to enable it to carry street car traffic. The cost of reconstruction will be about $290,000, of which the county will pay $100,000, the railway $100,000 and the Main Street property owners $90,000.

Eureka, Cal.—Surveys have been begun on the proposed railway from Eureka to Klamath Falls, Ore., and it is expected that construction will be begun soon. [Feb. 27, '15.]

Pacific Electric Railway, Los Angeles, Cal.—Work has been begun by this company reconstructing its track on American Avenue, Long Beach, from Sixth Street to Anaheim Street.

San Francisco-Oakland Terminal Railways, San Francisco, Cal.—This company will be asked by the West Berkeley Improvement Club to extend its Sixth Street line from University Avenue north to the town line.

Santa Barbara & Suburban Railroad, Santa Barbara, Cal.—Work has been begun on the 2600-ft. extension planned by this company on the "Riviera." The Municipal Improvement Company has been awarded the contract, which includes the first 900 ft.

Connecticut Company, New Haven, Conn.—Work will be begun at once by this company laying new track on East Main Street from Broad Street to the city line and on West Main Street from Maple Street to the city line in Meriden. The company will use 80-lb. rail on East Main Street and 95-lb. rail on West Main Street.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—Material has been received and work will soon be begun on the extension of this company's Washington Street line to Concord Avenue and the Boulevard.

Idaho Railway, Light & Power Company, Boise, Idaho.—The properties of this company have been purchased by the Electric Investment Company.

Urbana & Champaign Railway, Gas & Electric Company, Champaign, Ill.—This company is improving its park and fair ground line, lowering the tracks to a new street pavement level, placing a modern curve at the east end of the park and building a new bridge over a small stream.

East St. Louis & Suburban Railway, East St. Louis, Ill.—Operation has been begun on the extension of this company's Lansdowne Avenue line from Twenty-fifth Street and Lynch Avenue to Jones Park, St. Louis.

Pekin (Ill.) Municipal Railway.—Operation has been begun on the Court Street line of this railway. [Nov. 21, '15.]

Evansville (Ind.) Railways.—Operation was begun on July 4 on the Bellemeade extension of this company's line.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company will lay new track on State Boulevard, Fort Wayne, and will move the track in front of the Indiana Home for Feeble Minded Youth from the north side to the south side of the street. Preparations are being made for the paving of State Boulevard. The company will expend $20,000 on these improvements.

Fort Dodge, Des Moines & Southern Railroads, Boone, Iowa.—This company has purchased its own right-of-way into Des Moines and construction will be begun at once. The company has acquired a strip of land from Swanwood, 1 mile north of the city limits, to Brooks Street, East Des Moines.

Worcester & Warren Street Railway, Worcester, Mass.—The Council of West Brookfield has ordered this company to relocate its tracks on West Main Street to meet the requirements of the town.

Hannibal Railway & Electric Company, Hannibal, Mo.—Work has been begun by this company relaying its tracks on South Maple Avenue from Broadway to Lyon Street, Hannibal, with 70-lb. rails.

Reno (Nev.) Traction Company.—Work has been begun by this company on an extension of its line from Fourth Street to the race track. The branch will not be a permanent line but will be constructed to take care of the heavy traffic during the race meet.

International Railway, Buffalo, N. Y.—Announcement has been made that work on the tracks of this company in Allen Street and Virginia Street for the Connecticut Belt and Hoyt Street car service will be completed within a short time. New rails have been laid, switches installed and the pavement repaired. About $10,000 is being spent on this undertaking. New track is also to be laid in various parts of the city and a considerable amount of paving work is being done.

New York State Railway, Rochester, N. Y.—The Public Service Commission for the second district of New York has approved the extension of this company's lines from Rochester to Greece to connect the company's tracks with a loop crossing Dewey Avenue, Greece, and crossing the tracks of the Kodak branch of the New York Central Railroad. The tracks will be built for about 1800 ft. from the present terminus of the lines to Little Ridge Road, connect with the Dewey Avenue extension and thence extend by a loop back to the south-bound tracks as now existing. The tracks will run through the center of Dewey Avenue, and will cross at grade Knickerbocker Avenue, Avis Avenue, Pullman Avenue, Steko Street and Palm Street and the tracks of the Kodak branch of the New York Central Railroad.

New York State Railways, Syracuse, N. Y.—This company plans to expend $200,000 for trackage improvements in Syracuse.

Black River Traction Company, Watertown, N. Y.—This company will lay new double track on its line on lower State Street, Watertown. Wooden ties and stone ballast will be used.

Piedmont Railway & Electric Company, Burlington, N. C.—It is reported that this company may extend its lines to Elon College.

East Village & Harbor Traction Company, Ashtabula, Ohio.—Surveys will be begun at once of this company's proposed line in Ashtabula. In connection with the road a steel and concrete bridge will be constructed across the Ashtabula River at the foot of Main Street. Mark E. Copeland, Cleveland, is interested. [Sept. 19, '14.]

***Cincinnati, Ohio.**—Plans are being considered for the formation of a new interurban traction corporation, its object being to furnish an entrance into Cincinnati for the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad. The distance between Anderson's Ferry, the present terminus of the interurban line, and Third and Walnut Streets is about six miles and it is estimated that the cost of the road will be about $700,000.

Lake Shore Electric Railway, Cleveland, Ohio.—Work has been begun by this company reconstructing its tracks from the Big Four Railway tracks in Urbana to Crystal Lake Park. The tracks will be lowered from 2 ft. to 3 ft. and a more modern curve put in entering the park.

Oakwood Street Railway, Dayton, Ohio.—One of the tracks being constructed by this company has been completed and work is being begun on the other. The line extends about ¾ mile beyond the present Oakwood railway terminus. It is expected that the road will be completed and ready for operation about Aug. 1.

Springfield (Ohio) Railway.—This company has agreed to remove its feed wires from the trolley poles in Main Street between Grape Alley and Wittenberg Avenue so as to free the street from overhead obstruction. The feed wires will be placed in the alleys and across the streets in conduits.

***Henryetta, Okla.**—Plans are being considered to construct an electric railway from Henryetta to Dewar, 3 miles. Gen. Z. T. Sweeney, Columbus, Ind., is interested.

***Ephrata, Pa.**—A movement is being agitated for an electric railway from Sinking Spring via Denver, to Ephrata, where it will connect with lines operating to Lancaster and Lebanon, and at Sinking Spring with a line to Reading. Many landowners are willing to give the right-of-way.

Cleveland & Erie Railway, Girard, Pa.—A report from this company states that it is installing a sample lot of welded splice bars purchased from the Indianapolis Switch & Frog Company to be used in connection with 60-lb. A.S.C.E. rail in paved streets.

Houston, Richmond & Western Traction Company, Houston, Tex.—This company has awarded a contract to the Federal Bridge Company, Des Moines, Iowa, at $56,000 to construct a bridge over the Brazos River. This is in connection with the company's proposed 30-mile railway from Houston to Richmond. E. Kennedy, Houston, is interested. [June 12, '15.]

Ogden, Logan & Idaho Railway, Ogden, Utah.—Announcement has been made that this company will build a new line from Ogden to Brigham City, taking a shorter route than the present one and tapping a new territory. Surveys have been completed and right-of-way is being secured. Construction has been practically completed on the company's extension to Huntsville.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—A report from this company states that the contract has been awarded for grading and material purchased for an extension of its lines from Springville to Spanish Fork, 6 miles. Work has been begun.

Ohio Valley Electric Railway, Huntington, W. Va.—A contract has been awarded to the Brubaker Construction Company for the construction of an extension of this company's line on Twelfth Avenue, Huntington.

SHOPS AND BUILDINGS

Aurora, Elgin & Chicago Railroad, Wheaton, Ill.—This company announces that about Aug. 1 it will move its general offices from Wheaton to the Hotel Arthur Building, Aurora, Ill. The general offices will occupy the sixth floor and a part of the fifth floor, and the first floor of the building will be used as an interurban passenger station. All the interurban cars entering Aurora will receive and discharge their passengers at this point. These include the Aurora, Elgin & Chicago Railroad, the Joliet, Plainfield & Aurora Railway and the Chicago, Aurora & DeKalb Railroad.

Cleveland (Ohio) Railway.—Application has been made by this company to the building department for a permit to construct three buildings and a reservoir at Denison Avenue. W. I. Thompson & Son Company has the contract. An office building two stories high and a repair shop are included in the improvements, as well as a boiler and pump house. The cost is estimated at $84,500.

Corpus Christi Railway & Light Company, Corpus Christi, Tex.—This company reports that plans are being made to construct a new carhouse at Corpus Christi with a capacity for fourteen cars.

Milwaukee Northern Railway, Milwaukee, Wis.—This company has completed its new $25,000 station on Fifth Street between Wells Street and Cedar Street, Milwaukee. The structure is 70 ft. x 40 ft., one story with basement. The building is of brick, concrete and tile and the interior is finished in tile and quarter-sawed oak.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—This company advises that it is installing two 200-kw. motor-generator sets in its new substation at Corona, which is the terminus of a short line running from Riverside to Corona. It is estimated that the cost of the plant will be about $20,000.

Hutchinson (Kan.)—Interurban Railway.—This company has purchased a double equipment of Westinghouse 35-hp. railway motors.

Vicksburg Light & Traction Company, Vicksburg, Miss.—A report from this company states that it has recently purchased a new 500-hp. Heine boiler to be equipped with Green chain grate stoker to replace two 250-hp. Stirling boilers equipped with Murphy stokers. The installation will be made about Sept. 1, at its plant in Vicksburg.

St. Louis, Mo.—Morrison & McCall, purchasing agents, Chemical Building, report that they have ordered five 125-kw. Allis-Chalmers oil engines complete with exciters and d.c. generators for use on various electric railway properties controlled by them.

Toledo Railways & Light Company, Toledo, Ohio.—Plans are being made by this company to build an addition to its power plant at Water Street. It is estimated that the cost will be $2,700.

Manufactures and Supplies

ROLLING STOCK

Dayton & Troy Electric Railway, Dayton, Ohio, is rebuilding a car in its shops.

Toledo & Western Railroad, Toledo, Ohio, has ordered one 60-ton electric locomotive and one steel-body package freight car.

Boston (Mass.) Elevated Railway has ordered three two-way dump cars from the Universal Car & Manufacturing Company, New York, N. Y.

Morrison & McCall, St. Louis, Mo., purchasing agents, located in the Chemical Building, expect to purchase possibly five extremely light cars for their various properties.

Fort Dodge, Des Moines & Southern Railway, Boone, Iowa, will receive two new passenger cars on July 31. One car, which has a side entrance, is for the Boone-Ames line; the other, a larger car, is for the main line traffic between Fort Dodge and Des Moines.

Ogden, Logan & Idaho Railway, Ogden, Utah, noted in the ELECTRIC RAILWAY JOURNAL of March 20 as having ordered one 50-ton Baldwin-Westinghouse electric locomotive, is reported as having ordered an additional locomotive of the same type, to be put into service on Nov. 1.

TRADE NOTES

Standard Paint Company, New York, N. Y., has received a gold medal at the Panama-Pacific Exposition for its cement waterproofing compound, "Impervite."

I. R. Nelson's Electrical Manufacturing & Repair Works, Newark, N. J., has appointed A. M. Leacock to represent this company in the electric railway field. Mr. Leacock has had extensive experience in the manufacture of field and armature coils, both in electric railway repair shops and with manufacturing concerns. He recently resigned as superintendent of the Electric Operations Company, Inc., where he had complete charge of the field coil department.

Electric Specialties Company, North East, Pa., has been formed for the purpose of manufacturing electric machinery and repair parts, such as commutators, trolley wheels, line material, copper, bronze and brass castings, and drop forgings in copper and steel. The plant at North East is of brick and steel construction and occupies 15,000 sq. ft. of floor space. The officers of the company are: President, G. E. Pierce; vice-president, F. B. Moorhead; treasurer, O. C. Hirtzel; secretary, N. P. Fuller.

O. T. Hirtzel, who severed his connections with the Westinghouse Electric & Manufacturing Company on Feb. 1 has been appointed treasurer of the Electric Specialties Company, North East, Pa., a new corporation described elsewhere on this page. Mr. Hirtzel has been with the Westinghouse Company since 1912 as railway supply specialist of the detail and supply department at East Pittsburgh. Prior to that he was treasurer and manager of the Eureka Company, formerly the Eureka Tempered Copper Works, since the formation of that corporation nearly twenty years ago.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received an order to equip with No. 307-V four-motor equipments and control the six cars recently ordered by the New York & Long Island Traction Company. Except for the fact that the new motors will be of the ventilated type they will be duplicates of the No. 307 motors now in service and therefore will enable the mechanical department of this company to benefit by the interchangeability of parts of the new with the old motors. The Westinghouse company has also received an order for ten a.c. two-motor equipments which are duplicates of the present No. 409 motors.

Archbold-Brady Company, Syracuse, N. Y., reports the sale of structural-steel towers for 28 miles of transmission line to be built by the Iowa Railway & Light Company, Cedar Rapids, Iowa, between Blairstown and Tama, Iowa. This will be a 66,000-volt, single-circuit, three-phase transmission line on suspension-type insulators. 48-ft. A-frame towers constructed on 440-ft. standard spans with lace-channel poles at special locations and square towers for anchoring line ends and at heavy angles will be used. The transmission line will be steel-reinforced aluminum with steel ground wires. This order was placed by S. C. Dows, purchasing agent, and J. M. Drabelle, electrical engineer.

ADVERTISING LITERATURE

Drew Electric & Manufacturing Company, Indianapolis, Ind., has issued a folder describing its new cable insulator and splicing sleeve for underground cables. When used as an insulator in the cable sheath, this insulator, it is said, will destroy the conductivity of the sheath by dividing it into short sections and prevent it from collecting current from earth and underground structures. When used as a splicing sleeve it eliminates the danger of leakage at the splice, as the insulator will stand up against any voltage.

Lincoln Electric Company, Cleveland, Ohio, has issued a booklet on the subject of electric arc welding. This gives an excellent description of the principles involved in welding of all kinds and devotes special attention to autogenous welding with the electric arc, an analysis being made of the cost involved, both for labor and for power to produce the arc. Detailed accounts of the methods of welding various pieces of apparatus are included, together with a description of the Lincoln arc welder which is manufactured by this company.

Mitchell-Rand Manufacturing Company, New York, N. Y., manufacturer of all kinds of wax, pitch and asphalt compositions, has issued a folder describing the Columbia or "drop" method and the Kraemer and Sarnow method for testing the melting point of these substances. The difficulty in taking the melting point of such materials as mentioned above, which do not crystallize on solidifying, is the fact that there is no line of demarcation between its solid state and its liquid state. This company has endeavored, therefore, to standardize its tests so that a desirable uniformity on the various products is maintained and the user will have a standard on which to base comparisons. The folder illustrates the apparatus and describes the methods for ascertaining melting points in a way which would make recourse to a chemist or a technical expert unnecessary.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just issued a booklet entitled "Results of Electrification" in which the history of electric operation on steam railroads is outlined briefly, descriptions of a number of the more important electrified lines being given. These descriptions are grouped under general headings covering installations for tunnels, terminals, trunk lines, mountain grades, switching service and for railroads having relatively light traffic, such as is found on the larger interurban systems. The booklet is elaborately illustrated and contains a number of tables covering important data upon the various systems described. It concludes with an interesting diagram showing the cumulative shipments of electric locomotives on a tonnage basis by the Westinghouse Electric & Manufacturing Company from 1905 to 1914, the curve showing a comparatively steady increase from an insignificant total in 1905 to approximately 24,000 tons in 1914.

COMPANY MAY NOT ABANDON LINE

The Public Service Commission for the Second District of New York has refused to permit the Empire United Railways to abandon its line from Oswego to Seneca Hill on the east side of the Oswego River. The application is the second which the company has made to the commission since it constructed its line through Minetto to Oswego on the west side of the river. Though Commissioner Irvine finds that the population along the east side of the river is not sufficient to make the operation of the line pay, it is decided that the road should be operated for the accommodation of the residents of Seneca Hill until the proposed bridge across the river from Seneca Hill to Minetto is completed. The order of the commission suggests that the cars might be operated at a forty-minute headway or less the year round. The company receives permission to renew the application as soon as the new Minetto bridge is completed, as at that time the residents of Seneca Hill can be as readily accommodated on the west side line as on the present east side line.

Electric Railway Journal

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WHY RUSH-HOUR ENERGY COSTS MORE

The rather disappointing increase in energy unit cost in Chicago, noted in a reference to the recent report of the Board of Supervising Engineers on page 138 of last week's issue of this paper, emphasizes the unfortunate effect of rush-hour traffic on the power station load factor. In Chicago between 1909 and 1913 the cost of energy rose from 0.711 cent to 0.742 cent per kilowatt-hour, although the consumption increased more than 68 per cent. In the same period, however, the statistics show that the average load factor for the year decreased from about 55 per cent to about 45 per cent. It costs more to generate energy for rush-hour service for the same reason that rolling stock and labor cost more per car-mile when used in intermittent service. Power plant equipment must be provided for the maximum demand no matter how short the duration of the demand may be. A typical load-duration curve printed on page 422 of the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 5, 1914, shows that with a 30,000-kw. plant installed in Rochester, N. Y., the load is above 20,000 kw. for but 450 hours per year; it is above 16,000 kw. for but 3000 hours, and above 12,000 kw. for but 5500 hours, while only 4000 kw. of load continues throughout the year. J. C. Parker, electrical engineer of this plant, estimates the annual cost of the extra generating and distribution equipment needed to supply the short-duration load at $750,000, or about 50 cents a kilowatt-hour, with no allowance for fuel, labor, etc. This is worse than the relative cost of the traditional amateur gardener's cabbages.

ENERGY COST AND LOAD FACTOR

The purchaser of electrical energy is apt to think of it as a commodity to be purchased at a more or less uniform price per kilowatt-hour in given quantities. Of course, he ordinarily expects to, and does, get the energy more cheaply in large quantities, but as has been seen this is not a necessary result. Whether a company generates its own power or buys it, the cost will be determined partly by the "when" factor and partly by the "how much" factor. This is true of the small customer's demand, as well as of the demand by the large customer, although the principle with small customers is still being but grudgingly accepted. The Chicago Surface Lines' contract, involving as it does such enormous monthly charges, about a quarter of a million dollars, is undoubtedly as scientifically drawn a contract as is possible. While its application to such an extreme case was not contemplated, it is interesting to inquire what it would show if the load were of 100 per cent load factor. By the method outlined in last week's abstract a simple calculation shows that if the present annual consumption, divided according to the relative requirements of the surface line companies in the proportion given in the report, could be used at a uniform rate the cost would be about 0.57 cent per kilowatt-hour. The difference from the actual cost of 0.74 cent, 0.17 cent, or nearly 30 per cent increase over the theoretical minimum, is due to the poor load factor and measures the cost, to the railway company, so far as power is concerned, of the irregularity of its traffic. In Chicago the demand charge is determined from the average of six hours' load taken from the morning and evening peaks on three successive days, provided that this is not less than previous demands similarly determined and that it is the maximum average which can be obtained by the given method during the month. For each extra kilowatt of demand the price averages about $1 per month and the price of the corresponding kilowatt-hour is very high because the load peaks are of short duration.

ELECTRIC ROADS RANK HIGH IN PUNCTUALITY

An appropriate obituary of the old joke about the chronic irregularity of trains appeared recently in the editorial columns of the New York *Evening World*. In order to show the improvement made by the railroads in running trains on time the editorial quotes figures issued by the Public Service Commission of New York, Second District, which show that of 67,080 passenger trains running on the railroads included by this district during June, 1915, 93 per cent arrived at their division terminals on time, *i.e.*, not more than five minutes late, the New York, Westchester & Boston Railway holding the highest percentage for any one railway of the group, namely, 99.4 per cent. While we agree heartily with the closing recommendation of our contemporary's editorial to "give modern railroading its due" for the high standard of punctuality attained, we think it only fair to add also, "give heavy electric traction its due!" That the Westchester percentage is not a chance figure is shown by the fact that this line averaged 99.2 per cent for twelve months ending June 30, 1915. The high standard of punctuality for electrified roads is not confined to the Westchester alone. The electric divisions of the other lines included by the same Second District territory, *i.e.*, the Hudson and Harlem divisions of the New York Central lines, and those of the New York, New Haven and Hartford Railroad show in the recent reports excellent figures for promptness, the figures in every case being above and sometimes well above the average for that month. The average number of minutes late per train run by these same lines is also proportionately low, the New York, Westchester & Boston Railway even averaging for the last year under one-tenth of a minute late per train.

THE PUBLIC'S INTEREST IN SKIP-STOPS

Time saved for the traveling public may have a rather nebulous value when calculated in dollars and cents. Nevertheless, experience with the jitney has shown beyond a doubt that the average rider considers his minutes spent en route to be no insignificant factor, and on that basis the recently proposed skip-stop plans in Chicago and St. Louis stand as an impressive public benefit. A simple calculation will determine what the latter is. Taking St. Louis, for example, the proposed plan involves the abolition on the routes in question of 720 stopping points, each one of which necessitates a roughly approximate loss of fifteen seconds in acceleration and retardation and in the stop itself whenever a car passes. Upon the assumption that the average stopping point is passed by a car at least 200 times during the course of a day and that the average car contains some thirty passengers, there is a daily saving of 20,000 passenger-hours. Even under a time value for passengers of only 10 cents per hour (a figure that might be otherwise expressed as equivalent to a willingness on the part of the average passenger to pay 5 cents for a ride that could be made in fifteen minutes, although he could get to his destination without expense in three-quarters of an hour) the time-saving value to the public of the St. Louis skip-stop plan would be $2,000 daily, or $600,000 per annum. Here is an indirect return to the community that is roughly equal to the amount now paid in taxes to the city by the railway. It seems impossible to imagine that a proposal to increase the tax payments by 100 per cent could meet with public disapproval, yet this attitude, or its equivalent, seems invariably to follow any plan to eliminate stops. Is not this a good subject for a campaign of popular education?

LABOR AND ARBITRATION

Undoubtedly one of the most serious problems now before the electric railway companies of the country is the labor problem. The jitneys have been making inroads into the gross receipts of the companies, but this trouble is generally considered to be temporary. Labor will always be necessary to operate the cars, and labor will have to be paid, and the rate of wages will have to be determined either by mutual consent or by some outside authority, like an arbitration board. But, as we said last week, the whole tendency of arbitration boards in labor disputes is to compromise. Either the board exactly "splits the difference" between the rates proposed by either side or it declares in favor of some intermediate scale between the two schedules presented to it for consideration. The practical result of the action is serious because the company rarely, if ever, goes before the arbitration board with an offer of less than the existing wages while the demands of the men are always for a large increase over the existing wages, undoubtedly with the expectation of a compromise decision. The consequence is that the rate of wages is constantly going up. Where is it to stop?

Recent decisions of arbitration boards avowedly ignore as essential factors in establishing a reasonable wage both the financial ability of the company to pay higher wages and the existing conditions of the labor market. The former principle was distinctly stated in the Bay State Street Railway award as published in our issue of June 26, and in the Chicago decision, testimony that plenty of labor could be secured at the existing wages and that they were 50 per cent higher than those paid in many of the skilled trades in Chicago, as well as higher than those paid for the same work in other American cities where the cost of living was greater, made no difference in that award. Even if one should admit, for the sake of discussion, that the increase given in Chicago was warranted, what is to prevent the use of the same arguments (or lack of arguments) to justify another increase of the same amount at the end of the contract period provided arbitration is followed and a compromise verdict only is rendered. This *reductio ad absurdum* of the situation only emphasizes the importance in all arbitration cases of some method which will secure a decision on the merits of the case.

Some suggestions may be obtained from the experience of the steam railroads which have been through a somewhat similar experience in their wage adjustments with the various brotherhoods, but as they are interstate corporations, federal influence and legislation have been important factors in the methods employed and the results obtained. The first most important federal legislation on the subject was the Erdman act. This act provided for two permanent mediators, the commissioner of labor and the chairman of the Interstate Commerce Commission, who were empowered to settle the matter by mediation if possible, but if they found this beyond their ability, they had authority to appoint the third member of an arbitration board if the contending parties could not agree on one. This general plan was duplicated in 1913 by the Newlands act, which also provides for mediation by a federal government board but with three members, or, if the board is not successful in settling the controversy, of an arbitration board selected much like that under the Erdman act, except that if both sides prefer it can consist of six members, two representing each side and two to be impartial.

The practical workings of all of these methods, as well as of the Canadian Industrial Disputes Board and of compulsory arbitration in New Zealand, were discussed in a paper at the last meeting of the American Economic Association by Professor Dixon of Dartmouth, who gives his preference to a permanent federal mediation board acting somewhat under the procedure followed by the Canadian Industrial Disputes Board. The method of selecting "arbitrators" will be mentioned later. According to Professor Dixon, mediators and arbitrators in wage disputes should be experts not only in the questions involved, but with experience in the proper procedure in the cases which come before them. From such men mere compromises should not be expected. Moreover, from the successful experience with mediation, as administered by Judge Knapp and Dr. Neill under the Erdman act, he expects more successful results than if there was entire dependence upon arbitration.

Of course with any permanent board everything depends upon the personality of the officials engaged. The chief objection to a permanent board, according to Professor Dixon, is the fear of the employers that it will "get into politics" and of the employees that it would fall into the hands of the employing class. He admits that it is natural to expect that any permanent body of arbitrators would quickly become unacceptable to one side or the other or both, but mentions with seeming approval the suggestion of Professor Shortt of the Canadian Civil Service Commission, who has served as chairman of a number of railway arbitration boards, that three or four persons be named by the government as constituting a panel of eligible persons from which the chairman of each board must be selected. Nevertheless he hopes, also from the experience of Canada, that the "investigators" could often bring about a settlement without resort to arbitration. They should, as under the Canadian plan, have the power to forbid strikes and lockouts during the period of investigation, and the publication of their findings should be an important influence on public opinion. In conclusion, he emphasizes the importance of some sort of co-ordination between such a board and the Interstate Commerce Commission so that rates, if necessary, could be increased to compensate for increased wages.

It is obvious that a plan such as outlined is much more easily adapted to interstate roads and a federal form of government than to intrastate roads and a number of state governments. Nevertheless it is helpful to know the evolution through which steam railroad arbitration has passed as well as the directions in which it has broken down and in which developments may be pending. It would probably be unwise to attempt to add the duties of wage regulation to the state public service commissions, but in an industry in which the amount paid for salaries and wages is 60 per cent of the total operating expenses, as in the electric railway business, there should certainly be a very close connection between the wage schedule and the rates permitted to be charged, and increases in the former should be reflected in the latter. Finally any way in which the merits of wage disputes can be brought before the public and in which the responsibility for excessive wages can be transferred in part to the public would be a step in the right direction. We believe that with a properly educated public opinion in regard to the merits of such a case there would be much greater willingness on the part of the public to put up temporarily with the inconveniences of a strike provided there was general conviction that the railway company was right in its contention and that the wages paid were adequate for the work performed.

WHY NOT FIX RAIL-WEAR LIMITS?

In our study of the economics of girder and high T-rail renewals, printed elsewhere in this issue, we were led to conclude that to put this problem on a scientific basis, wear limits for the various rail sections must be arbitrarily fixed. While most engineers will agree with this conclusion, difficulty is certain to be experienced in arriving at the allowable per cent of head reduction. Misapprehension regarding the effect of this probably will exist because many will construe the fixed limit of wear as the amount all rail must be worn before it is economical to renew it. Such a conclusion is incorrect, however, since the only purpose of suggesting a limit of wear is to put the economics of rail renewals on a definite basis. Reference to the empirical formula in the article on rail renewals printed elsewhere in this issue, as well as to the curves comparing the annual cost of renewals on a fifteen and thirty year maximum life basis, should indicate the urgent need of fixed wear limits. This formula was designed to test the economy of making rail renewals, and unless rail-wear limits have been fixed, the remaining wear life of any section under investigation cannot be determined.

Some engineers may think that the limits of wear suggested for the three general types of rail sections are excessive, but computations, on both the fifteen-year and thirty-year bases, show that if the limit was 50 per cent, rail renewals would be economical at 33 1/3 per cent head reduction, and if the limit was 60 per cent, renewals should be made when the head has been reduced 40 per cent. Certainly this amount of wear is not excessive, in fact some engineers have adopted these percentages as the limits of rail wear. On the other hand, one must not lose sight of the fact that these curves do not take into account all the factors which may affect the economy of rail renewals. In other words, the conclusion should not be drawn that rails must be renewed when a certain percentage of the head is worn away. Track maintenance may not increase, joint renewals may be unnecessary after the periods assumed, and, finally, heavier and more expensive new rail may be used. If any or all of these factors are present, the curve representing the annual cost of the old rail would not intersect that for new rail at the point indicated. Moreover, limits of rail wear even greater than those suggested seem warranted since the girder strength certainly is not impaired by the amount of head reduction in percentage which this formula would permit.

In summing up we believe that rail-wear limits can and should be arbitrarily fixed for all rail sections and that such limits should only be governed by two factors, safety and economy. Rail-wear limits determined on this basis will permit the economy of renewals to be calculated within reasonable limits. This is all the more important because the present small margin of profit in the street railway business demands scientific management of the strictest kind and the magnitude of the rail investment warrants special attention to its economical use.

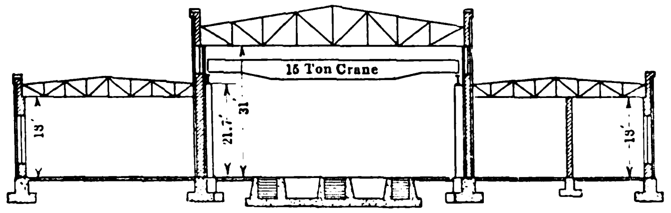
Monroe (Tex.) Maintenance Shops

The Southern Traction Company's Shops at Monroe Handle Both 600-Volt City and 1200-Volt Interurban Cars—The Equipment Permits Much Manufacture to Be Carried On

The new Monroe shops of the Southern Traction Company are up to the high standard of this road, a general description of which was published in the ELECTRIC RAILWAY JOURNAL of July 4, 1914. They are modern in every respect. The best engineering practice has been used throughout, and a number of original ideas have been incorporated in their design.

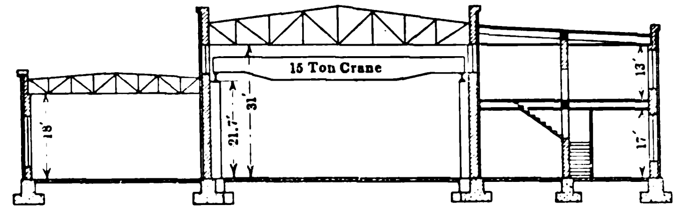
LOCATION

The shops are healthfully situated 4 miles south of Dallas on Trinity Heights. The pleasant location of the shops has helped draw to them some of the most desirable workmen in the community. The prevailing southern breezes blow directly through the main aisle, which runs north and south. Shower baths, wash basins, toilets and lockers are provided for the workmen. Most of the men live in Oak Cliff, a suburb of Dallas, fifteen minutes' ride from the shops, on the Southern Traction line. Though Oak Cliff is a very desirable place, with cheap rent and low cost of living, several of the workmen have built homes at Trinity Heights, within walking distance of the shops.



Transverse Section
X-X

Scale 1'' - 45 Ft.



Transverse Section
Y-Y

Electric Ry. Journal

MONROE SHOPS—CROSS-SECTIONS OF SHOP

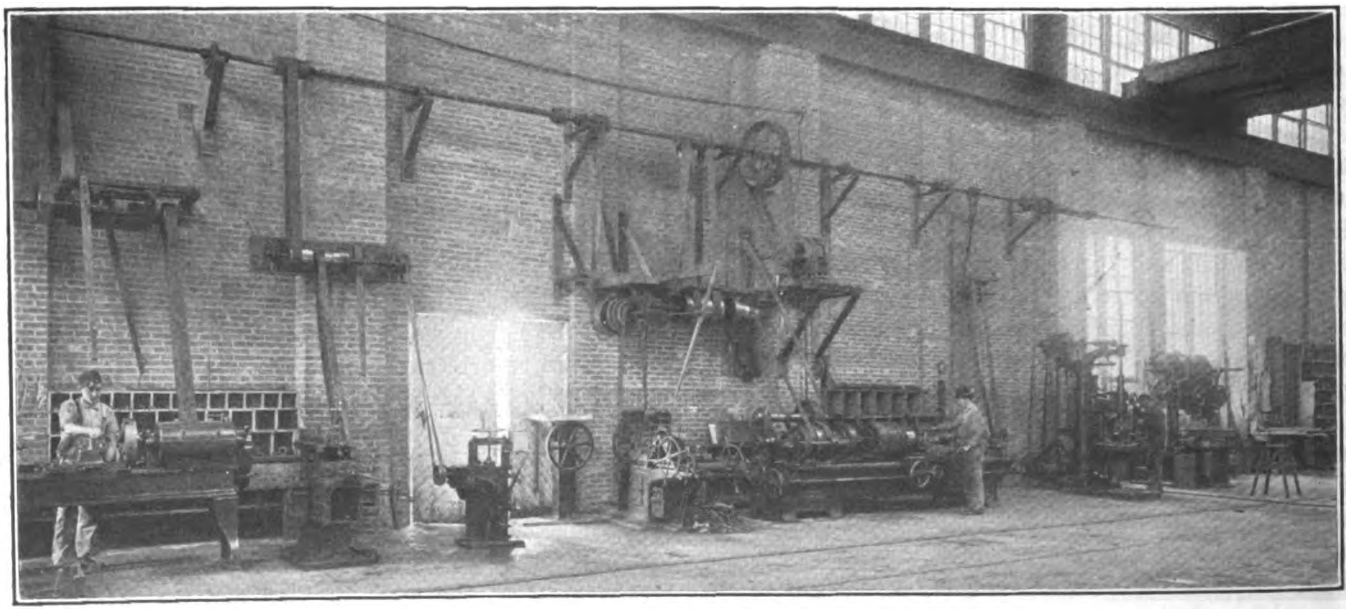
The Monroe shops are situated at the meeting point of the Dallas-Waco and Dallas-Corsicana divisions, so that disabled cars may be brought in quickly for repairs. It is also conveniently located with respect to the Texas Traction Company line, which has a terminus in Dallas and which, together with the Southern Traction Company, are under the control of the Strickland-Goodwin Management Association. All heavy repair work to Texas Traction cars is done at the Monroe shops.

Before passing on to a general description of the shops themselves, the protection of the main line and work tracks may be considered. One loop track connects all shop tracks with the main line, which is protected by a switch and short track which would send a runaway car up a slight incline and stop it against a pile of soil. All of the work tracks are protected by Hayes' derails.

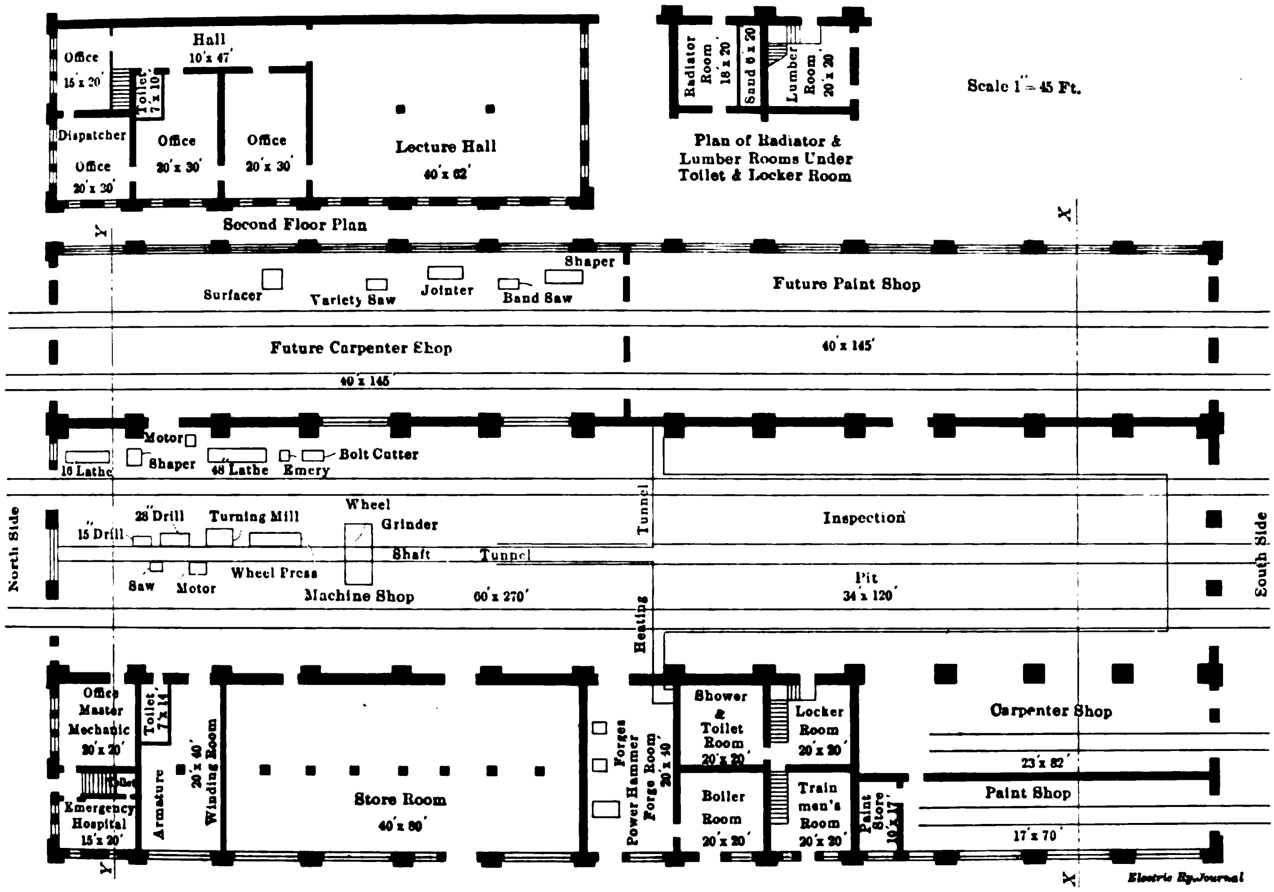
GENERAL CONSTRUCTION AND LAYOUT

The shop building is 275 ft. long by 105 ft. wide. The main bay, as stated above, runs north and south. Built of red brick with white concrete cappings and trimmings, the edifice presents a pleasing appearance. The main division walls are of brick, and expanded metal lathing makes the other walls nearly flameproof. All ground floors are of cement. The wooden roof, with tar and gravel covering, and the inflammable contents of the building are well protected by numerous fire hydrants (with hose) located in the building, while a 50,000-gal. steel water tank furnishes water at 70-ft. head.

The west wing of the building, as shown on an accompanying drawing, has two stories. On the upper floor are three general offices, a lecture hall 40 ft. x 62 ft., and a dispatcher's office—the last being located in



MONROE SHOPS—LINE OF MACHINE TOOLS IN MAINTENANCE SECTION


Office 15'x 20'
Hall 10'x 47'
Toilet 7'x 10'
Dispatcher Office 20'x 20'
Office 20'x 30'
Office 20'x 30'
Lecture Hall 40'x 62'
Second Floor Plan
Radiator Room 18'x 20'
Sand 6'x 20'
Lumber Room 20'x 20'
Plan of Radiator & Lumber Rooms Under Toilet & Locker Room
Scale 1" = 45 Ft.
Surfacer
Variety Saw
Jointer
Band Saw
Shaper
Future Paint Shop
Future Carpenter Shop
40'x 145'
40'x 145'
Motor
16 Lathe
Shaper
48 Lathe
Emery
Bolt Cutter
North Side
15" Drill
28" Drill
Turning Mill
Wheel Grinder
Shaft
Tunnel
Saw
Motor
Wheel Press
Machine Shop 60'x 270'
Tunnel
Inspection
Pit 34'x 120'
South Side
Heating
Office Master Mechanic 20'x 20'
Toilet 7'x 15'
Emergency Hospital 15'x 20'
Armature
20'x 40' Winding Room
Store Room 40'x 80'
Forges
Power Hammer
Forge Room 20'x 40'
Shower & Toilet Room 20'x 20'
Locker Room 20'x 20'
Boiler Room 20'x 20'
Train men's Room 20'x 20'
Paint Store 10'x 17'
Carpenter Shop
23'x 82'
Paint Shop
17'x 70'
X
X
X
X
Electric Ry. Journal

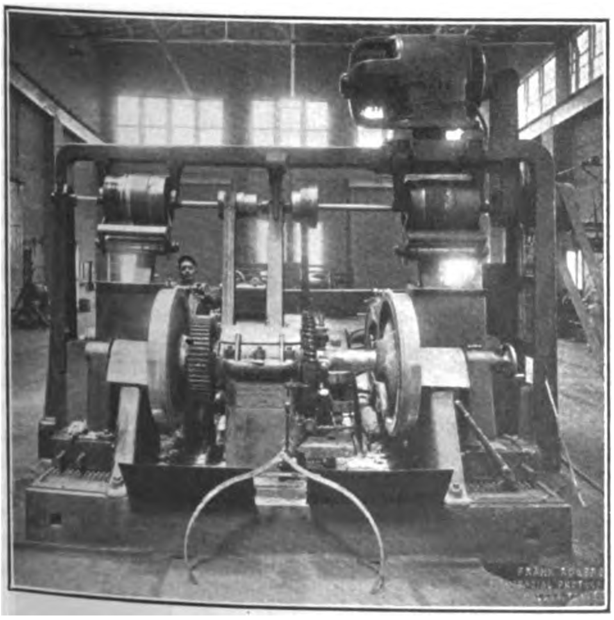
MONROE SHOPS—GENERAL PLAN WITH MACHINE TOOL LAYOUT

the southwest corner where a full view of the main tracks is obtainable.

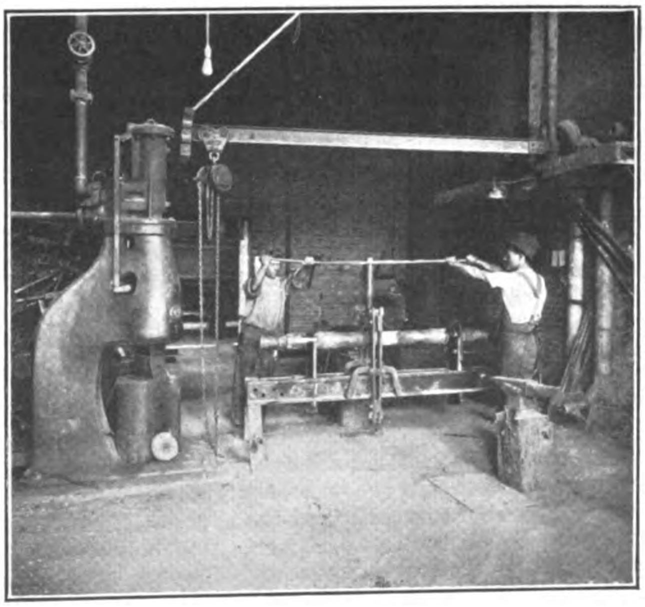
On the lower floor are the offices of the shop foreman and of the superintendent of equipment. Situated also on the lower floor of this wing are the storeroom, the armature winders' room, the blacksmith shop, the boiler room, a trainmen's room, the carpenter shop and the paint shop. Each shop is separated from the others and from the main bay by brick walls and Durand's tin-clad fire doors.

The storeroom is 40 ft. wide by 80 ft. long, and contains 1000 bins arranged in six double tiers. The blacksmith shop contains two Buffalo forges, fitted with forced draft and suction hoods, the centrifugal fans being electrically driven. The blacksmith shop also contains a 400-lb. Chambersburg hammer operated with air at 90-lb. pressure. The illustration on this page shows a home-made axle straightener and a home-made jib crane, the latter fitted with a $\frac{1}{2}$-ton Yale & Towne hoist.

The carpenter shop is fitted with a 12-in. patent column hand planing and jointing machine, one variety saw with boxing and hollow chisel mortising attachment and with arbor arranged to receive gaining head, one



MONROE SHOPS—WHEEL GRINDING OUTFIT



MONROE SHOPS—STRAIGHTENING AXLE IN FORGE ROOM single-cylinder surfacer, one 36-in. band saw, one double-spindle shaper, one swing cutoff saw, and one knife grinder and knife balancing machine. Group belt drive is employed. The entire carpenter shop machinery comprising equipment from the J. A. Fay & Egan Company, is run by one 50-hp, three-phase, 2300-volt motor. Natural overhead light is supplied by three wire-glass skylights, each 4 ft. 2 in. wide by 15 ft. long.

In the paint shop, light from above is furnished by two skylights, similar to those in the carpenter shop; and the shop is further lighted on the west side by fourteen windows, each 3 ft. 4 in. x 11 ft. 2 in. Twelve similar windows light the storeroom.

The main aisle or bay is 273 ft. long, 60 ft. wide by 31 ft. from the cement floor to the bottom members of the structural steel trusses which support the roof. These trusses are a combination of the Warren and Pratt types with the top cord slanting to accommodate the roof which slopes from the center toward the sides; these trusses are spaced 21 ft. throughout the length of the aisle. To prevent the trusses from bulging sideways, there are provided three lines of cross bracing, running the entire length of the bay. The high winds that frequently occur in northern Texas make necessary this extra strong roof support.

LIGHTING

The main aisle is lighted by a row of 8 ft. x 3-ft. 8-in. windows, 22 ft. from the floor. These windows extend almost completely around the aisle, there being 103 in all. A few 3-ft. 4-in. x 11-ft. 2-in. windows, 4 ft. 2 in. from the floor, are also provided in the bay near the lathes and mechanics' benches. The aisle is lighted from directly above by five 6-ft. 5-in. x 15-ft. 6-in. wire-glass skylights. The system of natural lighting is found very effective and satisfactory.

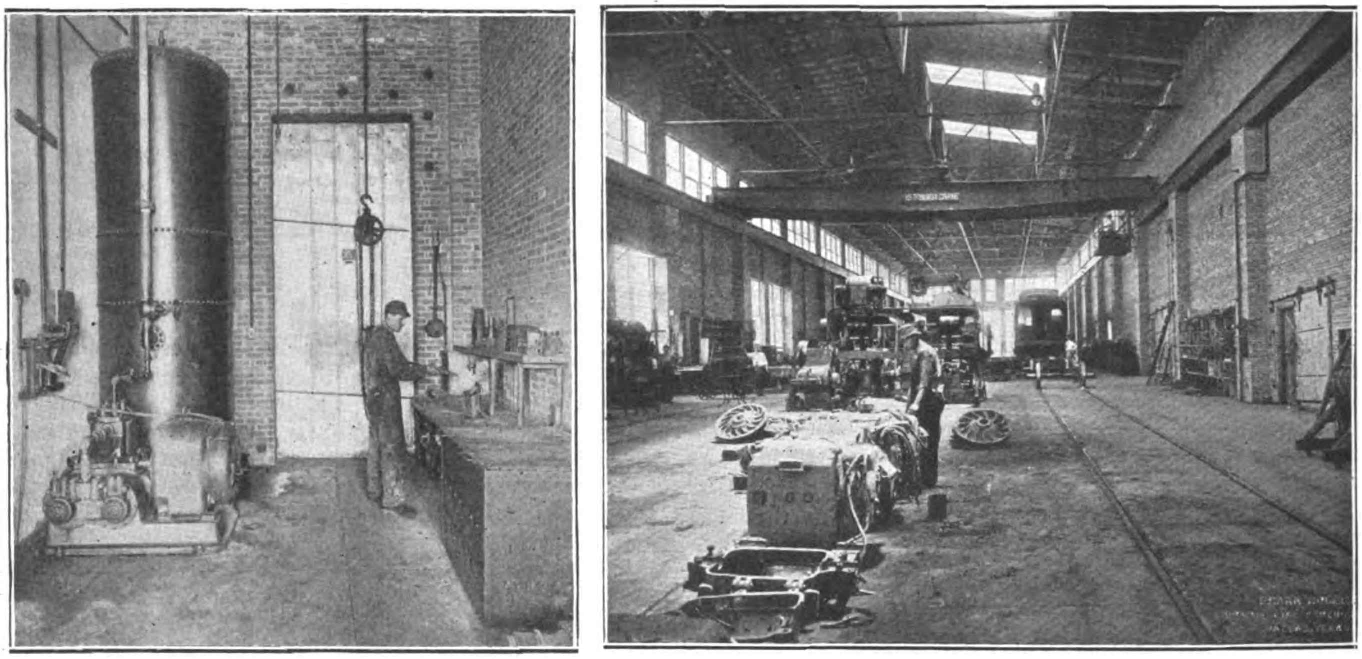
Illumination of the main aisle by night is accomplished with ten inclosed arc lamps, hung staggered, in two rows; the globes are on a level with the lower members of the roof trusses to put the arcs out of the direct range of vision for the workmen. Condulet sockets to accommodate incandescent lamps with extension cords are provided wherever close work or inspection under cars is necessary. The artificial illumination of the shop has been found satisfactory.

INSPECTION PIT AND MACHINE SHOP

Three tracks run the entire length of the main bay. The southern half of the aisle is given over to an inspection pit, 34 ft. wide by 120 ft. long. All rails passing over this pit are supported by 12-in. x 12-in. wooden joists, which rest on concrete posts, spaced every 10 ft. The pit is 4 ft. 10 in. deep; the floor is of concrete 12 in. thick. Two sets of concrete steps, one at each end, afford entrance to the pit. Wooden floors have been put in between tracks and on a level with the rails.

The northern end of the bay is occupied by the machine shop. This contains one 16-in. Lodge & Shipley lathe with patent head and 11-ft. bed, one McCabe 2-in. 26-in.-46-in. lathe with 8-ft. centers used chiefly for turning axles and large commutators and occasionally for wheel work; one 22-in. Ohio machine tool shaper, one single-head bolt threader, one grindstone and an emery wheel. These machines are run as a group, through jackshaft and belts, by a 15-hp. d.c. motor. In another group are one 15-in. and one 36-in. Barnes drill press, one 11½-in. Higley cold metal saw with automatic adjustable feed, one 40-in. Bullard boring mill, and a 260-ton Caldwell wheel press. This group is run by a 15-hp, 110-volt, a.c. motor, the jackshaft and motor being located in a concrete pit which is covered by concrete flags. The machine shop also contains one German-made combination splitting shear and punch sold by Henry Pels & Company, New York, and is provided with a riveting hammer and air drill. A Norton wheel grinder driven by a 35-hp, 550-volt, d.c. motor forms an important part of the machine shop equipment.

A 15-ton Box crane, driven by three d.c. motors, serves the entire main aisle, running on rails located 21 ft. 8 in. above the floor. A system of pipes and valves serves all the shops with air at 90-lb. pressure, from a 48-in. x 12-ft. air tank and a 100-cu. ft. air compressor driven by a 20-hp, 550-volt, d.c., series-wound motor. A pipe has also been run over to the Monroe substation, 300 ft. away, where the air is very effectively used in cleaning the machines.



MONROE SHOPS—BABBITTING JOURNAL BRASSES; INTERIOR VIEW OF MACHINE SHOP, SHOWING CRANE

Girder and High T-Rail Renewals

A Summary and Discussion of Existing Practice, the Factors Influencing the Rate of Wear and the Wear Limits, and the Derivation of a Formula to Test the Economics of the Problem

BY EXUM M. HAAS, ASSOCIATE EDITOR ELECTRIC RAILWAY JOURNAL

A wide diversity exists in the practice of making renewals of girder and high T-rail in paved streets. Some railways insist upon strict economy in this regard, while others are grossly extravagant. The diminishing profits of the industry make scientific economy in all departments of utmost importance, but especially in track work, since it represents about 40 per cent of the total plant cost. Traffic conditions obviously will govern the period of renewals, but it is a moot question as to when rail is worn out. This uncertainty is due largely to the fact that wear limits for the different rail sections have not been adopted, although there is no practical reason why one cannot be fixed arbitrarily for each rail section. It may be that this limit would never be reached in service, because of the many other factors entering into the problem, but the mere fixing of a wear limit would place the economics of rail renewals on a definite basis.

Whenever a track appraisal is undertaken the engineer is confronted with the problem of determining the percentage of depreciation. At best, most of these determinations are guesses, based either on the experience of the engineer who makes the appraisal or on precedents set by previous valuations. On some appraisals as large a figure as 8 per cent per annum has conservatively been assumed as the rate of track depreciation, and records indicate that the minimum rate used in any valuation is about 4½ per cent. Information recently obtained after an exhaustive analysis of rail wear in one of the large cities in this country tends to show that an average of thirty-one years of wear life could be obtained. This average wear life, however, was based upon a conservative limit of rail wear which has in some cases been exceeded without affecting track economy.

EXISTING PRACTICE

There is little or no standard practice regarding the limits of wear for the various types of girder and high T-rail. Most engineers who have a definite rule believe that with grooved-girder and tram-girder rails, the limit of wear has been reached when the wheel flanges ride on the floor of the groove or tram. Limits of wear fixed for T-rails are usually based on steam-road practice, or on limits adopted in some important valuation. Perhaps the Boston Elevated Railway has gone as far toward fixing a definite limit of wear for T-rails as any other electric road in the country. Conditions governing the life of T-rail on open elevated structures with high-speed trains, however, are not analogous to the conditions in paved streets where speeds are comparatively slow. The application of steam-road practice to electric railway tracks in paved streets is also in utter disregard of the economics of the problem at hand and results in most extravagant track-maintenance methods. Generally speaking, street railways cannot afford to use relay rails, except in temporary work, on account of the expensive construction employed and the difficulty experienced in making repairs. Some relay rails, however, have been taken from heavy trunk lines and laid in extensions of light traffic lines. Usually such practice is economical only if undertaken at the time of pavement renewals.

Perhaps present-day practice in making appraisals of tracks and in calculating their depreciation is nowhere more typically set forth than in the 1906 report of the Chicago Traction Valuation Commission. In this, track was divided into two parts: the rail and the substructure. Rail depreciation was determined by three principal factors: the wearing life in the head of the rail, the condition of the tram and the condition of the joints. Joints were depreciated on the basis that to obtain the full value in the head of the rail, joint renewals would be necessary. Where the tram was broken the rail wear-life limit was considered as reached regardless of the remaining life in the head of the rail. The wear limit of the rail head was considered as reached when it had been worn away so that the height of the head above the floor of the groove or tram was ⅝ in. or less. With this wear limit fixed, the remaining wear value of the rail was readily determined. Enough measurements of the worn rail head were taken to obtain an average. The ⅝-in. limiting dimension was governed by the depth of the standard wheel flange. In other words, the wear limit was fixed at the point where the standard wheel flanges rode on the floor of the groove or tram.

CHANGES IN RAIL SECTIONS INCREASE WEAR LIFE

Since that time new rail sections have been developed in which metal has been added at points where it was needed to prolong the life of the rail. In some cases the limiting factor of the life of the rail has been railway traffic, in others vehicular traffic, in still others corrosion. Provision has been made for these and other factors which might influence the serviceability of the rail in the later sections. The general adoption of the girder-grooved rail as a substitute for the old tram rail with the horizontal wagon-wheel tread is certain, except under extraordinary conditions, to eliminate vehicular traffic as a life-determining factor. The shape of the groove also makes flange riding less hazardous, and the depth of the groove, in many sections, insures a liberal wear value in the head of the rail.

Grooves, correctly designed, should be of sufficient depth to permit maximum head wear before the standard wheel flanges ride on the groove floor. The introduction of rolled-steel wheels, however, has obviated flange riding as a limiting condition. Comparatively few wheels in service are new, and even a short period of wear increases the wheel-flange depth appreciably. As a result of this, even if the groove depth were correctly designed, one could conceive of rails worn so that all wheels except the new ones would be flange riding. Obviously, wheels worn to the extreme allowable flange depth would ride before the others.

The latest types of girder-groove sections provide a liberal groove width and an angle so that they are self-cleaning. The tendency of one wheel of a pair to wear to a thick flange and the other to a thin flange, as well as for both wheels to wear to thin flanges, results in more or less flange cutting on the lips of the rail groove. Accordingly, the lips of the groove have been made heavier to provide against excessive wear of this kind. Likewise, provision has been made for wear on the gage side of the head due to wheel conditions and the nosing of the trucks by moving the center of the head more nearly over the center of the web, thereby increasing the horizontal thickness of the head. Some companies (Chicago, for instance) have designed a rail section with additional metal under the head opposite the gage line. This insures a maximum horizontal as well as vertical head reduction before the rail is ready to be scrapped.

Other provisions against the factors which may limit the life of rails include a liberal bevel on the pavement side of the rail head. This not only avoids false treads when narrow wheels run on the track but allows a head area above the normal pavement surface. Some engineers have claimed that the limit of wear will be reached when head of the rail is worn below the original grade of the pavement, and that, consequently, a wear limit based upon any greater percentage than this would allow would be impracticable. Experience seems to indicate, however, that where railway traffic is dense, vehicular traffic also is sufficiently dense to wear down the pavement in advance of the rail. On the other hand, this extra rail-head area above the surface of the pavement insures that at least until the first pavement renewal is made the surface of the rail head will not be below that of the pavement.

In some localities the rapid deterioration of the rail web and base, due to corrosion, determines the life of the rail. Rail corrosion advances very rapidly in some districts, particularly where the drainage conditions are good and the tracks are laid on streets with rather steep grades. This is due principally to oxidization of the steel caused by frequent changes from wet to dry, conditions such as would occur where good track drainage obtains. Here, of course, the life of the rail is not determined by the head, and an increase of the metal in the webs and bases offers the only recourse.

Undoubtedly changes in the chemical composition of rails and in the methods of manufacturing them have improved their wearing qualities. Experience has shown that open-hearth steel rails wear longer than those manufactured by the Bessemer process, and in addition the former have a higher resistance against corrosion. Improvements in the methods of manufacture which have resulted in a more uniform quality and a finer grain have also had a tendency to lengthen the wear-life of rails. On the other hand, modern methods of production under pressure have to a certain extent offset the benefits which should have been derived from improvements in manufacture and changes in chemical composition. An increase in the carbon content has tended to lengthen the wear life of rails. Perhaps the best evidence that changes in chemical composition do improve the quality of the rails is to be found in the service records of titanium-treated rails. While it is possible that other alloy steel rails may produce the same results, actual service data are not available. Apparently rail corrugation which was introduced with the more rigid types of track construction has been eliminated or at least greatly delayed by the titanium treatment. In addition the structural properties, as well as the wearing qualities of the rail, have been improved.

EFFECT OF JOINTS, TIES AND FOUNDATIONS

Although the introduction of the welded and riveted joints has had a tendency to reduce joint difficulties in track, the old adage, "The life of the joint is the life of the rail," still holds, but to a greatly reduced degree. The additional support given to mechanical joints by the modern foundation construction also has made them less of a determining factor than in the earlier types of track laid in paved streets or in open-track ballasted construction. As long, however, as rail is not made continuous across the joint and a line is perceptible where the rails butt together, it will be impossible to eliminate cupping at that joint. The application of the grinder to insure perfect rail surface on new track and to eliminate evidences of cupping at joints as soon as they appear, is certain to reduce the importance of the joint as a determining factor.

The type of tie used has little effect on the life of rails, although it undoubtedly has some bearing on the problem. Some engineers are of the opinion that the wooden tie, being more resilient than the steel tie, decreases the rate of rail wear, particularly where both are laid in solid concrete. Where soft wood ties are used without tie plates, they may affect the character of wear on the rail. Instances may be cited where rail has canted on soft ties to such an extent as to change the angle of wear on the head. Moreover, mechanical wear on the soft ties may force rehabilitation, which in turn might make rail renewals necessary in advance of the time dictated by rail wear or other track conditions.

If one may draw a conclusion from the rate of rail wear as found in ballasted open-track construction and in paved streets, it would be that the rate of wear on resilient construction is much less than that on rigid construction. If that is a test, then ballasted construction in paved streets should make rails wear longer than solid-concrete foundations. This is a point, however, upon which opinions differ, and strong evidence can be submitted in support of both sides of the question. On the other hand, the permanent types of track foundations have given added importance to the problem of making rail renewals. If there is any economy in the expensive permanent types of construction, and undoubtedly there is, it ought to be practicable to renew rails without any change in the foundations except with possibly some slight repairs. If no more life is to be obtained from foundations of this expensive construction than from those of cheaper construction their use should be discontinued. Experience with the improved types of foundation construction, however, indicates that they will outlive one set of rails. Renewals on old permanent foundations have been made, and will continue to be made, if the foundations have been properly designed and installed.

CHARACTER OF PAVEMENT

Probably no other factor is more important in considering the economics of rail renewals than the character of pavement. In districts where vehicular traffic is reasonably heavy, it is probably safe to say that the modern permanent types of track construction will outwear the pavement. Accordingly, when pavement renewals are contemplated the engineer must determine the remaining life of the rail and whether it will be economical to permit the rail to remain in service. With the large investment in the plant and the small margin of return allowed to railway companies at the present time, this question should be decided on a strictly engineering basis. In other words, if the pavement is to be renewed and the remaining wear value of the rail is such as to make it economical to leave the rail in the track until it is worn out, mere sentiment should not govern the final decision.

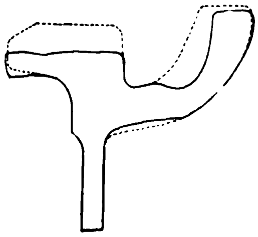
GRADES AND DRAINAGE

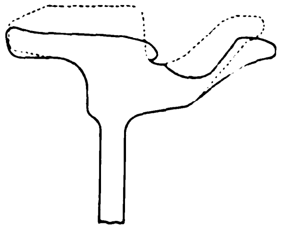
Single track laid on heavy grades wears more rapidly than single track on the level. Similarly, track on ascending grades in double-track construction wears more rapidly than track on descending grades. This is largely due to the unusual tractive effort necessary which may be accompanied by spinning wheels on sanded track. Drainage on grades is not so important, but on level track it is of vital moment and will determine the life of track foundations. Manifestly, failure in the track foundation has an important bearing on the rail-renewal problem.

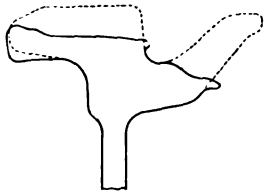
FACTORS AFFECTING THE RATE OF RAIL WEAR

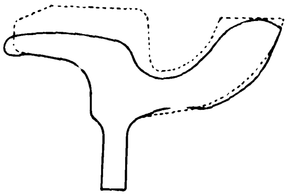
Obviously the density of traffic, both railway and vehicular, determines rate of rail-head wear. Closely related to these two are the type and weight of the rolling stock, whether single or double truck, light weight or heavy. The total weight of the car is not so important, but the weight per wheel is of moment, the rate of wear being directly proportional to the weight per wheel. The kind of wheels, whether rolled steel or chilled iron, as well as the wheel contour, determine the character of wear. When wheel flanges ride on the floors of the groove or tram, some engineers consider that the wear-life limit of the rail has been reached. Others go so far as to permit the wheel flanges to shear the lip off completely before the rail is considered worn out.

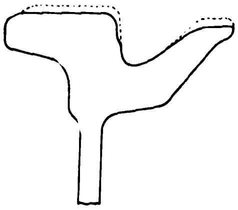
If the track is otherwise in serviceable condition, the

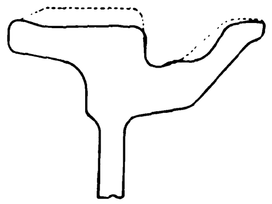

9-in. 145-lb. guard rail from curve in Chicago. Original section installed in 1908 and removed March, 1915. Head reduction 44.1 per cent.

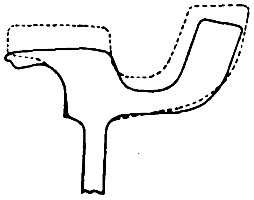

9-in. 129-lb. rail from curve in Chicago, original section installed in 1908 and removed March, 1915. Head reduction 44.5 per cent.

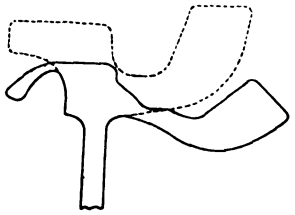

9-in. 129-lb. rail from curve in Chicago. Other end of rail shown in the cut at the left. Original section installed in 1908 and removed March, 1915. Head reduction 46.6 per cent.

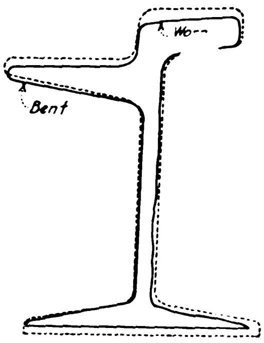

9-in. 145-lb. guard rail on curve in Chicago. Original section installed in 1908 and removed March, 1915. Head reduction 46.9 per cent.


9-in. 129-lb. rail from tangent in Chicago. Original section installed in 1908. Templet taken March, 1915. Note vehicular wear on lip. Head reduction 12.8 per cent.

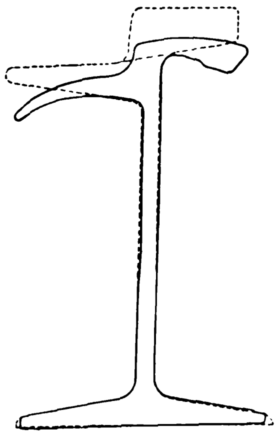

9-in. 129-lb. rail from tangent track in Chicago. Original section installed in 1908 and templet taken April, 1915. Note wear due to canted trucks. Head reduction 29.0 per cent.

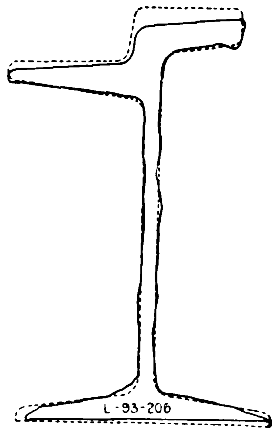

6-in. 97-lb. guard rail laid on a slight grade on a 100-ft. radius curve; 22 lb. per yard worn off or head reduced 56.0 per cent.


6-in. 97-lb. guard rail on curve; 0.0 grade; 23.7 lb. per yard worn off or head reduced 76.6 per cent.

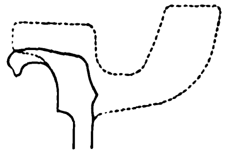


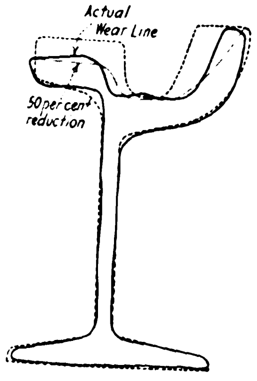
7-in. 80-lb. tram girder rail from Milwaukee laid in 1898 and removed in 1914. Note head and tram wear. Reduction due to corrosion, causing renewal. Head reduction 28.5 per cent.


L.S.—93—206. 9-in. rail removed after twelve years of service. Joints showed same head reduction. Head reduction 49.3 per cent.

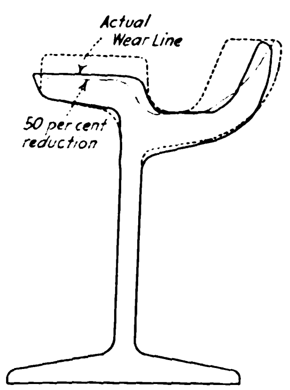


L.S.—90—206. Taken out of track in Toledo, Ohio. This rail was laid on a sand foundation twenty-one years ago. In good condition except reduction in web due to corrosion. Head reduction 38.2 per cent.

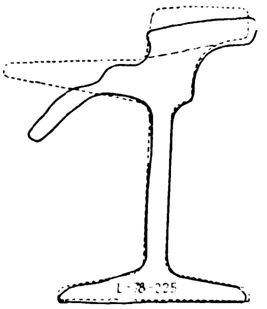

6-in. 97-lb. guard rail on a 60-ft. radius curve; 0.0 per cent grade; laid 1902, measured 1910. 49.4 lb. per yard worn off or head reduced 66.1 per cent.



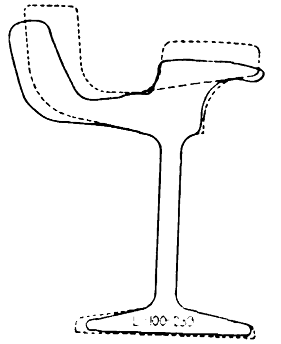
Inside guard rail L.S.—398 —7 in. 108 lb. per yard. Head reduction 50.6 per cent.



L.S.—6—398. 7-in. 108-lb. rail. Same rail as shown in the cut at the left. Section taken by sawing rail from end. Head reduction 39.2 per cent.



L.S.—78—225. 6-in. rail removed from macadam street after fourteen years' service. Joint failure cause of removal. Head reduction 19.7 per cent.



L.S.—100—239, worn out guard rail taken from 40-ft. radius curve, which carried 150 cars daily for twenty-one years. Head reduction 40.7 per cent.

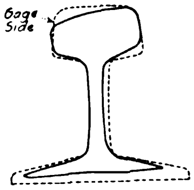
SECTIONS OF WORN RAILS FROM DIFFERENT ROADS, SHOWING HEAD REDUCTION (¼ size) tremendous investment in the modern types of track as compared with the small investment in wheels, should dictate the turning down of the wheel flanges to eliminate them from the realm of limiting factors. From the standpoint of safety there is no objection to the practice where rolled-steel wheels are used, because their flanges do not chip, and when these wheels begin to become flange bearing, the deep flanges wear off so that the wheels are soon equally flange and tread-bearing. Experience in the past with chilled-iron wheels seems to indicate that it would not be good practice to allow them to ride on the flanges. However, a change in the shape of the wheel flange might permit this practice so that the mere fact that chilled-iron wheels were used would not make them a limiting factor in the rail-wear life. Even with chilled-iron wheels, the problem should be determined on a safety-of-operation basis rather than simply because the flanges are riding. In cases of this kind it might be economical even to change the shape of the wheel contour to permit the rail head to wear to its limit.

The rate of speed is of vital moment, and for track in paved streets it is safe to assume that the speeds are comparatively low. In other words, they are not comparable with open track on an elevated structure, nor with track on a private right-of-way. But as low speeds reduce the stresses in the rail it appears reasonable to draw the conclusion that the limit of wear for rail in paved streets may exceed that for rail in open-track construction. Since conditions are not analogous, the practice on steam railroads, interurban railways or elevated railways should not be an index of rail renewal requirements in paved streets. Moreover, the large investment in the types of track construction used in paved streets is sufficient reason to induce the prudent engineer to make every effort to obtain long wear life.

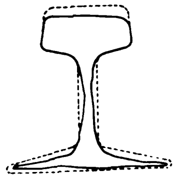
Rapid acceleration and braking increase the rate of rail wear. Equipment maintenance, particularly as regards the condition of the trucks and wheels, also affects the wear life of rails. The flexibility of the car springs and the ease of movement of the side bearings, so far as they affect the position of the trucks and wheels in relation to the rails, also affect the rate of wear. Wheel maintenance in particular is important, as well as the selection of wheel contours which insure a distribution of the load across the full width of the head. Where flanges are permitted to wear unusually deep, wheels may become flange riding long before they should. When flange riding occurs it results in wear in the groove and when the groove is worn through the wear-life limit of the rail should be considered as reached. It is, therefore, important that the limiting depth of the flange should be within reason. Some question has been raised concerning reduction in electrical contact on flange riding track, and this, too, is important in obtaining economical power consumption. On the other hand, the mere fact that the electrical contact is not good should not determine the life of the rail, but should dictate better wheel maintenance.

Other Factors Affecting Rate of Rail Wear

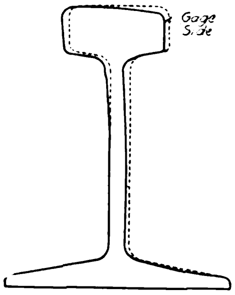
Numerous other elements have a minor bearing on the rate of rail wear, such as the cleanliness of the streets, the weather, the amount of snow and ice, and



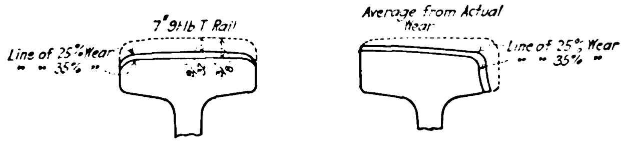
3¾-in. 45-lb. T rail, laid in Milwaukee in 1890 and scrapped because of corrosion.



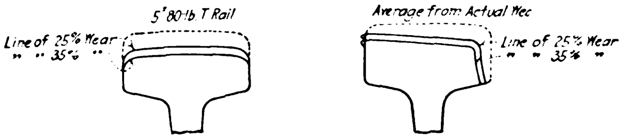
3½-in. 40-lb. T rail. No record of service. It was scrapped because of corrosion.



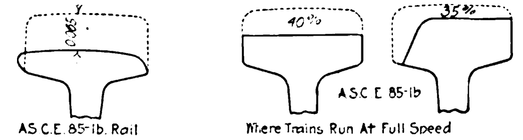
6-in. 60-lb. T rail laid in Milwaukee in 1898 and removed in 1914. Note bend in web probably due to heavy cars and lack of tie rods.



7-in. 91-lb. T rail. L.S.—375. Left-hand section shows line of symmetrical wear; right-hand section shows actual wear; from Twin City Rapid Transit Company.

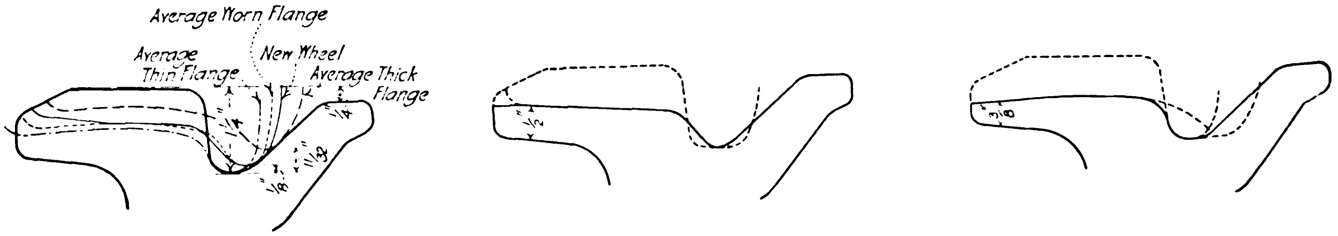


5-in. 80-lb. T rail. I.S.—8004. Left-hand section shows line of symmetrical wear; right-hand section shows actual wear; from Twin City Rapid Transit Company.



Allowable wear of T rails before renewal on the Boston Elevated Railway.

SECTIONS OF WORN RAILS FROM DIFFERENT ROADS, SHOWING HEAD REDUCTION (¼ size)



Fully depreciated Chicago rail—on basis of flange bearing.

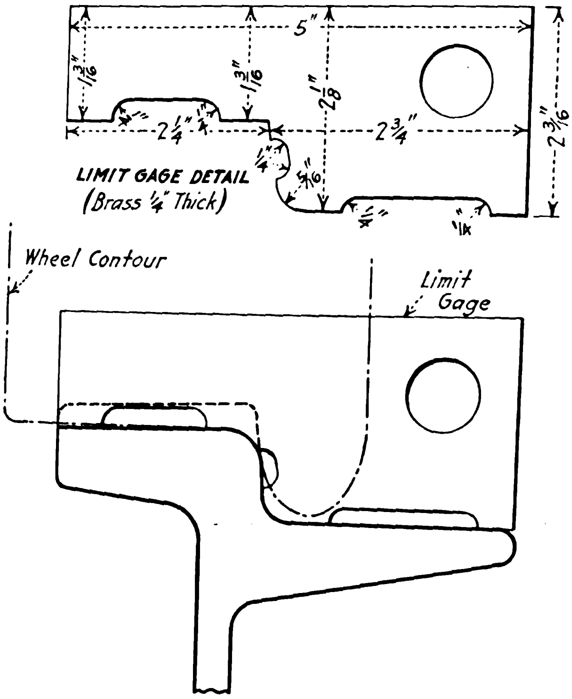
Fully depreciated Chicago rail—on basis of new wheel profile with flange riding in bottom of groove.

Fully depreciated Chicago rail—on basis of worn wheel profile with flange riding in bottom of groove.

SECTIONS OF FULLY DEPRECIATED CHICAGO RAIL (½ size) street sprinkling. Lack of cleanliness causes a collection of grit on the rail which increases the rate of wear. Frequent alternation of wet and dry periods increases the rate of corrosion and produces slippery rails, making the use of sand necessary. Both the corrosion and use of sand increase the rate of wear on the rail head. During winter months the amount of snow and ice is also important, because in some cities it is necessary to use great quantities of salt which gives impetus to both the rate of corrosion and wear. The amount of snow and ice also increases the number of slipping and grinding wheels, although these are of minor importance in influencing the rate of wear.

MUNICIPAL REQUIREMENTS

In many cities railway companies are usually required to renew their track when changes in the grade or the line of streets are made. When changes like these kinds are contemplated the problem resolves itself into one of track economics, together with what character of construction future traffic will demand. These elements enter into most any rail-renewal problem, consequently the decision must depend upon the engineer's previous experience, as well as his ability to anticipate traffic conditions. It seems reasonable to assume that he may make these determinations within safe limits, yet how well it is done depends largely on the human equation. It is believed that rail renewals in cases of this kind do not deserve as serious consideration as the character of foundation to be employed. With the more permanent types of foundations it is safe to assume that rail renewals may be made without disturbing the foundation. If the alignment or grade is changed a loss is entailed in the investment, because the original foundation cannot be used. In contrast with this the rail may be used in the new line or on the new grade or transferred to an entirely new location. These considerations also enter in changes from single to double track.



RAILWEAR ECONOMICS—LIMIT OF WEAR OF L. S. 95-297, ADOPTED BY INDIANAPOLIS TRACTION & TERMINAL COMPANY (½ size)

THE ECONOMICS OF RAIL RENEWAL

When pavement renewals become necessary or the foundations, ties or joints have failed, the question is usually whether it is economical to use the old rails in the new work. This problem must largely be governed by local conditions and in specific instances. Before the economy may be determined, however, it is necessary to assume some wear-life limit. With a limit fixed the remaining life of the rail may be estimated readily by obtaining the average head reduction for the period the rail has been in service. With this information in hand the rate of wear per year may be ascertained and the remaining life estimated. When this has been done the condition of the joints, ties and the foundation should be carefully examined, as well as the extent of corrosion and the condition of any other part of the structure which may have a bearing on the remaining life of the rail. If the amount of corrosion indicates that it may limit rail life in advance of wear, the rate may be determined in a manner similar to that employed in calculating the rate of head wear.

If the foundation must be rebuilt or if the ties must be renewed, they increase the cost of the installation and may show that it would be uneconomical to use the old rail. The condition of the joints, whether good or in need of repairs or requiring that a permanent type be substituted for the mechanical joint, affects the economy of renewal. When the problem can be decided solely on the basis of economics, it resolves itself into one of balancing interest, depreciation and maintenance of the new rail against the old. The following factors must enter the problem to obtain the comparative annual cost between the old rail and the new:

R_2 = Total cost of new rail, joints and fastenings in place in dollars.
L_2 = Total estimated wear life of the new rail in years.
M_2 = Annual maintenance cost of the new rail in dollars.
P = Annual interest and taxes on the new rail in per cent.
V_r = Remaining wear value of the old rail in dollars.
S = Scrap value of the old rail in dollars.
K = Cost of replacing the old rail in dollars.
T = Cost of tearing up and relaying the pavement, including labor and material, in dollars.
M_1 = Annual cost of maintaining the old rail and fastenings in dollars.
L_1 = Remaining wear life of old rail in years.
X = Money in dollars expended to prolong the life of rail which could not be charged to maintenance (betterments).
C_2 = Annual cost of the new rail in dollars.
C_1 = Annual cost of the old rail in dollars.

From the foregoing factors the annual cost if old rails are used would be:

$$\frac{V_r + K + T + X - S}{L_1} + M_1 = C_1.$$

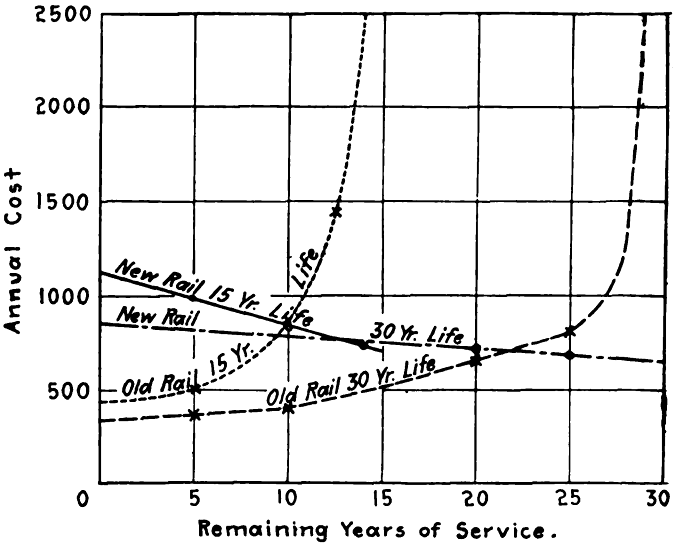
The total annual cost if new rails are substituted for the old ones at the time repaving is done, is as follows:

$$\frac{V_r + R_2 - S}{L_2} + (R_2 - S)\,P + M_2 = C_2$$

To determine the relation between the annual cost of a mile of new rail as compared with a mile of old at the different ages of the old in service, the following values per mile of single track have been given to the various items contained in the formula:

R_2 = \$6000 (including rail and fastenings).
M_2 = \$100.
P = 8 per cent.
V_r = \$2000.
S = \$1200.
K = \$2000.
T = \$1000.

For the different ages of rail V_r will naturally change. It was also assumed that the new rail was of the same section and of the same cost as the old rail. Although there may be some slight change in the scrap value at the different periods, it was allowed to remain the same in the calculations. The annual cost of maintaining the old rail, or M_1, was increased 50 per cent for the fourteenth year and 25 per cent for the twelve and one-half year period. After the ten-year period, it was also assumed that new joints would be necessary on all the old rail. On the assumption that 60-ft. rails were used, an amount of $440 was added to the cost per mile for joints. Similar assumptions also were made in determining the relation between the annual costs of new and old rail on a thirty-year basis. The results of these calculations for the different periods are indicated by the graphs shown in the accompanying diagram. No general deductions may be drawn from these curves since they apply only to the cases in hand. The method employed, however, is applicable to any case, and the terms of the formula are sufficiently general to determine the economy of making rail renewals under all conditions.



30-Year Basis
M_1 = $100 from 1 to 19 years
M_1 = $125 from 20 to 24 years
M_1 = $150 from 25 to 28 years
M_1 = $200 from 29 to 30 years
X = $450 at the 20, 25 and 29-year periods.

15-Year Basis
M_1 = $100 from 0 to 12½ years
M_1 = $125 at 12½ years
M_1 = $150 at 14 years
X = $440 at 10, 12½ and 14-year periods

RAILWEAR ECONOMICS—ECONOMY OF RAIL RENEWAL TESTED BY COMPARISON OF ANNUAL COST OF NEW AND OLD RAILS ON A FIFTEEN-YEAR AND A THIRTY-YEAR MAXIMUM WEAR-LIFE BASIS

CONCLUSIONS

In the foregoing discussion an endeavor has been made to consider every phase of the rail-renewal problem. As a result of this analysis the following conclusions seem warranted:

1. Rail renewals in straight track are seldom necessary because the head has been diminished by wear sufficiently to reduce the structural strength of the rail so that it will not carry cars safely. Light sections on which considerable wear has occurred, however, may be too weak structurally to be safe or economical under an increase in the weight of rolling stock.

2. Better chemical composition, the addition of extra metal where most wear occurs, improvements in the methods of manufacture, lighter cars and training of motormen in the proper method of acceleration and braking have tended to increase the wear life of rails.

3. The more substantial and expensive track foundations now being laid in paved streets, as compared with the earlier types of construction, make more life from the new types necessary if they are economical. Hence, it should be possible to make rail renewals without disturbing the foundation.

4. Joint failures or cupped rail at joints, followed by destruction of the foundation beneath them, are the most important factors in limiting the life of rails. A high standard of construction and maintenance in this respect is certain to delay renewals due to these causes, and it is quite possible that defects of this kind may be made of secondary importance.

5. In districts with heavy vehicular traffic, pavement renewals rather than failures in the track, force engineers to consider the economy of rail renewals.

6. In districts where vehicular traffic is light, rail renewals are largely governed by foundation, tie or joint failures.

7. The large investment in track in paved streets as compared with the small investment in wheels makes rail renewals uneconomical simply because wheels are flange bearing, unless this condition actually makes operation unsafe.

8. The head cross-sectional areas available for wear in most high T-rails are greater than those of girder-grooved and girder-tram rails.

9. The present practice of making rail renewals on an arbitrary headwear limit basis is in general uneconomical, since the ultimate limit of head wear for most sections, both girder and high T-rails, is seldom, if ever, reached.

10. Ultimate permissible wear limits for the standard rail sections of the American Electric Railway Engineering Association should be arbitrarily fixed, if for no other reason than to simplify calculations of the economy of making renewals.

11. For girder-grooved sections, a 50 per cent head-reduction limit appears to be an entirely reasonable one to adopt, although it will be safe to allow more than this on some sections.

12. For shallow-head high T-rails it appears safe and reasonable arbitrarily to fix the wear limit at 50 per cent head reduction.

13. For the A. R. A. and A. S. C. E. rail sections an allowance of a 60 per cent head reduction is believed to be within safe limits.

14. Unless a rail renewal is required by ordinance the relative economy of using new rail or relaying the old rail should be carefully calculated when pavement renewals are made. With these data in hand engineers will have a strong argument for adhering strictly to the economics of the problem.

15. This study finally leads to the conclusion that the rate of rail wear varies with localities, with streets and even as between blocks. For appraisal purposes an average life may be determined for a given property, but this average should not be applied in depreciating track on any other property.

Coupon Transfer at Exposition Grounds

In connection with the handling of travel to the Panama-Pacific Exposition the United Railroads of San Francisco built a loop terminal at Van Ness Avenue between Francisco and Bay Streets. Passengers who enter this terminal pay fare to a station collector and receive a transfer with a coupon attached. As the passenger proceeds he hands his transfer to a checker who tears off the coupon upon which both date and serial number are printed. This coupon is dropped into a box and serves later to check the cash receipts. The portion of the ticket returned to the passenger is the company's standard transfer form.

Skip-Stops in St. Louis

The United Railways, in Its Application Before the Public Service Commission for Permission to Eliminate Car Stops, Replies to Criticisms of Proposed Plan

The brief that has been presented by the United Railways Company of St. Louis before the Public Service Commission of Missouri in connection with its recently-proposed skip-stop plan states that both in this country and abroad the endeavor has been, as territorial expansion in large cities has increased, to shorten the time of transportation for passengers. It then submits the plan, which is outlined in the following paragraphs, to the end that the whole people of the city of St. Louis may be better served, more quickly transported from their places of residence to their places of business, and vice versa.

About 7000 stops are now made in the operation of the street railway system in the city, and of these stops it is proposed to eliminate some 720. This will permit a saving of time that would be required in the slowing up, stopping and starting of cars at those points, and with the same general speed as is now maintained, it is estimated that from four minutes to five minutes will be saved on every line.

The selection of the stops to be eliminated has been made with reference to their present non-usage or the scarcity of passengers presenting themselves for passage, together with the minimum amount of additional walking distance to be imposed by virtue of the increased distance between stops. Stops are to be made in a systematic manner at alternate streets. At every point where cars stop, a red sign with "Cars stop here," or the equivalent, will be posted, and places where the cars do not stop will be indicated by a blue sign with appropriate letters.

Some idea of the immeasurable benefit that this plan will bring to those who ride upon street cars is obtained when it is considered that the United Railways Company now carries about 1,000,000 passengers per day. Assuming that 25 per cent or 250,000 of these passengers save five minutes per trip, a saving of 20,866 hours per day is made, and if the value of this saved time is estimated at the low rate of 10 cents per hour, the value of the time saved is $2,086 per day, or $625,980 for the 300 working days constituting the year.

To this proposal of the elimination of these 720 stops some twenty specific objections were lodged, covering twenty different stops. During the course of an early hearing a committee was appointed by all represented at the proceedings to make an inspection of the stops to whose omission specific objection was made and to report its findings to the Public Service Commission. In this report no general objection is lodged to the whole scheme but rather an approval of the plan. However, the particular stops could be retained if this is found desirable without affecting the whole plan materially.

In addition to the objections to particular non-stop points, there have been some half-dozen general objections to the scheme as presented in its entirety. These objections have come from a labor organization, an association known as the People's League, and one or two individual objectors, of whom one is not a resident of the city of St. Louis.

Criticism of the proposed plan can be classified as follows: (1) Some passengers would be required to walk further; (2) there will be a diminution in real estate values at the affected corners; (3) at the eliminated stopping points the speed will be too great, causing more accidents; (4) the company will get the principal advantage of the plan by reason of its ability to take off cars.

As to the first criticism, it has been shown in evidence that the average increased walking distance is about 300 ft., and that this affects only the persons living in the immediate vicinity of the eliminated stops, a comparatively small number. At the rate of 4 m.p.h., which is the average walking rate, 300 ft. will be covered in less than one minute. There can be little hardship in this short walk, and those making the walk will participate in the saving of time due to the elimination. In all large cities where rapid transit obtains, the stations are from three to four blocks apart, this being four and five times the distance between stops in the present proposed plan.

As to the diminution of real estate values, owners of real estate at the different corners have no vested interest in the operation of street railway cars. Their interests are at all times subordinate to the interest of the general public in its transportation facilities. A real estate owner cannot oppose his interest to the interest of the majority of the people. Whether or not street cars will continue to be operated in front of his property is a matter of chance, not of right. But aside from this question the diminution of real estate values is merely a surmise prompted by an overcautious imagination, as there seems to be no real reason why real estate should diminish in value either as to business or as to residential locations.

As to excessive speed, the speed of the cars passing over the non-stop points will be no greater than at any of the other places along the route. The evidence shows that even now one-fourth of the cars passing certain points do not stop at that point either for the reception or discharge of passengers. Therefore, the same condition that obtains now in practice will be put into effect in a more systematic manner.

As to the claim that the company will reap some financial advantage, the complainants have attempted to show that since the time for making the trip will be reduced the company will thus be enabled to give the same service with fewer cars and that there will be a saving in power and in wear and tear upon the cars. If this is true, it is a very urgent reason why the plan should be adopted. No one is bettered by economic waste.

Of course, there is no disposition on the part of the United Railways Company to do anything which would decrease riding on its cars. Its only hope for success is to use such methods as will increase its patronage, which can only be done by appealing to the convenience, pleasure and necessity of its patrons. It considers that in eliminating the stops, it would be doing something to save time of the great majority of its customers. The convenience of the public is its first and only consideration. If this proposed elimination is put into effect the speed at the non-stop points will not be any greater than at present. The time that will be saved will be that consumed in making the proposed eliminated stops.

The following letter from Peter Witt, Commissioner of Street Railways for the city of Cleveland, to Richard McCulloch, president United Railways of St. Louis, was submitted to show the attitude of the people regarding skip-stops in the former community:

"Replying to your letter in reference to the car-stop elimination, I am inclosing several [popular ballot] cards, which will show you the method employed here to put this plan in effect. The votes on every line showed a majority for the change, ranging from three to one on the short lines, to eleven to one on the long lines. We eliminated 47 per cent of the stops. The average distance between stops is 800 ft. We cut the time per half-trip from two to eleven minutes. The only trouble we met with was from the property owners whose interests were affected. The car riders themselves registered no kicks, and so successful has been the plan that I am positive when I say to you that were we to go back to the old way with the slow time, the kicks and complaints would be many."

Comment in the recent report to the city of Detroit by Barclay Parsons & Klapp regarding the elimination of stops was also cited as follows: "In the earlier days of horse-car service it was not unusual for passengers to expect the cars to stop midway, or even at irregular intervals, along the block to suit the convenience of each individual householder or storekeeper. As the distances became greater and the demand for more rapid service grew, the rule of stopping only at corners became necessary. * * * It is now recognized that rapid transit conditions affect such a large proportion of the traveling public that the inconvenience of the few, in walking short distances or in changing cars to complete their trip, is not only warranted, but necessitated by the growing density of traffic on the highways of our large cities."

Pennsylvania Overhead Line Crossing Specifications

This Subject Has Received the Exhaustive Attention of a Committee Appointed in November, 1914—The Specifications Are Divided Into Nine Sections

As reported by R. P. Stevens, president Mahoning & Shenango Railway & Light Company, to the Pennsylvania Street Railway Association at its May meeting, a joint committee representing the different classes of utilities in interest has prepared for adoption by the Public Service Commission of Pennsylvania, a set of specifications covering the construction at crossings of overhead lines of public utilities. Mr. Stevens was the chairman of the committee of the association on a uniform crossing agreement. The specifications are the work of a committee appointed as a result of a conference held on Nov. 16, 1914, at Harrisburg at the request of F. Herbert Snow, chief of the bureau of engineering of the Public Service Commission. As a result of the discussion at the meeting the following committee was appointed: S. M. Viele, Pennsylvania Railroad; D. B. Heilman, Philadelphia & Reading Railway; J. S. Jenks, West Penn Traction Company; R. P. Stevens, Mahoning & Shenango Railway & Light Company; R. E. Chetwood, Western Union Telegraph Company; J. F. Skirrow, Postal Telegraph-Cable Company; Nathan Hayward, Pennsylvania Bell Telephone Company; J. F. Stockwell, Keystone Telephone Company of Philadelphia; Thomas Sproule, Philadelphia Electric Company; G. E. Wendle, Lycoming Edison Company, and Paul Spencer, United Gas Improvement Company, chairman. Beginning Dec. 1, 1914, meetings were held weekly in Philadelphia until the specifications were completed. In the work the committee had the assistance of a number of other experts.

As stated by the committee, the specifications are intended to cover crossings of overhead conductors of any utility and the overhead conductors of any other utility, or the tracks and right-of-way of railroads. They are, as far as possible, complete for all types of conductors and cover definitely the general requirements at the points of crossings, without stating the type of construction in such specific details as to limit it to any particular method. In its work the committee took under consideration other similar specifications, including those adopted by the National Electric Light Association in 1911, which specifications were, with certain revisions, later adopted by the American Electric Railway Association; the specifications recently adopted by the Idaho Public Service Commission; those of the Illinois Public Service Commission and the Oregon Railroad Commission; the act relating to electrical construction, of the State of Washington; the specifications of the Pennsylvania Railroad and of the Association of Railway Telegraph Superintendents; the regulations of the Swiss government in reference to electrical installations, and the specifications established as standard practice of the *Verbandes Deutscher Elektroteckniker.*

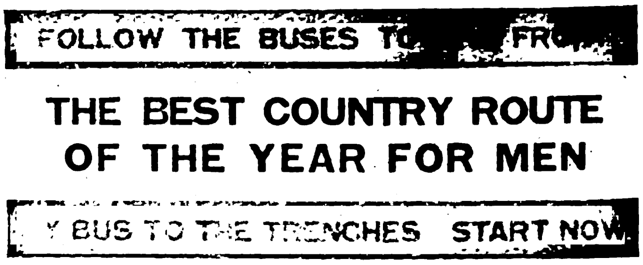
The new specifications, which, with appendices, cover 165 pages of the size of those used in the A. E. R. A. engineering manual, are divided into nine sections covering the following subjects: (1) Definitions and classifications; (2) construction of power lines up to 5000 volts on crossing communication circuits and power lines up to 15,000 volts when crossing other power lines, also communication lines crossing over communication lines; (3) construction of power lines of over 5000 volts, crossing over communication lines and of power lines of over 15,000 volts when crossing other power lines; (4) "collinear" construction, that is, construction of one line parallel with an existing line, but on separate supports, and so placed in reference to the other that one line will be wholly or in part over the other; (5) construction of communication-line crossings over railroads, based upon specifications of the Association of Railway Telegraph Superintendents; (6) crossings of power lines of all voltages over railroads; (7) construction of overhead lines where crossing under railroad bridges; (8) underground construction at railroad crossings, and (9) appendices containing sag tables and diagrams, wood-pole specifications, various diagrams of line construction details, a method of calculating the strength of double cross-arms, tables of allowable working unit stresses in line construction, details of a typical crossing of a power line over a railroad, and tables of minimum clearances and of wind and ice loads.

From what has been said it is apparent that the recommended specifications contain a wealth of data and that unusual attention has been paid to definitions. The latter is especially important in the case where the recommendations will be used in formulating commission orders.

"The Best Country Bus Route"

The latest recruiting appeal to be issued by the London General Omnibus Company takes the form of a striking and original form of panel bill as illustrated.

This slip, the color scheme of which is a tasteful black, yellow and light blue, is now being brought prominently before the notice of London's countless thousands by being displayed conspicuously on the "General" buses, with the result, it is hoped, of further stimulating recruiting and impressing the public at large with the great need there is for an adequate supply of men.



FOLLOW THE BUSES TO [illegible] FR[illegible]

THE BEST COUNTRY ROUTE
OF THE YEAR FOR MEN

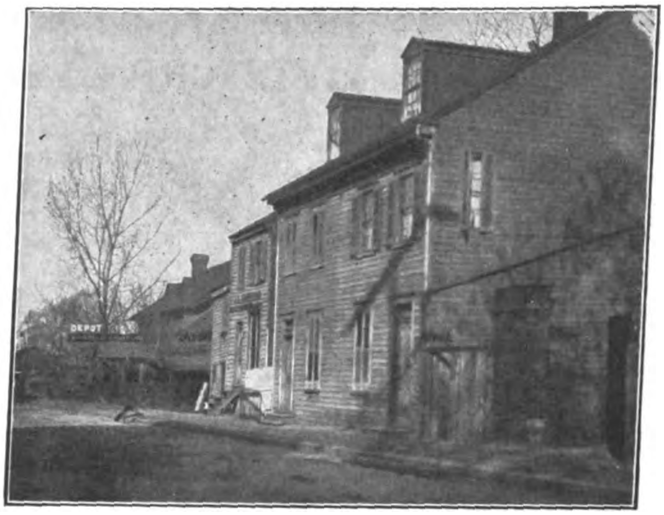
[illegible] BUS TO THE TRENCHES START NOW

RECRUITING PLACARD ON LONDON BUSES

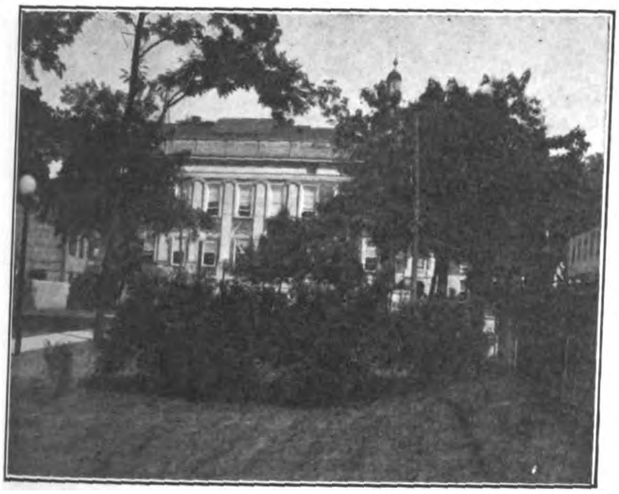
Improving Station Surroundings

When Allen & Peck, Inc., took over the operation of the Annapolis Short Line in 1912 the new management found that the vicinity of the station was hardly in consonance with the fine Colonial atmosphere which makes Annapolis a pleasing reminder of the past. A number of tumble-down buildings not only obscured the view of the near-by Court of Appeals, but gave the approach to the station a most uninviting appearance. It was therefore decided that the rental from the shacks could well be dispensed with as a contribution to civic improvement. The structures were torn down and replaced with turf and flowers with the results illustrated.

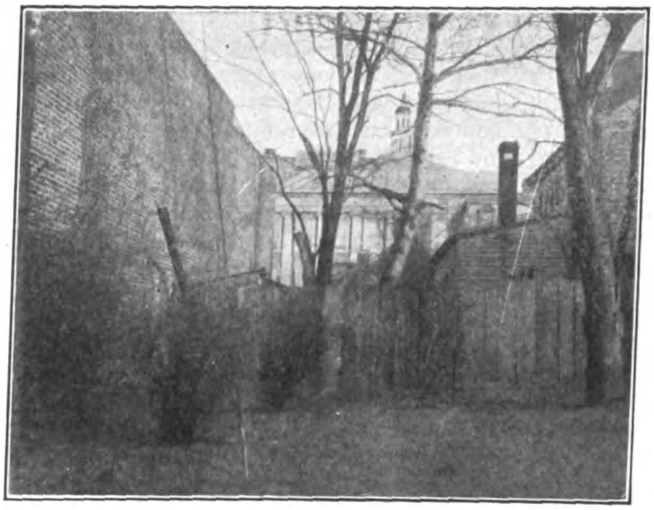
Thus the opening of "Short Line Park" not only cleared away several old unsightly buildings but virtually placed the Short Line on one of the main streets of the city and within a block of the group of State buildings. The improvement was in line with the rehabilitation of the Short Line, which included all new passenger equipment consisting of center-entrance all-steel cars, and change in motive power from a.c. to d.c.



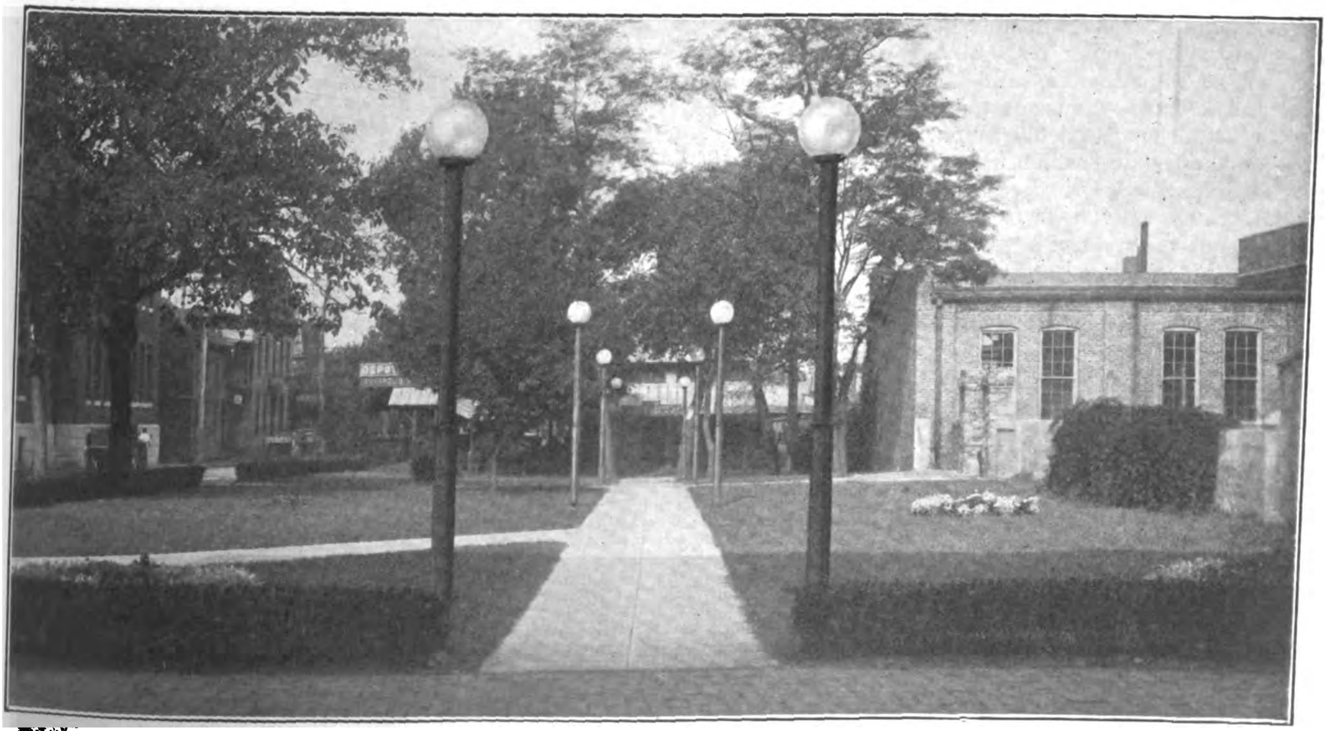
ANNAPOLIS SHORT LINE—SCENES LIKE THIS WERE NO ATTRACTION FOR TRAVELERS



ANNAPOLIS SHORT LINE—THE WORTHY FOREGROUND OF MARYLAND'S COURT OF APPEALS TO-DAY



ANNAPOLIS SHORT LINE—A FORMER VIEW OF MARYLAND'S COURT OF APPEALS



ANNAPOLIS SHORT LINE—AN ELECTRIC RAILWAY'S MITE TOWARD THE CITY BEAUTIFUL—VIEW LOOKING TOWARD THE ANNAPOLIS TERMINAL TO-DAY

American Association News

Excellent Progress Is Being Made on the Program for the Convention — Booklets on the Itineraries of Convention Tours Are Being Distributed by Mr. McConnaughy

CONVENTION PROGRAM PROGRESS

While it is still too early to give details of the program excellent progress is being made. A decision has been tentatively made to hold the American Association meetings in the morning and those of the affiliated associations in the afternoon.

Acting on local advice the executive committee has decided to hold the meetings in the building of the Native Sons of the Golden West located at 414 Mason Street. This building is the center of the hotel district and is admirably adapted for convention purposes. The original intention was to hold sessions at Inside Inn.

THE CONVENTION TOURS

As announced on the "Association News" page last week, the itineraries of the convention tours have been distributed. They are contained in attractive booklets appropriately bound in red and blue respectively, the colors corresponding with the titles of the special tour trains. The booklets contain the complete schedules and much interesting information concerning the points to be visited en route. Even photographs of the special trains are included. The "Red Special" booklet is issued with the imprint of the New York Central Lines and the "Blue Special" booklet with that of the Pennsylvania Railroad. The text of both booklets shows that the most scrupulous care has been exercised in providing for every detail of convenience and comfort of the tourists. Both booklets are beautifully illustrated and contain maps in colors. Both contain the schedule of the "White Special," the one-way train, which leaves Chicago on the evening of Oct. 1, reaching San Francisco on the morning of Oct. 4.

Supplementing his statement, quoted last week, H. G. McConnaughy, director of transportation, states that copies of the booklets will be sent to all those who ask for them, such having been already sent to company members of the American and Manufacturers' Associations and to those who requested copies in advance. He directs attention particularly to the arrangement of stops on these tours, which have been designed to minimize tediousness. In the cities through which the special trains will travel the American Association is planning, at the request of the local railway companies, a series of meetings and entertainments which will make the tours an important part of the convention. Mr. McConnaughy predicts that every member who makes this trip and attends the convention will return with new ambitions, new ideas and new knowledge sufficient to return the investment tenfold. He thinks that the opportunity to absorb the spirit of the West, to test its hospitality and to examine its engineering achievements alone are worth the cost. He waxes enthusiastic over the beauties of the expositions at San Francisco and San Diego, quoting Edwin Markham's description of the former as follows: "I have seen to-night the greatest revelation of beauty that was ever seen on earth. I say this, meaning it literally and with full regard for all that is known of ancient art and architecture, and all that the modern world has heretofore seen of glory and grandeur. I have seen beauty that will give the world new standards of art and a joy in loveliness never before reached. This is what I have seen—the courts and buildings of the Panama-Pacific Exposition illuminated at night."

In closing Mr. McConnaughy directs attention to the notes under the heading "Resourcefulness," which appears on the front page of the *Brill Magazine* for June, raising the query as to the number of resourceful men that are in the railway association and implying an important connection between resourcefulness and attendance at the convention.

ENGINEERING ASSOCIATION STANDARDS COMMITTEE

A largely attended meeting of this committee was held in New York on July 29 and 30 to review the work of the technical committees for the year. The members present were: H. H. Adams, Chicago, Ill., chairman; C. F. Bedwell, Newark, N. J.; C. H. Clark, Cleveland, Ohio; W. G. Gove, Brooklyn, N. Y.; J. H. Hanna, Washington, D. C.; C. S. Kimball, Washington, D. C.; F. R. Phillips, Pittsburgh, Pa.; A. S. Richey, Worcester, Mass.; Martin Schreiber, Newark, N. J., and J. W. Welsh, Pittsburgh, Pa. E. B. Katté was represented by H. A. Currie, New York, N. Y. There were also present by invitation R. C. Cram, Brooklyn, N. Y.; W. E. Johnson, Brooklyn, N. Y.; A. B. Stitzer, Philadelphia, Pa., and Frank Kingsley and H. H. Norris, ELECTRIC RAILWAY JOURNAL. Secretaries E. B. Burritt and C. W. Stocks also attended the sessions.

The committee considered in detail the recommendations of the technical committees in so far as they affect the association standards and a number of valuable reports were adopted for approval by the association. The material submitted to the committee showed that a remarkably fine year's work had been done and the engineering manual will be greatly enriched by the results.

Street Railway for Canton, China, Proposed

The construction of a street railway system in Canton is being considered by the provincial authorities, reports Consul George E. Anderson, Hongkong, China, and plans have been drawn for a line connecting the stations of the Canton & Hankow Railway and the Kowloon-Canton Railway, running through a populous section of the city.

The proposed line is projected by General Lung, Military Governor of Kwangtung Province, in connection with Chinese capitalists in Hongkong, and the plans call for the construction of a little less than 6 miles of street railway along a route which will permit the use of a considerable portion of the old wall of Canton. It is proposed to construct the line by means of a company for which the provincial government will furnish half the funds.

Plans for the rolling stock are not yet complete, but the general idea seems to be to buy motors and steel parts of cars abroad, completing the cars in Canton or Hongkong, present high freight rates rendering the purchase of complete cars abroad at this time a matter of difficulty. It is thought that the line as projected can be started with an initial outlay of about $100,000.

COMMUNICATIONS

Specifications for Gears and Pinions

THE METROPOLITAN WEST SIDE ELEVATED RAILWAY COMPANY

CHICAGO, ILL., July 26, 1915.

To the Editors:

I have been interested in the paper on "Railway Motor Gearing" read by W. L. Allen before the last meeting of the Central Electric Railway Association, an abstract of which was given in the ELECTRIC RAILWAY JOURNAL for June 26, page 1201, and in the further remarks by Mr. Allen in the issue of July 17, page 111.

On the Chicago Elevated Railroads very little trouble has been experienced from the breakage of gears, but pinions have caused considerable trouble. As a rule gears remain in service until the wear on the teeth makes their removal necessary. Pinions show widely varying results, some failing shortly after being placed in service and some giving very long life. As reliability of service and elimination of failures were far more important than the value of a few pinions we adopted the policy of installing new pinions at each general overhauling (approximately every 75,000 miles) whether the pinion removed showed any appreciable wear or not. Even this did not eliminate failures on the road, as some pinions failed before making the general overhauling mileage.

We believe that buying gears and pinions under specifications and testing each order will assist in working out a specification and in developing a material which will stand up under the requirements of heavy service. The specification will give us something to work toward. If the first specification does not prove satisfactory, changes can be made. The records of the chemical and physical characteristics of the material and method of treating different lots of pinions will enable the railway companies and the manufacturers to intelligently follow the problem until it is satisfactorily solved.

H. A. JOHNSON, Master Mechanic.

THE CAPITAL TRACTION COMPANY

WASHINGTON, D. C., July 28, 1915.

To the Editors:

I have read with interest W. H. Allen's paper on "Specification for Gears and Pinions" in the issue of the ELECTRIC RAILWAY JOURNAL for July 17.

In the last few years the untreated gears and pinions have to a large extent been superseded by two classes of gears and pinions which may be properly classified as "heat-treated" and "case-hardened." When the untreated material was in general use several of the larger companies had specifications for the purchase of gears and pinions, but, so far as I have been able to find out, none of the railway companies have specifications for either the heat-treated or case-hardened gears and pinions, although several companies are preparing specifications at this time.

This was one of the subjects assigned the equipment committee of the American Electric Railway Engineering Association, and a preliminary specification has been prepared to be presented at the convention in October. In the preparation of this specification the committee had the assistance of the manufacturers, and I am informed that they would welcome a reasonable specification. In preparing a specification at this time the question of treatment should be left to the manufacturer and the physical properties which the product is to have after treatment should be specified. The development of the high-grade gears and pinions has been so rapid that it is only reasonable to expect that they will continue to improve and that a specification prepared at this time will have to be revised from time to time.

In my opinion there is no reason for not having specifications for gears and pinions, but some standard specification should be adopted that could be followed by all the manufacturers.

The purchase of gears and pinions to specification would increase the cost if the specification required the manufacturer to change his method. Care should therefore be taken to prepare a specification that would secure a satisfactory material and not impose any unnecessary hardship on the manufacturer.

The manufacturer would not be relieved by the specification from responsibility for breakage or poor wear, but wherever such did occur an investigation would locate the trouble. Although I am not a manufacturer, I must admit that the manufacturer is not responsible for all of the broken or badly-worn gears. The care of the equipment has much to do with the life of gears and pinions.

As this is a subject of considerable interest at this time, the equipment committee of the American Electric Railway Engineering Association would appreciate the assistance of the members in preparing a standard specification for gears and pinions that could be used by all the member companies. If a standard is adopted it will be an advantage to the manufacturer as well as to the purchaser, and if properly prepared its use should not increase the cost, but might, on the contrary, reduce it.

R. H. DALGLEISH, Engineer of Equipment.

Cause of Thick and Thin Wheel Flanges

BUFFALO, LOCKPORT & ROCHESTER RAILWAY COMPANY

ROCHESTER, N. Y., July 20, 1915.

To the Editors:

In an article published in your issue of May 29, 1915, page 1037, over the signature of M. M. Lloyd of Des Moines, the statement is made that "the principal cause of thick and thin flange wear on rolled-steel wheels is the difference of the wearing quality of the metal in the wheels." In this connection it seems only fair to call to the attention of your readers the conclusions of last year's committee on equipment, along the same line of investigation.

On page 280 of the 1914 proceedings of the American Electric Railway Engineering Association, in the report of the committee on equipment, the committee states: "While the number of wheels included in the reports was not large enough to serve as a basis for any general conclusions, a surprising lack of positive evidence on this point was manifest and the figures seemed to show, so far as they showed anything, that there was not sufficient justification for a strong insistence on mating by carbon content." This conclusion was reached after the examination of records of a comparatively small number of wheels taken at random from among records of service of several thousand wheels of all manufactures. The complete lack of uniformity of performance of wheels of similar chemical composition led to the conclusion above quoted, and it would not be too much to say that any chemistry falling within the limits of the standard specifications of the association has been shown to give good service."

Mr. Lloyd's statement "That it is possible to delay wearing of sharp flanges by checking up the trucks for square and by taping the wheels to be sure that the diameter is exactly the same" seems to contain the real kernel of demonstrated truth in the matter.

The writer has personally known of a number of cases where phenomenally large mileage was obtained by calipering the wheels without removing them from the car, and placing abrasive brakeshoes against the larger wheels. These experiments, while comparatively few in number, nevertheless seem to demonstrate very clearly that if the two wheels on one axle could be kept at exactly the same diameter throughout their life, and further assuming that trucks were in square and that track curvature was approximately the same in both directions, the wheels could be worn to the limit of wear groove without necessity of turning on account of sharp flanges.

The manufacturers of wheels have done a great deal to perfect their product and have shown a very open-minded policy in dealing with the American Electric Railway Engineering Association, as well as the individual users of wheels, and it would seem that in common justice to them the chemistry and method of manufacture of wheels should not be held responsible for results which are in practically all cases due to the mechanical practice of the user of the wheel.

James P. Barnes, General Manager.

99.2 Per Cent of Westchester Trains Are on Time

The accompanying table shows the remarkable record for punctuality which the New York, Westchester & Boston Railway has maintained during the last twelve months ending June 30, 1915. These figures are based on the monthly reports submitted to the Public Service Commission of New York, Second District.

It will be seen from the table that the maximum percentage of trains on time for any month was 99.6 per cent in March, the minimum 98.4 per cent in April. The average punctuality for the twelve months was 99.2 per cent. The average lateness in minutes per train run varied from 0.23 minute in April to 0.04 minute in February and March.

It will be noticed that from 64 to 90 per cent of the delays are listed under the column headed "waiting for other railroads." This large proportion is due to delays occasioned by the opening of a drawbridge over the Bronx River, where the trains of the New York, Westchester & Boston Railway run over the tracks of the New York, New Haven & Hartford Railroad, a condition over which the mechanical and operating departments naturally have no control.

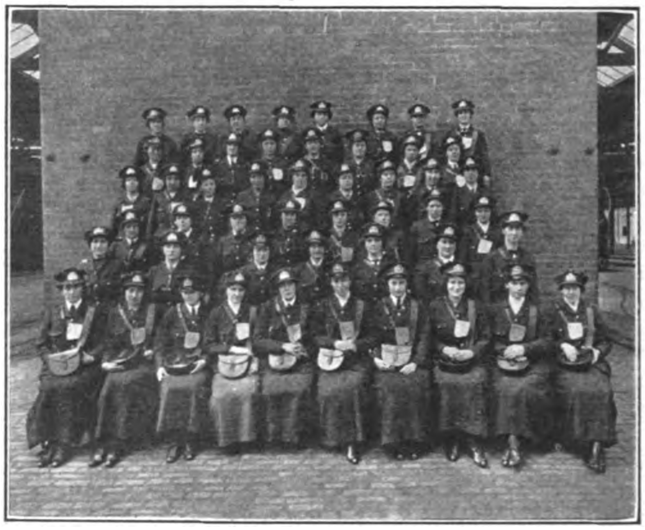
Month	Trains Run	Trains Late	Trains on Time	Per Cent on Time	Minutes Late	Av. Minutes Late per Train Run	Average Minutes Late per Delay	Principal Causes of Delay, in Per Cent: Equipment	Waiting, Other Divisions	Waiting for Other Railroads	Signals	Other Causes
July '14.	6,319	42	6,277	99.3	351	0.05	9	4	14	64	18	0
Aug....	6,300	88	6,212	98.6	1408	0.22	16	1	8	64	15	12
Sept....	6,113	35	6,078	99.4	370	0.06	10	3	8	86	0	3
Oct.....	6,320	48	6,272	99.2	409	0.06	8	1	20	79	0	0
Nov....	6,114	65	6,049	98.9	666	0.11	10	1	10	79	0	10
Dec.....	6,320	60	6,260	99.1	734	0.11	12	5	10	68	8	9
Jan., '15.	6,318	51	6,267	99.2	400	0.06	4	2	12	80	0	6
Feb.....	5,706	28	5,678	99.5	234	0.04	8	3	11	83	0	3
Mar....	6,320	24	6,296	99.6	228	0.04	9	0	5	87	0	8
April....	6,109	97	6,012	98.4	1442	0.23	15	1	3	72	0	24
May....	6,315	49	6,266	99.2	694	0.1	14	0	8	90	0	2
June....	6,297	40	6,257	99.4	342	0.05	8	0	5	77	0	18
	74,551	627	73,924	99.2 per cent for year.								

The next most frequent special source of delays, classified as "waiting, other divisions," is due to delay in the interchange of passengers between local and express trains at East Third Street Station, Mount Vernon, where both classes of trains are regularly scheduled through the day to arrive at the same minute and wait for each other's arrival.

One of the chief causes for the excellent showing in punctuality on the New York, Westchester & Boston Railway is ascribed to the policy maintained of scrupulously examining the defects in equipment or other sources of delay and their causes when they first occur in order to insure that a recurrence of the same kind of a delay will be prevented.

Women Conductors in Glasgow

It is not often that this paper publishes a view of a group of conductors on a transportation system. The accompanying engraving, however, seems to be so interesting as to warrant its publication. A few months ago this paper described the experiment made in Glasgow with women conductors. At first two conductors were put in service, and the result with women has proved so satisfactory that the Corporation Tramways have employed a number of women to take the place of the men who are now at the front during the war. A group photograph of the women conductors employed on the system was taken some time ago, and it is reproduced herewith.



GROUP OF WOMEN CONDUCTORS, GLASGOW TRAMWAYS

Railway Power Rates in Chicago

On page 138 of the issue of the Electric Railway Journal for July 24 certain information regarding the operation of the contracts between the Chicago Surface Lines and the Commonwealth Edison Company were published. The prices for energy there quoted, for the years 1910 to 1913 inclusive, were the prices under the old contract. While these were the prices originally paid, the 1913 contract was retroactive and, as adjusted under the new contract, the rates actually paid were as follows: 1909, 0.711 cent; 1910, 0.720 cent; 1911, 0.713 cent; 1912, 0.725 cent, and 1913, 0.742 cent.

Warning to Trespassers

Posters entitled, "Why the Public Should Keep Off the Railroad Tracks," are prominently displayed in the passenger stations of the Michigan Central Railroad. These posters take the form of maps of the railroad system upon which is indicated, by different colored spots, the location of each accident during the year. A key on the poster indicates that spots of one color show that the passengers were injured and spots of another color that the accidents were fatal. The four margins of the poster are taken up by photographs of the different types of trespassers on railroad rights-of-way, and the danger to which they subject themselves.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Some Experiences with Field Control

BY H. M. LLOYD, EQUIPMENT ENGINEER BRITISH COLUMBIA ELECTRIC RAILWAY, VANCOUVER, B. C.

The British Columbia Electric Railway has in operation field control on eleven passenger, three combination and seven express cars operated usually in two or three-car trains, and occasionally in five-car trains, including a couple of trailers. These cars are run almost exclusively on the 64-mile line between New Westminster and Chilliwack. The equipments per car comprise four Westinghouse No. 333-C2 115 to 125-hp. field-control motors geared 20:57. At present the trolley potential is 630 volts, fed from five substations about 12 miles apart, and the minimum voltage is sometimes 400 volts. It is intended, when traffic warrants the change, to raise the potential to 1200 volts. The car equipment will be readily adapted for this increase in voltage by changing resistance and control connections.

The track over which these equipments operate has a maximum grade of 2.7 per cent and a maximum curvature of 10 deg., but a large part of the track is level and straight.

The running time between New Westminster and Chilliwack for passenger trains with about thirty stops is two hours and forty minutes and for milk trains about three hours. In operating over the line passenger train speed ranges from 20 m.p.h. on grades and curves to 50 m.p.h. or more on level tangents. The field control is used on the heavy grades and during acceleration periods.

In one test a 106-ton train, comprising two motor cars and one trailer, in regular service averaged 7.8 kw-hr. per mile with a maximum draft on the substations of not more than 1000 amp. On the other hand, a similar train of three motor cars with twelve 75-hp. motors of the same gear ratio but without field control required starting currents as high as 1200 amp. to make the same schedule.

The most marked advantage of field control was shown in ascending the 2.7 per cent grade. This grade is about 4 miles long and includes some sharp curves. With the full field the train under test made a speed of approximately 15 m.p.h. while drawing 720 amp. On changing over to the tap field the current jumped to 920 amp., with a consequent drop of line voltage. The resultant speed was only about 18 m.p.h. A heavily-loaded five-car excursion train with three motor cars will average about 10 to 12 m.p.h. up this grade on full field. Thus it is clear that field control increases the capacity of the line.

Another advantageous feature of field control for us is low speed running through rock cuts and around sharp curves. Here we run economically on tap field with the motors in series at about 18 m.p.h., whereas the old control for the same rate of speed would have involved continual cutting in and out and consequent resistance losses.

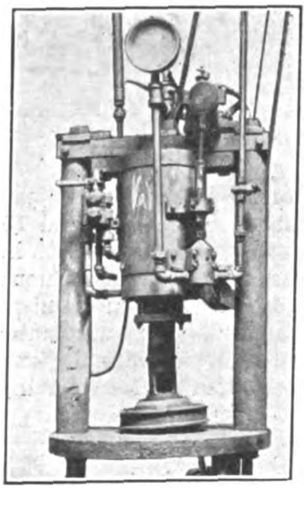
In starting trains with field control the acceleration is also much smoother than without it, the change from series tap field to parallel full field being accomplished without jerking. The low starting speed is found especially useful on milk trains in running up to the milk stands to take on cans.

The maintenance cost of field-control motors and of multiple-unit control is also less than that of other motors because they are not subjected to the strain of excessive starting currents. For the same ton-miles operated the feeder losses and the strain on the substation equipment are correspondingly reduced.

A Hydraulic Bearing-Broaching Machine

BY C. M. FEIST, MASTER MECHANIC SIOUX CITY (IOWA) SERVICE COMPANY

Increased bearing wear averaging approximately 25 per cent more than that for bearings that are simply turned, is obtained by the Sioux City Service Company's mechanical department through the use of a hydraulic broaching machine. While it was designed primarily for this purpose, the machine is also used to press bearings into the solid-bearing type motor housings. After the bearing has been pressed in position a tapered broaching mandrel of the proper size is fitted to the plunger and forced into the bearing. All bearings are babbitted and machined in the usual manner, but in the latter process they are left approximately 1/64 in. under size. After the broaching mandrel has been forced through the bearing the babbitt is condensed so that the diameter is reduced to the correct size.



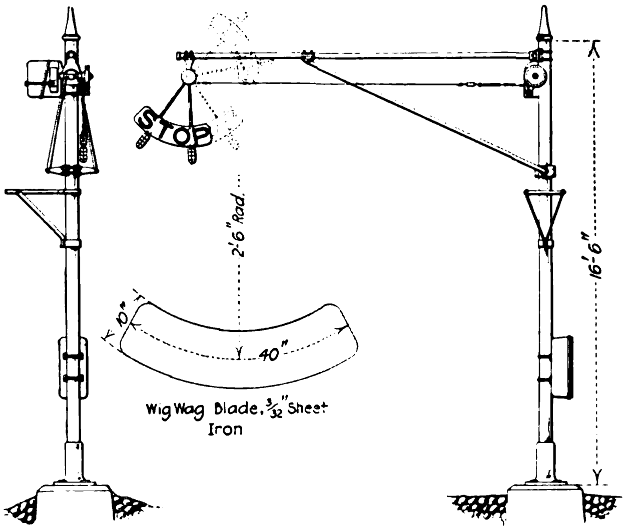
SIOUX CITY HYDRAULIC BROACHING MACHINE

As shown in the accompanying illustration, the broaching machine comprises a substantially-built frame with a heavy circular bedplate upon which the bearings to be broached or pressed into housings are placed. A hollow plunger fitted to an old air-brake cylinder connected to the shop compressed-air system and the city water supply, furnishes the necessary pressure. City water pressure of 90 lb. per square inch may be obtained, but when more is necessary a small belt-driven hydraulic pump mounted on the upper part of the frame and connected to the cylinder is brought into operation. With this, pressures up to 30 tons or 40 tons are obtainable if required. A gage connected to the cylinder and mounted in plain view indicates what pressure is being used. After broaching or pressing has been accomplished, the plunger is raised to the normal position by cutting off the water supply and injecting air pressure beneath the piston head through a standard motorman's valve. This is a home-made machine which was not very expensive to build and has paid for itself many times over in improved bearings.

A Home-Made Wigwag Signal

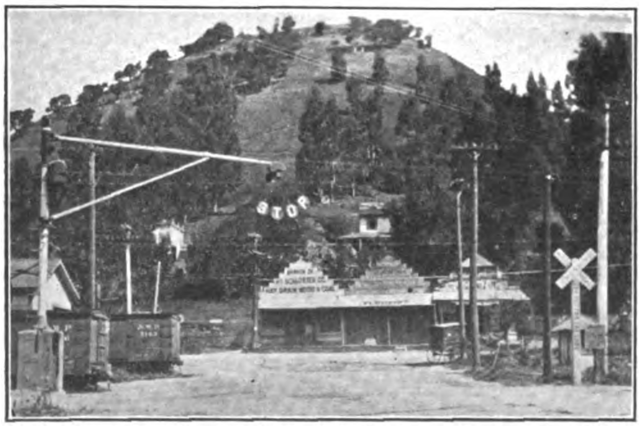
BY F. T. VANATTA, CHIEF ELECTRICIAN NORTHWESTERN PACIFIC RAILROAD, SAUSALITO, CAL.

Last year the writer designed a wigwag signal of the type illustrated, of which five have already been installed at crossings on the Northwestern Pacific Railroad. Unlike other wigwag signals, which wigwag only in case of danger, this one has three positions: First, normal clear; second, wigwag in top horizontal position for danger with the apparatus in perfect condition, and third, wigwag dropped permanently to danger if there is any defect in the control apparatus.



ASSEMBLY AND DETAIL OF BLADE OF WIGWAG SIGNAL FOR HIGHWAY CROSSING

There is, therefore, no danger of false clear indications. The sheet-iron stop shield is about 40 in. long and 10 in. wide, and carries for night use two 40-watt lamps in marine fixtures with red outer globes. These lamps burn only during the wigwag period. The mechanism which operates the banner and lights is of the automatic type furnished by the General Railway Signal Company, a short arm with an eccentric thereon having been added to secure the wigwag movement. This mechanism is operated from the regular track circuits such as are used for ordinary crossing-bell operation, or it may be operated by hand. For example, at Petaluma station, which is located between two signals, a train going one way sets the first signal automatically but must wait for the station master to set the signal at the outgoing end. At night, however, when there is no station agent on duty these signals are automatic throughout in this operation.

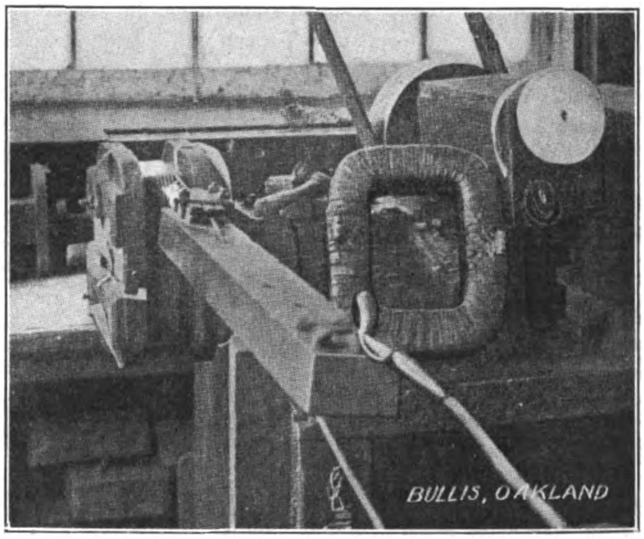


AUTOMATIC WIGWAG CROSSING INSTALLED AT SAN ANSELMO, CAL.

Rejuvenating Overloaded Motors

BY W. P. JACKSON, MASTER MECHANIC SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS

The San Francisco-Oakland Terminal Railways have 380 GE-70 motors in city service on two and four-motor equipments averaging about eight stops per mile on a 10-m.p.h. schedule. These motors are rated at 40 hp on 500 volts, and their mechanical construction and electrical characteristics compare very favorably with some of the more modern type. Up to about four years ago these motors were carrying about 13,000 lb. light with 22:64 gear ratio on 30-in. wheels. Owing to the addition of straight air-brake equipments and fenders, and to the lengthening and rebuilding of a number of cars, the average load on these motors was increased until operating temperatures of 80 to 90 deg. Cent. were not uncommon. Maintenance of armatures and field coils became a serious problem, especially on sixty-eight two-motor equipments on which the weight of body and equipment, exclusive of passengers, had been increased to 34,200 lb.



WIRE IN PROCESS OF APPLICATION ON FIELD COILS; ALSO ONE COMPLETED FIELD COIL WITH HEATPROOF INSULATION

Thus it became a daily occurrence to have solder thrown off from commutators or bands. In fact, conditions became so acute that a radical change of some sort was imperative. Apparently three courses were open: To purchase new motors of larger capacity; to modify operating schedules to conform more nearly to the capacity of the motors in use; or to rehabilitate the motors themselves in such a manner that existing schedules could be met at a lower temperature in field and armature windings, and otherwise to make the motor as near heatproof as possible. The last course was taken, and for two years the work was carried on during the course of regular maintenance and as a charge against the same.

The bottom handhole plate on the commutator end and the top handhole plate on the pinion end were perforated as closely as possible with ½-in. holes. In this way free circulation of air was obtained through the interior of the motor case whether the car was running or standing still. The handhole plate on the pinion end was provided with a sheet-metal guard over the perforations. While these motors are allowed to run open the year round, we have never had any cases of motor trouble due to the entry of water, street dirt or other foreign substances.

When armatures are rewound, the end windings are left as open as possible. The bands are soldered with pure tin, and the hoods are left off of both ends to allow free circulation of air around the coils and leads to the commutator. Delta tape is used as insulation under the bands on the core and end windings, while the face of the leads adjacent to the brushes receives several coats of a mixture of shellac and metallic brown. This mixture has given excellent results as a resistant to flashing and does not carbonize under high temperature. The same mixture is used as a coating on the bead ring and string band back of the commutator.

After the armatures have been in service from 60,000 to 75,000 miles they are removed during the course of motor overhauling, blown out thoroughly and otherwise cleaned up and placed in an oven for twelve hours at 100 deg. Cent. If the coils are loose under the bands, the armature is rebanded while hot and then dipped in black elastic baking varnish, allowing sufficient time for the varnish to penetrate thoroughly all parts of the winding. The armature is then drained to receive a further baking of twenty-four hours at 100 deg. Cent.

Field coils are wound with No. 3 Deltabeston wire heated in an oven at 100 deg. Cent. and dipped while hot in black elastic baking varnish. After draining and cooling a heatproof plastic composition is smoothed over the outside turns and the coil is served with a half lap layer of pure asbestos-woven tape, 20 mils thick. This tape has good mechanical strength and is drawn very tightly around the windings. The coil is then heated a second time to 100 deg. Cent. and dipped, following which it is served with one layer of Delta tape 20 mils thick and 1 in. wide.

Three screw terminals with copper conducting strips cast in are then fastened to the coil with asbestos twine, the terminals being insulated from the coils with two thicknesses of 20 mils Delta sheeting. The coil then receives a final wrapping of asbestos-woven tape, is heated for the third time, and after dipping is returned to the oven for a baking of forty-eight hours at 100 deg. Cent. All field coils receive the usual transformer tests for "shorts."

Not one of the coils made in the manner described has ever been removed from the motors, and they are standing up under conditions where an ordinary impregnated coil will not last sixty days. The cost of manufacture is $20 each.

The field connections in the motor case are made with No. 4 flexible strand, soldered into terminals made of scrap No. 0000, solid feed wire turned to ¼ in. diameter for the field terminal, with a hole drilled in the full-sized end for the lead wire.

As a further and not inconsiderable help to these motors we are gradually changing the gear ratio in the heavier cars from 22 : 64 to 19 : 67. The installation of armorized material has a tendency to hold up the maintenance figure on these motors to a certain extent.

During the year 1912 the monthly troubles on these rejuvenated motors averaged as follows:

Armatures, grounded	21
Armatures, open circuit	15
Fields, grounded	10
Fields, open circuit	5
Fields, weak	25
Maintenance per 1000 motor-miles	$1.30

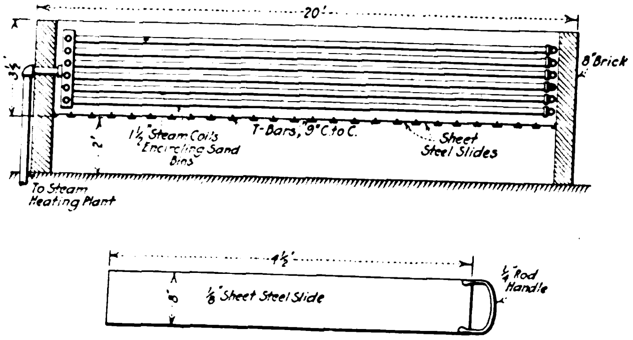
During the past fiscal year the monthly average of troubles has been:

Armatures, grounded	5
Armatures, open circuit	8
Field troubles (all kinds)	10
Maintenance per 1000 motor-miles	$0.96

The maintenance given includes gears, pinions, gear cases, armatures and axle bearings, suspension, and all parts of the motor proper. These 380 motors make an average of 1,476,000 motor-miles per month.

Drying Sand in 7-Yd. Batches

Small-capacity sand dryers require more or less constant attention and, while they are entirely satisfactory at carhouses where labor is always available, where this condition does not prevail a man must be detailed to attend to the work. The Sioux City (Iowa) Service Company eliminated this objection in Carhouse C, where the running repair force was only sufficient to take care of the equipment by providing a sand dryer of large capacity when the building was constructed. Aside from its capacity this dryer is unique in several particulars. It is installed in a room set aside for the storage of wet and dry sand as well as the drying plant. This room is oblong in plan and one wall of the sand dryer serves as one side of the wet sand bin, while the other side of the dryer is open so that the dry sand may be cast into the storage space at the opposite end of the room. As indicated in the accompanying illustration, the bin is formed of four 8-in. brick walls with concrete coping, and it is 20 ft. long by 4½ ft. wide over all, and 3½ ft. deep. The floor of the bin is 2 ft. above the building floor and is formed of T-bars, the legs of which support sheet-steel slides. The top of the dryer bin walls is only 5½ ft. above the floor level, hence the wet sand may be readily cast into the dryer. One and one-half-inch steam pipe coils encircle the interior of the dryer and are connected to the building heating plant. Comparatively little sand is used during the summer months, hence steam heat is available when most dry sand is needed.



Detail of Slide

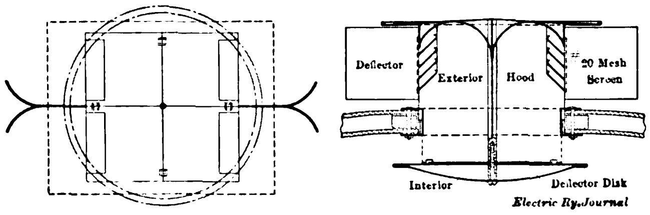
SIOUX CITY 7-YD. SAND DRYER

After the dryer bin has been filled with wet sand, holes are poked into the sand at frequent intervals with a broom handle. These hasten the drying process by permitting the escape of moisture. When the sand is dry the sheet-steel slides are withdrawn and the dry sand falls to the floor beneath the bin. From this point the sand is screened and cast into the dry-sand storage space. From the foregoing it will be seen that the work of casting sand into the bin is one process, and between that and the screening of the dry sand quite an interval may elapse, hence the dryer needs attention only when a 7-yd. batch is exhausted. This type of dryer has been very effective and the cost is relatively low when the dryer is installed at the time the building is constructed. Its principal advantage, however, is that it requires little attention and drying sand in it makes a fine rainy-day job for an outside man.

Long Island Railroad Installs Double Ventilators

The accompanying cuts show in detail the system of ventilation used on the twenty new steel trail cars recently placed in operation on the Long Island Railroad, which were described in the ELECTRIC RAILWAY JOURNAL of July 24.

The ventilators, provided for these cars by the Automatic Ventilator Company, New York, N. Y., are of a new design, but embody the well-known "intake and exhaust" principle of this system. This device, known as type "E-B," is installed on the center line of an almost flat roof and consists of an exterior hood, divided into four separate compartments, two exterior deflectors and an interior disk. When the car is in motion air is arrested by the exterior deflectors and directed into the two forward compartments (one on either side) of the hood and thence down to the interior disk, and is deflected outward and upward across the ceiling of the car, where it is sufficiently diffused to prevent a draught on the passengers. At the rear of the exterior deflectors is set up a partial vacuum caused by the rapid motion of the car, which induces a strong "exhaust" at the two rear ports of the hood and at the rear of the interior disk. Each ventilator provides two intakes and two exhausts and is therefore equal to two separate ventilators.



LONG ISLAND VENTILATORS—BOTTOM VIEW AND CROSS-SECTION

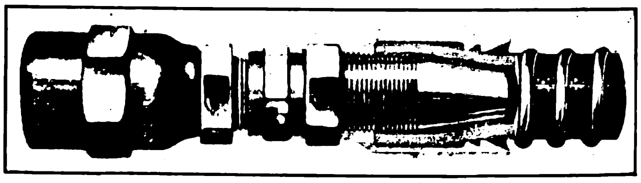
Cleaning Air for Ventilating Generators and Transformers

In the August issue of the *General Electric Review*, William Baum, electrical engineer General Electric Company, directs attention to the importance of cleansing and cooling the air used for the ventilation of turbo-generators and air-blast transformers. This is desirable because the accumulation of dirt means rapid deterioration and frequent cleaning. He considers the requirements of air filters to be as follows: Complete removal of suspended matter, minimum loss in pressure due to air passing through the clean and soiled filtering medium, minimum dimensions, simple construction with means for convenient removal and cleaning of the filtering medium, durable filtering medium which does not require too frequent removal and minimum fire risk. He discusses the available filters with respect to these requirements, describing typical filters of the wet-surface and dry-surface types. Air washers are also discussed with the statement that their prime object is to clean the air, the humidifying function being secondary. The cooling effect of the water is not appreciable. No insulation troubles have been experienced due to the effect of the saturated air upon generator windings. Some fifty-eight air washers have been installed in the United States for the ventilation of generators of an average size suitable for a 10,000-kw. generator. It appears that air washers are used for larger generators, dry-surface filters for small ones, and wet-surface filters for medium sizes. Air washers consist of the following essential parts: spray chambers, spray nozzles and piping, eliminator or baffle plates, strainer, settling tank and water circulating system with pump. The difference in the various makes is principally in the design and arrangement of the nozzle. Mr. Baum describes a number of typical air washers and gives tables and curves of space required and of unit costs. The space requirements are as follows: Air washers, 0.17 cu. ft. per cubic foot per minute; dry-surface filters, 0.10 cu. ft. per cubic foot per minute, and wet-surface filters, 0.09 cu. ft. per cubic foot per minute. In sizes from 30,000 to 60,000 cu. ft. per minute capacity air washers and wet-surface filters average in first cost about 3 cents per cubic foot per minute, washers being slightly cheaper as the size increases. Dry-surface filters cost about 1½ cents per cubic foot per minute. In all types the unit cost increases rapidly with decrease in size.

The general conclusions are as follows: For generators up to about 5000-kw., dry-surface filters may be recommended on account of low first cost, and if the air is not too dirty, their application is of advantage in dry, cold climates. They require careful attention and handling. Wet-surface filters, which have been found successful in England, have not yet been introduced in this country. Their field of application is for generators above 5000-kw. in size. The tendency toward the installation of large turbo-generator units will undoubtedly increase the application of air washers or humidifiers in preference to other types of air-cleaning apparatus. In dry, hot localities the cooling effect of air washers is appreciable. Special precautions are necessary to prevent freezing in winter.

Easily Applied Hose Coupling

An air, steam or water hose coupling, so designed as not to decrease the area of the hose connection, has recently been placed on the market by the National Hose Coupling Company, Chicago. It is furnished with a malleable-iron hose socket which fits over the hose and which is sufficiently corrugated on the inside to provide a positive grip when the hose is expanded inside it. A steel taper expander screws into the socket containing the hose and the latter is thus forced outward and into position. The area of the opening in the expander is the same as that of the hose, so that no obstruction to the flow is introduced. Application of the hose connection requires only a few turns with an ordinary hand wrench, and this makes it especially advantageous for use in connection with air-brake hose. The coupling is being manufactured in all standard sizes.

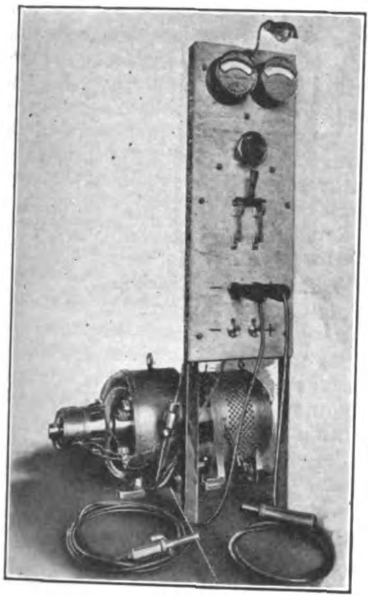


HOSE COUPLING WITH SECTION CUT AWAY TO SHOW CONSTRUCTION

Willy Lamot, Antwerp, Belgium, whose present address is Shardhighs, Halstead, England, reports the creation of an organization to introduce into Belgium as soon as the war is over all American products and manufactures and to employ as agents, representatives, etc., a number of Belgian manufacturers and business men who are prepared to give the necessary guarantees as agents and dealers.

Compact Arc-Welding Outfit

An arc-welding outfit of the motor-generator type, which possesses to an unusual degree the qualities of compactness and lightness, has recently been brought out by the Lincoln Electric Company, Cleveland, Ohio. It has been designed with the view of establishing distinctive features in economy of power consumption, simplicity of operation and reliability of service.



COMPLETET ARC WELDING OUTFIT

These features are obtained largely by the fact that the motor-generator is so designed as to generate at all times exactly the voltage required by the arc and in addition, give a current which is practically constant. In consequence, there is no need for resistance in the circuit to cut down the voltage, and the size and weight of the machine is reduced to the minimum necessary for the work in hand. Regulation is effected by special windings in the generator and by a simplified method of control which is easily grasped in a very short time by any reasonably intelligent operator. This is considered to be of utmost importance as most autogenous welding is done by men who are neither electricians nor mechanics, and since labor is a great factor in the cost of welding the machine ought to be so simple that it is not necessary to have a highly skilled man to do the work.

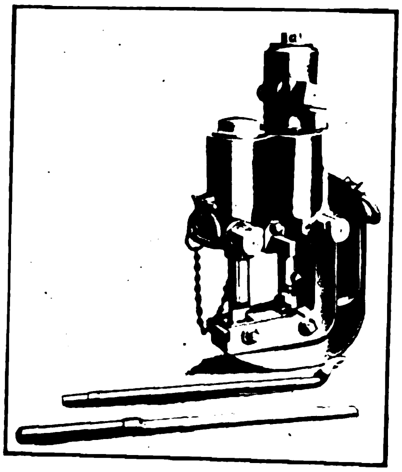
The Lincoln arc welder has been designed to stand long, heavy duty and to carry overloads without damage to the machine, as emergency service is frequently demanded in arc-welding plants. Every motor-generator is operated in the factory before shipment for five hours under a continuous make-and-break test in which the make and break at the rated output of 150 amp. occurs at least fifteen times per minute, and under this test the temperature rise is guaranteed not to exceed 40 deg. C. in the windings and 55 deg. C. at the commutator. Naturally, this conservative method of rating and the severe service test insures a liberal margin of safety in operation, both under normal and abnormal operating conditions.

Owing to the fact that no power is wasted in resistance banks the demand for current is small, and in ordinary service the Lincoln welder can be operated on any power line large enough to carry a 10-hp. motor. This permits the installation of the outfit at almost any point in a shop where there is a power line, and if desired the machine may be made portable and connected wherever the exigencies of the work demand it. In operation the machine is thoroughly flexible, and any number of them may be operated individually or in parallel. In fact, an operator can, without the services of an electrician, connect three 150-amp. plants in parallel to get 450 amp. for heavy carbon electrode work, and can then individualize the plants within a few minutes' time.

Aside from providing the feature of portability the small size of each plant limits the expenditure of money invested in welding equipment to a proper basis in proportion to the amount of work that is actually done. Where there is sufficient work to require more than one operator a separate unit is installed. In large railway shops where the time that is allowed to do work is limited and an accident to the welding plant would hold up the rest of the organization, the installation of individual welders serves as a form of insurance against the loss that would be inevitable in case a total shut-down occurred.

Hydraulic Punch for Track Spike Slots

A new hydraulic punch for cutting out at one setting two slots or notches for spikes in flanges of railroad or conductor rails has been brought out by the Watson-Stillman Company, Aldene, N. J. The advantages of this tool are that two holes can be punched at one operation on opposite sides of the rail in exact alignment, thus saving much of the time usually consumed in laying out centers and changing the punch from one side of the rail to the other. The machine makes an efficient tool for use by unskilled labor.



VIEW OF TRACK SPIKE SLOT PUNCH

From the accompanying illustration it will be seen that one punch is attached to a chain. This punch is removed and the tool is placed against the rail. The loose punch is then inserted in place and the punches are then run down to the rail by pinions, meshing into racks on the rams. A few strokes of the pump lever completes the operation, which takes less than two minutes and but little effort. The punches are pulled back by a rack and pinion movement.

The punch is built compactly and is so designed that the greatest strength is obtained with the least weight. Consequently, it may be easily and quickly handled when time is a factor. The working parts are readily accessible for cleaning and the punches and dies are removable, thus providing for sharpening and renewal.

Silica-Graphite Paint for Steam Boilers

A practice that is gaining recognition in power plants is the use of graphite paint for the inner surface of steam boiler drums. This is said to afford protection against pitting. For a number of years the manufacturers of the paint have coated the steam drums of five B. & W. boilers developing 1800 hp., and as a result the drums are in almost perfect condition. In another plant equipped with B. & W. boilers developing 8400 hp. the interiors of the drums were scalded, painted both above and below the water line and allowed to dry for forty-eight hours. This treatment was repeated every ten months, and not only was pitting stopped, but where it had previously taken six men seven days to clean the drums of one boiler, two men now clean them in a day. This latter experience is quoted from a letter of the chief engineer of the New York Life Insurance Company, in a recent issue of *Graphite*.

Electric Railway Legal Decisions

CHARTERS, ORDINANCES, FRANCHISES

Idaho.—Regulation of Utilities—Duplication of Electrical Plants.

All property devoted to public use is held subject to the power of the State to regulate or control its use in order to secure the general safety, health and public welfare of the people, and when a corporation is clothed with rights, powers and franchises to serve the public, it becomes in law subject to governmental regulation and control.

Under the State's police power the Legislature has authority to authorize the utilities commission to determine whether a duplication of an electrical plant is required in a town or city for the convenience and necessity of the inhabitants. (Idaho Power & Light Co. v. Bloomquist et al., State Public Utilities, 141 Pacific Rep., 1084.)

Kentucky.—Definition of Interstate Commerce—Reasonable and Unreasonable Municipal Regulation.

The traffic carried on by a Kentucky street railway corporation in connection with an Ohio corporation operating on the Ohio side of the Ohio River, in transporting passengers upon continuous and connecting tracks and across an interstate bridge between points in Covington, Ky., and Cincinnati, Ohio, by means of continuous trips and a single fare, and under practically the same management, is interstate commerce.

The absence of federal regulation does not justify the city of Covington, Ky., in regulating the interstate business of a street railway company principally engaged in transporting passengers from that city to Cincinnati, Ohio, by restricting the number of passengers which the company may admit to its cars to not more than one-third in excess of the seating capacity, except on certain holidays, and by requiring the company to operate sufficient cars reasonably to accommodate the public within the limits of such restriction, where compliance with such regulations will require about one-half more than the present number of cars operated by the company and more cars than can be operated in Cincinnati within the present franchise rights and privileges held by the company or controlled by it in that city.

Municipal regulation of a street railway company, principally engaged in interstate commerce, with reference to passengers riding on car platforms unless the same are provided with suitable rails or barriers, and with reference to the cleanliness, ventilation and fumigation of the cars, does not infringe upon the federal authority over such commerce—at least, until such federal authority is exerted.

A municipal ordinance providing that the temperature of the cars of a street railway company which is principally engaged in interstate commerce shall never be permitted to be below 50 deg. Fahr. must be deemed to be invalid as unreasonable, where the undisputed testimony shows that it is impossible in the operation of the cars to keep them uniformly up to this temperature, owing to the opening and closing of doors, and other interferences that make it impracticable. (South Covington & Cincinnati St. Railway Co. v. City of Covington, 35 Supreme Court Rep., 158.)

Massachusetts.—Crossings of Transmission Lines Over Highways—Abolition of Grade Crossings.

Where a railroad right-of-way crosses a public highway the land is subject to both easements, each to be exercised reasonably with reference to the other, and under such circumstances electric wires may be carried over the tracks in a proper way without liability to the railroad company.

Where grade crossings are abolished in accordance with Stat. 1906, Chap. 463, Part 1, Secs. 29-45, the two conflicting easements of the railroad company and of the public in the street are separated, and an electric company authorized to string its poles and wires in the street cannot place its poles over railroad tracks which have been elevated above the street. (N. Y. C. & H. R. R. v. Central Massachusetts Electric Co., 106 Northeastern Rep., 566.)

Minnesota.—Ordinance Requiring Additional Line.

Under the reserved authority of the city to order the construction of new lines of street railway, the city may direct whether a new line shall be a single or double track line, and defendant possesses under its franchise no vested right or option to determine the character of the line in this respect. (State ex rel. City of St. Paul v. St. Paul City Ry. Co., 149 Northwestern Rep., 195.)

Missouri.—Eminent Domain by Electric Railway—Value of Property for Station Purposes.

An electric railway incorporated under the steam railroad act (Rev. Stat. 1899, Secs. 1034-1174) is entitled to condemn land for railroad purposes, and, if it is an interurban railroad, it has equal right conferred by Laws 1907, page 174.

Where condemnation of land for railroad freight and passenger depot purposes was part of a general scheme previously inaugurated for the construction and operation of the railroad in accordance with a lay-out and plat adopted prior to the construction of railroad buildings on adjoining property, the owners of the property sought to be condemned were not entitled to have any increase in value of their property by reason of the improvement of the adjoining property considered in determining the value of their property for railroad purposes. (St. Louis Electric Terminal Ry. Co. v. MacAdaras et al., 166 Southwestern Rep., 307.)

Nebraska.—Permission Required to Discontinue Service.

When a company has obtained a franchise from the city to construct and operate its railways on certain streets of the city and has constructed its tracks and is operating its cars thereon pursuant to such franchise right, it will be enjoined from removing such lines or withholding its cars from such service without first obtaining authority from the State Railway Commission so to do. (H. Herpolsheimer Co. et al. (Wolfe et al., Interveners) v. Lincoln Traction Co., 147 Northwestern Rep., 206.)

New York. — Certiorari to Review Assessments—Testing Excessiveness of Assessment.

On certiorari to review the assessment of a street railway company's special franchise for taxation, where the State board of tax commissioners in its return stated that it availed itself of all tests of value within its reach and all information bearing upon such value and adopted no certain or fixed rule or method; that it would be impossible to state more definitely the mental operation which prompted it in arriving at the valuation fixed or to state which of the different elements, theories or methods considered most influenced the minds of the individual members, or to what extent each test was used, but that the valuation was finally fixed and agreed upon as the combined judgment of the board, irrespective of the individual methods of arriving at it, it was not error to permit the railroad company to show that the assessment was excessive under the net earnings rule, on the theory that as the board was not bound to adopt that rule, error was not proved by showing excessiveness under that rule, since the assessments were not conclusive but were subject to review, and the courts cannot review the undisclosed and concededly indescribable methods followed by the State board. (People ex rel. Third Ave. Ry. Co. v. State Board of Tax Commissioners (City of New York, Intervener); People ex rel. Wallace et al. v. Same; People ex rel. Kingsbridge Ry. Co. v. Same, 106 Northeastern Rep., 325.)

New York.—Rights of Transfer Passenger to Travel by Most Direct Route.

A passenger on a street railway car is entitled to be carried to his destination by the most direct route, Hence, where he was accepted on a short service car, which necessitated a transfer to a through car, the company cannot require him to transfer to a parallel line further over, except for some most cogent reason, and a mere statement that such requirement was to avoid congestion and for the convenience of passengers is no reason. (Goodman v. New York Rys. Co., 150 New York Sup., 702.)

New York.—Transfers Required Between Two Allied Companies.

Public Service Commission Law (Consol. Laws, Chap. 48) Sec. 49, Sub. 7, provides that every street service railroad corporation entering into a contract with another such corporation, as provided in Sec. 78 of the Railroad Law (Laws 1890, Chap. 565, as amended by Laws 1905, Chap. 695), shall carry between any two points on the railroads any passenger desiring to make a continuous trip for a single fare, and such corporation shall, without extra charge, give to each passenger paying a single fare a transfer entitling the passenger to one continuous trip to any point of any railroad embraced in such contract, and for every refusal to comply with the subdivision the corporation shall forfeit $50 to the aggrieved party. Railroad Law, Sec. 78, provides that any railroad corporation may contract with another for the use of their respective routes and that such contracts shall be executed by the contracting corporations under their seals, and, if it be a lease of any such road and for a longer period than one year, it shall not be binding unless approved by the votes of stockholders owning at least two-thirds of the stock of the corporation. Held, that where two street railroad corporations, though separate corporate entities, had the same office, officers and directors, and used and equipped cars interchangeably, paid operating expenses from the gross receipts of both, and were for all practical purposes one line, a passenger on one road could require a transfer to the other without extra charge, and could recover the statutory penalties for refusal to issue such transfer, notwithstanding there was no written contract between the corporations for the lease of one of the lines and though the arrangement between the companies was purely informal. (Catalano v. International Ry. Co., 145 New York Sup., 1005.)

New York.—Temporary Injunction Restraining Construction of Elevated Railway.

The reconstruction of an elevated railway, so as to destroy to a greater extent than before an abutting owner's easements of light, air and access, would be enjoined on a preliminary motion, where there was no material disputed question of fact, instead of awaiting the trial of the action, pending which the structure would probably be completed. (Rothschild v. Interborough Rapid Transit Co. et al, 147 New York Sup., 1040.)

LIABILITY FOR NEGLIGENCE

Connecticut.—Injuries to Alighting Passenger from Car Overhang.

Plaintiff, having assumed a position, when she alighted from a car, which was apparently free from danger and without knowledge of the actual danger from the overhang of the car as it rounded the curve at such point, was not guilty of contributory negligence as a matter of law. (White v. Connecticut Co., 92 Atlantic Rep., 411.)

Illinois.—Liability to Employee Riding on Pass.

A provision on the back of a free transportation ticket furnished to a street car employee releasing the company from all liability for personal injuries, was void, where the relation of carrier and passenger existed between the company and the employee. Klinck v. Chicago City Ry. Co., 104 Northeastern Rep., 669.)

Indiana.—Master and Servant; Injury to Motorman—Construction Work.

In an action by a servant for personal injuries caused by his having an unsafe place to work, the burden is on the servant to show that the master had knowledge, actual or constructive, of the dangerous condition long enough before the accident to have repaired it or to have given the servant timely warning of its condition.

A motorman operating a car drawing a plow on an uncompleted track on which no passenger or freight trains had been run was engaged in construction and assumed all risks incident to the service. (Egan v. Louisville & S. I. Traction Co., 103 Northeastern Rep., 1100.)

Indiana.—Liability to Employee Riding on a Pass.

Where a street railway regularly furnished its servants with passes to and from their work, a stipulation in such passes exempting the company from liability for injuries caused by its negligence is uninforceable, being contrary to public policy, the issuance of the passes being one of the considerations for the employment. (Indianapolis Traction & Terminal Co. v. Isgrig, 104 Northeastern Rep., 60.)

Kentucky.—Degree of Care Required to Prevent Injury to Property.

A street railway is bound to use extraordinary care only for the protection of its passengers, and, where its car left the tracks and injured adjacent property, it was not negligent if it used ordinary care to discover obstructions which caused the accident. (Kentucky Traction & Terminal Co. v. Bain (two cases), 170 Southwestern Rep., 499.)

Massachusetts.—Negligence May Be Imputed to Child Nine Years Old.

Plaintiff, a boy of nine years, was injured while crossing behind a street car by being struck by another car on the opposite track. He was familiar with the locality, and although alone there was nothing to distract him from caring for himself. There was no evidence that he listened for an approaching car, and though he testified that he looked twice in the direction from which the car approached and did not see it, there was no evidence to show that he could not see the car which struck him from the place where he looked. Held, that plaintiff was guilty of contributory negligence as a matter of law. (McManus v. Boston Elevated Ry., 103 Northeastern Rep., 284.)

Massachusetts.—Duty to Inspect Car Equipment.

The plaintiff was injured, while a passenger, by the breaking of a bolt in the back of a seat against which she was leaning. The bolt had a break which was invisible when it was in place, but it could have readily been removed for inspection. The cars had been in use for five years, and there was no evidence that the bolt had been inspected during that time, although it was an important bolt and in a position which subjected it to strains. Held, that the question of defendant's negligence was one for the jury, and that it was error to direct a verdict in its favor. (Murphy v. Milford, A. & W. St. Ry. Co., (two cases), 210 Federal Rep., 138.)

Massachusetts.—Injury to Passenger from Person Not in Employ of Company.

Where a passenger, who entered a closed subway car through its front vestibule, put her hand back of her on the jamb of the door to save herself from being thrown forward when the car started and someone not in the service of the carrier shut the door on her thumb, the carrier was not liable, where it was not the custom or duty of its servants to close the door. Tracy v. Boston Elevated Ry. Co., 105 Northeastern Rep., 351.)

Massachusetts.—Car Passing Stationary Car.

The operation of a car on one track on approaching a stationary car on another, in violation of the rule requiring the slowing down of a car and the sounding of the gong when passing a stationary car, is negligence. (Emery v. Boston Elevated Ry. Co., 105 Northeastern Rep., 889.)

Missouri. — Responsibility for Panic Following Controller Explosion.

The explosion of a car controller is prima facie evidence of negligence, and imposes on the company the burden of showing that the explosion was due to unavoidable accident. The death of a passenger pushed from the rear platform by other passengers in their haste to leave the car after such an explosion was the natural consequence of it, the test of liability being whether there was an appearance of imminent danger that reasonably should have been anticipated as too terrifying for passengers to face without alarm. (Agnew v. Metropolitan St. Ry. Co., 165 Southwestern Rep., 1110.)

Missouri.—Boarding Moving Elevated Car.

One who attempted at an elevated station to board a moving car, the gates of which were being closed, is guilty of contributory negligence as a matter of law, where the step of the car was within a few feet of the end of the platform, at which point the company maintained a sign warning the public against boarding moving cars. (Speaks v. Metropolitan St. Ry. Co., 166 Southwestern Rep., 864.)

Nebraska.—Injury to Passenger Riding on Steps.

A person standing on the steps of a moving street car, being unable to secure a seat or standing room within, is presumed to be there with the consent of the servants in charge of the train. (Kadner v. Omaha & C. B. St. Ry. Co., 151 Northwestern Rep., 169.)

New Jersey. — Injury to Pedestrian at Corner from Car Overhang.

In view of the well-known fact that in rounding a curve the rear end of a street car will swing beyond the track and overlap the street to a greater extent than the front, the motorman is justified in presuming that an adult person standing in the street near the track, who is apparently able to see, hear and move, having notice of the approach of the car and of the existence of the curve in the track, will draw back far enough from it to avoid being struck by the rear of the car as it swings around the curve in the usual and expected manner, and under such circumstances it is not negligent operation on the part of the motorman to continue the progress of the car without warning such person of the possible danger of collision with the rear of the car, because of the swing, if he remains in the same position. (Miller et al. v. Public Service Corporation of New Jersey, 92 Atlantic Rep., 343.)

New York.—Injury to Boy Who Climbed on Bumper.

Plaintiff, with five other boys, climbed on the rear bumper of defendant's trolley car and claimed that he intended to pay his fare. After the car had gone a few hundred feet the conductor came toward the boys, called to them to get off and made threatening gestures but was too far away to cause serious apprehension. Plaintiff and his companions sprang from the car, landing on their feet, when plaintiff ran onto the opposite track without looking for a car and was struck by a car going in the opposite direction. Held, that the facts were insufficient to raise an inference of actionable negligence on the part of the conductor in forcing plaintiff from the car by threats of personal violence. (Luter v. Union Ry. Co. of New York, 145 New York Sup., 893.)

New York.—Application of Sand and Brakes on Rainy Day.

An error of judgment by a motorman as to the time when he must apply sand and brakes on a rainy day, to avoid collision, is not negligence as a matter of law. (Koster v. Coney Island & B. R. Co., 151 New York Sup., 56.)

New York.—Third-Rail a Nuisance on Highway.

Where an electric third-rail used by a railroad to furnish motive power projected into a highway crossing unnecessarily, it was a nuisance, and the railroad was liable for an injury occasioned thereby. (Bloss v. Oneida Ry. Co., 147 New York Sup., 728.)

Ohio.—Traffic Agreements—Personal Injuries.

When one company makes an agreement with another company, under authority granted by Sec. 3443—17, Rev. Stat., for the joint use of its tracks, it is liable for injuries caused by the actionable negligence of its licensee thereon. The statute does not provide exemption from such liability, and as against the public it will not be implied. (Quigley v. Toledo Rys. & Light Co., 105 Northeastern Rep., 185.)

Oregon.—Injuries to Persons on Track.

Where there is evidence that a railroad acquiesced in the use of a bridge as a footway by the public, an instruction requiring of the railroad only the lowest degree of care for the protection of a person on the bridge was error. (Doyle v. Portland Ry., Lt. & Pr. Co., 143 Pacific Rep., 624.)

Oregon.—Measure of Damages for Death Under Employers' Liability Act.

The measure of recovery for death under Employers' Liability Act (Laws 1911, page 17) Sec. 4, giving a right of action for death caused by a violation of the act, is the pecuniary loss sustained, and the jury may not consider as element of damages deprivation of comfort, society, support and protection. (Fisher v. Portland Ry., Light & Power Co. et al., 145 Pacific Rep., 277.)

Oregon.—Violation of Fender Ordinance Negligence Per Se.

The operation of street cars not equipped with a fender as required by a valid city ordinance, from which an injury to a child upon the track resulted, was negligence per se. (Rudolph v. Portland Ry., Light & Power Co., 144 Pacific Rep., 93.)

Pennsylvania.—Master and Servant—Breakage of Coupling.

Where, in a street railway brakeman's action for injuries from falling between two freight cars being shifted by defendant's motor, it appeared that the cause of the accident was a jar due to the sudden application of power by the motorman causing the coupling to part, and there was no evidence that the coupling was out of repair or defective or different from those in ordinary use, a nonsuit was properly entered on the ground that the proximate cause of the accident was the act of plaintiff's fellow servant in the management of the motor. (Cover v. Conestoga Traction Co., 92 Atlantic Rep., 495.)

Pennsylvania.—Injury to Passenger on Running Board.

Since, in an action for the death of a passenger from collision with the shafts of a passing vehicle while he was standing on the running board of a crowded summer trolley car, the accident being due to the sudden and unexpected shying of the horse, there was no presumption of negligence on the part of the defendant railway company, the burden was on plaintiff to prove actual negligence. (Kurts v. Philadelphia Rapid Transit Co., 90 Atlantic Rep., 525.)

South Carolina.—Power of Headlight Proper Question for Jury.

Evidence that a proper street car headlight would throw light on the track 200 yards ahead of the car, and that the headlight on the car by which decedent was killed only threw a light from 35 to 50 ft., made it a question for the jury whether the street car company was guilty of wanton negligence in not having a proper headlight. (Kirkland v. Augusta-Aiken Ry. & El. Corp., 81 Southeastern Rep., 306.)

Texas.—Injuries to Persons on Tracks.

Where an intoxicated man negligently stepped in front of an approaching street car, his would-be rescuer stands in the same position as the intoxicated man, and the negligence of the latter is attributed to the rescuer, so that no recovery can be had against the street car company, though its servants were also guilty of negligence. (Scates v. Rapid Transit Ry. Co., 171 Southwestern Rep., 503.)

Utah.—Conductor's Assent to Passenger Alighting from Moving car.

Where a passenger on a street car, which he thought would follow one route, upon discovering that it had turned off, requested a transfer from the conductor so that he could catch a car following, and the conductor said that he could get off as the car was moving slowly, the passenger's attempt to alight in accordance with the suggestion of the conductor is not contributory negligence as a matter of law (quoting Paul v. Railroad, 30 Utah, 30, 83 Pac. 564). (Gaines v. Ogden Rapid Transit Co., 141 Pacific Rep., 110.)

Washington.—Company Not Liable for Injury to Employee Riding on Pass.

Even though an employee of a common carrier was promised free transportation as part of her compensation, yet where, on applying therefor, she was required to and did sign an application stating that the pass issued was a mere gratuity and based on no consideration, she thereby waived, as she had a right to do, the benefit of her prior contract for free carriage, and hence would be a mere gratuitous passenger for whose injuries caused by negligence the carrier was not liable. (Hageman v. Puget Sound Electric Ry., 141 Pacific Rep., 1028.)

Washington.—Injury to Infirm Passenger from Sudden Start.

Where an infirm passenger walking on crutches entered a street car it was the duty of the conductor not to direct the starting of the car until the passenger had secured a seat. (Rice v. Puget Sound Traction, Light & Power Co., 141 Pacific Rep., 191.)

Wisconsin.—Injuries to Passenger from Car Overhang.

Plaintiff having often boarded street cars before they rounded a corner where she desired to board a car, approached the usual stopping place without notice of an ordinance requiring the car not to stop until it had turned the corner. The motorman signaled her to go to the far corner, which she started to do. The car was then approaching a curve at about 3 m.p.h., and the speed was increased to 6 m.p.h. before the car got around the curve, which was on a grade, and, as it did so, plaintiff was struck by the outswing of the car. Held, that there was no evidence of actionable negligence on the part of the carrier. (Kuhn v. Milwaukee Electric Ry. & Light Co., 149 Northwestern Rep., 220.)

Washington.—Duty of Pedestrian at Street Crossing.

While one about to cross a street railway track is not under an absolute duty to stop, look and listen, he cannot, with knowledge that a street car is approaching, step heedlessly in front of it, under the assumption that it will not overtake him.

Though a street car may have been operated at an excessive speed, the company is not liable for injuries to plaintiff from being struck by the car, unless the excessive speed was the proximate cause of the injury. (Beeman v. Puget Sound Traction, Light & Power Co., 139 Pacific Rep., 1088.)

News of Electric Railways

BOARD APPROVES DETROIT CONTRACT

Terms of Contract Published by Board of Street Railway Commissioners—Procedure Outlined for Fixing Price and Transferring Railway to City

The board of street railway commissioners of Detroit on Wednesday made public the text of the contract which it has approved for the purchase of the lines of the Detroit United Railway within the one-fare zone. Publication was also made of the amendment to the city charter which must be passed by three-fifths of the voting electorate before the contract can be carried out by the city. The contract will be submitted to the stockholders of the railway on Aug. 2. If they accept the contract, as officials of the company will recommend to them, the street railway commissioners will take steps to have the Common Council name a date for the submission of the purchase question to the electors. It is understood that the election, if one is called, will be held about the middle of September.

The contract provides that the price of the lines within the one-fare zone shall be fixed by the Circuit Court of Wayne County, sitting as a Court of Chancery. The right of appeal to the State Supreme Court is reserved for both parties under an agreement that the decision of the latter tribunal shall be final and binding upon both.

It further provides that the property shall be delivered to the city on a specific date to be fixed by the circuit judges, which shall be decided within thirty days after suit has been started to fix the price. This provision allows the city to take possession of the lines within sixty days after the election, inasmuch as the suit must be started within thirty days after election.

The contract provides that the city shall accept the property subject to, and shall pay, the existing mortgages upon the property delivered to the extent of the price fixed by the court, and the balance of the mortgage debt, if any, shall be discharged on maturity by the railway. If the price exceeds the mortgage debts, the excess shall constitute a lien on the property. The city shall be obligated for the existing mortgages only to the amount of 2 per cent of the assessed valuation of the city (about $11,000,000). The amount, not to exceed the prescribed 2 per cent, shall be fixed in the decree and shall consist of at least $1,000,000, falling due on June 1, 1916, and of a portion of the first consolidated mortgage falling due on Jan. 1, 1932. All of the purchase price in excess of the amount assumed as a personal obligation by the city shall be secured by a lien due on or before Jan. 1, 1932. Payment of this sum shall be provided for from a sinking fund to be set aside from the earnings of the lines. Interest on the mortgage indebtedness which the city assumes is also to be paid from earnings.

Provision is made that in order to bind all the mortgage bondholders to the terms of the contract, the trustees of the mortgages shall be made party to the suit. The railway agrees that they shall all enter their appearances in the suit "in order that all persons interested may be before the court, all interests protected and a perfect title passed."

Accompanying the contract and charter amendment, the commissioners issued a statement explaining from their point of view what the contract really contained. They urge that the people trust the Circuit Court judges to give justice to both parties, and indicate their idea of what the city can accomplish through municipal ownership in the following language:

"The whole plan of the commission is to pay for the entire property and its extensions out of earnings, but this involves a longer time than sixteen years. If no extensions were necessary, the profits would pay the purchase price and operating charges at the present rates of fare by 1932, but as extensions and improvements are necessary to a large extent, a longer term will probably be necessary, and in the meantime two methods of procuring the necessary additional capital have been provided by the charter amendment. (Pledge credit of city up to $11,000,000, and pledge earnings of lines.)

"It is the confident belief of the members of the commission that outside of a part of the $1,000,000 due on June 1, 1916, it will never be necessary to call on the city to issue any of its own bonds to meet payments, but the earnings of the railway, plus the borrowing power based upon the pledge of future earnings, will take care of all future payments."

COMPLAINT FILED AGAINST CITY

Puget Sound Traction, Light & Power Company Alleges Policy of Harassments Is Being Pursued by the Municipality of Seattle

The Puget Sound Traction, Light & Power Company, Seattle, Wash., on July 23 filed a complaint against the city of Seattle with the State Public Service Commission, alleging that the municipality has entered into a campaign of harassments against the company. In filing the complaint the company asks that a date for a hearing be fixed, and that an order be entered declaring the provisions in its franchises requiring payment for bridges, paving, filling and maintenance of streets, and the payment of a percentage of the gross receipts of its railway system, discriminatory and void.

The company sets forth that in accepting its franchises it was with the understanding that the corporation should not be harassed by the city of Seattle. Instead of following that policy, the city has entered into competition in the light and power field and in the operation of street railway lines, and has adopted a program of harassments, causing the company to lose large sums of money in defending itself against demands made in conflict with the terms of its franchises. One specific instance cited is the fact that the City Council passed an ordinance requiring the sale of twenty-five tickets for $1, or six for 25 cents, in conflict with the franchises, and that before the court nullified the ordinance the requirement cost the company approximately $60,000 in loss of revenues.

The complaint also cites the fact that paving improvements planned by the city will cost the traction company $223,000 in paving that portion occupied by tracks, and that the 2 per cent of the gross earnings paid into the city yearly amounts to about $70,000. The petition prays that the company be relieved of these burdens. The complaint further refers to the passage of a bill requiring the company to build a line on East Union Street, where it had no franchise, and the effort made to convict officials of the company in criminal proceedings for failure to build such a line.

The entry of the jitney bus as a common carrier competitor is further cause for complaint. It is stated that the city, in the autumn of 1914, without lawful authority, issued licenses to more than 500 jitney buses to operate as common carriers along lines of the street railway. The company asserts that its loss of revenues from Nov. 1 to April 1 has amounted to from $45,000 to $60,000.

Reference is also made to the practice of the city lighting department in making excessive charges for street lighting, paid by the general public, in order that rates may be reduced to private and small consumers. This excess charge, it is said, amounts to $80,000 per year. In other words, the city charges itself for street lighting $80,000 a year more than what the same service could be obtained for from the complainant.

P. R. T. OUTLINES OBJECTIONS

Philadelphia's application for a certificate of public convenience, the next step toward building the Broad Street subway and the Frankford elevated, was argued on July 26 in Harrisburg before the Pennsylvania Public Service Commission. Appearing in opposition to granting the certificate were E. A. Ballard, chief counsel Philadelphia Rapid Transit Company; Ruby R. Vale, counsel for D. E. Dallam, whose suit for an injunction was described in the ELECTRIC RAILWAY JOURNAL of July 24; and Charles L. Fluck, of the Northwest Business Men's Association. City Solicitor Ryan was present on behalf of the municipality, and A. Merritt Taylor, Director of City Transit, was the sole witness heard.

All parties will submit briefs, which must be on file within ten days from July 30.

After Director Taylor had offered testimony that the city was legally qualified and financially capable of building the lines in question, Mr. Ballard announced the arguments that the company will submit in an effort to hold up construction of those lines. The company's brief will cover these points:

1. That by the act of March 23, 1866, the city of Philadelphia is prohibited from constructing a railroad on or along Broad Street.

2. That by the act of March 26, 1873, which virtually formed a contract between the State of Pennsylvania and the Thirteenth and Fifteenth Streets line, it was set forth that no other line should be built along Broad Street. According to Mr. Ballard, the Supreme Court has decided that this contract cannot be abrogated except by condemnation proceedings, and such proceedings have not been instituted.

3. That the contract of 1907, section 3, provides that Councils shall determine the routes and other conditions under which railway lines shall be built, and that the Philadelphia Rapid Transit Company shall have ninety days' option on the right of building necessary lines.

MERALCO INCOME FOUND ADEQUATE

Commission Reports on Financial Ability and Service of Manila Electric Railroad & Light Corporation—Fenders, Brakes and Training Suitable

The Board of Public Utility Commissioners at Manila, P. I., recently handed down a full decision covering various points raised in the investigation of the Manila Electric Railroad & Light Corporation. The company's contention that under existing rates its revenues from transportation are not sufficient to provide for the adequate maintenance and depreciation of the property used in the service, the safeguarding of the investment therein and a reasonable return thereon, is not sustained. The commission expresses its belief that the city of Manila is paying such a return on the investment as would entitle it to a thoroughly adequate and up-to-date service.

In rendering its final decision, the board took into consideration the full financial statement of the cost of the property operated as of Dec. 31, 1913. This was obtained from the holding company incorporated in New Jersey. The total investment shown by it on that date was 10,630,283 pesos, as compared to 11,107,300 pesos, the valuation set by Manager Duffy a year ago for the local holdings. Several items on this statement were not allowed, however, and the final estimate of the capital investment made by the board was between 7,500,000 and 8,000,000 pesos.

In its decision the board took up numerous points in connection with the street car service in Manila, complained of by the Philippine Chamber of Commerce. In conclusion it required the company to use vacuum cleaners on its cars during the dry season, to prohibit expectorating in the cars and the placing of the feet on seats by passengers, to brace all its open cars both longitudinally and transversely, to treat the roofs of all cars with waterproof preparation before the setting in of the rainy season, to provide all car windows with clutches, to prohibit passengers from riding on the sideboards or side steps of the open or closed cars, and to prohibit all overcrowding of passengers either on the front or rear platforms of open or closed cars.

The attention of the board had been called to street railway accidents which had occurred in Manila, with the charge that these were caused by defective brakes, improper training of motormen and inadequate inspection of rolling equipment. In answer to these complaints the company had asserted that the street railway accidents in Manila were comparatively infrequent; that the motormen were subject to physical examination and were duly instructed before being allowed to take charge of cars; that all cars and equipment were inspected once in every forty-eight hours; that owing to the fact that there were no rains and the rails were always dry and clean and the cars not heavy, the brake equipment was adequate, and that each car having its own motors was equipped with fenders which were approved by the municipal board in accordance with the company's franchise.

In connection with these points the commission decided mostly in favor of the company. It stated that it was not satisfied that the fenders at present in use were unsafe or inadequate. Until some type was offered which could be employed in the narrow streets of Manila with more decided advantage, the defendant company would not be obliged to make any change. Moreover, in the light of local conditions, the commission was unable to find that the present brake equipment was inadequate and unsafe. In view of the results of the investigation of the company's personnel, the commission found that the employees were adequately trained for the operation of the cars.

ULTIMATUM IN DES MOINES

The Harris Trust Company, Chicago, which controls the Des Moines (Iowa) City Railway, has delivered an ultimatum to the Des Moines Council, through the Des Moines Chamber of Commerce, in regard to the local franchise situation, which has been hanging fire for several months. The amount of capitalization has been the question which all former attempts at a franchise agreement have failed to solve. The company, reducing its capitalization from $5,400,000 to $5,000,000 in an effort to meet the issue, has been unable to appease Mayor Hanna, who demands a figure of less than $5,000,000. A committee of the Chamber of Commerce, trying to mediate the differences between the City Council and the company, recently went to Chicago and sought to have the capitalization figure reduced from $5,000,000. The substance of a letter in reply to this effort follows:

1. The Des Moines City Railway will not consider or discuss any further reduction of capitalization, which means that it will not continue the negotiations unless a capitalization of $5,000,000 is recognized.

2. Unless a settlement of the franchise is secured, the company will fight its receivership through with the purpose of attempting to override the decision of the State Supreme Court and secure a decision in the Federal Court that the franchise voided by the State Court is perpetual.

3. The owners of the system are tired of being pushed by the city hall officials and now regret the $1,000,000 spent in improvements since the dispute started. If the company had obeyed the order of the Supreme Court and torn up its tracks, the City Council thus would have been forced by public sentiment to a settlement as the result of public inconvenience.

The company is still willing to try for a franchise if a basis of agreement can be reached, but at present negotiations are at a standstill while members of the Council and the Chamber of Commerce committee are on vacations.

RHODE ISLAND ARBITRATION BEGUN

Arbitration proceedings were begun on July 26 at Providence, R. I., between the Rhode Island Company and its employees to fix wages and hours of labor. James H. Vahey, Boston, Mass., represented the employees' union, and James M. Swift, Fall River, Mass., appeared as counsel for the company. President A. E. Potter was the principal witness.

Mr. Potter stated, in answer to inquiries, that his salary is $12,000 per year. Upon consultation, it was agreed that a list of the salaries of various other officials should be filed confidentially with the arbitration board, in order to avoid the effects of publicity. Mr. Potter said that the company in conference proposed an increase to the employees, the offer being a guarantee of six hours per day at 25 cents per hour minimum, with 0.5 cent increase if the revenue increased, and a further increase of 1 cent if the revenue increased further. This was in place of arbitration, and was made particularly for the benefit of the spare men, as far as hours of labor were concerned. The regular men outnumber the spare men by about two to one. The present wage scale is from 23 cents to 28.5 cents per hour. Mr. Potter said that the 0.5 cent increase offered was contingent upon an increase of 2 per cent in the gross earnings of the coming year, the adjustment being made quarterly. He said that it was impossible to eliminate finances from consideration in discussing wages.

Mr. Potter felt that the men are getting a living wage, and that an increase is not necessary as the men are living reasonably well. He could not see how the men deserve an increase when those on other roads are getting less and could be employed for less. During the strike the company did not try to get these men. None were advertised for, and the company took only those that came along and applied for work. Mr. Potter said that if fares could be increased he would like to see the employees get higher wages. The company has 1000 cars representing an investment of $5,000,000; 400 miles of track representing $15,000,000; a $5,000,000 power plant and a tunnel worth $1,000,000. The physical characteristics of the system were briefly reviewed, and Mr. Potter said that more than half of the men have worked over four years for the company. He considered platform work unskilled labor, comparing the motorman to a truck driver and the conductor to a clerk.

Recalled to the stand on the second day, Mr. Potter said that in his opinion the fact that the men receive free transportation and overtime compensation offsets the time required to work up conductor's day cards. On the entire system from thirty to forty accident reports are usually made out, covering minor troubles as well as serious difficulties. Some of the men find suburban runs more difficult than those in Providence. The witness did not feel that the work in Providence is more difficult than that in other places. He thought that in Springfield, Mass., and Pawtucket, R. I., the work was more difficult. Counsel for the union initiated a line of questions relative to the comparative cost of living in Providence and elsewhere, but on objection of counsel for the company this topic was withdrawn before the board ruled, on the ground that it would unduly lengthen the proceedings. Relative to the quality of work done in the shops, Mr. Potter said that in the opinion of some of the foremen the work has been done less well since the organization of the union.

HASTY BUT LEGAL ACTION IN TORONTO

Chairman D. M. McIntyre of the Ontario Railway & Municipal Board has issued his judgment upon the Toronto Railway's application for an order compelling the city to relay the tracks on Yonge Street. The judgment, which is in favor of the city, is, in effect, that the purchase of the Toronto & York Radial Railway's tracks and equipment by the Toronto Railway did not give the company the legal right to operate the section of line referred to, and that while the company has franchise rights on the street it can exercise them only by complying with the terms of the general agreement—by submitting plans to the city engineer, etc., for a new line or extension.

The appeal to the board arose out of the action of the city on June 26 in tearing up 1320 ft. of track south of Farnham Avenue, immediately after the Toronto & York Radial Railway franchise for that part of Yonge Street expired. The Toronto Railway, which had a few hours before purchased the track and overhead equipment, intending to give a service on that section, appealed at once to the board for an order restraining the city from proceeding further and for an order compelling the city to relay the tracks, claiming that since the Toronto & York Radial Railway franchise had expired the Toronto Railway automatically came into possession of rights on the stretch.

Counsel for the city denied the jurisdiction of the Ontario Railway & Municipal Board to deal with the matter, and held that in any case the city was within its rights in removing the tracks. The only way the company could operate there was by submitting plans for tracks, etc., to the city engineer in the regular way. The board, after asserting its jurisdiction, proceeded in the judgment to deal with the claim of the company that it acquired a franchise right on the section of Yonge Street referred to when the Toronto & York Radial Railway franchise expired. This claim, which was not argued by the city, the board finds to be a just one, but by referring to the terms of the agreement between the company and the city the board takes the position that while the franchise right exists and the company owns the tracks and overhead equipment, it cannot make the track a part of its system. The portion of Yonge Street dealt with must be regarded as the proposed site for an extension of the company's railway, which brings it under the conditions respecting such extensions. In the judgment Chairman McIntyre took a thrust at the city for causing inconvenience to the public by tearing up the tracks. Referring to the number of complaints received from residents and ratepayers of the district, Mr. McIntyre pointed out that the city acted within its strict legal rights and that the board was obliged to determine the issue solely upon that basis. He added: "If the city authorities have caused discomfort and loss to citizens by destroying, needlessly and in haste, property which might under some interim arrangement have continued to serve the transportation requirements of a portion of the community, the citizens must carry their complaint to the city authorities."

DEADLOCK ON TOLEDO DRAFT APPROVAL

Until late in the afternoon of July 29 the franchise committee and representatives of the Toledo Railways & Light Company, Toledo, Ohio, discussed the question of whether the committee should recommend the tentative draft of the franchise to Council and whether that body will take action on it or simply file it for reference to the voters at a referendum election. It was not possible, however, to reach any agreement, and the meeting was finally adjourned until the afternoon of Aug. 3.

At the conference on July 28 a deadlock between the committee and Henry L. Doherty developed on this point. Mr. Doherty said the negotiations would be of no avail if Council did not take some action on the tentative draft before it is sent to the people. He continued:

"I would rather go to the people with Council's rejection and say this administration has failed to do its plain duty than have Council sit back and take no action whatever. This draft is according to your views and you frankly state that it protects the people. They are entitled to know the result of your work and to ask you whether the draft is a good one or not."

Member F. M. Dotson said that he believed the report to be made to Council would accomplish the purpose of a recommendation, and that the Council members believed the proposed franchise would provide for "a well-operated system, good service, minimum rates and a workable plan for obtaining municipal ownership." Mr. Doherty replied that if the committee would say that in so many words to Council, it would be all he would ask. Mr. Dotson, however, would not agree to that, and insisted that Council could only receive and file the report. He argued that if Council accepts and files the draft, the act would show that it is satisfied. Mr. Doherty asserted, however, that such a course would mean dodging the issue and that all he wanted was for Council to declare itself one way or the other. If the draft is not recommended, then some other course can be taken to get it to the voters. "We do not want to be placed in a position where Council, after accepting the report, can go out and fight the franchise," said Mr. Doherty.

N. Y. CONTRACTS LET AND APPROVED

A contract for the installation of tracks on the New Utrecht Avenue elevated railroad in Brooklyn has been awarded by the commission to Ward & Tully, Inc., the lowest bidders, for $71,355. The work must be completed within five months after the delivery of the contract. The New Utrecht Avenue line is a three-track elevated railroad, extending from Thirty-eighth Street, Brooklyn, over the route of the so-called West End line of the Brooklyn Rapid Transit Company to Coney Island. It will be operated by the New York Consolidated Railroad Company as a branch of the Fourth Avenue subway.

The commission has approved the plans and form of contract for the supply of special work for the new rapid transit system in Queens and will open bids on Aug. 18. The special work consists largely of frogs and switches and will be used upon the new elevated railroad from the Queensboro Bridge to Corona, on the junction section on the Queensboro Bridge Plaza, for the new elevated railroad from the Queensboro Bridge to Astoria, and for the extension of the Queensboro subway from its present terminus at Jackson and Van Alst Avenues, Long Island City, through Davis Street and Ely Avenue to the Queensboro Bridge Plaza.

The commission has approved plans and form of contract, submitted by the New York Municipal Railway Corporation, for the erection of steel, construction of tracks, etc., on the Broadway elevated railroad in Brooklyn between Myrtle Avenue and Aberdeen Street, in connection with the third-tracking of that line. The commission also approved the company's plans and form of contract for the supply of structural steel for widening and strengthening the Myrtle Avenue elevated railroad from Willoughby Avenue to Wyckoff Avenue for the third-tracking of that line. The company must submit both contracts to public bidding.

Agreement with Employees Extended in Toronto.—The agreement that existed between the Toronto (Ont.) Railway and the 2100 members of the company's employees' union for the last three years has been extended for another two years.

Electrical Prosperity Week Indorsed.—The Electrical Supply Jobbers' Association has passed a series of resolutions indorsing "Electrical Prosperity Week" and giving its whole-hearted support and co-operation to the movement. This week occurs Nov. 29-Dec. 4, 1915.

New Line Opened in Washington.—On July 28 the Washington Railway & Electric Company, Washington, D. C., put into operation a direct line between the northwest suburbs of the city and the government buildings on Fourteenth Street, south of the Mall. The line was established as a connecting link on the Fourteenth Street line between G Street and E Street, thus making the third north and south line to intersect Pennsylvania Avenue between the Peace Monument and the Treasury Building. On account of the cut off, several changes were made in the route of other lines.

Market Street Injunction Stayed in San Francisco.—The injunction issued to prevent the operation of San Francisco (Cal.) Municipal Railway cars over the outer tracks on lower Market Street, noted in the ELECTRIC RAILWAY JOURNAL of July 10, was stayed indefinitely on July 20 by a decision handed down by Judge Troutt of the Superior Court. In granting the city's petition Judge Troutt supplemented his written opinion with the statement that he intended the stay to be effective until the United Railroads of San Francisco could get a ruling from the Supreme Court as to his right to intervene in the injunction proceedings.

Injunction Issued in Montreal Franchise Case.—Justice Lafontaine in Practice Court on July 20 ruled that an interlocutory injunction should be issued to restrain the Board of Control and the City Council from further dealing with the Montreal (Que.) Tramways franchise renewal question, until such time as the Court shall have been afforded an opportunity to enter upon deliberations as to the merits of the allegations and counter-allegations arising from the board adopting, on the vote of Mayor Martin and Controllers E. N. Herbert and Thomas Cote, Controller Herbert's proposal of a thirty-year franchise agreement with the company.

New Pavement the Issue in East Cleveland.—The Cleveland (Ohio) Railway has notified the village of East Cleveland that it will not lay the new pavement between its tracks on Euclid Avenue through the town unless it is assured of a renewal of its franchise in 1921. The company, however, wants to make the fare 5 cents and the village has demurred. It has notified the company that the pavement will be laid, and the company held for the expense. The village asserts that the company has no franchise for a short stretch of its St. Clair Avenue line, and, if it does not do the paving on Euclid Avenue, the St. Clair Avenue cars will be stopped until the bill is paid. This would necessitate some arrangement to take care of the passengers on that line, which is the only one reaching Euclid Beach at the present time.

Trolley Pole Agreement Reached in Springfield.—An agreement has been reached between the city planning commission of Springfield, Mass., and the Springfield Street Railway relative to arrangements for the removal of trolley poles in the heart of the business district between State Street and the Union Station. The company has consented to meet the cost of substituting span suspensions with attachments to abutting buildings for the existing poles, the estimated outlay being about $5,000. About forty property owners are to be visited by the commission, and to each will be submitted a form of agreement which gives the company virtually a license to attach span wires but nothing in the way of an easement. If the owners consent, the City Council will be asked to grant the company the right to string span wires over the sidewalks, and the Massachusetts Public Service Commission will pass upon the plan.

Public Utility Committee Drafts Report.—The completed draft of the amendment proposed by the committee on public utilities of the Constitutional Convention was made public on July 24. The proposed article will permit the Legislature to limit the courts' powers of review, a prerogative the Legislature already possesses under the present constitution. The other principal provisions are as follows: (1) The public service commissioners shall be constitutional officers. (2) The terms are fixed constitutionally at five years. (3) The commissioners may be removed only by majority vote of the Senate upon "recommendation of the Governor stating grounds upon which such removal is recommended." (4) Each commission shall have the jurisdiction, powers and duties it now has, but nothing shall prevent the Legislature from enacting laws changing such jurisdiction, powers and duties; except that the Legislature shall not enact any law prescribing rates or standards of service until after it has received from one of the commissions a report thereon or until after the expiration of a prescribed period.

Board of Estimate Favors Tube Plan.—The Board of Estimate and Apportionment of New York City on July 21 unanimously adopted a resolution, introduced by President McAneny of the Borough of Manhattan, to notify the Public Service Commission for the First District of New York that in its opinion a tunnel should be substituted for the bridge plan for the connection of the new subway system with the Borough of Queens under the East River at Fifty-ninth Street. It was also stated that the board was prepared to supply the necessary funds for the tunnel work. The total estimated cost for the tunnel plan would be $4,740,000 as compared to $2,340,000 for the bridge connection. The board was assured by contractors that the tunnel could be completed within thirty months after the delivery of the contract, which would be about the time it would take to complete the unfinished sections of the new system. The Public Service Commission has withdrawn its objections to the tunnel plan and adopted a new route, No. 61, which will be a two-tracked subway under the East River from Fifth Avenue to the Queensboro Bridge Plaza.

PROGRAM OF ASSOCIATION MEETING

Railway Signal Association

The Signal Appliance Association has issued Bulletin No. 10. This submits information regarding the arrangements for the forthcoming convention of the Railway Signal Association, which will be held in Salt Lake City, Utah, on Sept. 14-16. The bulletin states that there will be no official exhibits at the convention, although informal exhibitions of devices at the meeting place will be encouraged. Arrangements have been concluded for a special train from Chicago, leaving at 11.55 p. m. Saturday, Sept. 11, over the Chicago & Northwestern Railway. The train will stop at Omaha, Ogden and Cheyenne to pick up passengers from connecting lines. It will arrive at Salt Lake City on Monday, Sept. 13, at 6.10 p. m. No special trains have been provided for the return trip.

The headquarters of the convention will be at the Hotel Utah in Salt Lake City, and reservations for rooms are to be made by members and guests direct with the management of the hotel. No formal program for the committee reports has been arranged at the present time, but Secretary Rosenberg of the Railway Signal Association will issue a complete statement on the first day of the convention. The annual banquet of the association will be held on the evening of Wednesday, Sept. 15.

Financial and Corporate

ANNUAL REPORTS

Brooklyn Rapid Transit Company

The comparative statement of income, profit and loss of the Brooklyn (N. Y.) Rapid Transit Company for the years ended June 30, 1914 and 1915, follows:

	1915	1914	Per Cent
Revenue from operation:			
Transportation	$26,096,265	$25,246,452	+ 3.37
Miscellaneous	331,421	311,797	+ 6.29
Total	$26,427,686	$25,558,249	+ 3.40
Operating expenses:			
Maintenance of way and structures	$2,391,814	$2,021,647	+18.31
Maintenance of equipment	2,401,841	2,315,990	+ 3.71
Operation of power plant	1,553,177	1,463,283	+ 6.14
Operation of cars—trainmen's wages	4,787,574	4,520,022	+ 5.92
Operation of cars—other expenses	1,744,690	1,696,132	+ 2.86
Damages	607,700	543,885	+11.73
Legal expense in connection with damages	261,153	219,758	+18.84
General law expenses	53,406	65,097	—17.96
Other general expenses	819,754	822,856	— 0.38
Freight and mail expenses	338,414	325,054	+ 4.11
American Railway Traffic Company—expenses	854	823	+ 3.76
Total	$14,960,381	$13,994,552	+ 6.90
Net revenue from operation	$11,467,305	$11,563,697	— 0.83
Income from other sources	438,715	451,771	— 2.89
Total	$11,906,020	$12,015,468	— 0.91
Deductions:			
Taxes	$1,700,035	$1,752,879	— 3.01
Interest and rentals (net)	4,693,424	4,946,884	— 5.12
Total	$6,393,459	$6,699,763	— 4.57
Net income	$5,512,561	$5,315,705	+ 3.70

The net income shows an increase of $196,856 or 3.7 per cent over the preceding year, and in addition the system's reserves for depreciation were credited with $256,384 as compared to a debit in the preceding year of $53,191. The figures for the current fiscal year include the operations of the Coney Island & Brooklyn Railroad for the entire year, whereas for the preceding year those operations were included for only six months. The accumulated surplus on June 30, 1915, after making sundry adjustments to the profit and loss account, and after the payment of dividends at the rate of 6 per cent per annum on the entire amount of capital stock outstanding during the year, namely, $74,520,000, was $10,621,966, an increase of $889,377 over the surplus on June 30, 1914.

The report calls attention to the fact that, excluding for comparison the newly acquired Coney Island & Brooklyn Railroad lines, the passenger earnings of the system failed for the first time in the history of the company to show a substantial increase over the passenger earnings of the preceding year. Instead there was a decrease, which is attributed to two main causes: (1) The general depression in business and industry affecting Brooklyn as well as other portions of the country, reflected in a large number of men and women out of work and a tendency toward economy in expenditures. (2) The very liberal increase in transfer facilities which went into effect on June 1, 1914, under order of the Public Service Commission, whereby the total number of transfer points on surface railroads in the system was increased from 721 to 1008. The first year of operation under this order shows an increase of 10,552,274 transfer passengers carried, and a decrease of 2,141,700 cash passengers. This situation presented not merely a loss in revenue but occasioned an increase in expense by reason of the increased service required for the transportation of the large number of additional transfer passengers. Of the total increase of 6.9 per cent in operating expenses, nearly half, or $456,018.38, was due to charges to maintenance of way and structures and equipment, and $267,551.52 to trainmen's wages.

The report reviews the progress of work on rapid transit lines under contracts with the city, and expresses the opinion that owing to delays in letting contracts for construction the enlarged system will not be completed and ready for operation on Jan. 1, 1917, as expected. A synopsis of the company's rapid transit work shows that four tracks in the Centre Street loop have been completed; the Thirty-eighth Street construction substantially progressed; the four-track Sea Beach line completed and placed in operation; two tracks of the Fourth Avenue subway between Chambers Street and Sixty-fifth Street equipped and operation thereover begun; Broadway and Myrtle Avenue connection and the Lutheran Cemetery line completed; all of the Liberty Avenue elevated extension completed except the stations; first section of the Jamaica Avenue elevated extension begun; third-tracking of the elevated lines progressed; 300 new subway cars ordered, 160 of which have been delivered; comprehensive contract for signal equipment for rapid transit lines entered into and numerous additions to power plant supplied. The total expenditures for rapid transit work by the New York Municipal Railway Corporation to June 30, 1915, were $30,010,860. The pooling of earnings with the city, which began on Aug. 4, 1913, shows a deficit to June 30, 1915, in meeting the company's preferentials of $545,413, and a deficit in meeting the city's interest and sinking fund of $714,722.

Among the items of maintenance, additions and improvements on other than rapid transit lines, were the relaying of 83,930 ft. of surface track; overhauling and repairing of an additional 96,072 ft. of surface track; the installation of 154 pieces of special work; the laying of 146,578 sq. yd. of improved pavement; the renewal of 51,658 lin. ft. of track on elevated lines; the painting of 22,593 lin. ft. of elevated structure; the building of 140,508 lin. ft. of footwalk on elevated structure, and the installation of 16,789 ties on elevated track and 39,630 lin. ft. of timber guard rail.

During the year the company expended in the maintenance and improvement of the club rooms for employees, in support of the pension system, in medical inspection service and in sickness and death gratuities in cases not reached by the employee's benefit association, the sum of $78,742. The system of compulsory medical inspection accomplished during the past year a reduction in the amount of time lost by the operating employees on account of sickness of 13,485 days (or nearly 18 per cent) over the time lost in the year ended June 30, 1914. The milder winter of 1915 accounted for about 7000 days of the total reduction. Making due allowance for this, however, there still remains a saving of upwards of 6000 days' work for the year, or a reduction of 8.6 per cent over the sickness record of the year ended June 30, 1914. The system was also accompanied by a reduction of 24 per cent in the number of days' work lost by operating employees on account of illness.

On account of the high rate of insurance fixed by the New York Fire Insurance Exchange two years ago the company was obliged to insure its risks with London Lloyds, where a much lower rate was obtainable. Last year the local exchange offered a rate lower than Lloyds, and about 20 points lower than the rates fixed in the preceding year, so that the insurance was placed for three years with domestic companies at an average rate of 0.25387, which has since been reduced to 0.23358. The company's insurance reserve fund has reached $787,439, an increase of $188,242 during the year.

Liverpool Corporation Tramways

The report of the Liverpool (England) Corporation Tramways for the year ended Dec. 31, 1914, shows that the total revenue for the year amounted to £722,307, operating costs (including rental of leased lines) £473,678, and gross profit £248,629. The gross profit was apportioned as follows: Interest, £50,082; sinking fund and repayment of loans, £63,726; reserve, renewal and depreciation account, £34,821, and contribution in aid of the general rate, £100,000. The net profit for the year amounted to £134,821, a decrease of £19,341 as compared with 1913.

The following figures may prove interesting in connection with the financial position of the tramway since it came into the hands of the city: The total sum set apart for sinking fund and redemption of debt up to Dec. 31, 1914, amounted to £1,177,949; reserve, renewal and depreciation,

£800,623; contribution in relief of rates, £572,898. In addition, the sum paid by the tramways since 1897 in rates and taxes amounts to £401,383.

The number of passengers carried, miles run and traffic receipts for 1914, compared with 1913, are as follows:

	1914.	1913.	Increase.
Passengers..............	145,656,374	144,085,927	1.1%
Receipts.................	£684,026	£677,881	0.9%
Mileage..................	13,657,888	13,442,605	1.6%

From the above figures it will be seen that there was an increase in the traffic receipts of £6,145, notwithstanding the fact that the country was under war conditions for nearly five months. The receipts from Jan. 1 to Aug. 1 showed a progressive increase equivalent to 4 per cent. The average earnings per car mile for the year 1914 amounted to 12.02d, as against 12.10d for 1913, a decrease of 0.08d. This decrease was due to the issuing of one and three-quarter millions of free passes to members of His Majesty's forces.

APPEAL TAKEN FOR BOND ISSUE

Washington Railway & Electric Company Wants Court to Remove Valuation Restriction Imposed by Commission

The Washington Railway & Electric Company, Washington, D. C., on July 20 appealed to the Supreme Court of the District of Columbia to set aside a ruling by the Public Utilities Commission which declined to approve a bond issue of $341,000 requested by the railway. The company a few months ago asked for a total issue of $694,000 in bonds, but the commission would allow only $353,000 to be issued at that time or until the commission had completed its valuation of the company's property. Previous references to this case were made in the ELECTRIC RAILWAY JOURNAL of Jan. 23 and April 3.

Eight different reasons are set forth in the company's petition to substantiate its claim that the failure or refusal of the commission to approve the bonds is illegal. It has no assurances when, if ever, the valuation will be completed by the commission. The commission makes a distinction between issues of bonds for capital charges sought voluntarily by the company and those made under express direction of Congress, issues of the latter class always having been approved.

There is no question, says the company, as to the legitimacy of the charges or of the fact of actual expenditure. It is asserted that the law does not contemplate the completion of valuation before action by the commission on its application. The commission is not required to have before it the relation which the value of the property bears to outstanding stocks and bonds before approving the issue. Ascertainment of valuations cannot lawfully enter into or affect the question of the legitimacy of the capital expenditures for which issuance of bonds is desired.

The question of present capitalization is not drawn into controversy, the company contends, by the application for approval of bonds. Even if it were, the company shows that all of its outstanding stocks and bonds were issued and applied under the act of June 5, 1900, and before the creation of the Public Utilities Commission, and that the commission cannot lawfully affect or disturb the existing capitalization fixed with the express sanction of Congress.

The company explains that between Jan. 1, 1909, and Nov. 30, 1914, it expended for additional equipment and extensions the sum of $457,849. It asserts that it is entitled to have its requested issue of $694,000 of bonds approved and asks the court to set aside so much of the order of the commission as denied the right of the full issue.

BRISTOL TRAMWAY SALE NEGOTIATIONS

Some time ago the option committee of the Bristol Corporation and the representatives of the Bristol (England) Tramways met to see if any arrangement could be arrived at between the two sides with regard to the future of the tramway undertaking. The company broke off negotiations and the corporation has now reopened the matter endeavoring to find out from the tramways company whether some arrangement cannot be arrived at so as to secure the full development of the transit facilities in order to meet not only the present but the future requirements of the city and surrounding districts. The corporation lays down various conditions which it would like to see fulfilled, and asks if, in the event of the corporation undertaking not to exercise its option of purchasing the tramways, the company will make an offer to enter into an agreement based on these conditions. In the meantime, however, the Bristol Tramways Company is applying for powers to extend its business. It desires not only to continue in the tramway business but to carry on the business of motor-car manufacturers, motor-car engine manufacturers, and repairers and dealers in motor-cars and their parts. It also desires power to include the manufacture of airships and aeroplanes, and, quite naturally at present, power to manufacture ammunition, arms and the like. The company has orders for armed motor-cars, and it desires to do everything necessary to complete them, putting in the guns, etc. Being a large generator of electricity, the company also desires power to supply electricity to other firms, and in other smaller ways to extend its business.

Boston (Mass.) Elevated Railway.—The directors of the Boston Elevated Railway have declared a dividend of 1½ per cent, payable on Aug. 16 to stockholders of record on Aug. 5. During the year ended June 30 the company paid 5½ per cent in dividends, the dividend for the last quarter being 1 per cent. Through Boston bankers the company has sold an additional $1,000,000 of 5 per cent gold debenture bonds dated 1912 and due on Dec. 1, 1942, for 95.68 and interest, to yield 5.3 per cent. As mentioned in the ELECTRIC RAILWAY JOURNAL of June 19 in connection with the award of the bonds to the syndicate, this sale makes $5,000,000 of the issue outstanding.

Federal Light & Traction Company, New York, N. Y.—The voting trustees for the capital stock of the Federal Light & Traction Company gave notice this week that the voting trust agreement would expire by limitation on July 29 and that on and after that date the voting trust certificates might be surrendered and exchanged for proper certificates for the common stock of the company. All holders were required to surrender their certificates on and after the date mentioned to the National City Bank of New York, depositary.

Fort Wayne & Springfield Railway, Decatur, Ind.—The Fort Wayne & Springfield Railway will be offered for sale on Aug. 12. Each bidder must deposit a certified check for $5,000 and must enter into a contract to pay the balance of the purchase price within sixty days. This will be the fifth time the property has been offered for sale, there being no bidders three different times. In connection with the last sale, held on May 4, the bidder forfeited the $1,000 deposit then made. Various petitions carrying extensions of the time and asking that the $1,000 be protected were taken into court, but the court finally fixed upon Aug. 12 as the final date for the sale. On July 17 F. A. Dolph filed a petition asking that the line be sold to him for $130,000 and agreed to post the guarantee then. Upon objection Mr. Dolph withdrew the offer. Previous references were made in the ELECTRIC RAILWAY JOURNAL of March 13, May 22 and June 19.

Jacksonville (Fla.) Traction Company.—A quarterly dividend of three-fourths of 1 per cent has been declared on the 6 per cent cumulative preferred stock of the Jacksonville Traction Company, payable on Aug. 2 to holders of record of July 23. Previous payments of 1½ per cent were paid quarterly.

Montreal (Que.) Tramways.—The new issue of $1,000,000 of common stock for the Montreal Tramways, noted in the ELECTRIC RAILWAY JOURNAL of July 24, will be allotted pro rata to the holders of the $3,000,000 of stock now outstanding; that is, one share of new will go to the holder of every three shares of old. The proceeds of the issue will be used for the general purposes of the company.

New York (N. Y.) Municipal Railway Corporation.—The Public Service Commission for the First District of New York has approved an agreement between the New York Consolidated Railroad and the Nassau Electric Railroad, by which the former leases for 999 years the terminal of the latter company at Coney Island. The consideration is the payment of $247,000, which the commission has authorized the New York Municipal Railway Corporation to charge against the cost of construction under the dual system contracts. In accordance with the agreement between the Consolidated Company and the Nassau Electric Company, the city and the New York Municipal Railway Corporation will agree to a modification of the dual system contract whereby the city will obtain a right-of-way for two tracks into the Coney Island terminal between Avenue Y and Surf Avenue for the use of the trains to be operated over the New Utrecht Avenue elevated railroad. The Sea Beach Railroad has already obtained the right-of-way into the terminal for its trains, so that by the new agreements trains to Coney Island through the Fourth Avenue subway, whether operated over the Sea Beach line or over the New Utrecht Avenue line, will both enter the same terminal at Coney Island.

Pacific Gas & Electric Company, San Francisco, Cal.—The Pacific Gas & Electric Company has filed an application with the California Railroad Commission for authority to buy all the capital stock of the West Sacramento Electric Company from G. F. Detrick and H. W. Furlong for $30,000. The West Sacramento Electric Company operates in Yolo County. It has a capital stock of $100,000, divided into 1000 shares. The stock is in the hands of the Mercantile Trust Company of San Francisco in escrow. The Pacific Gas & Electric Company obtained options from Messrs. Detrick and Furlong on all of it some weeks ago. This company already owns and operates the electric railway lines in the neighborhood of the territory owned and served by the West Sacramento Electric Company.

Puebla Tramway, Light & Power Company, Puebla, Mexico.—The holders of the $4,229,200 of first mortgage thirty-year 5 per cent bonds of the Puebla Tramway, Light & Power Company were to vote on July 30 in London on a modification of the trust deed to make the interest on these bonds for five years from Jan. 1, 1915, payable only in the event of sufficient net earnings after providing each year for $3,000,000 of prior lien 5 per cent bonds. Any part of such interest remaining unpaid at the expiration of the five years would be satisfied, if required, by the issuance at par of 5 per cent cumulative income warrants payable only out of profits. No dividends would be paid on the common stock until the whole of income warrants had been redeemed. Provision is also contemplated for cancelling the operation of the sinking fund for five years from Jan. 1, 1916, and for extending the date of maturity of the bonds for five years from Jan. 1, 1937. The management of the company states that the average rate of exchange for last year was less than half of the par exchange or under 1s. per peso, with the result that the earnings in sterling realized little more than the amount necessary to meet the interest on the prior lien bonds alone. The company does not expect that its earnings will for some time realize in sterling the amount sufficient to pay the interest on its first mortgage bonds.

St. Louis, Lakewood & Grand Park Railway, St. Louis, Mo.—Under an execution entered on a judgment recently given in favor of a former superintendent for salary, a levy has been made on two of the three cars of the St. Louis, Lakewood & Grand Park Railway.

Washington (D. C.) Interurban Railway.—Chief Justice Covington on July 20 authorized the sale of the Washington Interurban Railway. The trustees, J. W. Yerkes and Guy T. Scott, are to conduct the sale in accordance with the decree of the United States District Court in Maryland, where a foreclosure decree was recently entered.

Washington-Oregon Corporation, Vancouver, Wash.—The property of the Washington-Oregon Corporation, both real and personal, was advertised to be sold under sheriff's sale on July 3 to satisfy a mortgage of more than $1,000,000, but the sale was adjourned indefinitely. Attorney Langhorn asserted that one reason for the postponement was the uncertainty existing as the result of certain franchise activities for the use of county roads being carried on by H. D. Fleischhauer, formerly manager for the Washington-Oregon Corporation. The county commissioners have been asked to refuse this grant and have decided to hold off temporarily, but until this matter is settled a stop is placed upon the intentions of the bondholders, who are prepared to buy in the property.

West End Street Railway, Boston, Mass.—The West End Street Railway has sold to F. S. Moseley & Company, Boston, an issue of $4,743,000 of one, two and three-year notes bearing 5 per cent interest. The notes are equally divided between the three maturities, making $1,581,000 of each. It is understood that they were sold at a premium. Several bids, naming longer maturing notes or long-term bonds, were received, but these were rejected, as it was felt it was not advisable to load up with long-term bonds, carrying a large interest rate, which would have to be sold at a heavy discount.

DIVIDENDS DECLARED

Bangor Railway & Electric Company, Bangor, Me., quarterly, one-half of 1 per cent, common.

Bristol & Plainville Tramway, Bristol, Conn., 2 per cent.

Connecticut Railway & Lighting Company, New Haven, Conn., quarterly, 1 per cent, preferred and common.

Cumberland County Power & Light Company, Portland, Me., quarterly, 1½ per cent, preferred.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, three-fourths of 1 per cent, preferred.

Illinois Traction System, Peoria, Ill., quarterly, three-fourths of 1 per cent, common.

Jacksonville (Fla.) Traction Company, quarterly, 75 cents, preferred.

Monongahela Valley Traction Company, Fairmont, W. Va., 2½ per cent, preferred.

Tampa (Fla.) Electric Company, quarterly, 2½ per cent.

United Power & Transportation Company, Camden, N. J., $1.34.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
ATLANTIC SHORE RAILWAY, KENNEBUNK, ME.					
1m., June, '15	$28,455	$29,883	†$1,428	$653	†$2,081
1 " " '14	29,863	24,075	5,788	680	5,108
BATON ROUGE (LA.) ELECTRC COMPANY					
1m., May, '15	$14,961	*$8,761	$6,200	$2,166	$4,034
1 " " '14	14,964	*9,650	5,314	2,109	3,205
12 " " '15	181,149	*111,446	69,703	25,127	44,576
12 " " '14	172,632	*112,603	60,029	25,291	34,738
BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.					
1m., May, '15	$9,473	*$8,484	$989	$1,134	†$145
1 " " '14	10,999	*9,936	1,063	1,082	†19
12 " " '15	120,004	*99,754	20,250	13,425	6,825
12 " " '14	122,375	*102,318	20,057	12,899	7,158
CAPE BRETON ELECTRIC COMPANY, SYDNEY, N. S.					
1m., May, '15	$26,611	*$16,410	$10,201	$6,724	$3,477
1 " " '14	29,486	*16,095	13,391	6,438	6,953
12 " " '15	340,034	*207,966	132,068	78,432	53,636
12 " " '14	374,594	*207,657	166,937	74,916	92,021
COLUMBUS (GA.) ELECTRIC COMPANY					
1m., May, '15	$56,471	*$27,395	$29,076	$28,578	$498
1 " " '14	54,086	*25,475	28,611	24,781	3,830
12 " " '15	694,332	*311,858	382,474	343,840	38,634
12 " " '14	641,478	*280,681	360,797	296,720	64,077
DALLAS (TEX.) ELECTRIC COMPANY					
1m., May, '15	$134,612	*$86,273	$48,339	$33,394	$14,945
1 " " '14	184,844	*105,648	79,196	27,493	51,703
12 " " '15	2,012,647	*1,163,449	849,198	402,896	446,302
12 " " '14	2,270,243	*1,336,740	933,503	314,938	618,565
EASTERN TEXAS TRACTION COMPANY, BEAUMONT, TEX.					
1m., May, '15	$58,141	*$31,897	$26,244	$8,713	$17,531
1 " " '14	55,084	*32,836	22,248	8,377	13,871
12 " " '15	672,184	*388,167	284,017	104,205	179,812
12 " " '14	571,267	*362,682	208,585	94,679	‡138,775
EL PASO (TEX.) ELECTRIC COMPANY					
1m., May, '15	$71,624	*$42,642	$28,982	$4,187	$24,795
1 " " '14	83,286	*47,521	35,765	4,201	31,564
12 " " '15	1,004,535	*550,173	454,362	50,337	404,025
12 " " '14	951,588	*521,694	429,894	51,284	‡383,622
GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.					
1m., May, '15	$169,249	*$101,054	$68,195	$36,059	$32,136
1 " " '14	210,528	*112,367	98,161	35,669	62,492
12 " " '15	2,242,178	*1,245,329	996,849	435,353	561,496
12 " " '14	2,442,273	*1,376,513	1,065,760	433,155	632,605
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.					
1m., June, '15	$768,699	$490,359	$278,340	$132,696	‡$147,663
1 " " '14	790,334	470,892	319,442	129,607	‡189,835
6 " " '15	4,589,809	3,035,016	1,554,793	800,914	‡768,607
6 " " '14	4,513,204	2,859,475	1,653,729	680,790	‡877,288

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*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

LOS ANGELES JITNEYS DECLINING

Strict Regulation Causes Reduction in Craze—First Driver in Pasadena Quits—Interurban Bus Question Put Before Commission

Since July 12 regulation of the jitney traffic in Los Angeles, Cal., has been on a firm and solid foundation, requiring substantial bond or insurance against personal and property damage and proof that the driver meets a certain standard of competency. It is too early to state fully what the effect will be, but hundreds of jitney drivers have quit, because unable either to pay the cost of securing bonds or to pass the reasonable examinations now conducted by the police traffic officials for old and new operators alike.

The ordinance upon which the present regulation is founded is No. 31,877, mentioned in the ELECTRIC RAILWAY JOURNAL of March 6. This contained a requirement for a $5,000 bond. The jitney men's association secured an injunction against its enforcement which remained in effect until after the municipal election last June. Then the injunction was dissolved by Judge Hewitt without any written opinion, and the ordinance became effective on July 1. An amendment, ordinance No. 32,518, was passed by the Council, to become effective on July 20, replacing the requirement of a $5,000 bond by that of bond or insurance (the insurance option being new) in the amount of $5,000 for injury or death of one person, $10,000 for injury or death of more than one person and $1,000 for damage done to the property of others. This insurance or bond must be approved by the police commission. The jitneymen's association has some arrangement with the Pacific Casualty Company whereby protection that is said to satisfy the ordinance is obtained by its members for $24 down and $8 a month. The $24 pays for the first two months, thus making the cost of the protection $104 a year.

Immediately after July 1 there was a great reduction in the number of jitneys on the streets. In the palmy days of the jitney craze the largest number counted in service in a day ran fairly close to 800, and in the middle of June a traffic count showed about 425 jitneys in service. After the first week in July there were less than 250 jitneys actually running. During the interval between July 1 and July 20, the police commission permitted operation by those complying with the ordinance in its original $5,000 requirement, and leniency was shown even in the enforcement of this. On July 12, 306 drivers had filed applications with bonds, and on that day officers were instructed to arrest all who were operating without bonds.

The police traffic department is holding examinations under the ordinance. Applicants are required by a written examination to show a knowledge of rules and orders governing traffic and to pass a road test in which they are accompanied by one of the officers competent to judge their driving. There have been more than 400 applicants examined, of whom about fifty, according to unofficial reports, failed. A great many of these were weeded out by sheer illiteracy or ignorance of the English language. On July 16 the department examined sixty-five applicants, including a few held over from the preceding week. The rate at which new applications have been coming in has been declining, but it is difficult to tell when they will stop. Those who have passed the written tests have usually also passed the road tests, as most of them are men who have been operating jitneys.

The police are not troubled much by attempts to evade the ordinance. The drivers know better, and their association, after the defeat of its efforts to eliminate the bond provision, is now urging peaceable compliance with the law. One driver on the first day of the new regime was taken in for a heart to heart talk with the traffic officers after he had been operating a few hours with a little slotted box tacked up under a sign saying that his vehicle was not a jitney bus, but inviting riders to leave a donation. He promised to quit. The jitneys continue to suffer from overcrowding. It is expected that there may be some regulation of this feature, which many think will result in a wholesale quitting of the service or higher fares.

The question whether the bond requirement applies to buses in interurban traffic entering the city has been taken into court in an action by the proprietors of the "Little Landers" stage, M. Spencer and S. W. Parmenter, which will also involve other features of the ordinance. The whole question of regulation of interurban bus traffic is becoming of increasing importance, as the number of vehicles so engaged is now fairly large. These buses take only the cream of the traffic. An example is the forty cars that run from Santa Ana to the beach on Sunday, but give no service on week days when traffic is light. This subject will be put before the California Railroad Commission under an application filed on July 12 by the Western Association of Short Line Steam Railroads, requesting a determination whether buses in interurban traffic are common carriers and as such subject to the laws, ordinances, rules and regulations governing common carriers. Electric railways will undoubtedly be represented at the hearings. Up to this time the only regulation of interurban buses of interest has been that by the city of Venice, which passed an ordinance permitting the trustees at their discretion to permit buses engaged in interurban traffic to enter the city on payment of a license fee of $100 a year. The trustees have not yet seen the necessity for issuing licenses to them. At first drivers attempted to evade the effect of this by driving to the next beach point, Ocean Park, but the number so doing has been gradually diminishing.

Some light on the troublesome question of jitney receipts is given by the retirement of C. W. Home, the first man to start a jitney bus in Pasadena, who was widely advertised in early newspaper articles as an example of success in the business. He says a good deal of his early traffic was from novelty seekers among people not accustomed to riding in automobiles. Now many people are getting tired of jitneys. He stated to a reporter: "I started in business on April 20, 1914, operating between the business portion of Pasadena and Lamanda Park. For a while I needed five cars to take care of the business, but now I cannot make a living at it."

JITNEY CONTROL REFUSED IN INDIANA

Commission Decides It Has No Jurisdiction Under Utility Act—Railway in Kokomo Establishes Bus Lines with Schedules and Transfers on Non-Car Streets

The Public Service Commission of Indiana entered an order on July 24 dismissing the petition of the Terre Haute, Indianapolis & Eastern Traction Company, which sought to bring all jitney buses in the State under the control of the commission, as noted in the ELECTRIC RAILWAY JOURNAL of July 17. The commission stated that it had no jurisdiction under the public utility law of 1913.

A hearing was held on July 22, at which officials of the principal street and interurban railways of Indiana appeared before the commission and joined in the petition of the Terre Haute, Indianapolis & Eastern Traction Company. John T. Beasley, attorney, appeared for that company and reviewed the petition and the progress of jitney operations up to this time. Mr. Beasley explained that the petitioners did not contemplate in any way that the jitneys should be wiped out as a competitive factor in the transportation problem, but that regulation on the same basis as the electric roads was all that was desired. He said that if in the development and advancement of this age, new and better methods of transportation are found, the commission should not be called upon to stand between one competing system and another, but it is the province of the State that the competition should be fair.

Mr. Beasley stated that while the Indiana utilities law specifies certain classes of utilities, among which the jitneys do not appear, the law refers frequently to "every public utility," "all public utilities" and "any public utility," and therefore, he argued, it was undoubtedly the intent of the legislature that the commission should have power over such a competitive agent of the traction companies as the jitney buses. Mr. Beasley quoted from decisions of other states to prove his contention that where such an act as the Indiana public utility commission law specifically refers to certain types of utilities it does not exclude from its provisions thereby others of a similar type. Commissioner

Clark asked Mr. Beasley what the commission might do in the premises, assuming that it had jurisdiction. Mr. Beasley said that it might issue an order citing all jitney bus owners to appear by counsel before the commission to formulate some method of licensing the jitneys. Commissioner Clark then expressed his opinion that the electric railway companies had the right to go into court asking restraining orders against the competing jitneys, thus getting the question judicially settled.

Ferdinand Winter, general counsel for the Terre Haute, Indianapolis & Eastern Traction Company, argued that the State has deemed it wise to prevent utilities from earning more than a fair return on an investment, and because of this the State should protect the utility from unfair competition of jitney buses, so that it might earn this amount.

After the decision the Indiana Railways & Light Company, operating the local lines in Kokomo, Ind., announced that it would establish two lines of jitney buses which will operate in portions of the city not now served by street cars. A regular schedule will be maintained and transfers will be given to the street cars, so that passengers may go to any part of the city for a 5-cent fare.

MOTOR BUSES FOR BALTIMORE

W. A. House, president United Railways & Electric Company, Baltimore, Md., stated on July 22 that his company was interested in the Baltimore Transit Company, which will place a number of motor buses in service on the streets of Baltimore. Mr. House said that the railway's interest in the establishment of this service is due to its desire to see a bona-fide effort made to ascertain whether or not that method of transportation is a desirable supplement to the present methods, and that its future action would depend on this demonstration. He added: "It has been shown by the experience with that type of vehicle elsewhere that, as now operated, they cannot be made to pay, and except where operated on a 10-cent fare they have gradually disappeared from the transportation field. It has not yet been demonstrated, however, whether or not they can be operated successfully as supplementary to street railway traffic. We are extremely doubtful as to whether they can, but we shall find out as a result of this experiment."

The Baltimore *Sun* states that the Baltimore Transit Company has an authorized capital of $100,000 and that it is having more than a score of buses made for it by The J. G. Brill Company, Philadelphia. William H. McKee, Philadelphia, is now in Baltimore as the general manager of Baltimore Transit Company.

JITNEY ORDINANCES RECENTLY PASSED

Wichita, Melrose, Ashtabula, San Diego, Leavenworth and Bridgeport Assume Regulation of Jitneys—Supplementary Ordinance in Dallas for "Rent" Cars

The city of Wichita, Kan., on July 15 passed a jitney ordinance to take effect after Aug. 1. The feature of this ordinance is the inducement offered to keep jitneys off streets occupied by car lines. No one operating a jitney may solicit or receive passengers on car streets (though they may travel on such streets) unless the owner shall pay an additional license fee of $300 a year for five-passenger vehicles, $350 a year for vehicles carrying from five to ten passengers and $400 a year for vehicles carrying more than ten passengers. All other streets may be traversed at will, provided the operators designate the route to be traversed and publish in some public manner the time of departure from the designated terminal corner for all jitneys. The regular city license for jitneys payable annually is $25 for a five-passenger car, $35 for a ten-passenger car and $50 for more than a ten-passenger car. No jitney will be allowed to carry more passengers than the license designates, and only one passenger may ride on the front seat.

Melrose, Mass., has adopted a jitney ordinance, the feature of which is that under no consideration shall the seating capacity of the car as planned by the maker be overtaxed. In applying for a license the applicant is required to show proof of the seating capacity of his automobile as given by the maker, pay a fee of $1 for a license and file an indemnity bond of $5,000.

In an effort to escape compliance with the jitney ordinance of Dallas, Tex., which was enforced on July 19, providing for a license fee of $75, members of the jitney union made preparations to take down their street signs and operate their cars as before, but under the guise of rent automobiles at the license of $10 provided for rent cars. This evasion was thwarted by the city officials through the creation of another ordinance which prohibits the solicitation of patronage by operators of automobiles for hire other than a motor bus as "motor bus" is defined in the jitney ordinance. The new ordinance stipulates that an operator of an automobile for hire shall be considered as soliciting patronage if he shall announce by voice, sign, writing, color scheme, symbol or advertisement, other than the license number plate, that such automobile is used for transporting passengers for hire. This emergency ordinance compelled compliance with the jitney ordinance, and the day following its enforcement there was no attempt to operate. Efforts to have this ordinance declared unconstitutional failed.

The jitney ordinance in Ashtabula, Ohio, was declared valid on July 12 by Common Pleas Judge A. C. Reynolds. Every point on which the ordinance was attacked by jitney operators was decided in favor of the city. This decision ends a long struggle in Ashtabula. The first ordinance passed by the Council was declared invalid by an acting police judge. On June 7 another ordinance was presented in Council which passed under suspension of rules and became effective on June 15. This also was declared invalid by the police judge, after which the jitney drivers had full sway until this decision by Judge Reynolds. The court decided that the requiring of a license fee of $25 was a proper exercise of the police power and the license itself was neither excessive nor unreasonable. The bonds of $3,000 for less than nine-passenger cars and $5,000 for nine-passenger cars were declared to be within the authority of the city in protecting the public and injured persons. The court held that the operation of the jitney is itself a legitimate business, but that unless it was controlled irresponsible persons would engage in it to the danger of passengers and pedestrians.

After one ordinance had been declared unconstitutional as the result of injunctions secured by the jitney drivers, Mayor Tapps of San Diego, Cal., on July 2 approved a second ordinance passed by the Common Council. This ordinance provides for an application for an auto-bus permit by the owners or lessees of cars, the application to state the routes to be followed, the fare, the schedules, the transfer points, the type of vehicle, the seating capacity and the like. The car owner or lessee must file a bond or insurance policy of $10,000 to cover accident and damage settlements and pay a license fee of $10 for each jitney seating five or less passengers, $15 for one seating more than five and less than eight passengers, $25 for one seating more than seven and less than sixteen passengers, and $40 for one seating more than sixteen passengers. Jitney operators must submit to an examination and pay a license fee of $1. No licenses to operate will be granted to any persons under eighteen years of age. The jitneys are prohibited from running off the prescribed routes, cutting schedules, raising the rates of fare and refusing firemen and police free transportation. Violations are punishable by a fine of not more than $100 or imprisonment for not more than three months, or both.

The Leavenworth (Kan.) city commissioners on July 20 passed a jitney ordinance requiring a license of $100 a year and a bond of $10,000. The jitneys must run on a regular schedule and a fixed route.

An ordinance for the regulation and licensing of jitneys went into effect in Bridgeport, Conn., on July 1. This ordinance provides that each jitney shall be licensed by the superintendent of police, the fee being $10 for the original license and $10 for each renewal for vehicles and 50 cents for drivers. The superintendent of police is empowered to require a demonstration by each applicant for a driver's license. No riding is allowed on the steps, hoods or doors of the jitneys and not more than three passengers above the actual seating capacity may be carried at any time. A violation of any provision of the ordinance is punishable by a fine of not more than $100. It is provided that the ordinance does not apply to any motor vehicle whose minimum charge is more than 10 cents.

JITNEY JOTTINGS

Jitneys in Kansas City Meet Rebuff—Memphis Railway Asks Injunction—Bristol Company Buys Buses for Jitney Service

The jitney situation in Kansas City, Mo., became acute last week, when the White Star line of buses raised its fare to 10 cents and discovered that the people would not pay this amount. They maintained this rate for a few days and then suddenly restored the 5-cent fare. After the failure of the Kansas City Jitney Transportation Company, noted in the ELECTRIC RAILWAY JOURNAL of July 24, plans for a coalition of jitney forces, abandoned several weeks ago because of lack of support, were taken up and met with hearty response. The Rapid Transit line got 100 adherents in a few days. This company had already leased a lot 50 ft. x 115 ft., at 1318 Walnut Street, erected a tent and arranged gasoline stations and small facilities for parking cars. It is now the plan to erect a building, with docks extending the long way of the lot, the cars to pass along one dock inward and out by way of the other. The ingoing and outgoing cars will be separated by a low curbing, the docks being on the outside of the runways. There will be plenty of seats on the docks, and outside the north and south walls will be concessions.

The Memphis (Tenn.) Street Railway on July 17 filed a bill in chancery to enjoin every jitney owner now operating in Memphis. It is asserted that the jitney drivers are operating without having given bonds as required by the recent Legislative act, without license, permit or franchise, and are using the streets without lawful authority, control or regulation of any kind. Jitney corporations and owners to the number of 316 are made defendants. The alleged infringement on the franchise rights of the railway is said to be causing the company a daily loss of $750 to $1,000.

The United States Circuit Court at Memphis on July 17 denied an injunction sought to void on constitutional grounds the Tennessee statute requiring jitney operators to furnish an indemnifying bond. It was held that the Tennessee act was not violative of the fourteenth amendment of the federal constitution. The opinion is contrary to the decision of Judge Pittman of the State Court, whose ruling was that the act was unconstitutional on account of being class legislation. An appeal from Judge Pittman's decision is pending. Aside from the moral effect on the appealed case, the federal decision simply confines the case to State litigation.

The Bristol (Tenn.) Traction Company has put a 1915 Buick jitney bus in service to supplement its railway lines and is reported to have purchased other automobiles to enter the service. Half a dozen cars have been bought and put into service by the local jitney company, which is composed of business men. The routes have been definitely laid out and the cars are operated on a schedule.

Claiming that jitney competition has seriously affected its business, the Charleston (W. Va.) Interurban Railroad has asked the Public Service Commission to allow it to discontinue traffic on two of its lines, one of them an interurban.

Judge Robert G. Street of the Fifty-sixth District Court at Galveston, Tex., on July 14 denied the petition of the Texas City-Galveston automobile line for an injunction to restrain the city officials of Galveston from enforcing a regulatory ordinance requiring bus licenses and an indemnity bond on each bus to the sum of $10,000. Judge Street held that in the enforcement of the ordinance there was no violation of any vested rights of the petitioners for using the streets and alleys of Galveston, and that they were subject to the ordinance notwithstanding the fact that they did not operate between points within the city.

The Philadelphia Jitney Association on July 22 unanimously voted against the six-for-a-quarter strip tickets which were recently adopted by the Auto Service Association, the South Philadelphia Jitney Owners' Association and the West Philadelphia Jitney Association, as noted in the ELECTRIC RAILWAY JOURNAL of July 24. As a result of this decision the tickets will be good on only about two-thirds of the jitney lines of Philadelphia. The Philadelphia Jitney Association also passed a resolution that no jitney driver could belong to both it and the Auto Service Association, which will cause 300 men to desert one of them.

The Des Moines ordinance for the regulation of jitney buses was declared valid this week in the District Court. The Court holds that the city has a right to regulate the operation of jitneys and to require an indemnity bond as the ordinance provides. The only portions of the ordinance held invalid are the sections requiring that jitneys take on or discharge passengers within 2 ft. of the curb and that they be halted behind street cars or other jitneys taking on or discharging passengers. The section of the present ordinance requiring bonds is also faulty, because it does not insure a proper bond. This defect of the ordinance will be remedied by the city at once. Recent investigations show that the number of jitneys being operated in the city has fallen below thirty.

I. C. C. DECIDES TRAFFIC CASE

Commission Specifies Basis of Haul Division and Prorating of Joint Rates for Insull Lines Between Louisville and Indianapolis

After a long controversy between the Board of Trade of Louisville, Ky., and the three Insull lines which together make up the route from Louisville to Indianapolis, the Interstate Commerce Commission on July 23 handed down an order apportioning between the three roads the rates to be charged on shipments of freight north from Louisville. The contentions also involved the matter of adequate terminal facilities in Louisville, and the commission directed in favor of the Board of Trade.

The commission's order provides that the through rate between Louisville and Indianapolis shall be divided into three parts, the haul being from Louisville to Seymour, from Seymour to Sellersburg and from Sellersburg to Indianapolis. As between these parts, the joint rates shall be prorated on a mileage basis, with a minimum division of 20 per cent to the Indiana Public Service Company, a like minimum division to the Indianapolis & Louisville Traction Company, and a like minimum division in the aggregate to the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company for their services south of Sellersburg. The last-named two lines, however, shall have an arbitrary allowance before prorating, on account of Ohio River bridge conditions and terminal conditions, of 1 cent per 100 lb. on less-than-carload shipments, and one-half of 1 cent per 100 lb. on carload traffic, this arbitrary allowance to be included in the minimum 20 per cent division and not to be added to it. By the ruling the basis of divisions and minima shall also govern the apportionment of joint rates applying between Louisville and points on the Indianapolis & Louisville Traction Company line.

This finding means a great deal to the Louisville shippers and is expected to result in an increased volume of freight to the railway companies. Heretofore Louisville shippers have been unable to bill shipments through north of Seymour, although shippers in and north of Indianapolis were able to bill through to Louisville and electric railway points beyond. Traffic by electric railway north of Seymour meant many changes and many bills for the three lines were unable to agree on a division of the rates. As a result the traffic was virtually little or nothing. The basis of division is now specified, and the Louisville Board of Trade will take up with lines north of Indianapolis the matter of through rates from Louisville, heretofore made impossible by reason of the deadlock south. No difficulties are expected in working out these schedules, and through rates would open up a wide and rich territory to Louisville, reaching from Chicago through Toledo, Detroit, around to Cincinnati.

Interurban and Steam Lines Running Excursions.—The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., is running popular excursions to St. Louis in connection with the Toledo, St. Louis & Western (Clover Leaf) Railroad. The business is handled via Bluffton, Ind.

Holding Cars for Transfer Passengers.—The cars of the Louisville (Ky.) Railway are being held at intersecting points until it is certain that there are no passengers wishing to transfer from cars on the cross lines. There was some disposition at first to complain about delays through such waiting, but this kind of service now has the full support of the people who ride on the cars. Visitors to the city write letters to the local papers expressing their approval of this practice and speaking of the distinction it gives the service. It has not been found that waits of this kind slow up the traffic appreciably.

June Accidents in New York City.—The engineers of the Public Service Commission for the First District of New York have completed the tabulation and classification of all accidents reported by railroad and street railway companies in the district for June. They show a total of twenty-three persons killed, which is exactly the number killed in June of last year. Of these fatalities eight occurred on the surface lines, eight on subway and elevated lines, six on railroad trunk lines, and one on railroad terminal lines. The total number of accidents decreased from 6466 in June, 1914, to 6148 in June, 1915.

Joplin & Pittsburgh Line to Develop Carload Freight.—The appointment of a traffic manager, J. D. Cornell, by the Joplin & Pittsburgh Railway, noted in the issue of July 24, prefaces active efforts for carload business. Heretofore the line has done considerable freight business, but mostly in broken carloads, handled by the baggage or freight cars of the company. Through rates and divisions are being arranged on all commodities from Kansas City, the Missouri River and defined territory to all points on the Joplin & Pittsburgh Railway. It is expected that preliminary details, such as agreements with steam roads, publication of rates and approval by the commission, will be completed so that the extended business can begin to flow by Sept. 1.

Petition for Extension of Fare Limits Refused.—The Massachusetts Public Service Commission has refused to grant a petition of the Selectmen of Rockland for the extension of transfer privileges on the Bay State Street Railway within the town. The general grant noted in the ELECTRIC RAILWAY JOURNAL of July 24 had reference to the consent of the company to extend the privileges of an existing 7-cent workman's ticket, good at certain hours only, between Rockland and Brockton to all parts of Brockton. This offer was made by the company pending a decision upon the application which it expects to make for a general revision of fares as a result of the recent arbitration award. In refusing to grant a general free transfer in Rockland, the commission pointed out that passengers boarding a car in any part of Rockland would be able to ride to Brockton or vice versa for 10 cents.

An Investigating Committee Satisfied.—Representatives of the transportation committee of the Louisville Commercial Club recently called on Walter Foreman, superintendent of the Louisville & Northern Railway & Lighting Company and the New Albany (Ind.) city lines, to take up a protest made at a recent club meeting about poor freight and express service between New Albany and Louisville. Mr. Foreman satisfied the committee that other circumstances than the delivery system were responsible for delays complained of, and incidentally disclosed the elaborate preparations that had been made to give Louisville merchants a first-class service with the towns across the river. The freight cars of the Louisville & Northern line and those of the Louisville & Southern Indiana Traction Company operate as frequently as the volume of traffic justifies and this service would be increased if the demand for it developed sufficiently. It was possible, in fact unavoidable, Mr. Foreman stated, that bulky freight shipments which were not delivered until after 5 p. m. would not reach the other side until the next morning, but freight in packages of less than 100 lb. was normally delivered in New Albany in forty-five minutes, and similarly in Jeffersonville, while equally quick service is given in Seymour, Columbus, etc., on small freight from Louisville. The cars for a large part of the day are run on a fifteen-minute schedule, while except at night the service is never slower than half hourly. The motor trucks of the company make collections and deliveries in the business section of Louisville, from the river to Broadway and from Shelby to Fifteenth Street; and collections and deliveries are made to all points of the Indiana cities across the Ohio River. After hearing these facts, the committee recommended a larger use of the service available.

Personal Mention

Mr. **T. J. Collins** has been appointed assistant superintendent of the Eastern Pennsylvania Railways, Pottsville, Pa.

Mr. **C. D. Willoughby** has been elected vice-president of the Mobile Light & Railroad Company, Mobile, Ala., to succeed Mr. J. H. Whiting.

Mr. **E. S. Gillette**, formerly assistant engineer of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has been appointed electrical engineer to take up part of the duties made vacant by the resignation of Mr. E. F. Gould, noted elsewhere in this column. Mr. Gillette will have charge of the shop, power house, substation and line departments.

Mr. **J. Dunhill**, secretary of the Trinidad Electric Transmission, Railway & Gas Company, Trinidad, Col., has been elected treasurer of the company to succeed Mr. L. C. Gerry. Mr. J. B. Marsh has been elected secretary of the company to succeed Mr. Dunhill.

Mr. **E. R. Peacock** has been appointed president of the Barcelona Traction, Light & Power Company, Ltd., Barcelona, Spain, to succeed the late Mr. F. S. Pearson. Mr. Peacock will have charge of the financial arrangements of the company.

Mr. **C. F. W. Wetterer** of Stone & Webster, with headquarters at Boston, is now assisting Mr. C. F. Wallace, now at Dallas, Tex., in charge of the Stone & Webster interests there. Mr. Wetterer was formerly secretary to Mr. M. H. Phinney of Stone & Webster.

Mr. **J. J. Callahan**, formerly superintendent Montreal & Southern Counties Railway, Montreal, Que., was on July 15 named operating manager of the London & Port Stanley Railway, London, Ont., which is now being run by hydro-power by the city of London.

Mr. **H. S. Cooper**, who has been the energetic secretary of the Southwestern Electrical & Gas Association for the last three years, has opened an office as consulting and advisory engineer at Dallas, Tex. This makes no change in his office as secretary of the association. In his new work Mr. Cooper will specialize on the construction, operation, and maintenance of electric railways, lighting, gas, and waterworks properties, not only in engineering cases but in matters of public policy. He has been very actively connected with work of this kind for the last twenty years or more, first in Schenectady, N. Y., then in Ithaca, N. Y., and later in Galveston, and he has been conspicuously successful in rehabilitating poorly-paying properties and in putting them on a sound financial basis.

Mr. **E. F. Gould** has resigned his position as assistant general manager and mechanical and electrical engineer of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., to become consulting engineer in the Cleveland office to act in a supervisory capacity over all the properties in which Mandelbaum, Wolf & Lang are interested. Mr. Gould has been with the Aurora, Elgin & Chicago Railroad since 1903, first as a mechanical and electrical engineer and later as assistant general manager and engineer. He designed and built all additions and improvements to plant and equipment and paid special attention to power economies. Prior to 1903 he spent four years in the railway engineering department of the General Electric Company at Schenectady. For the last few years Mr. Gould has been consulting engineer for the Western Ohio Railroad, Lima, Ohio, one of the properties owned by Mandelbaum, Wolf & Lang.

OBITUARY

Samuel E. Vincent, author of the Connecticut public utilities commission act, died at his residence in Bridgeport, Conn., on July 19.

J. Frank Chapman, who was general manager Thousand Islands Railway and Oshawa (Ont.) Railway, died at his home in Gananoque, Ont., on July 19 at the age of fifty-two. When seventeen years of age he entered the employ of the Thousand Islands Railway as junior clerk, from which position he rose to be chief executive. He was president of the Canadian Freight Association for one year.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Corpus Christi Traction Company, Corpus Christi, Tex.—Incorporated in Texas to construct an interurban railway in and out of Corpus Christi north, west and south. Capital stock, $100,000. Incorporators: J. S. Caswell, San Diego; J. R. Hopkins, W. G. Blake, Orlan P. Metcalf, Gordon Boone and W. E. Pope, all of Corpus Christi, and Arthur McEvoy, New York City. [July 17, '15.]

FRANCHISES

***Los Angeles, Cal.**—P. D. Cornelius has received a twenty-one-year franchise from the Council to construct an electric railway on Brooklyn Avenue, Evergreen Avenue and Wabash Avenue, Los Angeles.

Los Angeles, Cal.—The Pacific Electric Railway has received a franchise from the Council to construct an extension of its lines across the Shoe String Strip.

San José, Cal.—The Council of San José has passed a resolution to grant a franchise for the construction of a line on Alum Rock Avenue requested by the San José Railroads. Bids for the franchise will be received by the Board of Supervising Engineers until Sept. 7, 1915.

***Clearwater, Fla.**—E. W. Parker, Tampa, and associates have received a franchise to construct an electric railway in Clearwater and vicinity.

***Baltimore, Md.**—The Idlewylde Park Railway has received a franchise from the Council to lay tracks on Regester Avenue from the York Road to Idlewylde Park. This railway will connect with the tracks of the Towson and Catonsville division of the United Railways & Electric Company.

Springfield, Mass.—The Springfield Street Railway has received a franchise from the Council to construct a railway from East Springfield to Chicopee.

Buffalo, N. Y.—The Council of Buffalo has adopted a report granting a franchise to the International Railway to lay a special track on Michigan Avenue and Ohio Street, subject to the consent of the Lackawanna Railroad.

Utica, N. Y.—The New York State Railways will ask the Council for a franchise to extend its Elm Street line eastward on James Street, Utica.

Wilkes-Barre, Pa.—The Wilkes-Barre Railway has received a franchise from the Council to lay tracks on East North Street between North Main Street and North Pennsylvania Avenue. This track will be used by the Parsons, East End and Miner's Mills cars for temporary service during the construction of a new sewer on North Pennsylvania Avenue.

TRACK AND ROADWAY

Columbus, Ark.—Work has been resumed on the proposed electric railway between Columbus and Washington, Ark., after having been suspended last fall on account of financial conditions. It is expected that the roadbed will be ready for the ties and rails inside of six weeks. Rufus S. Stout, Pine Bluff, is interested. [May 1, '15.]

Connecticut Company, New Haven, Conn.—This company has agreed to pay $1,250 toward the construction of a new bridge over Sumner Creek, Hartford, and work will be begun at once. The bridge will be 65 ft. long and 32 ft. wide, with a roadway of 26 ft. and 6 ft. for pedestrians. A temporary bridge will be constructed for use while the new bridge is being built.

Washington Railway & Electric Company, Washington, D. C.—Work has been begun by this company improving its tracks in Anacostia and placing its power underground.

Clearwater, Fla.—Work will soon be begun on the proposed electric line from Brooksville to St. Petersburg, via Clearwater. Construction will be begun at Brooksville and will extend southward. It is expected that the line will be completed as far as Clearwater by Nov. 1. James Murphy, St. Petersburg, is interested. [Nov. 7, '14.]

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—Announcement has been made that this company plans to extend its lines in Lewiston about 1 mile and its lines in Clarkston about 1 mile at an estimated cost of from $75,000 to $100,000. Preliminary surveys have been made.

La Salle County Electric Railroad, Chicago, Ill.—Plans for the construction of this company's line have been submitted to the Public Utilities Commission of Illinois. The contemplated road will connect Ottawa and Mendota. [July 17, '15.]

***Peoria, Ill.**—Peoria financiers are interested in a proposition to construct an electric railway from Peoria to Galesburg. The route will probably be via Peoria and Farmington, to connect with the Illinois Central Electric Railway extending south from Galesburg into Fulton County.

Peoria (Ill.) Railway.—Material has been received and work will be begun at once by this company relaying its tracks on Second Avenue from Franklin Street to State Street, Peoria.

Tri-City Railway Company of Illinois, Rock Island, Ill.—This company expects to have its new Fourth Street line in operation within the next thirty days. The rails being used are of the heaviest type.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company is considering the construction of a line to Spencer Park, Logansport.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company will lay an additional track on Indiana Avenue, Indianapolis, from West Street to Blake Street.

Lafayette & Northwestern Railway, Lafayette, Ind.—The people of Rensselaer, Ind., voted down a proposition to give a 2 per cent subsidy, amounting to $60,000, for the construction of this company's line through Rensselaer. [April 3, '15.]

Louisville & Southern Indiana Traction Company, New Albany, Ind.—In connection with the improvement of Market Street from the Chicago, Indianapolis & Louisville Railway to Vincennes Street this company will replace its T-rails with girder rails.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.—Homer Loring, president of this company, announces his relinquishment of stock control of the Crooked Creek Railroad between Lehigh and Webster City. He says he has given up the idea of electrifying the line, although he has not abandoned the project for an electric line from Fort Dodge to Webster City. The contract for new $70,000 terminal buildings at Fort Dodge has been awarded and work is now in progress. Work has been begun on a new $50,000 warehouse at Fort Dodge.

Ottumwa Railway & Light Company, Ottumwa, Iowa.—A petition will soon be presented to this company by the residents of Ottumwa for the extension of its Court Hill line north about 1½ miles.

Hutchinson (Kan.) Interurban Railway.—Plans are being made by this company to use steel ties in the construction of its track on South Main Street and Second Avenue East. The base of the right-of-way under the pavement will be of concrete. Under each rail, extending lengthwise of the street, will be a section of reinforced concrete on which the steel ties will rest.

Lowell & Fitchburg Street Railway, Ayer, Mass.—This company has asked the Public Service Commission of Boston for its approval of the extension of its tracks on Main Street and West Main Street, Ayer, across the Boston & Maine Railroad tracks to connect with the Ayer terminus of the Shirley-Ayer line of the Fitchburg & Leominster Street Railway.

Bay State Street Railway, Boston, Mass.—This company has completed the work of laying new double track on its line on Lakeview Avenue, Dracut.

Boston (Mass.) Elevated Railway.—Work has been begun by this company laying new tracks on Washington Street, Brookline.

Worcester (Mass.) Consolidated Street Railway.—This company has completed the work of relocating its tracks in Wood Square, Marlboro.

Detroit (Mich.) United Railway.—Work will be begun at once by this company on the construction of an extension into the Fourth Ward. The line will connect the west side with other car lines in the city.

Fallon (Nev.) Electric Railway.—Work has been resumed by this company on the construction of its line from Fallon to Sand Springs, 30 miles. The roadbed is completed as far as the heavy grading, cuts and fills are concerned, and work at present will be confined to trimming up the grade to get ready for the laying of ties and tracks. It is expected that track-laying will be begun within the next sixty days. Mayor E. S. Berney and Dr. C. A. Hascall are interested. [Dec. 19, '14.]

***Landing, N. J.**—Decision to build a new electric line from Landing to Lake Hopatcong and thence through Fort Morris to Netcong was reached on July 20 at a meeting in Pittsburgh of officials of the Morris County Traction Company. While this new railroad will be virtually under the management of the Morris County Traction Company it was decided for financial purposes to form a separate company, the name of which has not been selected. It is proposed to pay 5 per cent of the gross income to the municipalities through which the new line will pass. Roxbury Township has already granted the franchise from Landing through Port Morris, but the question has not yet come up before the Netcong officials.

***Salem, N. J.**—Plans are being considered to construct an electric railway from Salem to Pennsgrove. Among those interested are Arthur B. Smith, Harry G. Hart, Isaac C. Smashey, James S. Wheeler and Wesley F. Sinnickson.

New York, N. Y.—Bids were opened on July 27 by the Public Service Commission of the First District of New York for the construction of Section 3 of Routes No. 4 and 36. This section begins at Thirty-eighth Street, New York, and runs north under Broadway to Forty-second Street, where it crosses under the line of the existing subway and continues north through Seventh Avenue to Fifty-first Street. The lowest bid was that of Holbrook, Cabot & Rollins Corporation for $3,741,000. Bids were also opened for the construction of Section 3 of Route No. 12, which runs under Eastern Parkway, Brooklyn, from Nostrand Avenue to Buffalo Avenue. The lowest bid was that of Rodgers & Hagerty, Inc., for $2,170,000. The Broadway subway is to be operated by the New York Consolidated Railway under contract between the city and the New York Municipal Railway Corporation. The Eastern Parkway subway will be operated by the Interborough Rapid Transit Company as an extension of the existing subway. Bids were also opened for the supply of 2200 tons to 3000 tons of manganese rails to be used on the new subway and elevated lines to be owned by the city, for which the lowest bid was that of Manganese Steel Rail Company, $263,591.

Niagara River & Eastern Railway, Niagara Falls, N. Y.—Briefs were filed by this company on July 20 with the Public Service Commission for the Second District of New York, supporting its petition for permission to build a double track fast freight and passenger line from Lockport to Niagara Falls to connect with the Buffalo, Lockport & Rochester Railway and the International Railway. Connected with this plan is the proposition to double track the Buffalo, Lockport & Rochester Railway. [April 10, '15.]

Goldsboro Electric Railway, Goldsboro, N. C.—This company reports that it expects to build 1 mile of new track in Goldsboro.

Cleveland (Ohio) Railway.—Peter Witt, street railway commissioner of Cleveland, stated on July 21 that the Buckeye Road line will be extended from East 116th Street to East 130th Street and the Woodland Avenue line from East 122d Street to East 130th Street. Work will be completed by Dec. 1.

Cleveland, Akron & Canton Terminal Railway, Cleveland, Ohio.—Engineers will begin work within the next few days along the route of this company's proposed subway under East Fifty-fifth Street, preparing plans, specifications, and estimates covering the construction of the subway, freight stations, docks, and water front development. The Foundation Company of New York and the Osborne Engineering Company have received the contract. O. C. Barber, Barberton, president. [July 24, '15.]

Lehigh Valley Transit Company, Allentown, Pa.—Plans are being made by this company to lay a second track along Broad Street, West Bethlehem, near Twelfth Avenue.

Schuylkill Electric Railway, Pottsville, Pa.—The contract for the grading and laying of track on this company's line over Broad Mountain has been awarded to the Trexler Contracting Company, Reading. The railway will connect Pottsville, Frackville, and Shenandoah, and will form a complete line between Pottsville and Shamokin. The rails to be used will be of the heaviest type.

***Alexandria, Tenn.**—The voters of Alexandria and the rest of DeKalb County will vote on Aug. 12 on a $150,000 bond issue as its contribution to an electric railway that is projected to run through DeKalb County and Wilson County. The Nashville, Chattanooga & St. Louis Railway plans to electrify its road from Nashville to Lebanon, to connect with the extension which is planned to run from Lebanon via Watertown, Alexandria, Liberty, and Dowelltown to Smithville.

Northern Texas Traction Company, Fort Worth, Tex.—This company plans to extend its Summit Avenue line for more than half a mile beyond the present terminus, Willing Street and Folsom Avenue. The line will extend west on Folsom Avenue to Gordon Street and south on Gordon Street to the old belt line tracks. About 2500 ft. of the extension will be beyond the city limits.

Wheeling (W. Va.) Traction Company.—This company is placing new ties and rails on Eoff Street, Wheeling, between Twenty-seventh Street and Twenty-ninth Street, and laying new brick between the tracks.

Waupaca Electric Light & Railway Company, Waupaca, Wis.—A report from this company states that it expects to install a small signal equipment some time before fall.

SHOPS AND BUILDINGS

Illinois Traction System, Peoria, Ill.—The Public Utilities Commission of Illinois has approved the plans for a joint station to be built by this company and the Chicago & Eastern Illinois Railroad at Glover, Ill.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company has purchased the property opposite the railway junction at Burrton for its new interurban station.

Electric Short Line, Minneapolis, Minn.—Bids will be opened shortly by this company for the construction of a new passenger station at Seventh Street, Holden Street, and Third Avenue N., Minneapolis.

New York State Railways, Rochester, N. Y.—Plans have been completed and work will soon be begun by this company on the construction of a new terminal at Glen Haven.

Goldsboro Electric Railway, Goldsboro, N. C.—A report from this company states that it has awarded a contract to Glisson & Sons for the construction of a new carhouse in Goldsboro.

Oregon Electric Railway, Portland, Ore.—Among the improvements contemplated by this company is the construction of an extension to its freight sheds in Eugene which will almost double their capacity, and a warehouse 50 ft. x 100 ft. at Harrisburg.

POWER HOUSES AND SUBSTATIONS

Manchester Traction, Light & Power Company, Manchester, N. H.—J. H. Mendell Company has begun work on the construction of this company's Brook Street substation and on the auxiliary steam power plant at Kelley's Falls. Construction will soon be begun on its substation at Garvin's Falls. The Brook Street substation will be 145 ft. x 100 ft. and 64 ft. high. The generators will have a capacity of about 3500 kw. The Garvin's Falls substation will be 42 ft. x 70 ft. The Kelley's Falls plant will be 144 ft. x 44 ft. and 75 ft. high, and will be added to the recently completed substation, forming an L. This plant will generate 10,000 hp. All the buildings will be of brick and cement construction. It is expected that the cost of these improvements will be about $300,000.

Union Light, Heat & Power Company, Fargo, N. D—This company has placed an order through H. M. Byllesby, Chicago, for two 1875-kva., 2300-volt, 3600 r.p.m. turbo-generator units. The apparatus has been ordered from the Westinghouse Electric & Manufacturing Company.

Manufactures and Supplies

ROLLING STOCK

Humboldt Transit Company, Eureka, Cal., is remodeling its cars for pay-as-you-enter service.

San Francisco Municipal Railway, San Francisco, Cal., has received sealed bids for furnishing and delivering a work car.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., is considering the purchase of some new observation cars for interurban use.

Corpus Christi & Ward's Island Railway, Corpus Christi, Tex., a new line which is under construction between Corpus Christi and Ward's Island, is contemplating storage battery service and is figuring on a 25-ton storage battery locomotive to handle the movement of truck farming products in that section, the locomotive to be capable of handling 100,000 lb. in weight at a speed of 15 m.p.h. on level track.

Richmond & City Point Transportation Company, Richmond, Va., J. C. Robertson, has made arrangements with the Tidewater & Western Railroad for passenger operation over the latter's line in connection with the Virginia Railway, Light & Power Company to operate storage battery service to Bermuda Hundreds and thence by ferry to Dupont City, Va., the population of which latter city has increased from 18 inhabitants to 17,000 since the Dupont powder plant was built there.

Public Service Railway, Newark, N. J., has begun work in its shops on the construction of a closed car for city service. The length over bumpers will be 50 ft. 10 in., or 5 ft. longer than the standard cars now in service. Body length will be 36 ft. 6 in. Other details will be as follows: steel underframe, steel sides up to belt rail, tee-iron carlins, no bulkheads, longitudinal seats, compromise-type roof, with Agasote roofing and no inside lining, Standard Steel trucks, Westinghouse motors and Westinghouse HL control.

Maryland & Pennsylvania Railroad, Baltimore, Md., a steam road, has leased a storage battery car of the Railway Storage Battery Car Company, New York, N. Y., for trial operation under its regular passenger 75-minute schedule between Belair and Baltimore, 26.3 miles. The car will make three round trips per day, hauling a 30-ton trailer. The average grade on the line is 2.19 per cent, the maximum 5 per cent; there are also a great number of curves. If this car meets the requirements of service this railroad contemplates storage battery operation for the entire passenger service between Belair and Baltimore by equipping the line with five more cars.

TRADE NOTES

Curtain Supply Company, Chicago, Ill., has received orders to equip with its curtain fixtures and rollers the new cars recently ordered by the Corpus Christi & Interurban Railway, New York & Queens County Railway and Norton & Taunton Railway.

Esterline Company, Indianapolis, Ind., has received orders for "Golden Glow" headlights for the following electric railways: Metropolitan Street Railway, Kansas City, Mo., twenty SM-95 headlights; Beaumont (Tex.) Traction Company, fourteen SM-95 headlights; Binghamton (N. Y.) Railway, fourteen SM-95 headlights; Georgia Railway & Power Company, twenty-four SR-95 headlights, and New York & Queens County Railway, twelve SE-95 headlights.

Block Folding Step Company, Louisville, Ky., which proposes to manufacture and market a folding step for street cars and other vehicles, has been incorporated in Louisville with $5,000 capital stock. The authorized bonded indebtedness is $20,000. Incorporators are Rollie A. Jackson, Owensboro, Ky., and William H. Bartlett and William A. Rosenfield, Louisville. Morton Yonts of O'Doherty & Yonts, 906 Inter-Southern Building, is also interested. Plans of the company are indefinite as yet.

Electric Materials Company, North East, Pa., has been formed for the purpose of manufacturing electric machinery and repair parts, such as commutators, trolley wheels, line material, copper, bronze and brass castings, and drop forgings in copper and steel. The plant at North East is of brick and steel construction and occupies 15,000 sq. ft. of floor space. The officers of the company are: President, G. E. Pierce; vice-president, F. B. Moorhead; treasurer, O. C. Hirtzel; secretary, N. P. Fuller. A sketch of Mr. Hirtzel's business career was published last week. This item is a correction of one in last week's issue in which an error was made in the name of the company.

Lord Manufacturing Company, New York, N. Y., announces the resignation of E. A. Lightner as manager to become president of Thompson, Brown & Company, educational publishers. The latter firm is the oldest publisher of school textbooks in the country, having been organized in 1844 at Boston. The headquarters will hereafter be in New York. Mr. Lightner became connected with the Lord Manufacturing Company in 1912 as sales manager and secretary. In 1913 he became general manager and treasurer. He will continue to serve on the board of directors. C. W. Horne, who has been chief engineer of the company for the past year, has been made general manager. Mr. Horne was formerly engineer of tests for the Interborough Rapid Transit Company. He is president of the Horne & Crane Engine Company, whose automatic train stop and speed control device is being tested by the Central Railroad of New Jersey.

ADVERTISING LITERATURE

Roller-Smith Company, New York, N. Y., has issued a number of sheets describing its precision torsion balances for weighing lamp filaments and its various types of meters and circuit breakers.

Pelton Water Wheel Company, San Francisco, Cal., has issued a folder describing the individual features of the exhibit of hydraulic power apparatus and auxiliary equipment at the Panama-Pacific Exposition, San Francisco, Cal.

Standard Underground Cable Company, Pittsburgh, Pa., has issued a booklet entitled "Pointers on Telephone Cable Specifications." The booklet contains useful information regarding the size of conductor and sheath and type of sheath for various conditions, and directions for preparing specifications.

Pittsburgh High-Voltage Insulator Company, Pittsburgh, Pa., has issued a folder describing its high-voltage porcelain strain insulators of standard styles. These insulators are all free from metal parts and are not subject to strains set up by the use of metal expanding in greater proportion than the insulation.

Carnegie Steel Company, Pittsburgh, Pa., has issued the fifth edition of the Carnegie Shape Book. This book contains a complete list of all the products manufactured on the shape, plate, bar and rail mills of the Carnegie Steel Company with a few unimportant exceptions and is indicative of the variety of forms now made in rolled steel. A comparison of this edition with the fourth, issued in 1911, will show roughly the progress of the introduction of steel in varied lines within the past four years. Among the relatively new lines of manufacture will be noted very many new sash and casement sections, used in the construction of metal window panes, skylights, etc., and a large number of automobile sections together with a line of light weight beam sections distinguished from the American standard sections by the designation structural beams. The book is printed on special lightweight thin paper adopted by this company for publications of this kind and is attractively bound in green leather with gilt edges. Copies may be procured at the price of $1.

The Port Commission of Seattle, Wash., and the Ferry Line Auto Bus Company are negotiating for the establishment of jitney bus service in West Seattle in connection with the bay ferry steamers. The plans as proposed call for the operation of three large jitney buses. The agreement provides for a fare of 5 cents from Seattle across the bay to West Seattle by ferry, and by jitney bus to nearly every part of West Seattle, 2 cents of the fare to go to the Port Commission and 3 cents to the jitney bus company. The proposed buses would compete with the Alki Point and Fauntleroy lines of the Puget Sound Traction, Light & Power Company in West Seattle.

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GUARDING ADMISSION TO OPERATING DEPARTMENT

The second article of Dr. H. E. Fisher on the medical methods of the Elevated Railroads of Chicago, published elsewhere in this issue, presents a strong and vividly illustrated argument for the thorough physical examination and rigid method of selection of trainmen. Although the importance of accepting for railway operating service only those who are physically fit is generally recognized in theory, this principle has not always been carried out in practice owing to the lax methods employed in examining applicants for physical defects which are not at first apparent. It is pure folly, from a financial standpoint, for any railway company to entertain the possibility, through slipshod physical examinations, of risking the lives and safety of its patrons in the hands of motormen afflicted with heart trouble or any other ailment liable to produce sudden disablement. Rejection may be a hard blow to the motorman who has previously served without mishap on another road which was less particular, but his former experience cannot counteract the unfairness of the latent danger to the public and loss to the company. The operating department cannot be treated like an old clothes basket but should avail itself of the services of an experienced medical man who is not so overburdened with other work that he cannot render conscientious examinations. We understand that Dr. Fisher's first article, which appeared in our issue of June 26, attracted wide attention from operating and medical men connected with electric railway systems. The one this week should be equally instructive.

TRACK CONSTRUCTION AND WORKMANSHIP

Essential to permanent track construction in which extreme care has been exercised in the choice of materials and design is skilled workmanship. Frequently this important element is neglected to minimize first cost, but greatly to the disadvantage of the life of any installation. Slighted workmanship, like the use of inferior materials, must be paid for by increased maintenance costs. Perhaps the pavement, which is a burden the track must bear although it is of no value in the operation of a street railway, is the most typical example of slighted workmanship. As a rule, in pavements which are laid by railway companies, extraordinary care is exercised in the selection of the materials to be used and in the strictness with which concerns furnishing materials are required to adhere to dimensions and finish. After extreme diligence has been exercised in this respect, however, many companies conclude that nothing further is necessary to secure first-quality results. Often labor of the cheapest and most unskilled kind is employed to lay the pavement. While the choice of materials and strict adherence to dimensions will, to a certain extent, affect the workmanship obtained from inferior labor, it will not produce the results that skill will obtain with the same material. A wide variation in the life of various types of pavement, not particularly as regards wear but as regards maintenance, is found on different properties. Undoubtedly this result may largely be attributed to the character of workmanship in laying the pavement rather than to the choice of materials and design. Common labor without experience should not be expected to produce a first-quality pavement, and neither should ordinary laborers who become skillful pavers be expected to become permanent employees at minimum day wages.

THE COST OF PEAK-LOAD POWER

A reference was made in an editorial in the issue of July 31 to generated energy that cost more than 50 cents per kilowatt-hour, and although this applied to a combined lighting and railway load subject to extreme seasonal variations as well as to high interest charges on distribution equipment, the extraordinary cost is well worth consideration in connection with properties operating only electric railways. Of course, such a figure is hardly possible in plain railway service, but it is a fact that even under normal conditions the generally accepted value of 0.8 cent per kilowatt-hour is wholly inadequate to express the cost of some of the energy that is consumed. Consider, for example, the daily peaks of a railway load in which the load line is of the same general form day after day. Upon the basis of the charges that are common for purchased power, these being probably as low or lower than those that would be involved if the railway generated its own power, and with a peak measured arbitrarily by averaging maximum morning and evening hours, all of the energy consumed in excess of the average demand of the adjoining hours would cost at least 2 cents per kilowatt-hour. If the afternoon peaks exceeded the morning peaks, one-half of the excess would cost 3.7 cents per kilowatt-hour, these costs being based on the customary rates of $1 per month per kilowatt of demand, plus 0.4 cent per kilowatt-hour for energy actually consumed. It is through the seasonal variations, however, that power costs reach a real maximum, as the peak for one winter month will usually exceed those of adjoining months by several per cent. Under this condition the excess energy consumed during the daily peaks of the high month (even assuming inappreciable variations from day to day and between night and morning) will cost some 25 cents per kilowatt-hour. The one thing, in fact, that saves the situation is that the energy which thus has to be supplied at high cost constitutes only a small proportion of the whole.

SPECULATION BY DIRECTORS

The New York Times *Annalist* in recent issues has been publishing an unsigned symposium of ideas in regard to the duties of directors in relation to buying and selling shares of stock of their own corporations. We were interested to find that although each of the men consulted had a fairly well-defined opinion regarding the proper practices in such a case, none came out with a ringing statement of a clear-cut standard of conduct to govern market transactions by directors. Each man expressed his personal opinion—some favored unlimited buying but condemned short selling, and others upheld all acts not known to be injurious to other stockholders. Almost all, however, seemed to be struggling in an apologetic manner with a subject about which little has been said publicly by corporate leaders and for which none desired to be the first to define the limits demanded by sound ethics. It seems to us that where so few positive statements are available and where none desires to sign his name in defense of acts that he thinks might be condemned, there is an opportunity for missionary work of a clear-speaking sort.

Two examples occur to us of the laudable in directorate affairs. In the above-mentioned review President Shaughnessy of the Canadian Pacific Railway was not loath to state emphatically under his own name that from the beginning of his company it was understood that no director should speculate in the stock market or take advantage of any information secured in advance of other stockholders by virtue of his membership on the board. No qualifications can be found in this platform. The second incident which we have in mind is the recent resignation of William B. Hibbs from his directorship of the Washington Railway & Electric Company and other public utility corporations. As a broker Mr. Hibbs was called upon to buy and sell securities of the several companies of which he was director, thus being placed in an embarrassing position and sometimes subject to criticism. His withdrawal is not proof that he could not maintain a rigid separation of his functions as broker and director but rather a praiseworthy recognition of the broad ethical precepts making the maintenance of such a position inadvisable.

The vital point underlying these examples—and a point also which the quoted directors in the *Annalist* by their very anonymity seemed to emphasize—is that there is in existence, though not entirely crystallized, a sound public opinion against the propriety of speculation or even the appearance of possible speculation by directors. Little hesitation would be shown by the public in condemning directors who used their office for personal aggrandizement to the detriment of other stockholders. For this reason publicity would be an acid test for all acts of directors. If every director were required by law to publish to the stockholders all his transactions in the corporation's securities, so that it might be known whether he profited by prior sales or otherwise while other owners lost, the temptation of speculation would, we think, be removed. While such a provision may never become law, we would advise directors to hold it up before themselves for their moral guidance. He who would recoil from such a public test would do well to set up ethical standards of a more certain propriety.

NEW TECHNICAL TERMS IN HEAVY ELECTRIC TRACTION

The coinage of new technical words and phrases and the addition of new meanings to existing electrical terms are going on at a tremendous rate, for every new development brings with it an array of new equipment and operations which must be discussed. The new terms are likely to be suggested hastily, but so urgent is the need for them that the first proposal may easily find its way into popularity, and usage fixes it for a time. Take, for example, that flexible and ubiquitous word "jitney." Of uncertain origin it appeared in the West as synonymous with nickel. Next it becomes an adjective largely appropriated by a certain, or rather uncertain, type of motor car, then by buses of more pretentious size. Next it becomes a noun again, meaning a certain type of vehicle. What it will mean next, nobody knows.

Another word is pantograph, which is occasionally spelled "pantagraph," although the former spelling is preferred by both the Century and Webster's dictionaries. This word comes from two Greek words meaning "all" and "write," and is the name of a very old instrument for the mechanical copying of engravings, diagrams, plans, etc., either upon the same scale or upon a reduced or enlarged scale. With this meaning it occurs in a number of languages in substantially its English form. Recently the word has been applied to a collapsible frame used in collecting current for certain types of electric cars and locomotives, the form of which suggested the form of the drawing instrument, although the significance of the name is lost. This is said, not to criticise the new use of the word, for the word may be as good as any for the purpose, but to point out the trifling nature of the origin of a new meaning for an established word. This is the way of all but dead languages, and we must reckon with it.

At the recent A. I. E. E. convention, C. J. Hixson discussed, among other subjects, the need for careful definition of terms used and needed in connection with electric railway contact systems. In general we agree with his suggestions, but not when he states that "common usage seems to have already classified trolley wire collectors into wheel trolleys, roller trolleys and slider trolleys." Now with all respect to common usage, whose absolute sway in the formation of language the ELECTRIC RAILWAY JOURNAL respectfully owns, it seems that the A. I. E. E., which presumably has considerable influence with common usage in its field, ought to remonstrate before it is too late. "Slider trolley" breaks loose from all convention and ignores the history as well as the later uses of the word "trolley." Trolley was originally a costermonger's cart, then a small truck or car for running on tracks in a rolling mill, then a little truck for collecting current from overhead wires, finally specializing, according to the Century dictionary, into "a metal roller or pulley arranged to travel over, upon, and in contact with an electric conductor suspended overhead and connected with a flexible conductor or trolley pole for conveying the current into the motor circuit on an electric car." The "Electric Railway Dictionary," published in 1911, also preserved the distinction between a revolving contact device for use by cars, like the trolley, and a sliding contact device, like the bow collector and the conduit plow.

We admit that engineering usage in the past has been somewhat loose in this matter, and we ourselves may not always have been consistent in the use of all of these terms. Nevertheless, it has always been the aim of this paper to exert its influence in the direction of exact and correct terminology, and it appreciates the rapidly increasing efforts which are being made by technical societies to conserve effort and prevent misunderstandings by means of careful definition. In the early stages of an art a certain amount of looseness of expression can be pardoned, but as methods and apparatus become more standardized it is the duty of all to unite upon a common nomenclature. It is to be hoped that the A. I. E. E. standards and railway committees will consider Mr. Hixson's suggestions and recommend such terms as will enable us to say exactly what we mean in a reasonable number of words.

THE BLUE HILL FARE DECISION

A consistent policy with respect to the encouragement of electric railway earnings is evidenced by the recent decision of the Massachusetts Public Service Commission in the Blue Hill Street Railway fare case, abstracted elsewhere in this issue. Recognition of the needs of struggling companies by the board was so well set forth in its notable Middlesex & Boston decision last fall (ELECTRIC RAILWAY JOURNAL, Nov. 7, 1914, page 1055) that the finding just announced in the Blue Hill case is the logical outcome of the former. In certain aspects, however, the Blue Hill case has unusual features, and the treatment of these by the commission is most illuminating.

The road is a small one, serving probably less than 20,000 local residents in the outer suburban territory lying around Mattapan Square, Boston, the Blue Hills, Milton, Canton and Stoughton. Its total trackage is about 20 miles, and the length of the main line only about 12 miles. Built by Stone & Webster fifteen years ago and ever since managed by these interests, the property has rendered valuable service to the public, but it has never been able to earn a dividend, despite the most careful operation. With a gross annual revenue of about $93,000 the company meets its operating expenses and bond interest but has been unable to make any consistent appropriation for depreciation. On pleasant Sundays in the summer it is almost overwhelmed with traffic, but at other times earnings are small, due to the low density of population, to the increasing use of automobiles and to steam railroad competition.

The company asked the commission for a fare increase which would yield an estimated additional revenue of about $11,000 per year, the most important feature of the proposed tariff being the establishment of an 8-cent fare unit in place of the existing 6-cent rate. A short investigation was sufficient to demonstrate the company's need of additional revenue, but in carrying out its proper conception of responsibility to the public the commission made a very careful study of the finances of the road, setting forth its reasoning and deductions with as much care as though the system were twenty times as large. Instead of authorizing the use of an 8-cent fare unit, however, the commission added a fourth zone and thus made the fare from terminal to terminal 21 cents instead of the previous 18. The establishment of this zone enabled the board to standardize a 5-cent fare unit in three zones, retaining the 6-cent unit in the zone nearest Boston, which compensates for various inequalities in distance or traffic as outlined in the abstract. The establishment of two-part tickets for use at all hours between certain residential and industrial points on the southern part of the road was deemed preferable to the issuance of workingmen's tickets good only at night and morning. Such a differential fare arrangement is most interesting, and would seem to be highly appropriate under the conditions as a means of providing for short rides at relatively low cost to the passenger while affording the company the increased income essential to its service.

As in the Middlesex & Boston case, the board dismissed reproduction cost as the touchstone of value upon which to figure rates, adhering to the actual investment for this purpose, safeguarded as the public has been by the Massachusetts anti-stock-watering laws for many years. In this connection, the remarks of the commission upon accrued depreciation are well worth reading, for the board emphatically holds to the idea that the public should pay for the wear and tear upon the property, and for its deterioration in its service, no matter whether that depreciation is met early or late, by a road honestly and capably managed, and which has been unable to set aside funds for this important function by reason of its paucity of revenue. Another interesting point is the selection of a sum representing the principal upon which the return is to be earned on a total lower than the company has shown to be correct but which still demands a substantial increase in rates before the proper charges can be met. By taking a sum thus so much to the advantage of the remonstrants to the increase and clearly demonstrating the inadequacy of the existing rates, the board leaves no opening for disagreement among those opposed to the increase as to the justice of its finding.

Examining the Physique of Chicago Elevated Employees

The Author Treats of the Methods Employed for Determining Physical Fitness and Emphasizes the Importance to the Traveling Public of Thorough Physical Examination of Applicants and Employees

BY H. E. FISHER, M. D., SURGEON ELEVATED RAILROADS OF CHICAGO, ILL.

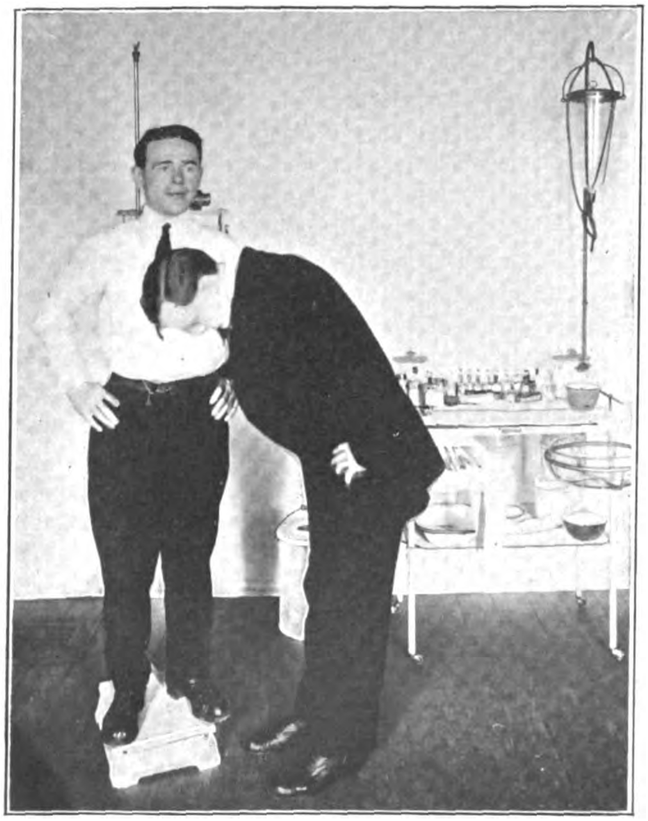
After the sight, hearing, color perception and mentality of an applicant or employee of the Elevated Railroads of Chicago have been examined he should pass a series of practical physical tests. To give a thorough examination, it is essential to have the applicant stripped, at least down to the waist line. This permits the examiner to have a better opportunity to obtain information which otherwise would be lost. It is not always practicable or feasible to strip a man, but it is important that he bare his chest and abdomen. In the examination of the heart and lungs it is necessary to get down to the skin surface to hear clearly the various chest sounds. It is folly and poor practice for a physician to try to examine a man's heart or lungs through a number of layers of heavy clothing. These deaden the chest sounds, and the delicate murmurs of the heart and the râles of the lungs are lost. The right and wrong ways to examine the heart and lungs are shown in the two accompanying illustrations.

I recently had the foregoing fact illustrated in the case of a man who had been examined and accepted for promotion to motorman on a high-speed interurban railroad. Later I had an opportunity to examine this man for a position as guard. With his chest bared, a dangerous organic heart lesion was found by using a stethoscope, much to the embarrassment of the applicant. Failing to understand how a railroad examiner would pass such a dangerous risk for the hazardous work of a motorman, I questioned the applicant. He informed me that the doctor had made the heart examination with his ear and through the clothing, and I quickly understood how the heart lesion had been overlooked. That error in technique on the part of the medical examiner might have resulted in a serious accident in case the motorman had heart failure while driving his car. This applicant offered strenuous objection to baring his chest when I examined him because, no doubt, he was aware of his heart condition and knew that an examination with the chest exposed would result in his being refused employment.

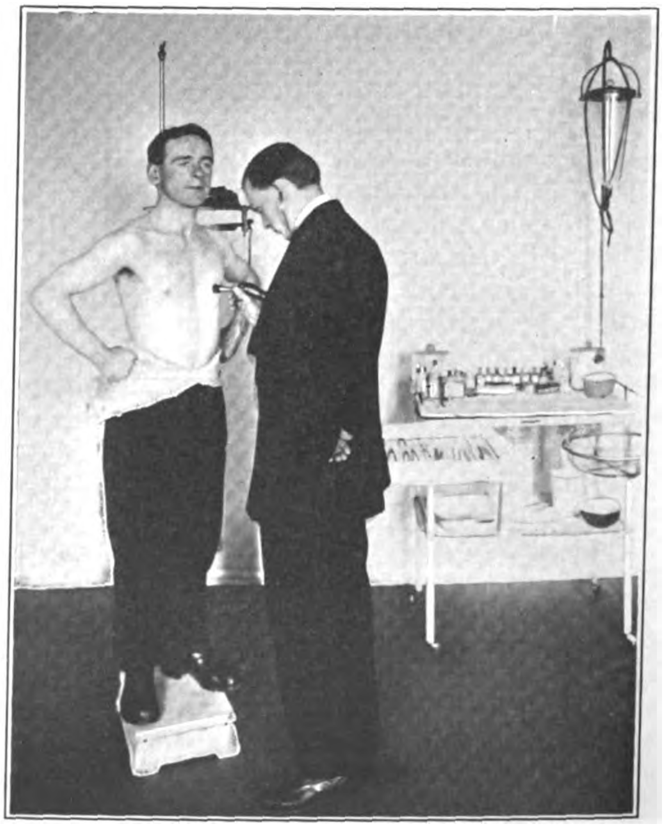
EXAMINATION OF HEART

In the medical office of the Elevated Railroads of Chicago the applicant's or employee's heart is carefully examined with the latest instruments. The condition of the heart valves, presence or absence of heart lesions, character of the heart and pulse beats, position of the heart apex, whether normal or displaced, the relative size of the heart and any pathological changes in the heart as indicated by the various characteristic sounds are carefully recorded.

A rapid beating of the heart found at the time of



CHICAGO ELEVATED PHYSICAL EXAMINATION—IMPROPER METHOD OF EXAMINING HEART AND LUNGS



CHICAGO ELEVATED PHYSICAL EXAMINATION—PROPER METHOD OF EXAMINING HEART AND LUNGS examination may often be attributed to some heart defect when, in fact, it is due to the nervous state of the applicant when the heart tests are made. It is always better practice to put off the heart tests until near the end of the examination. By that time the applicant's excitement has disappeared and the real status of the heart can be obtained.

Any heart lesion is good cause for rejection of an applicant. It is imperative that the heart be normal or nearly so to minimize the risk to the passengers. All motormen should have normal hearts to avoid the chance of their losing control of their trains due to a heart failure. Some may say strictness in this particular is unnecessary because the installation of the "dead man's control," which, if an accident occurs, will bring the train to a stop. Too much reliance for the protection of passengers and property, however, should not be placed in mechanical devices, because they sometimes fail at the critical moment.

In re-examination of old motormen a weak heart should receive careful consideration. Such a man is a dangerous risk to put in charge of the front end of a train. He should be relieved of his responsibility and be appointed to a less hazardous position where he can make a good living. Sentiment in this respect and willingness to take a chance that an old motorman's heart will not fail him open the way to a serious accident. It is far better to reduce one motorman with a defective heart than to allow him to continue work which may not only result in his own death but jeopardize the lives of the passengers on his train. Some medical examiners, upon finding a motorman's heart defective, believe it can be remedied and recommend a leave of absence to undergo treatment. When the motorman's heart has improved he is permitted to resume his former duties. To my way of thinking such practice courts disaster and should not be tolerated.

When an employee returns from sick leave on account of rheumatism, gout, contagious or infective diseases his heart should be examined before he is permitted to resume his duties. All employees who have been sick for more than one week are examined before they are allowed to return to work.

PULMONARY LESIONS AND RUPTURES

In the examination of the lungs the presence of pulmonary lesions, such as tuberculosis or chronic bronchitis, are sought. An applicant suffering from tuberculosis should be rejected and urged to secure medical advice and treatment. Those affected with this disease should not be permitted to serve the public, because they are a constant menace to the good health of others. Experience has shown that there is no better habitat for the tuberculosis germ to get in its deadly work than in a closed car, especially in the winter time. The danger of this disease to those afflicted with it is increased when they work where they are exposed to quick changes of temperature and humidity.

Recently the author was asked to allow an employee who had been under the care of a physician for tuberculosis to return to work as a guard. The employee's physician had advised that the outdoor life on the elevated railway would be of great benefit, and besides the employee needed money and it was necessary for him to return to work. Permission was granted to try the work for a short while, but the employee was obliged to give it up because his physical condition grew worse. This example is typical of all cases of this kind. Outdoor work on a street car in the Central States, where weather and temperature changes come in rapid succession, is not beneficial for those with tuberculosis, and they are always a menace to the public.

Continuing with the examination of an applicant, it is also important to ascertain whether a rupture is present. Tests for rupture are so easily performed and so quickly accomplished that there is no excuse for allowing this part of the examination to be slighted. Neglect in this particular has led to suits for damages for a rupture alleged to have been received in an accident after an employee had entered the service, when in fact the rupture was of long standing and should have been discovered before he was given employment. It is true that surgeons often can distinguish between a recent rupture and one of long standing, but this is not always reliable. It is far better practice to be on the safe side and examine each new man thoroughly before he is engaged.

In regard to the claims for damages for ruptures alleged to have been received while in the employ of a company, the author knows of three cases which are being tried at the present time in the courts. In two of these cases no examination was made at the time of giving employment, and in the other case the surgeon did not examine for rupture. Medical testimony, also, bears out the point that the ruptures were of long standing and not of recent origin, but this was insufficient to throw the cases out of court.

All shopmen, road department men, electrical men and ordinary laborers who are permanently engaged should receive a careful physical examination at the time they enter the service and at three-year intervals thereafter. This will furnish a record of their physical condition, and in case any employee meets with an accident, proof is at hand to determine whether the accident caused the injury, whether they were predisposed to such an injury, or that the defect was present when they were first employed by the company.

Employees in the electrical department, particularly linemen, should have practically normal hearts. Experience has demonstrated that a man with a weak or defective heart cannot stand an electrical shock so well as a man with a normal or strong heart. A shock which would not necessarily be fatal to a normal heart has in many cases been sufficient to cause the death of men with defective hearts.

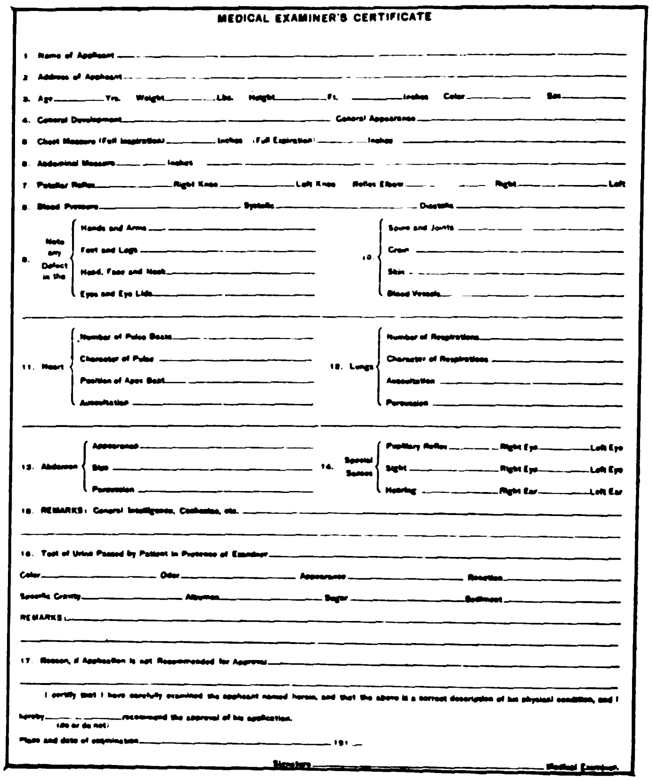
PHYSICAL CHARACTERISTICS AND AGE

Trainmen, and in fact all employees in the transportation service, should be at least twenty-one years of age and at least 5 ft. 6 in. in height. The only exception to this age should be in the shops where apprentices are employed. In the train service a man of youthful appearance does not command respect. Passengers like an older man, and, moreover, the rowdies are more prone to start trouble when a boy is in charge of the train. Youths are not disposed to be careful of themselves and passengers and are inclined to take greater risks than their seniors. Some may contend that this is a debatable question and claim that young men often make better trainmen than old men. I am satisfied that this is not generally true, but of course there will be instances where boys were geniuses, born to be trainmen. The older men are conscientious in the discharge of their duties, because in most cases they have families dependent on them and they cannot afford to take risks which might jeopardize their position or their pay envelopes. Before the age of twenty-one years few men look upon life seriously, and the youthful trainmen often do not care whether they hold their jobs or not. Moreover, younger men of the class from which trainmen are selected are not always as steady workers as older men, and they change from one position to another.

Undersized men, while a valuable asset in other walks of life, are not desirable in the train service. Trainmen of this class have difficulty in reaching the bell and register cords, and they are obliged to stand on the seats to open ventilators. In a crowded car the small men may occasionally find it impossible to see their signals, fares or streets over the heads of their passengers. On a crowded car platform the short conductor is often unable to see that passengers have safely alighted but takes a chance and gives a hasty bell signal which may cause an accident. Moreover, the small man is often imposed upon by those prone to make trouble, because trainmen of diminutive stature do not command the respect that trainmen of normal or large size do. Although the small man frequently has greater courage than the large man, the disadvantage to which he is put on account of his size more than counterbalances this advantage.

OTHER MATTERS TO CONSIDER

Tests of the various nervous reflexes should be made to ascertain the absence or presence of serious nervous diseases. It is useless to dwell on the subject of railroad employees who have perfect use of their limbs. No man should be taken into the train service who has lost a leg or an arm or who is crippled so that he cannot get about freely. Agility is the watchword of "safety first." Men who have lost a leg or an arm in the service should be given employment, possibly as flagmen at street crossings, providing, of course, that their sight and hearing are good. Flagmen whose duties include the operation of crossing gates should have unrestricted use of their legs and arms. Experience has demonstrated that accidents often occur at crossings guarded by crippled men and, in addition, the company may be held for negligence because its employee was not in good physical condition.



MEDICAL EXAMINER'S CERTIFICATE

1 Name of Applicant ______
2 Address of Applicant ______
3. Age ______ Yrs. Weight ______ Lbs. Height ______ Ft. ______ Inches Color ______ Sex ______
4. General Development ______ General Appearance ______
5 Chest Measure (Full Inspiration) ______ Inches (Full Expiration) ______ Inches
6. Abdominal Measure ______ Inches
7. Patellar Reflex ______ Right Knee ______ Left Knee Reflex Elbow ______ Right ______ Left
8. Blood Pressure ______ Systolic ______ Diastolic ______
9. Note any Defect in the
  Hands and Arms ______
  Feet and Legs ______
  Head, Face and Neck ______
  Eyes and Eye Lids ______
10.
  Spine and Joints ______
  Groin ______
  Skin ______
  Blood Vessels ______
11. Heart
  Number of Pulse Beats ______
  Character of Pulse ______
  Position of Apex Beat ______
  Auscultation ______
12. Lungs
  Number of Respirations ______
  Character of Respirations ______
  Auscultation ______
  Percussion ______
13. Abdomen
  Appearance ______
  Size ______
  Percussion ______
14. Special Senses
  Pupillary Reflex ______ Right Eye ______ Left Eye
  Sight ______ Right Eye ______ Left Eye
  Hearing ______ Right Ear ______ Left Ear
15. REMARKS: General Intelligence, Cachexias, etc. ______
16. Test of Urine Passed by Patient in Presence of Examiner ______
Color ______ Odor ______ Appearance ______ Reaction ______
Specific Gravity ______ Albumen ______ Sugar ______ Sediment ______
REMARKS: ______
17. Reason, if Application is not Recommended for Approval ______

I certify that I have carefully examined the applicant named herein, and that the above is a correct description of his physical condition, and I hereby ______ (do or do not) recommend the approval of his application.

Place and date of examination ______ 191_

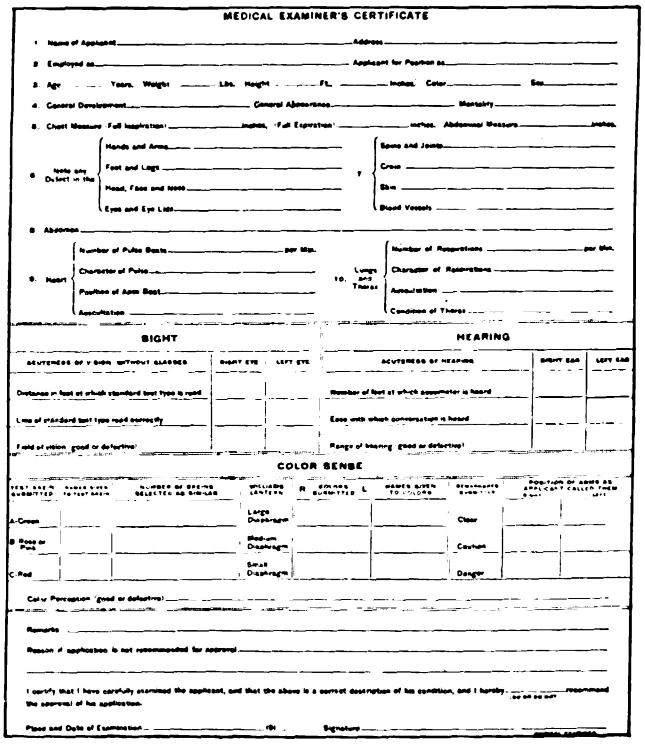
Signature ______ Medical Examiner.

CHICAGO ELEVATED PHYSICAL EXAMINATION—FORM OF TRAIN SERVICE EXAMINATION

All applicants should be carefully examined for old fractures or broken limbs. Frequently a trivial accident will result in breaking an employee's arm or leg which may necessitate the payment of damages. On the other hand, care in this respect might have obtained a record of an old fracture which really contributed to the break because the leg was not so strong as, without the previous fracture, it should have been.

INFECTIOUS OR CONTAGIOUS DISEASES

Personal appearance was discussed in my first article, published in the issue of the ELECTRIC RAILWAY JOURNAL for June 26. In this article it was also stated that men with infectious or contagious diseases should not be employed. This suggestion applies particularly to those afflicted with venereal or specific diseases, because they may be conveyed to passengers with transfers or money. Any man in the acute stages of a venereal or specific disease should be relieved from duty and advised to secure competent medical treatment. In the case of employing new men, should their examination show diseases of this nature, they should be disapproved. These conditions reduce the efficiency of the man and are often the cause of fainting fits or convulsions. Any man addicted to alcohol or drugs, especially when there is an authentic history of such indulgence, has no place in railroad service because he is not reliable.



MEDICAL EXAMINER'S CERTIFICATE

1 Name of Applicant ______ Address ______
2 Employed as ______ Applicant for Position as ______
3. Age ______ Years. Weight ______ Lbs. Height ______ Ft. ______ Inches. Color ______ Sex ______
4. General Development ______ General Appearance ______ Mentality ______
5. Chest Measure (Full Inspiration) ______ Inches. (Full Expiration) ______ Inches. Abdominal Measure ______ Inches.
6 Note any Defect in the
  Hands and Arms ______
  Feet and Legs ______
  Head, Face and Neck ______
  Eyes and Eye Lids ______
7
  Spine and Joints ______
  Groin ______
  Skin ______
  Blood Vessels ______
8 Abdomen ______
9. Heart
  Number of Pulse Beats ______ per Min.
  Character of Pulse ______
  Position of Apex Beat ______
  Auscultation ______
10. Lungs and Thorax
  Number of Respirations ______ per Min.
  Character of Respirations ______
  Auscultation ______
  Condition of Thorax ______

SIGHT

Acuteness of Vision without Glasses	Right Eye	Left Eye
Distance in feet at which standard test type is read		
Line of standard test type read correctly		
Field of vision (good or defective)		

HEARING

Acuteness of Hearing	Right Ear	Left Ear
Number of feet at which acoumeter is heard		
Ease with which conversation is heard		
Range of hearing (good or defective)		

COLOR SENSE

Test Skein Submitted	Names Given to Test Skein	Number of Skeins Selected as Similar	Williams Lantern	R Colors Submitted L	Names Given to Colors	Semaphore Submitted	Position of Arms as Applicant Called Them Right	Left
A-Green			Large Diaphragm			Clear		
B Rose or Pink			Medium Diaphragm			Caution		
C-Red			Small Diaphragm			Danger		

Color Perception (good or defective) ______

Remarks ______

Reason if application is not recommended for approval ______

I certify that I have carefully examined the applicant, and that the above is a correct description of his condition, and I hereby ______ (do or do not) recommend the approval of his application.

Place and Date of Examination ______ 191_ Signature ______ Medical Examiner.

CHICAGO ELEVATED PHYSICAL EXAMINATION—FORM FOR ALL OTHER EMPLOYEES

When there is a history of fainting spells, epileptic fits or convulsions, applicants should not be admitted to service. In the case of old employees all fainting attacks should receive very close observation, and any man unable to give a sufficient reason for fainting should be relieved from duty. More than one attack of fainting by the same employee should be cause to remove him from the service. Fainting spells and epileptic convulsions are dangerous risks both to the employees and the passengers entrusted to their care. Men subject to this weakness are liable to become unconscious at a critical time and cause an accident. A railroad keeping in a hazardous occupation an employee with a history of fainting fits is playing with fire and courting trouble. Every case of initial fainting should be closely investigated to justify the employee and not deprive him of his usual means of livelihood unless there is ample reason for it.

FORMS USED

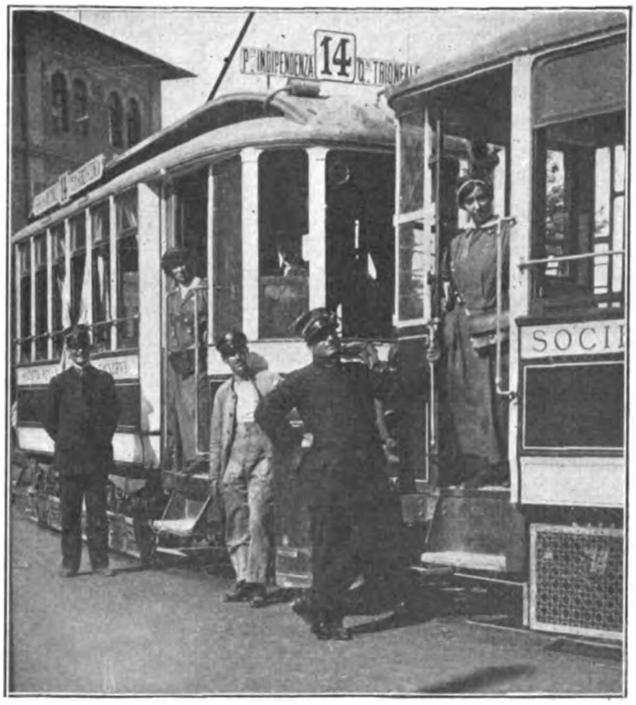
The form used by the Elevated Railroads of Chicago to record the physical examination is shown in one of the illustrations on page 218. This form is prepared in duplicate, one copy for the examiner and the other copy for the superintendent. The latter copy is filed with the employee's original application for employment.

The other form shown is a combined form used for all employees other than those in the train service. Reference to my previous article will show the standard requirements for physical examination. Where a company benefit association is in operation all employees and applicants should have a urine analysis, thorough examination being made to discover any constitutional and systemic diseases.

On the Elevated Railroads of Chicago all employees in all departments except the ticket agents and the clerical forces are examined. This practice furnishes a complete record of each employee's present and past medical history. Thorough and systematic examinations insure a better class of employees, greater efficiency and tend to reduce the number of accidents and injuries. Such a practice is therefore a protection to both the employees and the corporation, and should be the cardinal safety-first measure.

Bus Competition with London Tramways

At a recent meeting of the London County Council it was stated that motor bus competition existed on 100 miles of the Council's tramway routes. The number of bus-miles run annually over these routes was roughly estimated at 20,000,000, the cost being estimated at 16 cents per mile. The number of men employed by the buses was estimated to be 1500, while the additional number of men required on the tramways to carry the passengers now taken by the motor omnibuses over the routes in question would be only 460, the additional number of cars being 184. Attention was directed to the loss to the country of the services of more than 1000 men, whose labor was uselessly performed under the existing conditions.

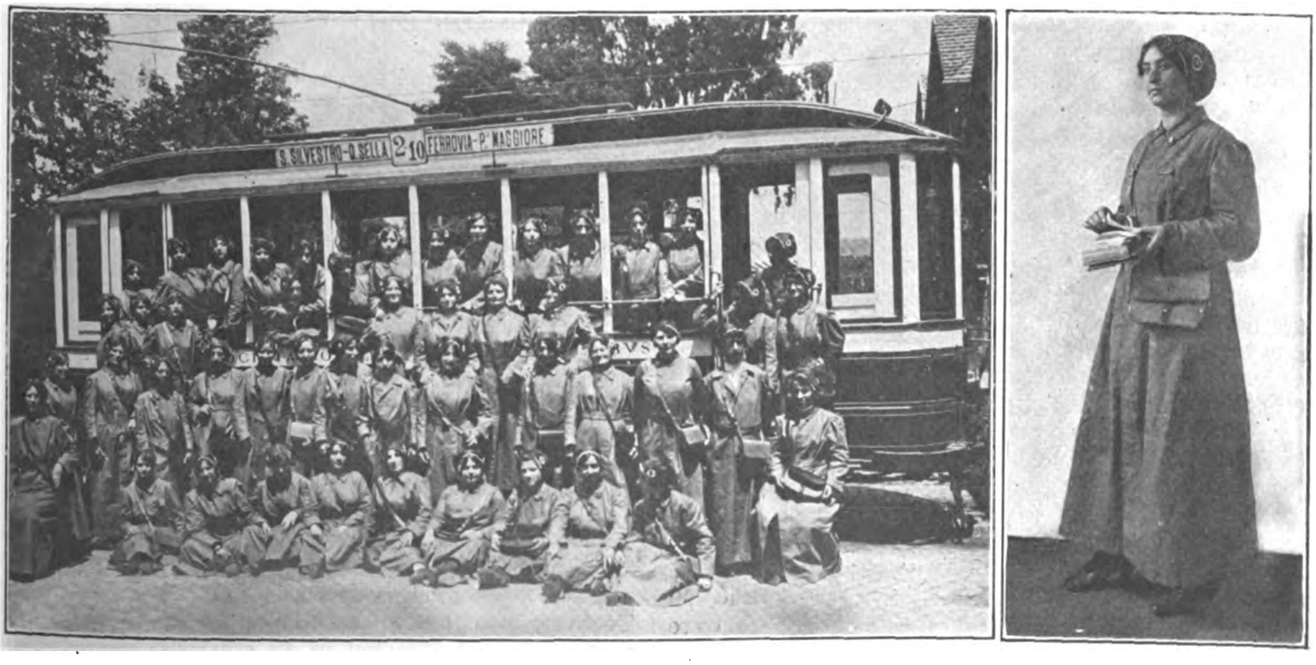


CONDUCTORS AND CARS USED IN ROME

Women Conductors in Rome

The European war in which Italy is now engaged has made its draft, as in other countries, upon the able-bodied men in the country, and a large number of the men employed by the different tramway companies have enlisted under the colors and have gone to the front. Under these circumstances the tramways have turned to women as conductors, and the accompanying views show some of those employed on the Società Romana Tramways-Omnibus, which operates the tramways in the Eternal City.

As shown in the engravings, the women wear a neat uniform with badge and carry the usual pouch for holding the pad of fare receipts used by the European countries for the various lengths of ride paid for under the zone system of fares. According to the management of the Rome tramways the service of women conductors have been verv satisfactory.


S. SILVESTRO-Q. SELLA 210 FERROVIA-P. MAGGIORE

GROUP OF WOMEN CONDUCTORS AT ROME—CONDUCTOR IN UNIFORM

Economics of the Jitney Bus Movement*

Factors Contributing to Its Development, Regulation and Cost of Operation—Effect on Owner, Railway and Public—Possibilities at Higher Rate of Fare

BY F. W. DOOLITTLE, DIRECTOR BUREAU OF FARE RESEARCH

It was not until late in the summer of 1914 that jitney bus transportation was recognized as a type, and it is probably true that a very considerable impetus was given to this business by the extent of unemployment existing at that time. While no accurate and comprehensive figures are available showing the number of buses in service from time to time, a rather careful examination of such data as are available indicates that we may date the origin of the industry as of Sept. 1, 1914. Its extent increased very rapidly until Jan. 1, 1915, after which it fell off slightly, reaching the previous high point again on March 1. Since that time, with the advent of more favorable weather conditions and the increase in tourist travel, the number of buses in service has increased slightly. The maximum number in service at any time appears to have been about 6000. Various factors have contributed since the latter part of 1914 to the growth of the jitney business, and these will be enumerated and discussed more fully later. It is apparent, however, that unemployment in the skilled trades, the accumulation of a large stock of second-hand cars normally idle, wide advertising in the newspapers of this novel method of competition with street railways, and the appeal to a large number of people made by an opportunity to ride in a car, as is customary on the part of their more prosperous neighbors, are the principal reasons for the very rapid growth in the number of jitney buses in operation during the later months of 1914 and the early months of this year. At present, the total number of buses in operation in the cities where the development has been under way the longest is practically stationary where no regulation has been attempted, and where there is some form of control the number is somewhat less than it has been in the past. In this connection, however, it is of considerable import that while the number of vehicles has remained for some weeks practically stationary, the personnel of those interested in this industry has been changing at a rapid rate. In one instance, out of some thirty men meeting to organize a jitney owners' association none was present at a meeting of a similar number of men held a month later, although in the meantime the number of jitneys in operation had remained about the same.

What the influence on electric railways of this type of competition may be it is difficult to predict. The jitney bus competes for business with the street car, but it competes also to a considerable extent with the taxicab and the somewhat more common method of transportation—walking. However, in certain cities there has been, since the advent of the jitney, a marked decline in electric railway revenues, traceable no doubt in part to general industrial conditions, but probably more largely to jitney competition. In small towns where the traffic is light and the length of haul short, the advantage of the jitney bus is greater than in large cities, and it may be expected to offer more serious competition to the smaller electric railways. Figures for a recent month from three cities, comparable except for size, show that for populations of 400,000, 40,000 and 20,000 the decreases in passenger revenues were respectively 15, 40 and 60 per cent. It is, of course, impossible to say how much of this loss was due to competition from jitney buses and how much to industrial depression, and the facts are given only for what they are worth. A somewhat detailed study of the situation, as will be shown later, indicates to the writer that this type of competition will not be permanent, because the jitney operators are exhausting their capital to make a wage which would not be attractive were industrial conditions better. The permanence of any industry, the returns from which are not sufficient to maintain the physical property as well as to pay operating expenses, is to be seriously questioned; and it is evident in some quarters that the continued existence of the jitney bus as a transportation factor has been due to the advent of the second or even third generation of investors in the industry following the exhaustion of the capital of their predecessors.

FACTORS AFFECTING THE DEVELOPMENT OF THE JITNEY BUS BUSINESS

Taking the matter up more in detail we will examine the factors which apparently were principally effective in promoting the development of the jitney business. From the standpoint of the owner and operator of the jitney bus, the most favorable factors have been as follows:

1. Small investment is necessary to engage in the business. The practice maintained by automobile salesmen of accepting in exchange for a new car an old one at a fair figure has been made possible by the point at which the price of the new car was fixed. These second-hand cars then, taken in exchange on new cars, have been available to purchasers at a very low figure and they have also been used in the jitney business by automobile dealers who hire operators to conduct the business on a salary or on a percentage basis.

2. The industrial conditions existing during the past year, particularly during the latter months, were such that a large number of skilled laborers found themselves out of employment. Frequently these men had accumulated a small amount of capital which they have invested in new low-priced cars or in second-hand cars. A very striking instance of this occurred in a New England city where, immediately following the closing of the mills, a large number of former employees entered the jitney business. It is altogether likely that a return to better industrial conditions would eliminate from the jitney bus business a large number of men who are now willing to accept a smaller wage than they are accustomed to, or who have found that the hazards of jitney operation are less to their taste than those of the employment for which they have been trained.

3. There frequently arise conditions under which an individual is willing to make certain sacrifices in order to obtain immediate returns on a prior investment. Such is no doubt the situation in the case of a considerable number of jitney owners. These men, during more prosperous times, acquired cars which they have not for some months felt they could properly afford. To these men the opportunity to obtain a quick return on this capital invested in an otherwise unproductive piece of equipment has proved strongly attractive. They

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*Abstracted from an article in *The Journal of Political Economy*, Chicago, July, 1915.

have entered the field in spite of the fact that under the customary conditions of operation they will, before a great while, have so depreciated the car as to make its remaining value negligible.

In the foregoing we have considered individuals who could weigh the somewhat involved principles of depreciation and the accounting which should properly accompany wasting assets. There are, however, a large number of individuals to whom the future is a closed book, and these probably constitute a major portion of those who have attempted to carry passengers for various distances at a fixed charge of 5 cents. One of the unfortunate phases of this experiment in transportation is that it appears to be likely that a considerable number of those who have engaged in it have been deprived of their accrued capital through their failure to recognize the fact that profits are properly computed only after the integrity of the investment has been assured in addition to the payment of operating expenses.

4. There has been for many years no more popular subject for the newspapers of this country than the public utilities. Any institution which affects as vitally as does the average public utility, and to as wide an extent, the members of a community, carries with it a news value. As a result the competition offered to electric railways in many cities by the jitney buses has secured a publicity which the competitors of other industries could not have obtained. It is immaterial that many newspapers have conducted so-called campaigns against the public utilities in their communities, for whatever affects any considerable number of the people has perforce a place in the newspaper read by those people. An additional factor of publicity has accrued through the very obvious advertising that the jitneys have done for themselves by their movements throughout the communities in which they operate. A ride in an automobile for 5 cents has been until recently something to occasion comment, and the appearance on the streets of a city of a large number of these cars carrying their advertisements on their wind shields has brought this new industry to the attention of a very considerable part of all the people.

From the standpoint of the patron of the jitney bus, there have been three factors favorable to the rapid growth of the habit of their use:

1. The novelty of going to and from one's work in an automobile, riding, as some of the jitney operators have felicitously expressed it, "on rubber and on air," has no doubt influenced many to use this form of transportation. This factor is, however, one which will decrease as time goes on. Many industries have been built up and have thrived for a short period, particularly in the amusement field, on the principle that novelty is as salable as more substantial commodities.

2. For a large part of the population of our cities, in spite of the constantly decreasing cost of automobiles, their use as a customary means of transportation is rare. No doubt a strong influence in the development of the riding habit has been the personal satisfaction which has come to the patrons of the jitney bus through a feeling, more or less definitely conceived, that they are, by adopting this means of transportation, bridging for the time being the gulf between themselves and their more fortunate neighbors in the matter of automobile riding.

3. The jitney bus is able under an unregulated status to offer certain conveniences which cannot be furnished by street railways handling passengers in larger groups. In the first place, the jitney operator is free to run his car to the curb and in fact on to a side street as an accommodation to his patron. He can vary his route at will, and there is a certain convenience resulting to passengers from this. It should of course not be overlooked that what is a convenience to one passenger may be an inconvenience to another, but with the small numbers ordinarily handled in an automobile the conflict of interest is not so certain nor extreme as is the case with the larger numbers handled in one group by electric railways.

Under the head of convenience may be mentioned the higher speeds of automobiles. This is due to three factors: the design of the automobile, its ability to detour, and the smaller number of stops necessary to receive and discharge a few passengers than many. The progress being made throughout the country in the adoption of the designated stop scheme by electric railways is tending to lessen the difference in running time of jitney buses and street cars.

The smoking privilege has very largely been curtailed on electric railway cars because only a minority of the passengers would be favored by its retention. In open automobiles smoking is presumably less offensive to those who do not indulge than it would be in a closed street car. Here, again, the possibility of conflict of interest is less in the case of the small groups riding together in automobiles than in the case of the larger number riding together in the street car. It should not be overlooked that at certain seasons of the year throughout the country, and for a major portion of the year in certain sections, considerably greater pleasure results from a ride in the open air than in a street car.

Some of the privileges and conveniences here enumerated are likely to be curtailed by regulation, but it is evident that there will always be at certain times and for certain individuals conditions which lead them to prefer the jitney bus as a means of transportation. On the other hand, while the factors here mentioned as favorable to the development of the jitney business, both from the standpoint of the owners and operators and from that of the patrons, have been developing, other factors have been exerting apparently a greater force toward the elimination of this means of urban transportation.

From the standpoint of the owner and operator these unfavorable factors may be classified as follows:

1. *Regulation.*—A rather interesting statement of the necessity for regulation indicating the point of view of a number of city governments is contained in the message of Mayor Rose of Los Angeles to the City Council, Dec. 23, 1914.[1] The statements there made are rather typical and their appeal to local interest accounts, in a measure, for the rapid growth of regulation.

The communities in which jitney buses have been most rapid in their growth have attempted to regulate them in a variety of ways. The principal features covered in the earlier ordinances have been followed in the later ones, and the most complete and carefully thought-out regulatory provisions have been based on a consideration of the following factors:

(*a*) Responsibility: To accomplish this there has been generally required of the jitney owner a bond for the protection of individuals who are injured through the carelessness or negligence of the driver.[2]

(*b*) Safety: This has been promoted by fixing the requirements for drivers in such a way as to eliminate those least fit to operate cars. In certain cities a special examination of drivers is required, and in most cities which have adopted regulatory measures a complete means of identification of drivers is required for the use of the police department. Jitney operators are, of course, subject to police regulations as to traffic rules.

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[1] See ELECTRIC RAILWAY JOURNAL for Jan. 2, 1915, page 76. [EDS.]

[2] In one of the Pacific Coast cities each of the three bonding companies there represented has, since the advent of the jitney bus, refused to issue indemnity insurance for such vehicles, and in another city, somewhat smaller, the rates for such policies have been increased from an annual fee of $50 to one of $250.

(*c*) Reliability: It has been deemed necessary for the convenience of the public that routes and charges be fixed, and many ordinances contain provisions to this effect. The tendency, early observed in many cities, to use the jitney for immoral purposes has led to certain provisions being made with regard to the lighting of closed cars.

(*d*) There appears in most regulatory ordinances provision for the licensing of jitneys and fees of various amounts have been imposed. In general these fees have not been particularly large, although there is a growing tendency to require these carriers to contribute by the means of special taxes to the extra burdens imposed upon the police and street departments in the cities in which they operate. These burdens imposed by regulations have eliminated a considerable number of the less efficient and less desirable jitney operators from the field, some because of their unfitness to operate a car and others because the added financial burden made it impossible for them to pay current expenses.

2. *Community requirements.*—Closely related to regulation, although properly classified under a separate head, are the requirements which the communities have imposed upon the jitneys in the way of contribution to public funds. Many cities have taken this step having in mind the fact that the money collected for transportation by the street railways is assessed for general purposes, and any diversion of this transportation income from street railways will lessen the amount thus contributed unless the agency to which the payments are diverted has imposed upon it burdens similar to those imposed upon the street railways. In certain cities as high as 15 per cent of the money paid to street railways for transportation finds its way into the coffers of the city, and it is apparent that any considerable lessening of the street railway's income will constitute a serious decrease in funds accruing to the city from this source.[3] An interesting phase of this matter is that of paving requirements. In the days of horse-drawn vehicles it was held that since this transportation agency in its use of the public streets for gain damaged the paving to a considerable extent, it should contribute to the funds necessary to lay and maintain paving by means of payments in the nature of a direct tax. Upon the change in motive power whereby the cable and later the electric motor replaced the horse, no corresponding change was made in the assessment against the railway for paving, so that at the present time street railways face the anomalous situation of being required to install and maintain a large amount of paving which they damage not at all, the tax being an inheritance from a time when they did contribute in some degree to the wearing out of pavement. Up to the present time no considerable progress has been made in the matter of assessing against the jitney buses an equitable share of the costs resulting from the wear of paving. It is evident, however, that in those communities in which the jitney has made serious inroads into the revenues of the electric railways the city treasury will shortly be under the necessity of obtaining from some other source funds for paving maintenance which have previously been furnished by the railways. A similar situation exists in regard to street sweeping, sprinkling and removal of snow.

3. *Depreciation charges.*—As has been indicated previously, the wasting of capital through the depreciation of the automobile has not been given proper weight in many cases. As the second-hand cars, and to a less extent the new cars which have entered this field of transportation, reach a point at which they can no longer be operated, the necessity for considering depreciation is being brought more forcibly to the attention of the owners. Those who entered the business first are now rapidly being brought face to face with this necessity, and although many operators have not yet given due weight to this factor, it will have, as time goes on, an increasingly greater force in determining whether or not the jitney bus is to remain.

4. *Cost of operation.*—The chief factor tending to discourage owners and operators of jitney buses is the high cost of automobile operation. This is a subject which has been gone into with a considerable degree of care, and the results of the computations based on actual operating experience in a number of cities are such as to indicate that, neglecting for the moment the wasting of capital, the average jitney operator is unable to make a reasonable daily wage over and above his cost of operation.[4]

THE ECONOMIC STATUS OF THE JITNEY BUS

We will look now at the economic status of the automobile engaged upon the public highways as a common carrier. It appears that this amounts to a reappearance of a type of transportation which vanished with horse-drawn vehicles upon the introduction of electric transportation, and it will be worth while to consider from various standpoints whether or not under present circumstances this type of transportation can return to supersede the more systematic type furnished by electric railways. While there are at present, in various cities, associations of jitney operators, not much progress has been made in the realization of their common interest by those engaged in the industry. With such a realization there would tend to come combinations and the formation of companies to take over and control the present scattered businesses. Such a development would greatly increase the ease of regulation and the effectiveness of control, and would probably result in making the possession of a franchise a condition of operation. Such changes do not appear to be a matter of the immediate future.

Obviously, the jitney bus will continue to exist if it can render a certain service at a less cost than its major competitor, the electric railway, or if it can render a better service at the same cost. The word cost in the previous clauses must be assumed to include a proper contribution to state and municipal funds. In other words, the existence of a subsidized industry, which is what the jitneys will amount to if they are relieved of their proper share of the burdens of the community, may or may not depend upon the factors which will be analyzed in an attempt to determine whether or not under free competition the jitney business will be permanent.

The question of the success of this experiment in urban transportation depends primarily upon three factors: (1) Is it profitable for the owner and operator? (2) Is it able to furnish a service to, and supply the needs of, a considerable portion of the community at a price within the ability of its natural patrons? (3) Is it upon general grounds advantageous to the com-

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[3] Detailed figures of such loss of revenue are given herewith:

Company	Estimated Annual Reduction in Gross Income Due to Jitneys	Loss in Taxes to State 5¼ Per Cent	Total Loss to Public 12 per cent
San Francisco	$920,000	$48,300	$110,400
Los Angeles	730,000	38,300	87,600
Oakland	300,000	15,700	36,000
Sacramento	37,000	1,900	4,400
Miscellaneous (estimated)	513,000	26,900	61,500
Total probable	$2,500,000	$131,200	$300,000

If the public is not to be the loser this sum must be paid in taxes by the jitneys.

[4] See special report on cost of jitney bus operation by bureau of fare research abstracted in ELECTRIC RAILWAY JOURNAL for March 27, 1915. Figures on the cost of jitney operation from the report are quoted in part by Mr. Doolittle. [EDS.]

munity? Obviously an industry might exist and secure, at a profit to itself and at a rate within the reach of a considerable number of people, business which it would be contrary to public policy to permit to exist. We have discussed somewhat at length in previous pages the question of the cost of operation. Assuming that the operator of the jitney bus bears his proper share of the expenses of the community as a whole and that he protects his investment, it becomes evident that there is only a relatively small part of the total transportation business in any community for which he can compete. Under these circumstances transportation by automobile at a 5-cent fare cannot supplant for the city as a whole the transportation furnished by the electric railways. The existence then of competition for what may best be termed "short-haul" business[5] appears likely to place upon the electric railways a burden such that it will be necessary, if operation is to be continued and the property maintained, to charge higher rates to those patrons who receive greater service. In other words, if there are eliminated from the business of the electric railway the short-haul passengers, the handling of whom presumably shows a profit, the passengers who are at present carried a considerable distance and the handling of whom shows a loss must in the future pay more than they do at the present. It is not within the province of this article to undertake to say in detail how such a change in fares will be brought about nor what effect the adoption of a zone system of fares would have upon the community in general. However the matter might be adjusted, it is apparent that such a change in the rates of fare on electric railways could not be accomplished without some difficulty and perhaps some loss.

The whole matter of transportation is a vital factor in city building, and any situation tending to bring about a change in the system of charging for urban transportation should be given attention by those within whose province it is to give thought to the larger interests of the community as a whole. In addition to the bearing which jitney competition appears to have on the rate of fare for a distance of more than 1 or 2 miles, which includes, of course, a considerable portion of suburban traffic normally handled on urban cars at a single fare, it should be noted that the confusion resulting from the addition of a large number of small, independent transportation units to the present complex traffic in city streets is a matter of grave importance. Various computations would indicate that it would be not an unusual condition during certain periods of the day to have the average distance between automobiles, engaged in passenger transportation, 5 ft. or less, if these cars were to replace the electric cars now furnishing the same service. Such a situation would doubtless be considered intolerable. It may be urged that the jitney business is in its infancy and that improvements in design of these passenger-carrying vehicles will so reduce the cost of operation as to enable them to compete upon a broader basis for the business of the electric railways. That such improvements in the art are possible cannot be denied; and as there have been improvements tending to reduce costs in very many of the mechanical arts, it will be indeed peculiar if the costs computed in this article are not lowered at some time in the future. There will still remain, however, in all probability, some reluctance on the part of cities to give up a major portion of their streets to passenger-carrying vehicles for the rendering of such service as is now being rendered by the electric railway cars which use but a small part of the street.

It is such cases as these which point out the need of scientific traffic surveys in every city. It is as important for city governments to know accurately the movements of population from hour to hour as it is for a street railway company to have this information, and it is apparent that this is a matter which will be given increasing attention in the future. The proper location of bridges and tunnels, both for pedestrians and for vehicular traffic, is a matter which cannot be determined except by an accurate knowledge of the hourly movements of the people in the community. That these change from time to time is well known to those who have considered the matter, and the future devolpment of means of travel through the various parts of any city should be planned always in the light of the best obtainable information as to the habits of its people. The use of a car 14 ft. long to carry four passengers is an extravagance which few cities can afford when cars seating fifty people are but 50 ft. in length. It may be urged that experience in Europe has indicated that cheap transportation in small units by transient vehicles has a legitimate place in the transportation scheme of any community. It should be observed, however, that conditions abroad are somewhat different from conditions in this country. In general, workers in Europe live closer to their places of employment than they do in this country. It appears that the average mileage per ride is considerably less in those countries than it is in this. The zone system of fares is very generally employed on European electric railways, and a considerable part of the population other than the laboring classes considers it beneath its dignity to walk a distance which in this country the average citizen walks with ease and without a thought as to its effect upon his social status.

CONCLUSION

In conclusion it would appear that the jitney bus cannot continue long to carry passengers the distances which it is now attempting to carry them at a 5-cent fare. The jitney bus, however, can compete with the electric railway for short-haul business. Improvements in automobile design tending to lessen depreciation and operating costs will probably from time to time change the maximum length of ride for which the jitney can profitably compete with the electric railway. It does not appear likely, however, that, within the near future at least, automobile transportation can be furnished to communities as a whole as efficiently and as economically as a similar amount of transportation can be furnished by the electric railway. The certain result of the taking of the more profitable business from the electric railways is an increased fare for the balance of the business. Assuming that the jitney business is regulated to a sufficient extent to protect to a reasonable degree the safety of the passengers and to promote as far as may be the reliability and regularity of the service, the interest of the city has not as yet been completely cared for. Streets are dedicated to the use of the public, and they will in the long run be so administered as to provide the greatest good to the greatest number. On this basis we may look to see considerable attention given to the fact that passenger transportation by automobile is wasteful of space in the city streets.

Considering all these factors, it does not appear that this most interesting experiment in urban transportation will result in the displacement of the present means of transportation, although for the period during which this experiment is being carried on individual instances will doubtless appear where the jitney bus can be operated profitably and with due regard to the interests of the people as a whole. It may not be out of place to suggest that a limited number of people would probably be glad to pay 10 cents or even 15 cents a ride for service of a somewhat higher character than it is possible for electric railways to furnish. The number of such people is not so large that furnishing them with transportation de luxe will seriously encumber the streets; and it appears at the present time probable that, as the individuals who have already engaged in the jitney business discover that their profits are less than were anticipated, a certain number of them will try the experiment of furnishing their service for a fare of 10 cents. Whether the operation of the "double jitney" would be a profitable business or not it is not easy to determine; but it is quite likely that there is some form of transportation of this general nature at a rate between that charged at present by taxicabs and the rate charged by electric railways at which automobile transportation will be a profitable venture. It appears quite certain, however, that at the present rate of fare the jitney bus experiment is doomed to failure.

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[5] The Kansas City *Star* quotes W. H. Miller, jitney promoter, as saying: "We are trying to select the short, profitable hauls, not more than 2 miles or 2½ miles at most."

British Managers Discuss Conditions

At Meeting of Tramways & Light Railways Association in London It Was Shown that British Tramways Have Been Seriously Affected by the War

At the seventh annual congress of the Tramways & Light Railways Association in London on July 15, J. W. Dugdale, general manager Oldham Corporation Tramways, discussed the influence of the war upon the street railways in Great Britain. He stated that the number of tramway employees who had given their services for the war had reached 18,057, approximately 30 per cent of the total. Every man who had gone to the front had been assured that his dependents would be looked after and that if he was spared his situation would be open when he came back. The cost of these grants amounted at the present time to $7,500 per week for the London County Council, $5,000 for Glasgow, $2,500 for Liverpool, and $6,500 for Manchester.

Owing to the shortage of labor the car service has been curtailed in many instances. Extensive experiments with women employees for platform work have been carried out, and in the near future these will undoubtedly extend to other departments. Wounded soldiers who have been discharged from the army are being engaged as guards and are being offered light employment in various capacities. Under the conditions it has become imperative for traffic employees, especially motormen, to work a great number of hours each week. In Oldham the hasty training of men to fill motormen's positions has been the cause of an increase of some $100 per week in the charges for electric energy. In that city the unit charge for current is 3 cents per kilowatt-hour, and it is expected that this figure will be increased because of the increase in the price of coal.

In the repair shops, a great scarcity of skilled mechanics exists, owing to the drafts by private workshops that are engaged in manufacturing munitions of war. On the Liverpool Tramways, munitions work is being carried out very successfully in the workshops, but only the largest tramway systems could cope with such operations and at the same time keep pace with their own repairs which need daily attention. Tramways are now handicapped in obtaining quick deliveries of materials, such as carwheels, axles, tires, etc., this condition having been brought about by the makers' inability to execute orders promptly because of pressing government work. Advances in the prices of material have already taken place and there is no doubt that tramways will be called upon to pay very inflated prices for material of every description. The copper market has already alarmingly increased.

Free riding facilities have been granted to soldiers in training by a large number of tramways, and other free riders include wounded soldiers going to and from hospitals, refugee children going to and from school, etc. This concession has cost the Oldham Tramways Committee as much as $200 per week, and at the same time the tramway revenue has fallen very much below that of normal times in a majority of towns. Owing to anticipated air raids, railways have to be prepared to be shut down direct from the power house at any time.

In the discussion of this paper a member stated that he had been unable to purchase steel tires and other equipment even at a 50 per cent increase in price, but notwithstanding the existing high price of material it was doubtful whether the postponement of track repairs was a measure of economy. Other speakers laid emphasis upon the difficulty of retaining sufficient men in service to operate the lines, the extent of the war's influence being indicated by comment to the effect that tramway employees were, in general, desirous of wearing badges similar to those worn by munitions workers in view of their services to the community at large.

OTHER PAPERS

Another paper presented at the meeting was entitled "Glimpses Into the Obvious" by A. V. Mason, general manager South Metropolitan Electric Tramways & Lighting Company, in which a number of hints on operating problems were presented. The discussion brought out considerable support of the prepayment principle and some comment on the advantages of high schedule speed.

A paper entitled "Battery Vehicles as an Adjunct to Tramways" by W. H. L. Watson gave data which indicated the superiority of the Edison nickel-iron cell as opposed to batteries of the lead type, owing to its lower cost of maintenance. In the town of Morecambe, Lancashire, where the overhead system was regarded as a menace to the scenic surroundings, a scheme for installing storage-battery cars was considered, this involving a capital expenditure of $90,000 for twelve fifty-six-passenger double-deck cars and the necessary depot complete with charging equipment. The running cost was guaranteed not to exceed 11 cents per car-mile, including charges against interest and depreciation on capital.

It was considered that the storage-battery omnibus would prove to be a popular method of building up routes prior to the extension of a full tramway service, and a number of such buses have been installed. In several cases these have shown reductions in operating costs of 4 cents per bus-mile in competition with gasoline-driven vehicles. In one city the power consumption per mile was found to vary between 1.63 kw.-hr. and 2.10 kw.-hr. per bus-mile and the maintenance charges had proved to be very slight. Even with such low average revenue as 12 cents per bus-mile the service covered the expenses.

In the discussion the advantages of the storage-battery bus were emphasized, but there were some adverse comments upon the high cost of the vehicle. The hill-climbing qualities were praised, it being stated that on a certain severe hill the gasoline buses were unable to stop because they could not start again, but that the storage-battery buses had no difficulty in this regard. Storage-battery service wagons were mentioned favorably, a case being cited where an Edison battery vehicle did as much work for $4.50 as could be done by horses for $8.40.

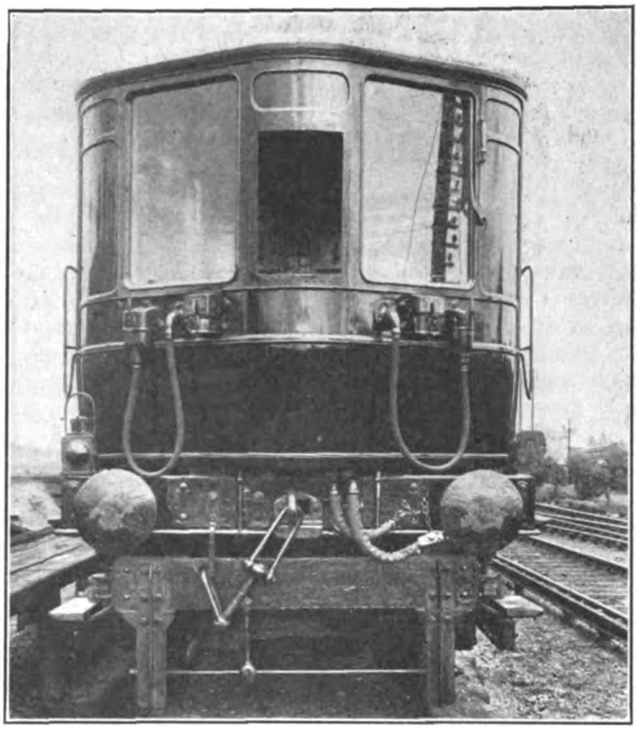
London & South-Western Railway Suburban Electrification

At This Time 140 Miles Are Being Electrified—The Train Make-up and Equipment of the 600-Volt Cars Are Briefly Described

The London suburban lines of the London & South-Western Railway now being electrified, following a slight delay at the commencement of the war, are the circular route from Waterloo via Wimbledon, Kingston, Twickenham and Richmond and back to Waterloo, the Hounslow loop line and the Hampton Court, Claygate and Shepperton branches. The total length of these routes is about 47 miles, equivalent to about 140 miles of single track. At a later date a further system of about 50 miles of route, the equivalent of 100 miles of single track, may be undertaken. A map of the electrification was published in the ELECTRIC RAILWAY JOURNAL for May 3, 1913, page 799.

After an exhaustive study by the engineers of the London & South-Western Railway of all systems in commercial use, it was decided to adopt direct current with a pressure of 600 volts on the third-rail. The trains are equipped for multiple-unit operation, and for convenience in handling are made up of three-car units (eighty-four in all), consisting of two motor cars with a trailer car close-coupled between them. The individual three-car units are designed to be permanently coupled, to form convenient units for traffic. It is intended to operate these units as either three-car trains or six-car trains, this being dependent upon the traffic requirements.

Each three-car unit is equipped with four Westinghouse 275-hp motors, 590 r.p.m., geared 21:59 on standard 42½-in. driving wheels; these motors are arranged in pairs on the trucks underneath the cabs at opposite ends of the unit. All electric-control gear is placed in the cabs, each pair of motors being controlled from its own set of control gear. The installation of the control apparatus in the motorman's cab, following the plan of the London tube lines, was selected by the railway's engineers in preference to under-car location in order to permit greater ease of access for inspection, cleaning and adjustment. Access to the control apparatus is obtained on one side from the motorman's cab and on the other through large hinged doors in the partition between the motorman's cab and baggage compartments.

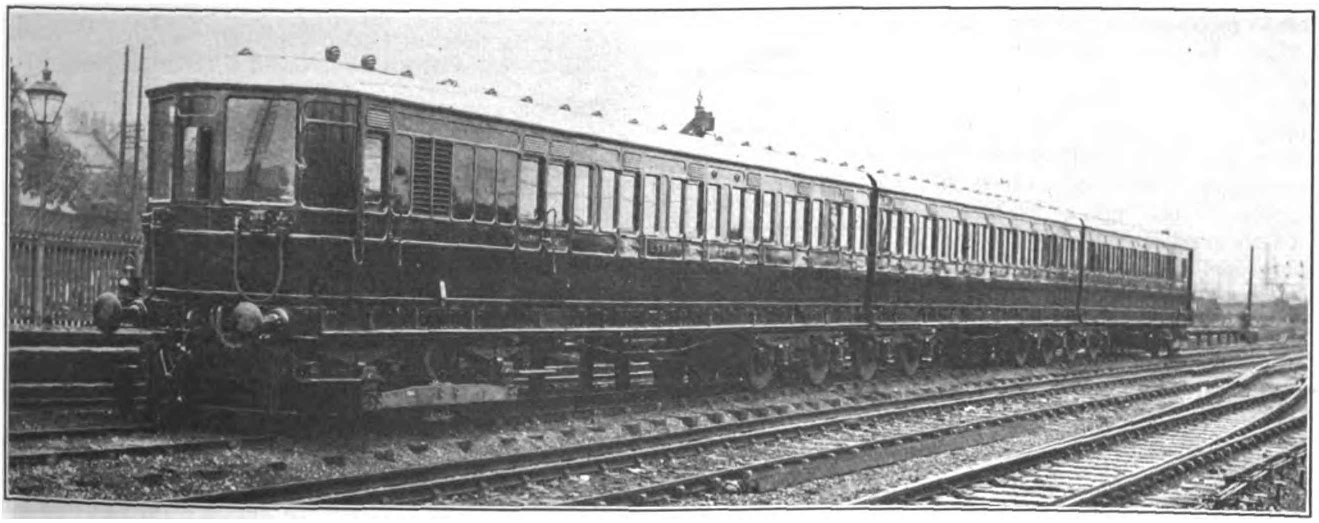


LONDON & SOUTH-WESTERN ELECTRIFICATION—END-ON VIEW OF MOTOR CAR

A further advantage in placing the control apparatus in the motorman's cab is that the weight of this apparatus comes over the driving truck and so increases the weight available for traction. For the electric trains the original rolling stock, consisting of the usual compartment coaches with side doors, has been used, the necessary alterations being made to fit them for electric service.

The motors are of box type with commutating poles and with a fan on the armature for internal ventilation. The control is of the Westinghouse all-electric type with automatic acceleration and deadman's handle. The coaches are heated electrically.

The Westinghouse brake used on the electric trains employs cylinders 12 in. and 14 in. in diameter with triple valves arranged to give almost simultaneous application of the brakes on a train 600 ft. long. All compressors start and stop simultaneously according to the maker's governor synchronizing system.

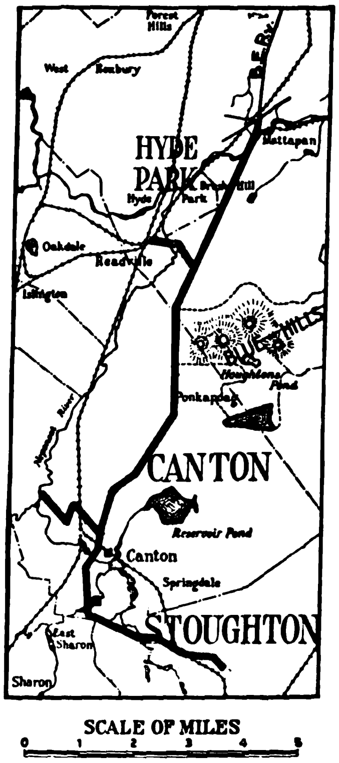


LONDON & SOUTH-WESTERN ELECTRIFICATION—STANDARD FOUR-MOTOR 1100-HP TRAIN OF TWO-MOTOR CARS AND ONE TRAILER

Another Massachusetts Fare Increase

Public Service Commission Adds Another Fare Zone to Blue Hill Line Because It Believes Company Entitled to a Fair Return on All Capital Honestly and Prudently Invested without Deducting Accrued Depreciation

In a decision handed down on July 31 and covering forty-two typewritten pages, the Massachusetts Public Service Commission ordered the establishment of a new schedule of fares on the Blue Hill Street Railway, a company operated by the Stone & Webster Management Association of Boston, Mass. The case is the most interesting of its kind with which the board has had to deal since the Middlesex & Boston finding in 1914, and in reaching its conclusions the commission has been guided largely by the latter. The company appealed to the board for authority to increase its fare unit from 6 cents to 8 cents, and while the road is a small one, operating less than 20 miles of track, the financial policy of its managers and the operating history of the company have been considered at great length. The commission soon came to the conclusion that the road needed increased revenue but deemed it important to discuss its regulative policy in considerable detail. An abstract of the decision is given below.



MAP OF ROAD

OUTLINE OF PROCEEDINGS

On March 9, 1915, the company filed with the board notice of a proposed increase in passenger fares to take effect April 15, 1915. The company proposed to make the cash fare 8 cents for every ride within the limits of any fare zone; to sell tickets, each ticket the equivalent of one cash fare, at the rate of seven for 50 cents; and to sell special school tickets at the rate of ten for 40 cents to pupils entitled by law to half-fare transportation. The existing fare unit was 6 cents, none other than school tickets being sold, the price of the latter being ten for 25 cents. The company estimated that the proposed increase would add from $8,000 to $12,000 to its annual revenue. The total operating revenue for the year ending June 30, 1914, was $95,224. A public hearing was held on April 14, 1915, and a petition was presented by 137 residents of the town of Canton asking the board, if it should allow an increase, to order the company to sell a workingman's ticket at the rate of 5 cents, good only on working days, between 6 and 8 a. m. and 4 and 6 p. m.

HISTORY OF THE COMPANY

The Blue Hill Street Railway was organized in 1899. The main line runs from Mattapan Square, in the outskirts of Boston, through Milton and Canton to Stoughton, with a short branch from the vicinity of Canton station to the Norwood-Canton boundary, and a still shorter branch from Blue Hill Avenue, Milton, to Readville Square, Hyde Park. The total trackage is 19.75 miles, of which 1.32 miles are on private right-of-way. At Mattapan Square there is a connection with the surface system of the Boston Elevated Railway, but a through service rendered some years ago has been discontinued. At other points there are connections with other companies and the road substantially parallels the New York, New Haven & Hartford Railroad. The population of the three principal towns served totals 21,145, a gain of 27.4 per cent in fifteen years. When the road was first built its ultimate extension to Providence, R. I., was contemplated.

In general, a regular half-hourly schedule is maintained on the main line and an hourly schedule on the Norwood branch. The Readville branch has for some years been operated only on pleasant Sundays in the summer season, and at present cannot be operated at all, owing to a local bridge situation. On Sundays and holidays in summer a much more frequent service is maintained on portions of the road to accommodate a large travel to and from the Blue Hill Reservation, one of the most notable areas within the Metropolitan Park system. The company is not always able to handle all of this class of traffic. The cars at present are of the single-truck, hand-brake type, designed for moderate speed and economy in operation. The road was originally equipped with double-truck, air-brake cars, but a fire in 1909 destroyed these and the present rolling stock was specially designed to meet the needs of low-cost service. No attempt is made to conduct a freight and express business, but $3,445 was earned in 1914 from the sale of power to a connecting company. The company was organized by Stone & Webster.

Prior to the current finding there were three fare limits on the main line, viz.: Mattapan Square to Ponkapoag, 5.41 miles; Blue Hill to East Sharon, 6.25 miles, and Canton to Stoughton, 4.22 miles. These zones overlapped, the total distance from Mattapan to Stoughton being but 12.74 miles. The unit fare was 5 cents until 1908, when it was increased to 6 cents and upheld by the Massachusetts Railroad Commission (Fortieth Report, page 115).

EARNING POWER AND CAPITAL EXPENDITURES

The operating revenue of the road in its fifteen years of life to June 30, 1914, totals $1,021,151, operating expenses being $770,266 and miscellaneous income $2,417. Deductions from income total $277,697, leaving a shortage in net divisible income of $24,406. The stockholders have never received any dividends, revenues have often been insufficient to meet fixed charges and at times have failed to cover operating expenses. The gross earnings for the year ending May 31, 1915, were $93,126, or $2,440 less than in 1914, and balance for reserves and dividends was $2,352 less this year than last. The balance sheet of May 31, 1915, showed total assets of $717,272 and a deficit of $43,202, the cost of the railway being $409,559, cost of equipment, $137,162, and the cost of land, buildings, etc., $113,251. All the stock and bonds were approved by the railroad commission.

The loans and notes payable account of the company totaled $160,601 on May 31, 1915, or 64.2 per cent of the outstanding funded debt. The investment per mile is $33,483. The commission concludes that the cost of the road is somewhat high for its location and questions the advisability of construction upon a percentage basis. Investigation of capital expenditures was hampered by the loss of construction records in the carhouse fire of 1909. In the absence of such records, the board resolves doubts arising from this cause against the company. Some criticism is included as to the accounting methods of the company and its returns to the board.

DEPRECIATION

The total deficiency, as compared with an allowance of 20 per cent of gross revenue per annum for maintenance and depreciation, since 1905, is $35,341. No fund has been accumulated to offset depreciation. With respect to accrued depreciation, the board says:

"The extent to which deduction should be made for accrued depreciation must, to some degree at least, be determined by the method employed in ascertaining the gross amount from which such deduction is to be made. Because a method of dealing with depreciation may be sound where such gross amount represents the cost of reproduction new, it by no means follows that the same rule can be rigidly applied where the gross amount represents honest and prudent investment. Under the reproduction cost theory, credit is given to the company for appreciation on items entering into the estimate of cost (and often for 'going concern value'), and it is entirely consistent with that theory to make a deduction to the extent of existing depreciation on other items. On the other hand, if a fair return is to be measured by the 'capital honestly and prudently invested,' and if no credit is allowed for appreciation of the property through an increase in land values or higher unit costs of material and labor, it would hardly seem just to deduct the full amount of the accrued depreciation under all the circumstances and without reference to the causes of the failure of the company to make due provision for it.

"The ruling of the commission in the Middlesex & Boston case was accompanied by the express stipulation 'that if there is mismanagement causing loss, such loss must be charged against the stockholders legally responsible for the mismanagement.' In other words, the company is held to the same standard of honesty and prudence in the management and maintenance as in the original acquisition of its properties. It must, so far at least as it reasonably can, keep its investment good. If through some fault of its own it has failed to make due provision for depreciation, it cannot reasonably expect the public to pay a return upon that portion of the investment which it has neglected to preserve. But under a consistent application of the investment theory it would seem in general that deduction should be made for the depreciation which comes of age and use in so far only as the failure to make provision for it is due to the payment of unwarranted dividends or is otherwise attributable to mismanagement.

"In this case the stockholders have received no dividends whatever. In view of the low earnings, the character of the territory in which the company operates and its past and present efforts to increase its revenues, and after careful consideration of its history, the commission is of the opinion that the failure to make provision for depreciation and the virtual loss of invested capital caused thereby cannot justly be ascribed to mismanagement. To sum the matter up, the property has depreciated in value in the public service, and the stockholders have had no dividends. On the other hand, the public served has been receiving transportation at less than real cost, and has, in effect, used up a portion of the property without giving an equivalent in return. As stated in the Middlesex & Boston case, to hold under these circumstances that the accrued depreciation should be deducted would amount to saying that money lost during the earlier stages of a public service enterprise is irretrievably lost by the stockholders; that if perchance rates have been fixed so low that the rate-payer has for a period of years obtained a service at less than cost this is the permanent misfortune of the stockholders, and that the public should never at any time and under any circumstances be called upon to make up a deficit thus incurred."

The board therefore rules that in determining the revenues to which the company is fairly entitled, allowance should be made for an amount equal to a fair return upon all the capital honestly and permanently invested without deducting accrued depreciation. The board does not hold, however, that if the company earns the amount to which it is entitled, it can properly pay dividends before the depreciation and other deficits from past operation have been made good.

The commission holds that if property of a company is destroyed by fire or other similar catastrophe before it reaches the end of its usefulness, or if it is voluntarily sold and a loss results over and above accrued depreciation, the amount of this loss should be deducted in determining the basis of a fair return. Such losses are risks which the stockholders assume and for which the company must be held responsible. The loss on the property destroyed by the fire was in this case inconsiderable, but the loss on cars sold over and above accrued depreciation came to fully $11,000. The entire amount received from insurance, salvage and sale was not reinvested in permanent property. To the extent of $21,327 it was used in reconstructing roadbed and track, an expense properly chargeable to operation. Funds so used can no longer be regarded as part of the capital investment, whatever bearing they may have in determining the reasonable charges against operation.

To all intents and purposes the Readville branch line has been virtually discontinued of late years. In view of the economic value, in general, to the State of even street railway lines whose existence seems hardly justified from the traffic point of view, the commission is not disposed to deny a return upon investment on the ground that an extension was built contrary to reasonable prudence and sound business judgment, except in the clearest cases. The line in question, however, seems on the evidence to be of so little economic value to anybody that the board would hesitate to approve an increase of rates upon the other lines merely to enable the company to earn a return upon the $25,000 investment in this branch.

NEED FOR ADDITIONAL EARNINGS

The commission finds that a fair return should be based upon at least $500,000, an assumption which it admits is distinctly unfair to the company but which leads to the irresistible conclusion that the fare-paying public has been and now is receiving service at substantially less than cost. Owing to the uncertainty of the records, the actual amount above this is left open without prejudice for consideration in any future proceedings. This sum is represented by $300,000 outstanding stock and $200,000 in outstanding mortgage bonds. Assuming no interest payments except upon the bond issue and eliminating the floating debt from consideration, the net earnings over and above operating expenses and fixed charges would yield but 4.61 per cent on the stock in 1915, with no provision for depreciation.

The board holds that the $21,237 of capital funds used for reconstruction in 1909 should be treated as an operating deficit, since the reconstruction was necessary, and if the company had not used available capital funds for this purpose it would have had to borrow money and to pay interest upon the debt. The company is entitled to have the sum gradually liquidated from earnings and to receive interest upon it to the extent that it remains unliquidated. Again, a sum of $13,750 representing discount on bonds is likewise entitled to be amortized from earnings during the life of the bonds and to bear interest to the unamortized extent. The deficiency was supplied by floating indebtedness, and the company is fairly entitled to interest upon this indebtedness until the impairment of capital so caused has been made good from earnings.

The commission has little fault to find with the management of the company and sees no reason to believe that operating expenses can be reduced materially, if at all.

ADDITIONAL FARE ZONE

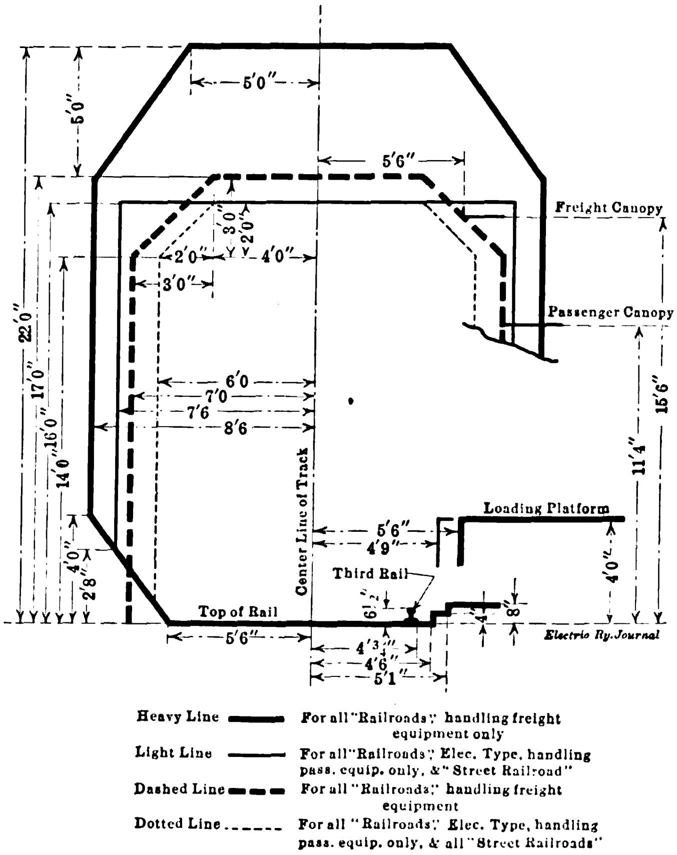
With the proposed increase to an 8-cent fare unit the increase, according to the company's estimate, would add about $10,000 to the gross receipts, but Vice-President A. Stuart Pratt held in the hearing that the effect of such a fare unit would be problematical and that only a trial would determine its efficacy. Mr. Pratt said that an increase of about 10 per cent or 12 per cent is the estimated result of raising the fare unit from 5 cents to 6 cents on the Blue Hill and Brockton & Plymouth roads, both under Stone & Webster management. Assuming that the proposed increase would produce as much as $12,000 additional revenue, there is no ground for a claim that this would result in excessive and unreasonable profits to the company. "If this were the only test to apply," says the board, "the commission would without hesitation approve the new schedule as filed." But with such a unit fare, the board holds that the discrimination between the long-haul and the short-haul rider would be unduly accentuated. Instead, it recommends the addition of another zone which was an alternative plan proposed by the company. Under this plan the unit fare will be reduced from 6 cents to 5 cents except in the zone between Mattapan and Blue Hill, which is much longer than any of the others, where it will remain 6 cents. The zones will have overlaps, and at one point, between Stoughton and Canton station, 4.22 miles apart, owing to local conditions, the company will sell two-part tickets, good at any time, at the rate of eight for 50 cents, the first part of the ticket to be collected in one zone and the second part in the other. It is estimated that these changes will yield between $10,000 and $12,000 additional annual revenue to the company.

The board recommends a year's trial of the new schedule and orders that the rates take effect in thirty days.

Commission Fixes Railway Clearances

The Public Utilities Commission of Illinois, after investigating the subject of clearances on steam, electric and street railways, has prescribed minimum dimensions to govern future construction. The order states that hereafter any structure erected adjacent to any railroad or street railroad must conform strictly to the minimum clearance dimensions unless permission shall have been received from the commission to vary from them. The composite clearance diagram is shown in the accompanying illustration. In this diagram the solid lines show the clearances required between stations, the dotted lines the clearances within stations and in yards and terminals.

Clearances required which could not be shown in the diagram for electric railroads are as follows: Those roads not handling freight equipment but which may be governed by a 9-ft. passenger car width are not permitted to have track centers less than 12 ft. Switching leads which lie adjacent and parallel to another track in which the switches are not operated mechanically, must have a center to center of track distance of 16 ft. For two switching leads parallel, this distance must not be less than 19 ft. The distance between centers for tracks given up wholly to passenger service in a passenger terminal or coach yard is prescribed as 12 ft. This minimum distance center to center of track also applies to track given up to loading and unloading of freight from cars of a passenger or express type, at freight houses, private industries, steam tracks and similar places. It will be noted in the composite diagram that in addition to loading platforms, canopies and overhead side clearances, a third-rail clearance is indicated.


5'0"
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Freight Canopy
3'0"
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Passenger Canopy
22'0"
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14'0"
6'0
7'0
7'6
8'6
Center Line of Track
11'4"
15'6"
Loading Platform
5'6"
4'9"
4'0"
2'8"
Third Rail
6½"
Top of Rail
4"
8"
5'6"
4'3¾"
4'6"
5'1"
Electric Ry. Journal
Heavy Line
For all "Railroads," handling freight equipment only
Light Line
For all "Railroads," Elec. Type, handling pass. equip. only, & "Street Railroad"
Dashed Line
For all "Railroads," handling freight equipment
Dotted Line
For all "Railroads," Elec. Type, handling pass. equip. only, & all "Street Railroads"

(Solid lines between stations; dash and dotted lines in stations and yards)

MINIMUM CLEARANCE DIAGRAM FOR FUTURE STEAM AND ELECTRIC RAILWAY CONSTRUCTION IN ILLINOIS

For street railways an 11-ft. minimum track center is allowed. The distance between the centers of switching leads and parallel tracks must provide a 3-ft. clearance between the sides of the cars. In city streets, where the clearance between main tracks is less than 3 ft. between the sides of the cars, the ruling provides that the windows of all cars shall be equipped with bars and that the vestibule doors shall be kept closed while the cars are in motion.

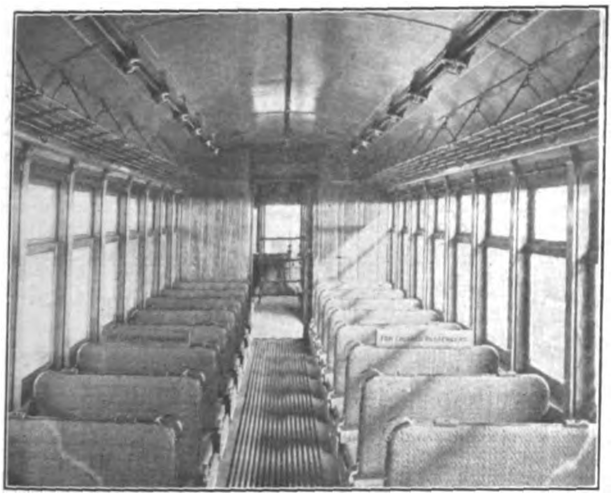
The clearance dimensions as prescribed in the composite diagram relate only to tracks on tangents or on slight curves. When the curvature is in excess of 6 deg., the rule provides that the horizontal clearance shall be sufficiently increased to secure the minimum allowance provided under the rules.

The Orleans-Kenner Electric Railway

This Is a New 1200-Volt Direct-Curren Interurban Line in Louisiana

The Orleans-Kenner Electric Railway, popularly known as the "O.K." line, was placed in operation on March 7. The cars are operated from Canal and Rampart Streets, New Orleans, over 4.3 miles of the New Orleans Railway & Light Company's tracks, thence for 11½ miles on right-of-way through the communities of Southport, Shrewsbury and Harrahan City. This right-of-way is a continuation of the neutral ground or parked center strip, common to many New Orleans car traction streets. It is flanked by high-class shell roads. By the completion of an overhead track crossing by the Illinois Central Railroad the road has just been finished to Kenner, and its eventual extension to Baton Rouge, 115 miles further, is contemplated.

The 2-mile zone adjoining New Orleans is good dairy land, while the territory beyond is used for truck farming. The Orleans-Kenner Electric Railway will endeavor to build up these industries by a frequent express freight service. At present the principal transportation means of this district is by a gas-electric car operated over the main line tracks of the Illinois Central Railroad between Kenner and New Orleans.



INTERIOR OF CAR OF ORLEANS-KENNER RAILWAY

The rail is 70-lb. plain girder on creosoted pine ties laid 2 ft. centers. The overhead construction is a General Electric catenary with ½-in. sherardized messenger, ⅝-in. sherardized hangers spaced 20 ft. to 40 ft. apart, and No. 0000 grooved copper trolley. This construction is carried in spans of 125 ft. from creosoted pine poles.

Energy is purchased from the New Orleans Railway & Light Company and transmitted to the Harrahan City substation at 6600 volts, three phase, sixty cycles. It is stepped down to 600 volts by means of three Westinghouse oil-cooled transformers for delivery to the same maker's 400-kw rotary which comprises two 600-volt machines permanently in series.

The carhouse, like the substation, is also a brick structure. It has but one track, and this is equipped with a pit for repair and inspection. Cars will be stored either in the open with tarpaulin sheeting or under an umbrella shed, these practices being feasible because of the mild climate. The carhouse is also at Harrahan City. Pending arrival of the first four motor cars, operation was begun with cars leased from the New Orleans Railway & Light Company. These cars are operated out of New Orleans every hour.

The new cars are of combination passenger and freight express type and were furnished by the American Car Works of The J. G. Brill Company. The operating equipment for each car includes four Westinghouse 50-hp motors with HL control and Westinghouse automatic air brakes. Following Southern practice, separate toilets are provided for white and colored passengers. The baggage compartment is available for smokers. An interior view is shown herewith. An article giving the general dimensions and other particulars of these cars was published on page 270 of the issue for Feb. 6, 1915.

Bay State Way Organization

Division of Duties of Way Department on One of the Largest Electric Railway Companies

According to the 1912 census report the Bay State Street Railway, Boston, Mass., operated more miles of trolley line than any other company in the country and was second only to the Pacific Electric Company of Los Angeles in miles of track. The recent consolidation in Chicago and possibly extensions of other systems elsewhere may have changed the relative positions of companies as regards length, but the Bay State organization remains one of the largest systems in the country. It serves the eastern portion of Massachusetts outside of Boston proper, the lines extending from Nashua, N. H., to Newport, R. I. There are now sixteen operating divisions and the organization of the maintenance of way department is unusually comprehensive.

The department is headed by an engineer of maintenance of way with headquarters at Boston. Under him as immediate assistants are three engineers and a chief clerk, the organization further requiring the services of one bridge superintendent, five inspectors, seven division roadmasters, twenty-one division foremen, twenty-one foremen, and ten acting foremen. During the busy months it is necessary to employ about thirty additional foremen to assist in supervising the extra men that are needed.

During the winter season all extra foremen are employed at the regular foreman's rate as trackmen, it being considered good business policy to retain trained men of this class. The company has had as many as eighty-two gangs working at the same time in Massachusetts, New Hampshire and Rhode Island. The company operates 941 miles of track. The force in winter varies from 220 to 1000 men, according to the weather, and in other months from 500 to 1500 men.

The engineer of maintenance of way has general supervision and responsibility in connection with all work relative to engineering, construction, reconstruction and maintenance of track and bridges on the system. He personally takes up matters regarding locations, grades, rebuilding of bridges, street widening and highway matters with local and state authorities, including legislative committees and the Public Service, Metropolitan Park and Highway Commissions. He submits estimates to and receives instructions from the general manager regarding work to be done; makes a general inspection of all work in progress and gives personal instructions relative to the manner in which the work is to be handled.

One assistant engineer has personal charge of all office work in connection with the preparation of estimates, making surveys, preparing plans for location or relocation of track, designing of special work, and giving line and grade for track construction. He makes personal investigation and reports on track conditions whenever requested by the engineer of maintenance of way, and attends public hearings and conferences when the latter cannot be present. In connection with this work are employed five assistant engineers in charge of survey parties, one draftsman, three instrument men and two rodmen.

Another assistant engineer has personal charge of engineering relative to bridges and structures supporting track. He is also in charge of engineering relative to the study of grade crossing abolition and checking up costs of construction as given in detailed statements by railroads in connection with the abolition of crossings. Special investigations of traffic conditions fall upon this engineer. In connection with this work one draftsman and one rodman are employed.

The third of the assistant engineers has personal charge of measurements and the preparation of detailed reports of new track work completed for the auditor. Under him come renewals of all track special work, the repair of all rail joints and general track maintenance and incidental engineering. There are employed in this connection two assistant engineers in charge of survey parties, two instrument men, one rodman and one draftsman.

The chief clerk has charge of the general office, including maintenance costs, checking of tools, railroad crossing, special work, construction, reconstruction and estimate records, material required and on hand, reports of work done, daily reports of maintenance and construction, the compilation of reports and correspondence. For this work are employed three stenographers and five clerks. The chief clerk also has charge of the division roadmasters' clerks.

The superintendent of bridges has personal charge of construction, reconstruction, maintenance and inspection of all bridges on the system, of which there are about 260. In this work are employed one bridge foreman, and from two to eight carpenters, depending upon the amount of work. This official also attends to special work, such as the maintenance and operation of stone crushers, temporary supports, and structures carrying track in connection with municipal and state improvements.

There are one tie and four track inspectors. The former has general charge of tie inspection of all ties ordered by the company and makes trips south as occasion demands, since some ties are inspected while in the course of loading. New men are broken in occasionally by the tie inspector when he needs assistance. He also attends to special work such as investigating foremen, timekeepers and outside clerks, and notes and acts upon reports submitted by inspectors.

The four track inspectors have similar duties in inspecting track, including construction and maintenance. One, however, pays particular attention to bonding and acts as division roadmaster in the concentration of work requiring the presence of the regular official of this class. Investigations of accidents, complaints, drainage and tool matters also fall within the jurisdiction of this inspector. Another inspector pays special attention to paving, another to electric drilling machines, electric welders, grinders and hydraulic rail benders, and another has charge of gravel pits during the busy season with the handling of work cars. Night work also comes under the supervision of the fourth track inspector.

Division roadmasters are personally responsible to the engineer of maintenance of way for track construction and maintenance in their respective divisions. Each of these officials has direct charge of from 75 to 229 miles of track. They receive and carry out instructions from the general office, personally inspect and call attention to large repairs required on their divisions, make a weekly inspection of railroad crossings, new rail, special work, joints, etc. General correspondence, inspection and signing of payrolls fall within the scope of their duties. Under them are various division foremen, with a subordinate organization of oilers, blacksmiths and trackmen.

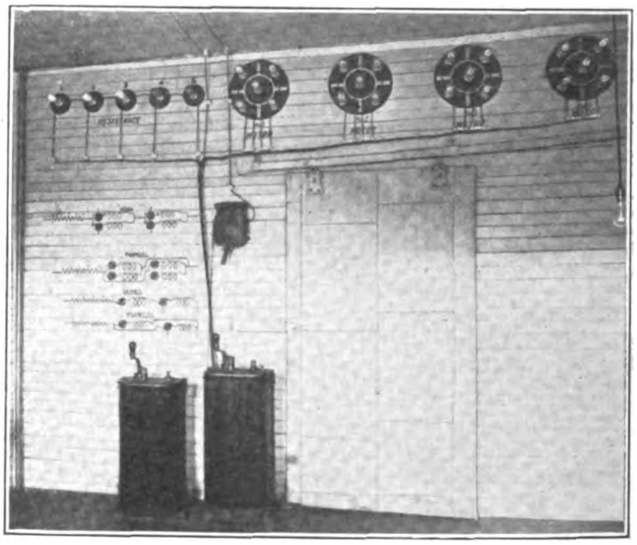
Instruction and Handling of Employees at Hampton, Va.

Besides Being Trained in the Operation of Cars, Motormen Are Instructed in Repairing Car Equipment and Inspecting for Defects

The following notes on the railway employees of the Newport News & Hampton Railway, Gas & Electric Company cover the practices in the instruction for motormen, in platform wages and in welfare work for all classes of employees.

INSTRUCTION OF MOTORMEN

A new motorman is broken in with a regular motorman until the instructor passes him on as fit. This period covers ten days to two weeks. Then the men spend four days in the shop pits and two days on the repair of controllers, compressors, etc. They receive $1 a day during this shop training. As a final polish the student is sent to the instruction room for several hours' teaching by the foreman electrician in cutting-out motors, inspecting for troubles, stopping cars with a single application of the air brakes, etc.



INSTRUCTING EMPLOYEES AT HAMPTON—ACTUAL AND PAINTED CIRCUITS IN SCHOOLROOM

Although the company has no skeleton instruction car it has found a way to make learning attractive to future motormen by the use of illuminated circuit diagrams. In the instruction room itself are placed the control equipment for K-28 four-motor and K-11 two-motor operation, including circuit breaker and hood switch. Pictures of the circuits for each set of motors are painted on a wall of the room, while lamps are wired into the real circuit just below to show the relation between the resistance steps and motors.

The student is not placed in charge of a car until passed by the foreman electrician and master mechanic. Furthermore, the mechanical department has the privilege of calling for a motorman's return to the shop if it appears that he is abusing the equipment.

Motormen are also instructed in the duties of conductors, as all men must be prepared to operate at either end of the car. By this plan disturbance of service due to absence is reduced to a minimum.

WAGES

Platform men are paid as follows: First six months, 18 cents; second six months, 19 cents; second year, 20 cents; third year, 21 cents. Working time includes thirty-minute meal reliefs and deadhead running. Platform instructors receive 4 cents an hour extra.

Runs are divided into early straights, late straights and swings, as the cars are kept on the road from fifteen hours to twenty hours a day. The working time of the crews, including layovers, is kept within twelve hours. The tripper problem is a hard one inasmuch as the peak loads are only one and one-half hours long, both in the morning and evening. Nevertheless, the extra men are guaranteed $1 a day minimum. At this time the company has thirty-three regular and nine extra motormen. The number of regular conductors is also thirty-three but the number of extra conductors is twenty because trailers are run during hours of heavy travel.

WELFARE WORK

All white employees who have served the company for five years receive a pass book for their wives while remaining in the service, aside from the monthly pass book issued to most of the other employees. Colored employees who have been in the service for five years receive annually three days' vacation with pay. As "lazy nigger" is such a stock expression, it is worth mention that most of these men prefer to work in vacation time and draw double pay. Colored employees, like a few of the white employees, ride on badges. The practice of giving premium uniforms every six months to all conductors and motormen who, during that period, have not been involved in an accident costing the company more than $10, had proven highly satisfactory to all concerned.

The white employees of the company formed some fifteen years ago the Tidewater Relief Association. This body has always been managed directly by the men. The dues are sufficient to cover the relief work of the association, while the $500 to $600 donated annually by the company pays for four or five entertainments a year. These affairs take the form of oyster roasts and dances which are prolonged into the night to give every employee a chance to join in the merrymaking. The association now numbers about 130 members. Among the chief clauses in its constitution and by-laws may be mentioned the following:

Membership ceases with resignation from the company's service; and the withdrawing member is entitled to receive the full amount of his contributions, less the pro rata share of disbursements made during his period of membership. A member who resigns from the association but not from the service does not participate in this privilege. The contrary was the case until it was discovered that some men resigned as members, got their pro rata and then rejoined a few months later! Under the present rules benefits do not begin until after four months' membership.

The death payment to the heir of a departed member is $100, but if a member's wife or mother dies he receives $50 to cover funeral charges and the like. The chief restrictions on the latter unusual provision are that no such benefit shall be paid twice to the same family within two years and that the relative so insured had been passed as in good health when the member himself was accepted.

Members who are not in receipt of regular salary while ill receive $7 a week while totally incapacitated, $1 per working day up to the end of the first six months and half that rate during the next six months, but not exceeding a total of $200.

Sick payments begin for all non-salaried members from the beginning of the eighth day, assuming proper certification by the physician or presentation of other satisfactory evidence.

The management is vested in eight men, four of whom are car men, two from the mechanical department and two from any other department. This board of managers is elected annually. The managers receive no salary but are reimbursed for any time that they lose because of attendance at association meetings. The only official of the company regularly connected with the association is the auditor, who is custodian of the cash and securities. If awards are disputed they are open to arbitration by a board, the third member of which must be approved by the parties at issue. Dues are deducted from the member's earnings in advance.

Free medical attention is obtainable from any of four physicians, and to prevent malingering a man who reports sick is subject to visitation by fellow members.

The initiation fee is $1 and the monthly payment is also $1. This is more than customary elsewhere, but it should be considered that this association is really self-sustaining and that its disbursements include the unusual feature of death payments for wife or mother, as already noted. Assessments are limited to 25 cents a month.

On June 1 the company established a pension and insurance system, as described on page 1183 of the issue of this paper for June 19, 1915.

The clerical employees enjoy at half rates all privileges at the Newport News and Hampton branches of the Y. M. C. A., the company paying the other half. In this way the inside workers are encouraged to use as much of their spare time as possible for healthful exercise.

Among the most popular features of get-together work are the departmental tournaments at Buckroe Beach. These are held annually, and each member of the winning five-man team receives a $5 sweater.

EMPLOYEES' SAFETY COMMITTEES

Another form of co-operation with the men is found in the committees on safety, economy and general efficiency. These are of two classes, those made up of groups of department heads and those of groups from the rank and file. The first committees are usually composed of three men, who are assigned to inspect a department over which they have no authority. Such committees make two inspections and reports a year. The employees' groups, known as sub-committees, are made up directly of workers in the department to be inspected. The sub-committees report monthly. New committees always have one holdover member to maintain the continuity of the work from year to year. All reports whatsoever covering this work are submitted for discussion at the weekly conferences of department heads under the chairmanship of the general manager. Action on the committee reports has resulted in many improvements, particularly in promoting safer working conditions and scientific care of new materials and scrap.

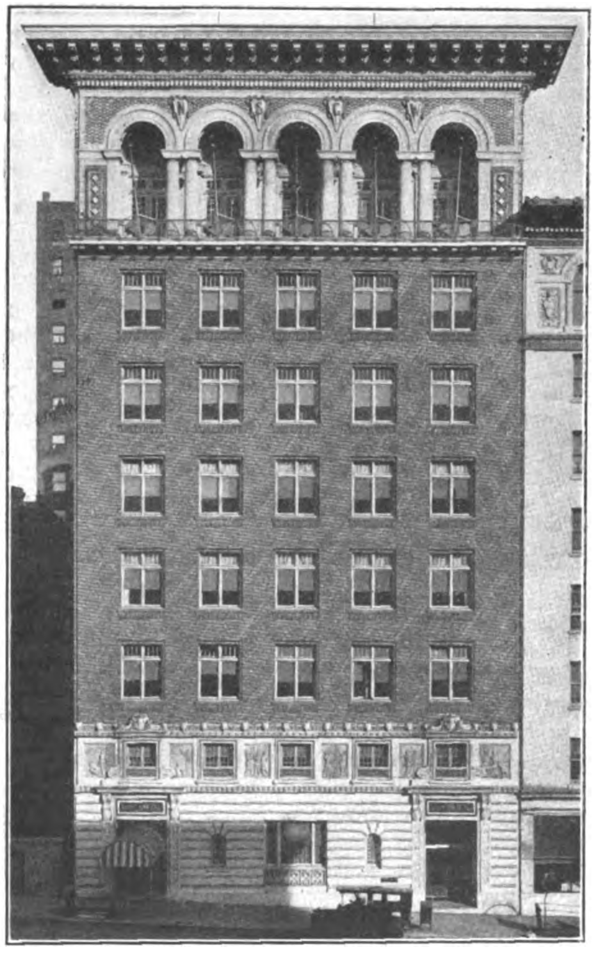
Among the suggestions adopted may be mentioned the following: Chains on flat cars in addition to couplings; employees' fire gangs; removal of unsightly and dangerous features like a defective rainspout outside the carhouse and rubbage-gathering shelves for holding fire pails inside the carhouse.

American Association News

Announcement Is Made of the Arrangements for Transportation from the New England Section—Convention Meeting Places—Engineering Association Committee on Standards Discusses Various Subjects

NEW ENGLAND TRANSPORTATION ARRANGEMENTS

For the greater convenience of New Englanders planning to attend the convention arrangements have been made for special-car service from Boston to the Coast and return in connection with the "Red Special" leaving for California on Thursday, Sept. 23. Henry E. Reynolds, assistant general manager Bay State Street Railway, 84 State Street, Boston, Mass., is now making reservations for this trip as chairman of the New Englang committee, and is prepared to give full information of this and the other special trains and to handle all details for members and other visitors to the convention from the northeast section of the country.



EXTERIOR OF NATIVE SONS' HALL, WHERE THE MEETINGS IN SAN FRANCISCO WILL BE HELD

By the original plan, New England delegates would have been obliged to join the "Red Special" at Albany, N. Y., in journeying by this train, but arrangements have now been made for the attachment of a number of cars of the seven-compartment, two-drawing-room type to the 10 a. m. express out of the Boston South Station on the Boston & Albany Railroad on Sept. 23, these cars to be attached to the "Red Special" at Albany and thence to continue across the continent and back to Boston as an integral part of the tour of this already celebrated train. The accommodations of the "Red Special" will include a baggage car with trunks accessible at all times, a club car, two "diners," valet, maid, barber and stenographic service, piano, "Victrola," and ample observation car accommodations. The party will be entertained at Milwaukee, Wis., Spokane and Seattle, Wash., and Portland, Ore. Already about twenty persons have signified their intention of going to San Francisco from New England on this train. Upon the filling of an application blank tickets will be prepared and mailed to the signer by Mr. Reynolds about Sept. 1, and all New England electric railway men and their friends are cordially invited to make full use of these facilities either by wire, mail or in person.

CONVENTION MEETING PLACES

As stated last week, the meetings of the association in San Francisco will be held in the building of the Native Sons of the Golden West, which is located between Geary and Post Streets at 414 Mason Street, directly in the rear of the St. Francis Hotel. The appearance of the front of this building is shown in the accompanying engraving. This is the building in which the National Electric Light Association held its convention last June.

The building contains numerous rooms suitable for general and committee meetings. Of these the largest is the Native Sons' Hall, consisting of an auditorium 66 ft. x 82 ft. or about 5500 sq. ft. It has a stage at one end, and the estimated seating capacity is about 2000. There are lobbies and a small reception room near the entrance. The sessions of the American Association and of the Transportation & Traffic Association will be held in this hall, which is on the first floor of the building.

The other associations will meet in lodge rooms on the fourth floor of the same building. The room selected for the meetings of the Engineering Association is called "Yosemite Hall" and is about 31 ft. x 67 ft. "Sacramento Hall," where the Claims Association will meet, and "San Joaquin Hall" where the Accountants' Association will meet, are also on the fourth floor. These rooms are also commodious, being each 31 ft. x 48 ft. All are well lighted and provided with anterooms.

The secretary's office and registration headquarters will be in the lobby on the main floor of the building.

The Native Sons' Building is in the center of the hotel, theater and club district of San Francisco and is used for many meetings in San Francisco.

ENGINEERING ASSOCIATION COMMITTEE ON STANDARDS

As stated in last week's issue, page 188, a meeting of the committee on standards was held in New York on July 29 and 30. In addition to those whose names were listed as being in attendance, the following were present at the second day's sessions: E. R. Hill, E. B. Katté and J. M. Waldron, all of New York City. The purpose of the meeting was to pass upon the recommendations of the technical committees in so far as they affect association standards.

On Thursday, after roll-call, Secretary Burritt read in full the rules for the adoption of standards and recommendations. The committee then took up one by one the recommendations of the committees, giving most thorough attention to each.

Prof. A. S. Richey presented the power distribution committee report. The inclusion of specifications for concrete poles in the Engineering Manual, as information, was authorized, as were also certain improvements in the steel-pole tables and formulas. At the suggestion of this committee the printing in the manual of portions of the report of the joint committee on the joint use of poles was also approved. The power distribution committee presented an elaborate, illustrated set of specifications for 600-volt overhead line material, the printing of which was approved. Recommendations as to the location of lightning arrester grounds, involving changes in Sections 81 and 82 of the overhead line construction specifications, were adopted, these being in conformity with the report of the committee on lightning protection.

The committee on lightning protection made a number of recommendations as to details of arrester installation and appended appropriate technical data. These were approved for printing in abstract in the manual.

The committee on buildings and structures recommended approval of a set of rules for instruction to employees for fire protection, which have been before the association for several years. These had been referred to Mr. Schreiber for consideration with the National Fire Protection Association. They have now the approval of this association. These rules are already contained in the manual, Section Bm 2b. They were approved by the standards committee.

At the session on Friday Mr. Gove presented the report of the committee of equipment, bringing up first a revised specification for heat-treated carbon-steel axles, shafts, and similar parts. It was decided to supersede this with a new specification which differs mainly in being more definite in wording and more up to date, the title being changed to cover quenched-and-tempered carbon-steel axles, shafts, and similar forgings. The specification for annealed carbon-steel axles, shafts, and similar forgings was then approved for revision in certain sections dealing with physical and chemical properties. New specifications for gears and pinions were submitted, these including both the quenched-and-tempered and the case-hardened types, and these were approved by the standards committee for submission to the convention as recommended specifications.

The equipment committee's proposal to print in the Engineering Manual a schedule for proof testing heat-treated steel forgings was approved, as was also the printing of the N. F. P. A. rules. Approval was given to a revision of the specification for air-brake hose in which minor changes in detail were proposed, and this will be presented to the convention as a recommended specification. A suggested revision of steel-wheel design which consisted in drawings for additional sizes extending down to 21 in. was postponed, together with the matters of new tread-and-flange-contour designs, these being held over for consideration by the ensuing committee on equipment.

J. M. Waldron then presented recommendations from the committee on block signals which included detailed drawings for a standard electric semaphore signal. The proposal of the 1914 committee for a recommended design for a spectacle casting, which was approved at the 1914 convention, was passed as a recommended design, this drawing forming part of the proposed details for the standard semaphore, and the detailed drawings were then adopted as recommended designs. A clearance diagram for semaphore signals, which had received the approval of the committee on power distribution, was referred back to the committee on signals for further consideration in connection with the recommendations of the convention for last year. In connection with light aspects for signals operated by contactors, the use of the terms car-registering and non-registering were adopted in place of car-counting and non-counting signals.

E. R. Hill then presented a report from the committee on heavy electric traction in which revisions of clearance lines for third-rails were proposed, together with recommended designs for protection of over and under-running third-rails and a standard definition for third-rail gage, all of these proposals being approved by the committee on standards. A proposed specification for coal purchases in the report of the committee on power generation was then submitted by Mr. Welsh. This gives an outline of the points that should be brought out in connection with coal contracts and it was approved for publication in the manual as miscellaneous method and practice.

Following this the report of the committee on way matters was presented by Mr. Kimball, who took up first the matter of rail foundation construction. The Type B of track construction as submitted in last year's report of the committee on way matters was approved as recommended design. Action on Type C, as submitted in last year's report, was deferred until after the coming convention. A classification of soils and screens was then submitted, the plan being approved for entry in the manual as a miscellaneous method and practice. Specifications for special work covering manganese steels, cast steel for track castings, cast-iron rails, splice bars, bolts, tongue switches, etc., were approved for presentation before the convention as a recommended practice.

A design of joints for standard 7-in. 80-lb. and 91-lb. plain girder rails was proposed as a recommended practice, together with a specification for drillings in standard section rails, both of these being approved. The question of symbols or conventional signs for recording surveys was then considered and it was suggested that this subject be considered jointly by various committees so that the existing symbols can be incorporated with those now bearing the approval of the Interstate Commerce Commission in its valuation work. It was suggested that the symbols be printed on a larger scale. This suggestion was approved and the report was referred to the executive committee for amplification by a joint committee so that all classes of symbols may be included. The addition of a missing dimension in the design of joint plates for 7-in. girder and grooved rails was then approved as a revision of the design.

It was recommended that the term "T-rails" be changed to "plain girder rails" in several places in the manual, owing to confusion that sometimes arose with the present nomenclature. This recommendation was approved. The subject matter now in the manual under the title "T-rails in Paved Streets" was revised also by rewording and subdivision, the design for plain girder rail covering the American Railway Engineering Association standard sections of 80-lb., 90-lb. and 100-lb. weight appearing in a separate section.

Chairman Adams then outlined preliminary arrangements that had been made for co-operation with the standards committee of the Transportation & Traffic Association and Mr. Stocks presented a report regarding the extent of the use of association standards by the member companies, prepared from replies to inquiries sent out from the secretary's office. Owing to the small number of replies received to the original circular of inquiry, as well as the apathetic nature of the replies, it was decided to appoint a sub-committee to report on the situation to the executive committee and Mr. Hanna was delegated for this duty.

COMMUNICATIONS

Is the Ultra-Light-Weight Car a Passing Craze?

NEW YORK, July 30, 1915.

To the Editors:

During the last few months I have been very much interested and I must confess somewhat disturbed over the demand for cars of extraordinarily light weight. I am not referring to the use of cars of small capacity as opposed to large units, as that is solely a transportation problem, but there has been a great deal of talk about cars which weigh, completely equipped, less than 10,000 lb., and, according to all of my past experience, this is far too low to provide proper lasting qualities.

In the movement toward lighter weights there is a deadline that has to be recognized eventually. I believe that the present demand has passed this. I have heard of designs for bodies seating approximately thirty-six which are estimated to weight approximately 5000 lb., and some reports even state that bodies of a much lighter weight than this have been proposed, but it is a significant fact that none of them is being built. Is it not true that while a great many managers of railway properties are demanding extremely light-weight cars and have ideas of their own as to how they should be constructed, in every case they want the car builders to stand behind the design and guarantee durability before they will actually undertake the construction, and is it not the case that the car builders are unwilling to do this? If so, there is not much danger in the movement. But I would not like to see the industry adopt a policy of building cars which, like buses, will last only for four or five years.

Naturally, I am interested in knowing whether the car of extremely light weight is really going to come into use. I hope not, because if it does it will be necessary for all of us to revise our ideas on car construction and to make extraordinary provisions for depreciation. On the other hand, since the decrease in jitney competition has become evident, the desire for extremely light cars seems to have decreased also. Indeed it might be daring (in the light of the still-prevalent fever for extremely light cars) to say that the craze is only temporary and will subside. MANAGER.

Injuries to Persons

LINCOLN, NEB., Aug. 3, 1913.

To the Editors:

The legal profession is fast becoming a dollar institution. The ethical side of life is being forgotten in the mad rush for financial gain. Not only is the profession destroying itself, but it is drawing into its whirlpool of disintegration thousands who are made to feel the sting of financial loss and starting as many more upon a moral decline by inducing them to see a state of facts that has no real existence.

The verdict of a jury is hardly to be considered as evidence of the guilt or innocence of the accused. Courts are becoming temples of technicalities rather than of justice. Case law appears to have more weight than the principles of law that underlie it. Sight is lost of the fact that justice is more liable to result from the application of a principle to a proven state of facts than in applying case law thereto. A little more care on the part of the judges and the members of the bar in rendering decisions and giving advice would save our people millions of dollars annually in Supreme Court expenses, in costs of actions that never should have been brought and in attorneys' fees that never should have been paid. The entire legal machine is very much in need of reform. This reformation should be from within, and were it not from a spirit of indifference, the fear of offending and the horror of being criticised, it would be.

The wrongs practised are generally known, they are numerous and glaring. One of the most damaging to the profession and to the general public, perhaps, is the present practice in personal injury cases. The loss to the general public by reason of such actions against steam railroads, street and electric railways run into the millions annually. However, the sum paid to the deserving claimants, so long as it is reasonable, is not to be complained of, but that which is paid to the large army of damage hunters and the 50 per cent that is retained by the attorney cannot be criticised too severely.

This item has grown to enormous proportions and is increasing from year to year, regardless of the safety appliances installed and the care and caution used by these corporations to protect the persons of its patrons. In fact, it appears that these transportation companies are really reducing the number of injuries, yet the aggregate sum paid is growing larger each year. For the year ended June 30, 1913, the railways of the United States, not including the street and electric lines, paid for injuries to persons the sum of $30,410,030, an increase over the previous year of $1,639,325. During the year 1912 the street and electric railways of the United States paid for injuries to persons the sum of $20,707,960, an increase over the year of 1907 of $2,531,655. If this increase with both steam and electric lines has been maintained to date these transportation companies will have expended upon this item for the year ended June 30, 1915, the enormous sum of almost $60,000,000. Of this the legal profession will have received not less than $30,000,000 for its services, thus damaging the public by reason of these charges in a sum not less than $18,000,000 if we allow them 20 per cent, and $24,000,000 if we allow them 10 per cent for their services. The commercial world pays for its collection when made by suit the sum of 10 per cent on the first $1,000 collected, and 5 per cent thereafter, and there is no good reason for the attorney charging more in personal injury actions.

To this sum retained by the legal profession we can with certainty add $6,000,000 paid to undeserving claimants through the efforts of the profession. It can be said with reasonable certainty, therefore, that not to exceed $24,000,000 of the $60,000,000 ever reaches the deserving claimant. If the $24,000,000 now unjustly taken from the railway companies were allowed to remain in their hands, it would go far toward settling the transportation question. Think what it would mean in one decade, almost a quarter of a billion dollars.

The profession has, for years, been educating the people that the transportation companies were outlaws to be preyed upon at will, forgetting to explain that every dollar above a legitimate claim and charge could not be justified, that all personal injury claims are chargeable to operating expenses and must be paid by the patrons of these companies.

The sums paid for injuries are becoming more burdensome from year to year. Something should be done to protect the public as well as the corporations. It is granted that the attorney has the right to contract for his services so long as he is reasonable and just and the public is not damaged thereby. In these cases the public is directly and vitally interested, and if the attorney forgets his duty to that public, the State should, at once, remind him of it in such a manner as to make it impossible for him to go wrong in the matter of his charges; they should be regulated and fixed. It should be made a crime to charge a contingent fee. Such regulations would save the public millions annually, and the deserving claimant be cared for as well as now. It is clear to both judge and jury that the charges made by the attorney are exorbitant. They understand that the verdict and judgment must be, at least, twice what it should be to remunerate the deserving claimant.

The money loss under the present practice is great, but the loss to manhood is much greater, due to the manner of procuring and prosecuting these claims. The attorney who makes personal injury suits his business has his emissaries at the danger points along the street car and steam lines. The unfortunate one is very often doubly injured by reason of the accident sustained by his person and the blow dealt his moral fabric at being made to understand that he must see the facts through the glasses of his attorney.

Not all the members of the profession are guilty of these practices, nor is it to be presumed that they would be if they had the opportunity, but the silence of all, and the indifference of the many, causes the public to think that one is as bad as the other. Nor has that public forgotten that in order to protect the old soldier from the greed and avarice of the pension attorney, a law had to be promulgated regulating his fee.

STEPHEN S. BISHOP, Attorney-at-Law.

Stone & Webster Official's Views on Motor Buses

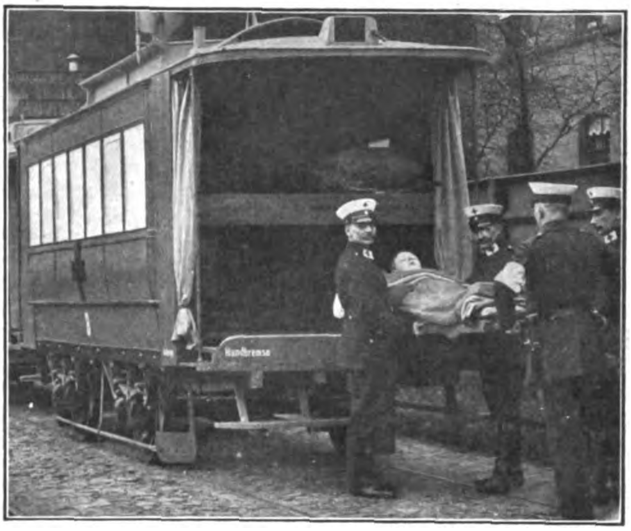
To a representative of the ELECTRIC RAILWAY JOURNAL, Frederick S. Pratt, chairman of the board of directors of the Puget Sound Traction, Light & Power Company, Seattle, Wash., and a prominent member of the Stone & Webster Management Association, recently outlined his views relative to the motor-bus situation in the Northwest upon returning to the Boston offices of the firm. Mr. Pratt said that about a month ago a motor-bus service was begun between Edmonds and the main line of the Pacific Northwest Traction Company, the electric interurban road connecting Seattle and Everett, the distance covered being about 3 miles. Sixteen Ford cars are also in use in Everett as an experimental means of handling short-interval travel in small amounts, the cars being run by the Washington Auto Bus Company, affiliated with the local traction company, virtually in competition with the latter's service.

On the Puget Sound Electric Railway, a gasoline motor-bus service is being run by the Auto Bus Company between Auburn and the towns of Buckley and Erumclaw, the last-named place being about 20 miles from the interurban road connecting Seattle and Tacoma. The buses carry twelve passengers each, and through tickets are sold between points on the bus line and the interurban terminal stations.

Mr. Pratt said that the usefulness of the motor bus as a feeder to a trunk line seems on the whole fairly well established. The company's jitney service has been in operation too short a time to yield valuable conclusions, but it is not regarded as a money-making venture as yet, and there is little reason to anticipate financial profit from such service on a 5-cent rate. Definite plans for establishing jitney service in Seattle, as discussed in the local press at various times, are by no means crystallized. It may become necessary to establish such a service, but at present no complete arrangements have been determined, and, in any event, the Stone & Webster interests are convinced of the permanence of the electric railway as the agency for handling the great bulk of city and trunk-line transportation.

Ambulance Trailers in Hanover

The street railway in Hanover has been rendering valuable aid to the authorities in transporting wounded soldiers from the railroad station to the several hospitals in the city in small trail cars like the one shown in the accompanying illustration. The bodies were prepared for their purpose by removing the ends and mounting angle-irons near the floor and at the height of the window sills. On these, acting as rails, small trucks were placed upon which the stretchers carrying the wounded soldiers could be readily rolled into place. Each trailer accommodates eight stretchers, the length of the body being about 16½ ft. The ends are closed with sail-cloth curtains.



HANOVER CARS FOR TRANSPORTING WOUNDED SOLDIERS

The company has been operating eight of these trailers and some weeks ago had already transported more than 7000 men.

Inventors' Guild Members on Naval Board

In accordance with the invitation of the Secretary of the Navy, the Inventors' Guild is planning to select two of its members for membership in the National Naval Advisory Board, the secretary having been instructed to send to the members of the Guild a brief statement reviewing the situation and a request that each nominate by letter ballot not less than two nor more than four members. These names are to be considered by the board of governors of the Guild with the understanding that from the names received three or more will be selected, the president of the Guild making the final selection of the two nominees.

It is expected that the National Naval Advisory Board will be composed of about eighteen members. Thomas A. Edison has already been appointed chairman, and the large technical societies of the country will each elect two members. The duties of this body will not lie so much in the actual invention of plans and devices as in advising the Navy Department concerning such technical matters as may be submitted for its attention, assisting in the investigation of such matters as are deemed worthy of consideration, obtaining for the Navy Department the assistance of the most competent men in any special technical branch and in offering a trained and receptive ear to inventors. The board will, in fact, form an effective professional connecting link between the people of the country and its trained military experts, it being probable that some arrangement will be made whereby the services of the board will be at the disposal of both the army and the navy.

Equipment and Its Maintenance

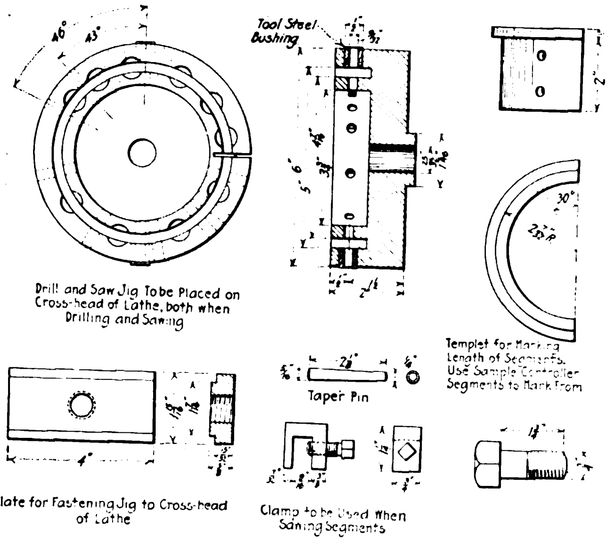
Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Resawing Old Controller Segments to Smaller Size

BY F. A. MILLER, SUPERINTENDENT OF POWER AND EQUIPMENT OAKLAND, ANTIOCH & EASTERN RAILWAY

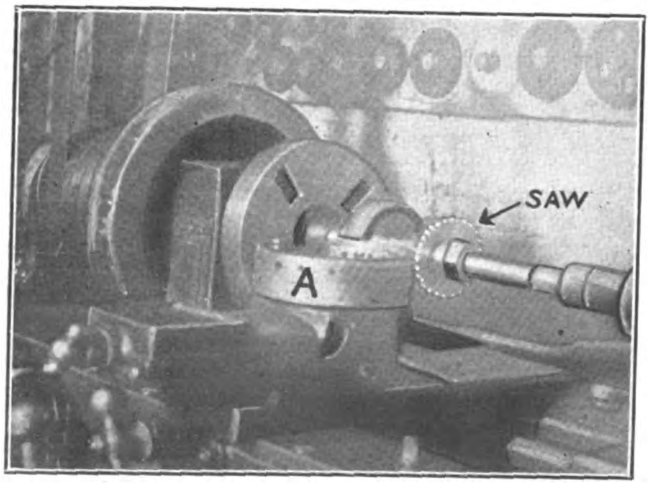
The accompanying halftone and drawing show an economical method of using worn segments of hand controllers by making smaller out of the larger ones. This practice was devised when the writer was with the Puget Sound Electric Company at Tacoma, Wash.



46°
45°
Tool Steel Bushing
30°
Drill and Saw Jig To be Placed on Cross-head of Lathe, both when Drilling and Sawing
Templet for Marking Length of Segments. Use Sample Controller Segments to Mark From
Taper Pin
4"
Plate for Fastening Jig to Cross-head of Lathe
Clamp to be Used When Sawing Segments

DRILL JIG FOR SEGMENTS OF K-6 AND K-28 CONTROLLERS

A is a jig counter-bored in order to fasten it to the tool-post rest by a T-headed bolt, and it also has a circular groove in order to receive the segment which is to be cut down. A saw cut and a row of holes allow the segment to be cut off to the proper length after it has been placed in the groove after inserting a ¼-in. standard taper pin in the hole in the good end of the segment. The jig is fed forward against the metal slitting saw which is fastened to a mandrel in the lathe centers.



RESAWING OLD CONTROLLER SEGMENTS TO SMALLER SIZE

After a lot of old segments have been cut to the desired length, the mandrel and saw are removed from the lathe and a drill of proper size is installed in the headstock. The jig is now fed forward until the hole to be drilled is opposite the drill. The segment to be drilled is dropped again into the groove, the ¼-in. pin is inserted in the one good hole in the segment and the tool carriage is fed against the drill.

It is to be understood that when this jig is manufactured the holes in the circle are to be the same height as the drill center in the headstock, and that a separate jig is to be used for each type of controller where the arc of the circle is different.

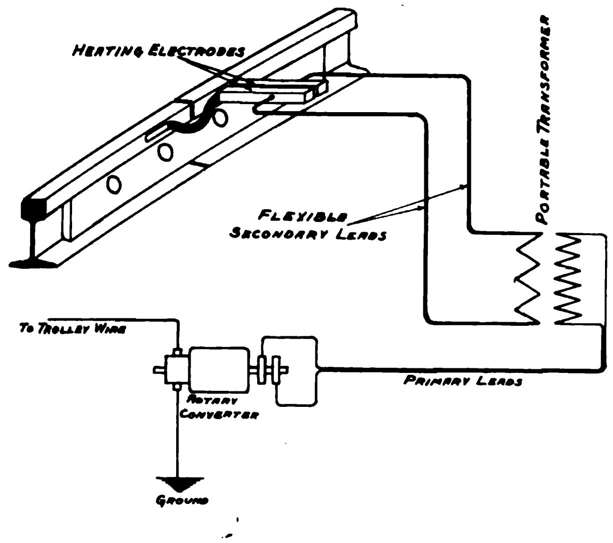
An Improved Method of Applying Rail Bonds

BY L. P. CRECELIUS, SUPERINTENDENT OF POWER CLEVELAND RAILWAY

Of all the items entering into electric railway construction, the rail bond is not only one of the most important, but it is also one of the most difficult to install and maintain properly. It is located at or near the ends of abutting rails where it is subjected to severe vibration and exposure and where it is frequently tampered with in repairing loose joint plates and resurfacing rails. These conditions require the following essentials in its design and application; first, flexibility graduated away from the terminals and apportioned over the length of the bond to resist injury from prolonged vibrations, and second, intimate and permanent union between bond terminals and rail from the mechanical and electrical standpoints.

The first of these requirements seems to have received early recognition, for there are available rail bonds equipped with terminals and sufficiently flexible to resist an almost incredible amount of vibration. The second requirement, however, has given rise to a number of processes for uniting the terminals of the bond directly to the rail by means of all sorts of external heating agencies, and there are at the present time in use numerous devices by means of which the bond terminals are soldered, brazed and even welded to the rails. Closely related to the second primary requirement is ease of application and avoidance of injury to bond and rail. It is also obviously necessary, on busy railways, that the tracks be left unobstructed so that traffic may continue over them while the rails are being bonded. This limitation imposes severe restrictions upon the use of bonding apparatus satisfactory in other respects.

In a bonding outfit which has been used in Cleveland during the past two years with very satisfactory results, notwithstanding the heavy traffic conditions encountered, these requirements have been met in the manner herein described. The designers of this equipment had in mind the object of overcoming the difficulties due to the high temperature encountered in welding by means of the electric arc, oxy-acetylene flame or superheated, molten copper. By the new method rail bonds may



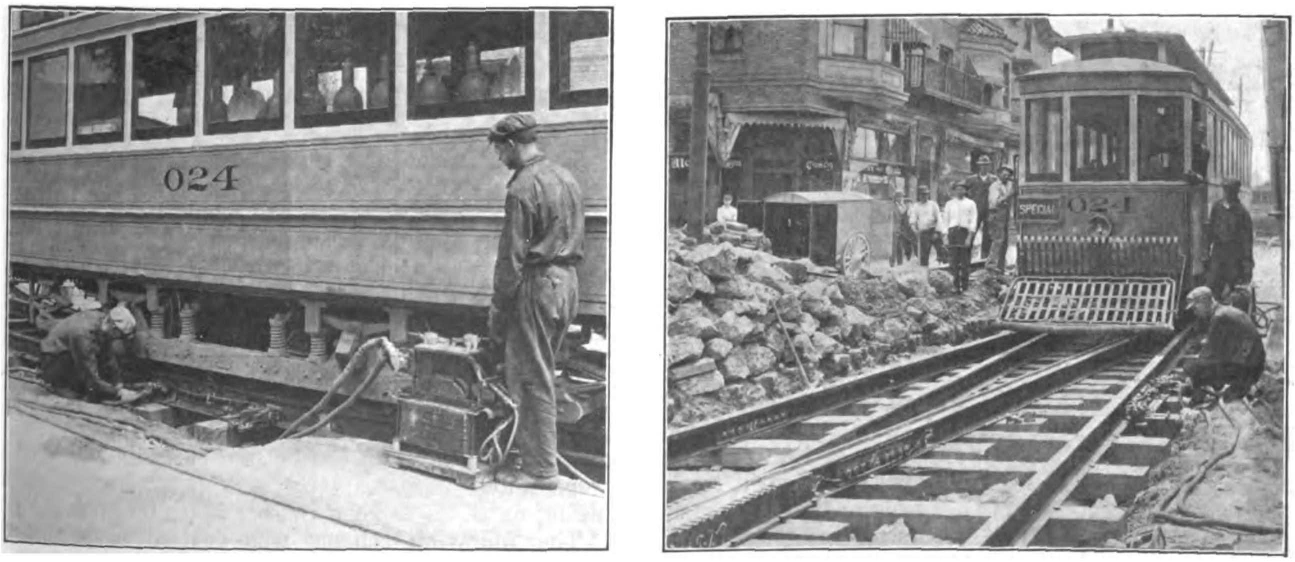
ELECTRIC-CIRCUIT DIAGRAM CLEVELAND RAIL-BONDING OUTFIT

GENERAL VIEW OF CLEVELAND RAIL-BONDING OUTFIT

be electrically brazed to the rails without interfering with traffic and at a temperature sufficiently low to avoid difficulty.

The device consists of small bonding clamps, which are arranged to be clamped to the lower flange of the rail or to the fish plates, and upon which are mounted two adjustable carbon heating electrodes which are brought to bear against the bond terminal. The electrode holders are equipped with quickly detachable terminals to which are connected flexible secondary leads extending from a transformer of about 18-kva. capacity. The transformer is made portable so that it can be lifted about from place to place. The primary leads to the transformer are connected to a small rotary converter of about 20-kva. capacity which receives power from the trolley wire. This converter is mounted on any suitable car or vehicle. One form of mounting is shown in an accompanying illustration. By extending the primary leads the transformer can be moved along the rails as the bonds are applied, to any desired distance from the rotary converter. The heat is produced electrically directly against the bond terminals by the I^2R loss in the resistance interposed in the circuit at this point by the contact of the electrodes with the bond terminal. The circuit, therefore, consists of the transformer secondary, the flexible leads, the electrodes and the bond terminal, all connected electrically in series. By this arrangement there is thus introduced into the circuit, at the desired point, a considerable and effective heating resistance permitting of a very substantial reduction in the amount of current ordinarily required to produce the necessary I^2R drop. In consequence, the size of the secondary leads from the transformer are reduced to a point at which they can be very easily handled. The electric circuit is illustrated in the accompanying diagram.

To avoid mutilating the bond terminals and overheating the rail section, silver solder interposed between the bond terminal and rail is employed as a brazing material. Silver solder is an alloy composed of copper, zinc and silver of such proportions that its fusing point is in the neighborhood of 1500 deg. Fahr. This material has to a marked degree the requisites of conductivity and cementing power, with the additional advantage that it forms a perfect union between the bond terminal and rail at a temperature sufficiently low to prevent injury to either. Standard forged-terminal bonds, which have been designed to resist the effects of vibration and which have contact areas commensurate with the cross-sectional areas of the bonds, can thus be used. In other words, in the application of this method most of the objections to the use of thermic processes are removed



APPLICATIONS OF CLEVELAND RAIL-RONDING OUTFIT WITHOUT INTERFERENCE WITH TRAFFIC and the bond may be permanently and cheaply brazed to the rail.

As shown by the illustrations on page 237, the outfit is assembled into a compact unit and is so arranged as to provide the maximum of portability. In some instances it is placed in a small cart and delivered alongside the section of special work to be bonded, being towed there by an auto-truck and left until the work is finished, whereupon it is moved along to the next job. When the work consists in rebonding rails that have been repaired here and there along the street, the outfit is placed aboard an auto-truck and the leads extended from the transformer to the clamps which have been placed on the rails. In these cases it is unnecessary to remove the transformer from the truck. In outlying districts where the bonding must be done from the tracks along the private right-of-way, removed from roadways, the outfit is placed aboard any suitable car, and where traffic conditions warrant the bonding is done without unloading the equipment. Where conditions are such, however, as to require the car to be removed to a siding in order to clear the main line, the transformer is removed and the primary leads are extended from the car which contains the rotary to the point where the bonds are being applied. In fact, in some cases the primary leads are extended for a distance of half a mile or more on either side of the car to the transformer. This arrangement is such as to afford the greatest utility to the apparatus because of its flexibility.

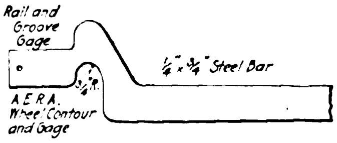
To summarize, the advantages of this method of bonding have been found to consist of the following: (1) The entire elimination of obstruction to traffic along the rails which are being bonded; (2) the use of silver solder whereby standard forged terminal bonds can be applied very efficiently from the mechanical and electrical standpoints; (3) the absence of pyrotechnical displays in the public highway, due to the low temperature by which the union between the bond and rail is made; (4) the absence of overheated and broken rail sections and multilated bond terminals; (5) the high degree of flexibility which has been incorporated into the design of the apparatus, resulting in general utility, and (6) the low cost.

Apparatus making use of the method as described above is manufactured by the Cleveland Rail-bond Company and is known as the "Champion Portable Rail-bonding Outfit."

Combined Wheel and Track Gage

BY C. M. FEIST, MASTER MECHANIC SIOUX CITY (IOWA) SERVICE COMPANY

Accuracy in special work installations, with particular reference to wheel and track gages, is obtained by the Sioux City (Iowa) Service Company by checking both with a combined wheel and track gage. This gage is shown in the accompanying sketch. It is made of a ¼-in. x ¾-in. steel bar, with the American Electric Railway Engineering Association's standard wheel contour on the underside of the gage bar and the correct track gage to fit this wheel on the opposite side of the bar. This device has been found particularly effective in testing the wheel passages through special work, and makes possible the correction of errors in the track or the wheel gages.

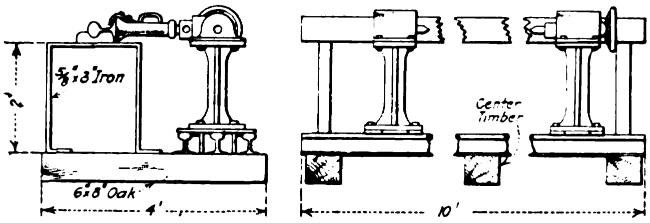


COMBINED WHEEL AND TRACK GAGE

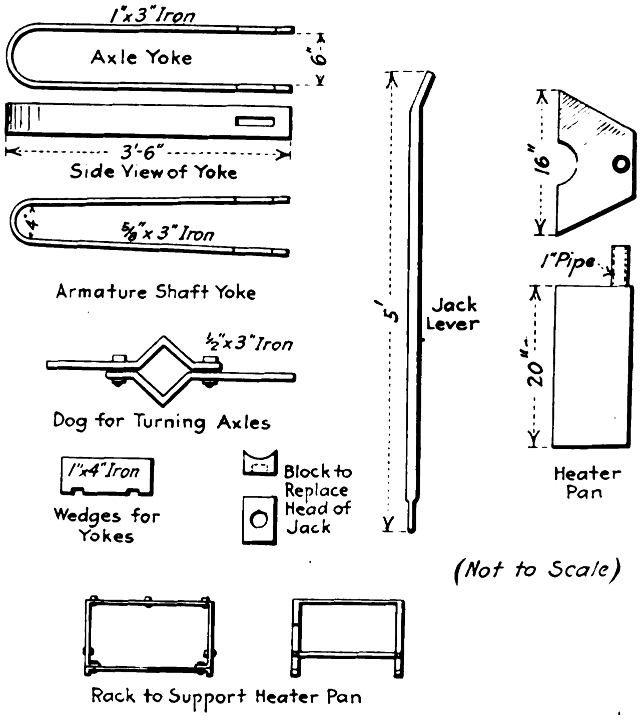
Axle and Armature-Shaft Straightener

BY J. N. GRAHAM, MASTER MECHANIC ROCKFORD & INTERURBAN RAILWAY, ROCKFORD, ILL.

A good home-made axle and armature-shaft straightener has been in use for some time in the Rockford & Interurban Railway shop with excellent results. The machine was made for the most part from material similar to that which can be found in any railway shop. As will be evident from the illustrations, it consists of a headstock and a tailstock mounted upon a bed made of rails with provision for applying a straightening force at any point by means of an ordinary screw jack. A simple heater permits the axle or shaft to be softened if necessary.



SIDE AND END ELEVATIONS OF AXLE AND SHAFT STRAIGHTENER



ACCESSORIES FOR AXLE AND SHAFT STRAIGHTENER

The foundation of the straightener consists of three pieces of 6-in. x 8-in. x 4-ft. oak tie to which, at one end, are bolted three pieces of rail about 10 ft. long. This rail may be of any convenient size and the pieces should be placed with spaces of about 2 in. between them.

On this rail bed rest movable heads, in one of which is a fixed lathe center, and in the other a movable center, operated with hand wheel and screw as in the tailstock of a lathe. Patterns had to be made for these heads. In order to guide the heads on the bed, pieces of ¾-in. x 3-in. flat iron, long enough to span the three rails, were bolted on the bottom surfaces and to these were bolted pieces of ¾-in. x 2-in. flat iron, the latter acting as slides to keep the heads in line with the rail.

The following scheme was devised to permit the straightening force to be applied to the axle without putting a strain on the centers. On the ends of the outside foundation timbers opposite to those occupied by the rail two stands made of ⅝-in. x 3-in. flat iron were mounted, their height being such that a rail laid across them was level with the lathe centers. The height of the machine is at the option of the builder, but the one which we are using has the centers 2 ft. above the top of the bed rails. On the stand was mounted a piece of rail 10 ft. long, supported on its side on two pieces of wood sawed to fit the contour of the rail. This piece of rail is loose on the stands so that it can be moved back and forth.

To this jack rail was attached an ordinary screw jack by means of two iron hooks bolted to its base. It is necessary to use a heavy type of jack for this purpose. The head of the jack was removed and replaced by a piece of iron cut out to fit around the axle. A pair of yokes, like those shown in one of the illustrations, are used to hold the jack rail at the proper distance from the axle. These yokes are slipped over the axle and over the jack rail and iron wedges are pushed through slots near the open ends of the yokes and back of the jack rail, these wedges being notched to prevent the spreading of the yokes under pressure. A jack lever, made of 1½-in. hexagon steel, with ends rounded to fit into the holes in the jack screwheads, is used in applying the straightening force.

Other auxiliaries which are convenient in the operation of the straightener are a dog for turning axles and a heater pan, details of which are shown. The dog is used for turning axles from which it has been necessary to remove the wheels, although in most cases the axles can be straightened without such removal. In most cases, the shaft can be straightened cold but it can be easily heated, if necessary, with the aid of the heater pans made of No. 16-gage, blue annealed steel. The pan is fitted with a small piece of pipe at one end, close to the bottom, for attachment to an air hose, charcoal with air blast being used to prevent the formation of smoke and the production of scale on the shaft.

Economies of the Light Car and of Ball Bearings

BY ARTHUR V. FARR, S. K. F. BALL BEARING COMPANY, NEW YORK

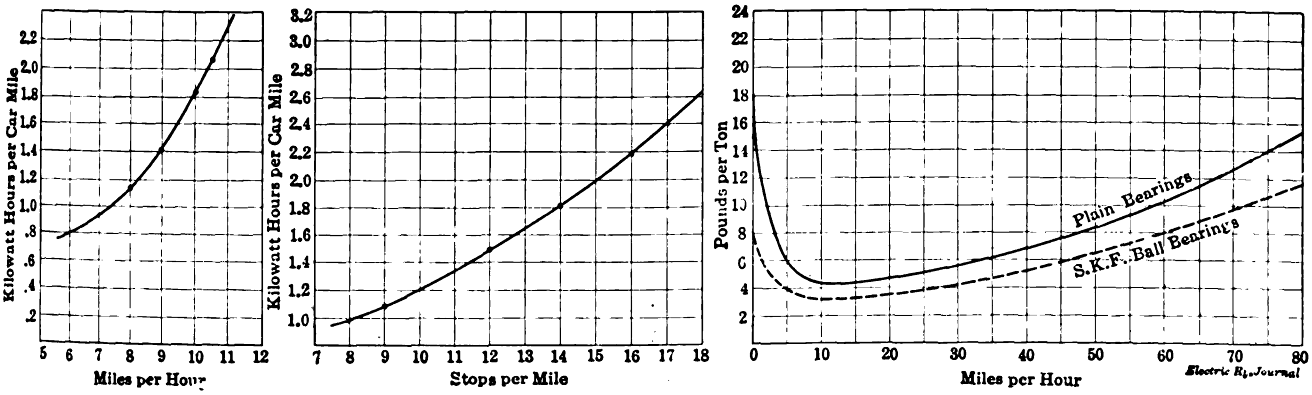
Frequency of schedule and character of service rendered are factors upon which success in modern street railway practice often depend. To operate a faster schedule and reduce headway without materially increasing operating expense is the problem facing the operator. And its successful solution will be welcomed by both operator and public.

The solution to the problem depends upon the answer to this question: Can a car be made which is acceptable to the public and which combines the qualities of light weight and strength to such a degree that the savings in power and maintenance more than offset the additional platform expense where more cars are used? The answer to this inquiry is, "Yes," that the advance in body and truck design not only makes this possible, but such cars are being made and operated with notable success to-day.

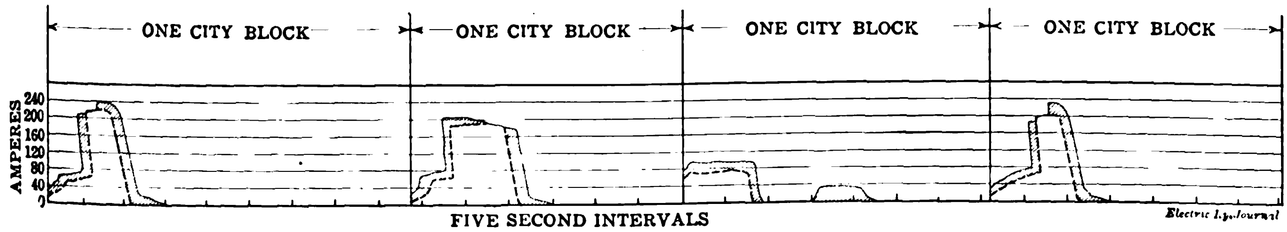
The modern type of light car is frequently a single-truck proposition, following the practice of modern engineering design in securing greatest strength for least weight. By the use of the radial truck construction and long wheelbase the riding qualities of the single-truck car approximate those of the double-truck car.

Weight reduction is a matter of recognized importance. Five cents per pound per year is usually accepted as the saving which can be secured in city service by cutting down car weight. On this basis the substitution of a 12,000-lb. car for one weighing 40,000 lb. would save $1,400 per car annually. Against this saving would be the increased platform expense for the daily rush hours, amounting to not more than $300 to $400 per car annually.

The Third Avenue Railway of New York has used



THIRD AVENUE RAILWAY CAR TESTS—FIG. 1—ENERGY CONSUMPTION WITH 9.17 STOPS PER MILE, 26,000-LB. STEPLESS CAR, BALL BEARINGS, RADIAX TRUCK, FOUR PASSENGERS; FIG. 2—ENERGY CONSUMPTION AT 7.5 M.P.H. SCHEDULE SPEED, SAME CAR; FIG. 3—COMPARATIVE TRACTIVE EFFORT WITH PLAIN AND BALL BEARINGS RESPECTIVELY



SAVINGS DUE TO BALL BEARINGS—FIG. 4—CURRENT CONSUMPTION RECORDS SHOWING COASTING WITH PLAIN AND BALL BEARINGS RESPECTIVELY

Solid Line, Plain Bearings; Dash Line, Ball Bearings; Shaded Area, Saving Due to Ball Bearings.

the light type of car to advantage and has reduced the car weight per seated passenger from between 800 and 900 lb. (average for typical double-truck cars in city service) to 650 lb.

The biggest item of economy is, of course, power saving, and the use of ball-bearing journals further increases this item. The reduction of power consumption, especially at the peak of the load during rush hours, affords an opportunity for immense economy. The use of light cars reduces the required investment for power stations and substations to the extent of $1,000 to $2,000 per car, or, in the case of existing properties, permits the operation of a greatly increased car mileage.

Tests show that the starting effort required is reduced 55 per cent when ball bearings are used. The reason for this reduction is this: plain bearings, depending upon a film of oil to separate the journal from the bearing lining, bind when the car stops. The pressure of the car on the journal squeezes the oil out, and in starting the rubbing friction of two metal surfaces in contact must be overcome. The starting friction of ball bearings, on the other hand, is no greater than the running friction. They do not depend upon a film of oil, so start easily from rest and operate at uniformly high efficiency.

	Forty passenger Car	Twenty-nine passenger Car
Length of route—miles	4½	4½
Round trip—miles	9	9
Maximum speed—miles per hour	30	25
Schedule speed—miles per hour	9.2	9.9
Stops per mile	8	6
Weight of car complete, pounds	26,000	10,000
Hours operated, per day	12	12
Time each way—minutes	30	27¼
Time round trip—minutes	58.7	54½
Round trips per day	12¼	13.2
Seated passengers per round trip	80	58
Seated passengers per day	980	766
Gross earnings per car per day	$49.00	$38.30
Number of cars operated on route	4	9
Gross earnings per day on route	$196.00	$344.70
Headway—minutes	15	6¼
Capital investment—four cars	$24,000	.....
Capital investment—nine cars	.....	$18,000
Daily mileage per car	110	119
Daily mileage—four cars	440	.....
Daily mileage—nine cars	.....	1,071
Power consumption kilowatt-hours per car-mile	3	1
Power consumption kilowatt-hours per day—four cars	1,320	.....
Power consumption, kilowatt-hours per day—nine cars	.....	1,071
Cost of energy delivered at car, per kilowatt-hour	$0.01	$0.01
Cost of energy per day—four cars	$13.20	.....
Cost of energy per day—nine cars	.....	$10.71

The decreased bearing friction with ball bearings permits a car to coast farther than one equipped with plain bearings. Because of the higher rate of acceleration and the ability to coast at much slower speeds, the ball-bearing equipped car can be operated a very much larger part of the time on the coast, between corners when making stops and on slight grades in city districts where the grades are of little or no value to the plain-bearing car.

The advantage which the ball-bearing car secures from these long coasting periods cannot only be accurately determined by experimenting in a congested city, but by comparing the ease with which a 9000-lb. car can be moved by hand when mounted on ball bearings and the amount of force necessary to move a forty-passenger bronze-bearing car in the same way. One can in this way readily appreciate what this coasting factor amounts to.

The increased revenue by the use of light cars, in comparison with cars of greater weight is illustrated by the accompanying table. In this instance nine light cars replace four heavier cars, making schedules appropriate to the increased number. It will be noted that the larger car, weighing 26,000 lb., is small compared with city cars weighing 40,000 lb. and more. Compared with these the saving would be still more in favor of the light car.

The comparison is between a forty-passenger car weighing 26,000 lb. and a twenty-nine passenger car weighing 10,000 lb., operating over the same route during a period of twelve hours daily.

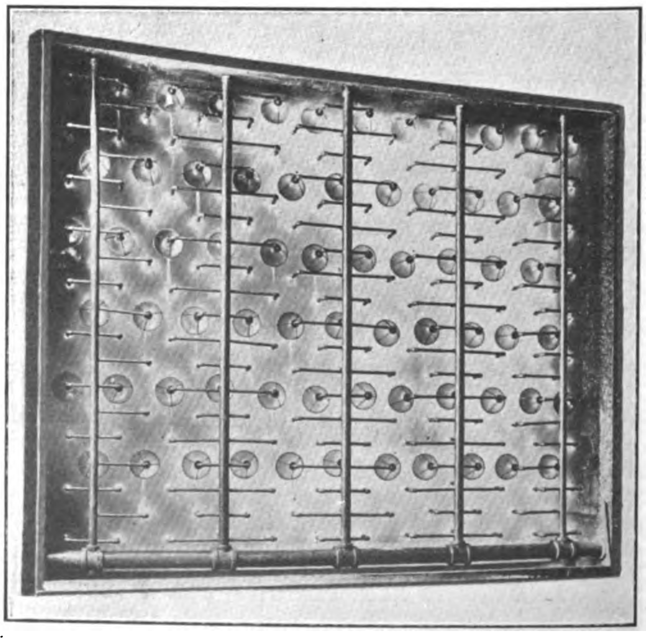
One of the chief considerations of almost every part of car equipment is its bearing on accident reduction. Doors, steps, brakes, brakeshoes, wheels, axles, and bearings (if of the anti-friction type), all play an important part in helping to reduce accident. Ball bearings permit a car to be more easily manipulated, and easy manipulation means quicker starts and freedom from jolts at starting, as cars can be started with smooth, constant torque. Not only do ball bearings help to reduce the number of accident claims, but being more durable than plain bearings they reduce the liability to car accidents in service.

Among other advantages of ball bearings are the following: Lubrication cost is saved to the extent of 85 per cent. As the bearing housings are sealed, there is no leakage and lubrication is required but once in three months. There is also a saving of from 35 per cent to 70 per cent in maintenance cost, and heating of journals is eliminated. When used on the motors the ball bearings insure uniform air gap, aid in commutation and reduce gearing and bearing wear, at the same time permitting a shortening of the motor by from 10 per cent to 20 per cent.

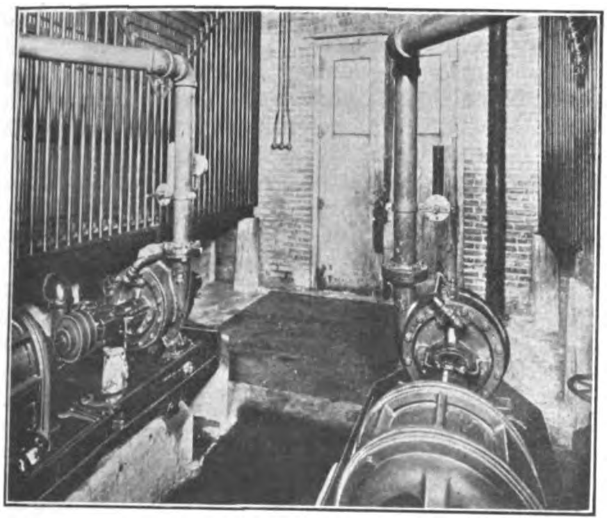
Test of Kansas City Air Washer

The Metropolitan Street Railway, Kansas City, Mo., has recently completed the installation of two air washers in connection with its largest turbo-generating plant at the corner of Second Street and Grand Avenue, and the company's engineering department now announces the successful outcome of its tests of the machines, which have a capacity of 80,000 cu. ft. per minute each. The installation includes complete equipments of motors, pumps, patented spray nozzles, spray piping, screens, eliminator plates and other necessary appliances.

According to the railway officials, the expense of installing and operating the air washers has been more than justified by the results obtained—the removal of practically all the dust in the air entering the washer



KANSAS CITY AIR WASHER—SPRAYING EQUIPMENT



KANSAS CITY AIR WASHER—PUMPING UNITS AND TEMPERING COILS

and the cooling of the air to the wet bulb temperature, thus increasing the capacities of the turbo-generators from 12 per cent to 15 per cent. The installation will undoubtedly prevent expensive burn-outs that are liable to result from carrying overloads, with an accumulation of dirt on the windings, and is believed by the railway electricians to constitute an effective insurance against the losses due to decreased efficiency and the delays required for repairs and cleaning the generator windings.

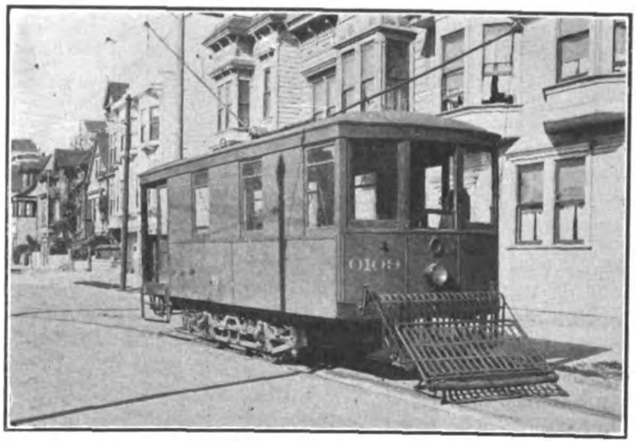
The new machines, shown in the accompanying illustrations, were purchased by the Metropolitan Street Railway from the Spray Engineering Company, Boston, Mass., which followed its usual custom in erecting them for the purchaser. About 350 ft. of 1-in. galvanized steam piping were included in the equipment of each washer, to be used as tempering coils to reduce the humidity of the outgoing air, when required. These coils are constructed so as to operate satisfactorily under a steam-gage pressure of 5 lb. per square inch. The air-washer equipment furnished renders it unnecessary to have any extra equipment for washing down the eliminator plates, thus considerable expense is avoided. The eliminators consist of vertical plates, so arranged as to provide a large wet surface. The washers are guaranteed to operate efficiently for ten years.

Each pump unit of the machines is mounted on a heavy cast-iron bedplate, so constructed as to extend under all parts. This arrangement prevents oil and water from dripping from the pumps and motors on to the floor, the bedplates being flanged and set at an incline so as to give perfect drainage. The motors are capable of operating without deterioration in a moist atmosphere from 40 deg. to 50 deg. Fahr., and the pumps operate readily with a 60 per cent efficiency. All piping and fittings are of galvanized iron to prevent corrosion incident to a humid atmospheric condition.

The tests made in Kansas City have interested a great many electricians of the Southwest who came to witness them. The assistant electrical engineer reports that in the tests thus far made, the washer passes no free moisture that will show on a plate of clean glass held at a distance of 8 in. from the eliminator. The test for cleaning consisted in sifting 5 lb. of dry boiler soot into the mouth of the washer at a temperature of 70 deg. At the same time, a sheet of clean white paper was held at right angles to the air flow at about 6 in. from the flow openings. This test was conducted for ten minutes, after which not a trace of soot could be found on the paper. With a view to seeing what result would show in the case of the finest dirt, two wire screens were covered with a thin film of absorbent cotton, and one of these was inserted in the air duct to intercept the air as it entered the washer, while the other was placed in the duct leading from the washer. The first screen was allowed to remain in the air current continuously for six hours and the second for two weeks. At the end of the latter period it was found that the second screen showed no more soiling than the first, which had been exposed for the shorter period.

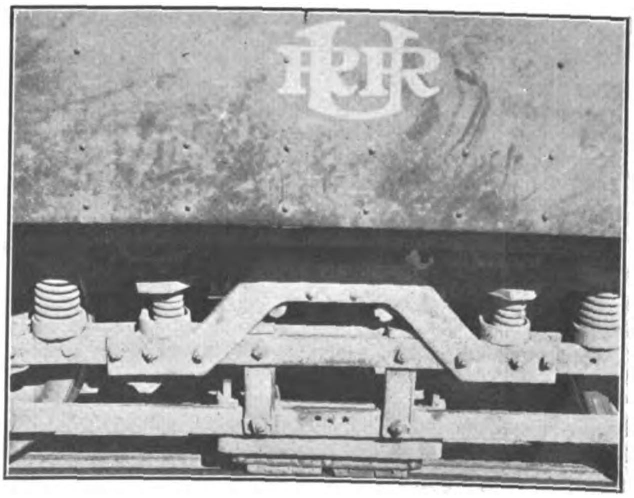
Grinding Rail with Carborundum Track Brake Shoes

To hasten the grinding of rail the United Railroads of San Francisco replaced the blocks used for wooden track-brake shoes on several of its single-truck service cars by carborundum blocks which are clamped into the same holders, four 2-in. x 4-in. x 8-in. blocks being used per car. The cars are run over the track with dragging shoes until the rail has been properly ground, the process lasting from a few days to as many weeks, depending upon the condition of the rail.



SINGLE-TRUCK CAR FITTED WITH CARBORUNDUM RAIL-GRINDING SHOES

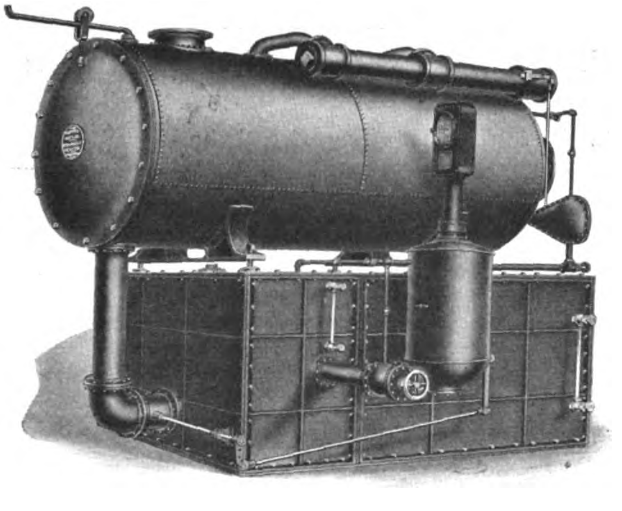
The cars are run at regular speeds while grinding in this unusual manner, and where possible they are run back and forth over a given piece of rail. Owing to the noise made by the grinder, night work is carried on only in business sections like lower Market Street, but on the less-traveled tracks in residence sections day operation is entirely feasible. No less than seven cars have been equipped for this work.



CLOSE-UP VIEW OF CARBORUNDUM RAIL-GRINDING SHOE

A Simple Feed-Water Recorder

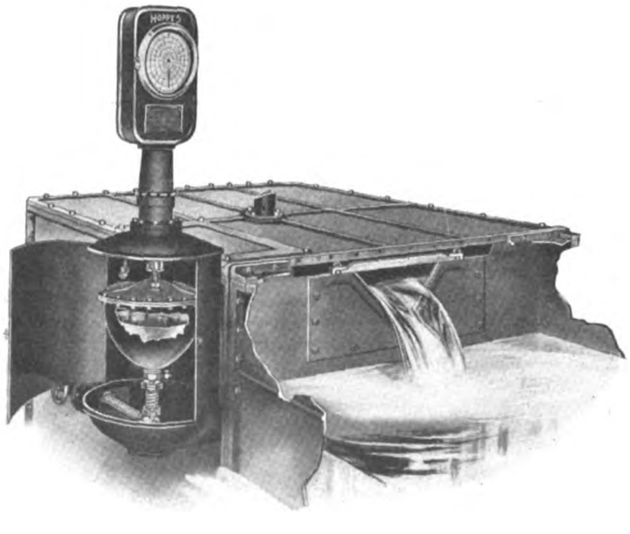
The feed-water recorder that is furnished by the Hoppes Manufacturing Company, Springfield, Ohio, in connection with the well-known Hoppes feed-water heater, is a device of unusual simplicity, although it is guaranteed to be accurate within 1½ per cent by actual weight at any temperature and at any rate of flow. Its operation is based upon the principle of the V-notch weir, and no engineering features that are not thoroughly understood have been incorporated in the design.



EXTERIOR VIEW OF FEED-WATER HEATER, TANK AND RECORDER

The meter consists of a storage tank divided into two parts by a diaphragm with a V-notch at the top. A cabinet is attached to the side of the tank by a bracket, and inside of this is a weighing vessel suspended by a coil spring, the vessel being connected to the interior of the tank by flexible bronze hose in such a manner that the water in it will always be at the same level as the water behind the weir. As the water rises behind the V-notch it also rises inside the weighing vessel, and as this vessel is so shaped as to contain just enough water at each unit of height to draw down the spring in a direct ratio to the rate of flow, the pen and recorder are directly attached to it without the use of cam or other motion-changing device.

The recording and indicating device is located in the head of a column that is supported by the cabinet. A clock movement operates a circular chart on one side, this making one revolution in twenty-four hours, and on the other side is an aluminum disk making one revolution per hour. The pen for making the record on the chart is attached to a crosshead that moves vertically and is directly connected to the weighing vessel. An arm is carried to the other side, and this supports a small planimeter which is mounted on a vertical axis and is revolved by the aluminum disk.



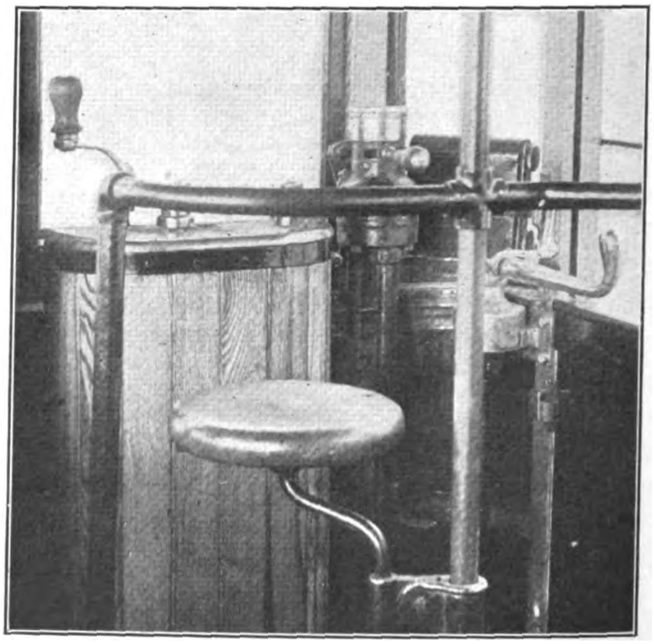
VIEW OF RECORDER CABINET WITH DOOR OPEN TO SHOW WEIGHING VESSEL

The planimeter wheel moves a train of gears and operates an integrator which records the amount of water in pounds that has passed the wheel. When the water is just starting over the V-notch the planimeter wheel rests at the center of the disk. As the head increases the wheel is drawn downward, and as the wheel moves away from the center the increase in the radial distance increases the rate of travel as the disk has a constant rotary motion.

Where the tank of the feed-water heater is placed above the floor line, or on a floor that is above the most desirable place for locating the recorder head, an inverted head can be attached to the bottom of the cabinet and can be carried as far below the cabinet as desired. If it is more convenient to read the record from the floor above the installation, an extension can be furnished and the head raised to any height desired above the cabinet.

Adjustable Seat for Motorman

E. L. Stephens, master mechanic Los Angeles (Cal.) Railway, has recently applied for patents on the motorman's seat illustrated as in use in the accompanying halftone. The seat is attached to a curved arm which sets in an automatic eccentric grip attachable to any of the vestibule stanchions. The seat may be swiveled at any angle, and may also be raised or lowered at will by raising a cam which compresses a spring that keeps the seat in any set position. Thus the user of the seat can adjust it to suit himself. The San Diego Electric Railway has placed seats of this design on its latest cars.



ADJUSTABLE SEAT FOR MOTORMAN

Another seat designed later by Mr. Stephens includes a spring in which the seat pivot can be set to give easy riding.

LONDON LETTER

(From Our Regular Correspondent)

The work of electrifying the Lancashire & Yorkshire Railway's branch line to Bury, via Prestwich, is now almost completed. It had been hoped to have this line opened to the public this month, but that is now found impossible, because of the war. Experiments have recently been made on certain sections, over which trains have been run, current for this purpose having been supplied by the Manchester Corporation. The principal work that remains to be carried out refers to the big power station that is being erected near to Clifton Junction. This new railway scheme is to afford a better service between Manchester and Bury. In normal times there are about sixty stopping trains on this line. For the new electric service the third-rail system is to be used, this being similar to that on the Liverpool-Southport line. There will, however, be this difference, that a different voltage will be employed. The trains are to consist of long and wide corridor carriages of the saloon type, and each is to have accommodation for about 100 persons.

For something like fifteen years the City & South London Railway—the oldest of the London tubes—has been a subject of special interest to all concerned in the transmission and distribution of electrical energy. There is no other railway or tramway in England, and it is a question whether there is any in the world, which is worked on the three-wire system. The "outer wires" are formed by the conductor rails of the two tracks and the running rails form the "neutral wire." With such a frequent service of trains as that run on this railway the load on each side of the neutral is fairly evenly balanced. As a result of the recent consolidation of interests among a number of the London Underground Railways, the three-wire system is likely to be superseded by the method employed on the other lines, namely, transmission by high-tension three-phase current to substations and thence by simple low-tension d.c. circuits to and from the motors of the trains. Thus a very interesting and successful demonstration of the three-wire system of traction will pass away.

The bill to authorize the City & South London, the Central London, the London Electric, and the Metroplitan District Railway companies, to make arrangements with each other and with the London General Omnibus Company for the purpose of providing increased facilites for the interchange and alternative routing of traffic, has been passed for second reading and committee stages by the examiners of the House of Lords. The promoters have agreed to amend the bill by deleting all powers dealing with interchange of traffic, etc., thereby limiting the measure to the pooling of the receipts of the companies and also to insert a clause making it clear that no statutory powers shall be conferred on the London General Omnibus Company.

The Bristol Tramways & Carriage Company has been successful, in the Chancery Division, in securing the sanction of the court to the extension of its object to enable the company, among other things, to make and arm motor cars and aeroplanes.

The Underground and its allied companies have subscribed for £800,000 in the war loan. Provision has been made by the T.O.T. group enabling their employees to invest in the loan by deductions from their wages at the minimum rate of 2s. per week.

The recent strike of the London tramwaymen has resulted in a net loss of more than £100,000. Last year's report showed that there was a deficit of £33,000, and nothing was available for the reserve fund. This year's estimates, prepared before the strike, anticipated a deficit of £91,000, due principally to allowances to those who have enlisted. The strike has made the financial situation serious, and before the end of the year it is likely that the general reserve fund will be exhausted. The men, too, are demanding increases. The arbitration court has just decided that in the case of the men in the electrical section the war bonus of 3s. a week shall be extended from men earnings 30s. and under to men earning up to £2, and no doubt the conductors and motormen will secure this concession. Unfortunately, the Treasury has held up the Council's scheme of linking up and consolidation.

The Dublin United Tramways Company has recently suffered loss by the deaths of two of the best-known members of its staff. C. W. Gordon, manager of the tramways, died suddenly on May 27 while riding, and R. S. Tresilian, secretary of the company, died on May 29 after a severe operation. Both gentlemen were well and favorably known to most of the members of the tramway fraternity in Great Britain, and members of the two tramway associations of Great Britain will not be likely soon to forget the kindness of these two gentlemen on their visit to Dublin in 1910. W. M. Murphy, the chairman of the company, who is well known not only in Great Britain, but also in America, has received many tokens of sympathy on his being deprived so suddenly of the services of his two right-hand men. In the meantime, George Marshall Harriss, chief electrical engineer, has been appointed as general manager, and Mr. M'Hugh, chief accountant, has been appointed as secretary. Other new appointments have been made, all from the existing staff of the company.

F. Ayton, M.I.E.E., presented a report of the electric vehicle committee to the members attending the meeting of the Incorporated Municipal Electrical Association recently held in London, in which it was stated that there were now three municipal tramway undertakings making use of the electric bus as an adjunct to their tramway services, namely, Southend-on-Sea, South Shields and York. In all three instances it was understood that the vehicles were giving satisfaction. Other corporations are considering the adoption of electric vehicles for various purposes, and it would appear that before long a number of these vehicles would be in regular service.

Following the example of other cities and towns—Glasgow, Newcastle, Sheffield, Salford, Aberdeen, Cardiff and Blackpool—the Birmingham tramways committee has decided to employ women as conductors to help make good the shortage in this class of labor caused by the war. An experiment will be made on the Bristol Road and King's Norton cars, with fifty or sixty women, and if they come up to requirements more will be engaged for other routes. By this means the committee hopes to lessen the difficulties in the working of the system caused by the shortage of about 120 men as drivers and conductors. The men's union offers no objection whatever to the employment of women as a temporary expedient, and especially in view of the fact that the old hands have had to work long hours since the depletion of the staff began. Evidence obtained from other towns where female labor has been employed is without exception to the effect that women have given satisfaction as tramway conductors.

The Local Government Board has authorized the Manchester Corporation to borrow £432,470 to enable it to proceed with the erection and equipment of the large new electric generating station at Barton. Some months ago the station, with its complete equipment, was estimated to cost £1,775,000. Prices have risen since then, so a larger sum will probably now be required. The loan just sanctioned is, however, deemed sufficient to cover the cost of the first complete section of the scheme. A somewhat higher sum was originally submitted to the Local Government Board in respect of this section, but the estimate was cut down to meet the views of the Treasury. The scheme for the complete station provides for a plant capacity of 160,000 kw.

The introduction of women into the Hull tramway service threatens to cause serious trouble among the men employees. The tram drivers and conductors have unanimously passed a resolution declaring that they will refuse to work with women conductors and calling for their withdrawal. They contend that there are sufficient men not eligible for military service who are willing and capable of taking up temporary positions as conductors, and they object to the employment of women on the ground that it encourages the practice of employing casual labor. Discussing the position, the Lord Mayor, who is chairman of the Hull Corporation tramways committee, stated that it was absolutely impossible to get suitable men. If they could be found they would be employed, but he stated emphatically that he would not move from the decision to employ women, and the committee would, he believed, support him.

A. C. S.

News of Electric Railways

ACTION ON RAPID TRANSIT CONTRACTS

Three Contracts Aggregating $7,022,540 Awarded by New York Commission

The Public Service Commission for the First District of New York during the week ended July 31 acted upon rapid transit contracts aggregating $8,714,911. The total awards of the week totaled $7,022,540, and one contract amounting to $1,692,370 is expected to be awarded soon. The contracts awarded included the only remaining section of the Broadway subway in Manhattan, and next to the last underground section of the Eastern Parkway subway in Brooklyn. The contracts follow:

Section No. 3 of Routes Nos. 4 and 36, the Broadway subway in Manhattan. Section No. 3 extends from Thirty-eighth Street northerly under Broadway to Times Square, and thence northerly under Seventh Avenue to Fifty-first Street. Awarded to Holbrook, Cabot & Rollins Corporation, the lowest bidders, for $3,740,913.

Section No. 3 of Route No. 12, the Eastern Parkway subway in Brooklyn. This section extends from about Nostrand Avenue easterly under Eastern Parkway to Buffalo Avenue. Awarded to Rodgers & Hagerty, Inc., the lowest bidders, for $2,170,652.

Section No. 1 of Route No. 49, the Culver elevated line in Brooklyn. Section No. 1 extends from a point near Thirty-seventh Street over Gravesend Avenue to a point near Bay Parkway. Awarded to Post & McCord, Inc., the lowest bidders, for $877,959.

The Broadway subway and the Culver line are both for operation by the New York Municipal Railway Corporation, while the Eastern Parkway subway, which is an extension of the existing subway, is for operation by the Interborough Rapid Transit Company.

In addition to the construction contracts, the following awards were made for track materials, which will be used on about 230 miles of single track of the dual system, covering all lines not already provided for: Track rail splice bars, the Rail Joint Company, $197,106; nut locks, Robert F. Horsey, $735; anti-creepers, the Creepcheck Company, $35,174.

The commission has laid out a new rapid transit route, to be known as Route No. 61, providing for the construction of a new tunnel under the East River from Sixtieth Street, Manhattan, to the Queensboro Bridge Plaza in the Borough of Queens, where it will connect with the new rapid transit lines in that borough running to Astoria on the north and to Corona on the northeast. This action was taken in pursuance of resolutions adopted by the Board of Estimate and Apportionment asking that the tunnel route be substituted for the original route over the Queensboro Bridge. The new route is for operation by the New York Municipal Railway Corporation in connection with the Broadway subway in Manhattan and the new lines in Queens, over which this company will have trackage rights. In December, 1914, the Degnon Contracting Company proposed the change from the bridge to the tunnel, and in February, 1915, that board adopted resolutions requesting the Public Service Commission to submit a plan for a tunnel and to prepare for introduction in the Legislature such amendments to the rapid transit act as would be necessary to enable the city to make the change. The commission immediately caused to be introduced in the Legislature the required act, which was enacted into law. The proposed change was submitted to Alfred Craven, chief engineer of the commission, who made two reports thereon in March, in which he favored the bridge route. These reports were transmitted to the Board of Estimate, and on July 21 that board adopted further resolutions declaring that "it is still the opinion of the board that ultimate economy will best be served through the substitution of a tunnel connection for the proposed connection across Queensboro Bridge." The Degnon Company in its proposition to the Board of Estimate stated that it would submit a bid for the construction of the tunnel not to exceed $4,500,000, and it would agree to complete the work within two and a half years. If this is possible it will not materially delay the beginning of operation of the Broadway subway in Manhattan.

DETROIT STOCKHOLDERS APPROVE SALE TO CITY

Stockholders of the Detroit United Railway, at an adjourned meeting on Aug. 2, approved the proposed purchase contract between the city and the company. More than 80 per cent of the stock was represented at the meeting.

The necessary papers have been signed by the officers of the company and returned to the board of street railway commissioners, ending the company's participation in the proposition for the present. The next step is to be taken by the members of the Street Railway Commission, upon whom devolves the duty of setting the machinery in motion to get the purchase contract before the electors. Inasmuch as Chairman Couzens is absent from the city and his signature is required, it probably will be two weeks before the contract is in shape for presentation to the Common Council. After it reaches the latter body it must lie on the table for thirty days before it can be placed on a ballot at a special election. It is not expected that the contract will be held up in any way by the Common Council as the latter body has not been inclined to interfere with the Street Railway Commission in any of its proposals. At present the submission of the plan to the electors about Oct. 1 seems likely.

The Detroit United Railway, through *Electric Railway Service*, its official publication, announced that inasmuch as it is a party to the contract it will not participate in any discussion concerning it. What is regarded as the company's last statement on the proposal says:

"We feel sure we will be pardoned for expressing some slight objection to one feature of the pending propaganda—that is, picturing the Detroit United Railway as a sort of 'foreign devil' because part of its earnings go to the absent owners of some of its securities. We particularly object to that suggestion because the Detroit United Railway will be charged with the responsibility of presiding over more than 600 miles of Michigan electric railways even after the city lines are taken over by the city of Detroit. We further object because the truth is that almost as many Detroit United Railway securities are owned here at home as are those of Detroit's principal newspaper corporations and those of the city of Detroit itself. It is, furthermore, doubtless true that at least 99 per cent of the automobiles manufactured in Detroit are dependent upon the purchasing power of absent owners. No one should Chinaize or Mexicanize the city of Detroit with the thought that outside investors are to be invited in only to be snubbed or to have their pockets picked."

NEW YORK'S CONSTITUTIONAL CONVENTION MAKES SLOW PROGRESS

Senator Root of New York recently warned the constitutional convention that it was far behind schedule and that the delegates must give their entire time to the task before them if they wish to complete their work in time to submit a revised constitution to the people this fall. On Aug. 1 the convention had been in session four months and in that time had tentatively approved four out of 707 proposals introduced. These four proposed amendments have been advanced to third reading and put aside for final consideration at a later date. Two other proposed amendments have been defeated in committee of the whole. Thirty-four others have been reported favorably by standing committees, and are now awaiting debate. It was expected that by the close of the week ended Aug. 7 the standing committee would have placed in its hands amendments embodying the projects of the reorganization of the State government by the co-ordination of departments and by the application of the short-ballot principle to the elective offices of the State; the reform of the financial system of the State by the esablishment of an executive budget; the freeing of municipalities from legislative interference with their private affairs by a broad grant of home rule, and the attainment of a speedier and more systematic administration of justice by the revision of the judiciary article of the constitution.

The proposal for an appointive judiciary has been rejected by the judiciary committee. The committee on legislative powers, of which William Barnes is chairman, has reported favorably to the convention Mr. Barnes's amendments designed to prohibit the Legislature from enacting advanced social legislation, notably a minimum-wage law. On the other hand the committee on industrial relations has reported in favor of authorizing the Legislature to pass a minimum-wage law. Mr. Barnes's committee has also indorsed the Dunmore amendment, requiring that all regulations by boards and commissions in the exercise of the police power should be "reasonable," and so subject to review by the courts. It appears that there is every prospect of the passage of an amendment making cumulative voting compulsory in the election of corporation directors.

A digest of the proposals contained in the completed draft of the amendments advocated by the committee on public utilities with respect to the public service commissions was published in the ELECTRIC RAILWAY JOURNAL of July 31, page 202.

TOLEDO TENTATIVE DRAFT COMPLETED

Report of Franchise Committee Reviewing New Grant Printed in Full

At the close of the conference between the franchise committee of the Toledo City Council and the representatives of the Toledo Railways & Light Company, Toledo, Ohio, on the evening of July 29, Henry L. Doherty, chairman of the railway board, left for New York to confer with his associates in regard to the tentative draft of the new franchise as prepared and the report of the committee, which is to accompany the grant when presented to the City Council. Mr. Doherty and the committee had disagreed on the report because the committee refused to include anything that could be called a recommendation for the action of Council on the franchise. The committee told the railway's representatives that they did not expect Council to do anything further than refer the grant to the voters for action. Mr. Doherty contended that the work that has been done in preparing the draft would amount to nothing unless Council either accepted or rejected the proposal.

A copy of the report was submitted to the Toledo Railways & Light Company on July 29 after it had been revised to some extent by the commitee. When Mr. Doherty found that the committee was fully committed to the report as it then stood he asked for time to submit it to his associates. The committee made some objection, but Mr. Doherty said if the report had been furnished to him just after the close of the last conference on the previous week he would have had his reply ready. It was agreed that another meeting should be held on Aug. 3, when Mr. Doherty expected to give the committee his decision as to both the tentative draft and the report. The report, as it stood at the close of the conference on July 29, is as follows:

"At the end of the try-out period Council is required to establish a rate of fare which will cover the cost of operation, the cost of maintenance and a 6 per cent return to the company for a period of five years or more if neither party requests a new fare at the expiration of five years; further, the fare thus established by Council cannot be questioned in court or by arbitration until it has been in operation for six months and it cannot be disturbed by any court or by any arbitrators to whom it may be submitted, unless it is clearly proved by the company that the fare is insufficient to cover the operating and maintenance costs exclusive of interest on bonds, and a 5½ per cent return upon the value of the property.

"There is only one condition under which the fare fixed by Council may be brought in question before the expiration of the six months' period, and that is when the company is able to prove to the commissioner of public utilities of the city, who will be an officer under the new charter, that the rate of fare fixed by Council is insufficient to produce a return in excess of 3 per cent upon the value of the property, in which event the question may be submitted to arbitration.

"If the fare is found by arbitrators or a court, as the case may be, in a final hearing of the question, to be insufficient to meet the three items named, then the fare is abolished and Council has ninety days in which to establish a new rate of fare, and during the ninety-day period the fare will be seven tickets for a quarter for adults, and if Council fails to establish a fare within the ninety-day period, then the arbitrators or court, as the case may be, may fix the fare to prevail after the ninety-day period until the Council does establish a new rate of fare.

"As to municipal ownership, the ordinance expressly reserves to the city the full, complete and absolute right and authority at any time, upon twelve months' written notice to the company, to acquire the railway property at its true value, which shall be determined by three arbitrators appointed, one by the city, one by the company, and the third by those two, and the valuation shall be made as though no franchise rights existed, and all franchise rights terminate at once when the city takes over the property. This also gives the city the right to issue its bonds and make them a lien upon the property by a trust deed, together with a franchise to the trustees of the bonds for the benefit of the purchaser of the property in the event of a foreclosure sale of the property.

"At the end of ten months a try-out period of twelve months begins, during which time the fare for adult passengers shall be five tickets for 15 cents, and the entire system during the try-out period will be under the control, direction and management of three commissioners appointed by the city, thus affording the very best opportunity to the citizens to ascertain for themselves whether a 3-cent fare is practical.

"These commissioners will have full access to and control of all the books, records, incomes, expenditures and all the affairs of the company, and will be required to furnish monthly reports to the city setting forth all the information secured relating to the railway business.

"During the try-out period three arbitrators, one chosen by the city, one by the company and the third chosen by the former two, will value the property, which valuation is to be made without reference to any franchise rights or privileges, and shall be made as though no franchise rights or privileges existed.

"The ordinance reserves to the city at all times control over the operation of the system, the character of the equipment, the schedule and routing of cars, the maintenance and extension of lines and the right to fix the fare to be charged during the time the franchise continues, and control of interurbans.

"The proposed ordinance contains many other features suitable to the needs of the city and of the railway system, but the foregoing are perhaps the more salient features of the proposal, to which the committee desires particularly to call attention at this time.

"The ordinance provides definitely for maintaining the railway system and property at a high state of efficiency at all times, which the committee believes will prove very effective and beneficial. It provides for a rearrangement of the railway system, the rerouting and scheduling of cars during the first four months that the ordinance is in effect by a committee appointed by the city, including a proposed crosstown line and necessary extensions. It requires the company to equip the entire system with pay-as-you-enter or pay-as-you-leave cars with fare box receivers, and to do the necessary work during the first ten months of the ordinance to make the existing lines conform to the rearranged system."

Phil Hassenzahl, chairman of the franchise committee, received a letter from Henry L. Doherty on Aug. 2, in which he said that after a conference with his associates in New York it had been decided that the company could not accept the franchise prepared unless the committee asked Council to approve or refuse it before presentation to the voters. Mr. Doherty says that the majority of the members of the Council were elected nineteen months ago on their promise to settle the street railway franchise trouble. Only three months of their term remained. He felt, therefore, that if the members recommend or reject the draft, it can be put before the people upon its merits.

The letter was read to the committee on the afternoon of Aug. 2 and some discussion followed. The members do not agree with Mr. Doherty in the original understanding that the committee was to make the recommendation he asks.

They also consider that the street railway question has already been divorced from politics.

OFFICERS TESTIFY IN RHODE ISLAND ARBITRATION

At the continued hearings at Providence, R. I., in the Rhode Island Company wage arbitration, officers and employees of the transportation and allied departments have testified at length upon the duties, compensation and qualifications of men in the car service. Counsel Vahey for the employees' union stated that the men's side of the case would probably be completed by the end of the first week in August, leaving a week or ten days as the probable time required for the presentation of the company's case.

R. Roscoe Anderson, superintendent of transportation, expressed the opinion that a guaranteed minimum number of hours a day for spare men was undesirable in view of the cost to the company and the tendency toward reducing the amount of work available for the more industrious men. He did not look upon platform work as skilled labor in the usual acceptance of the term. Between 50 and 75 per cent of the blue-uniformed men were first-class workers. No change in the schedules was made after the formation of the union, and the speed of the city cars had not been increased materially.

William D. Wright, supervisor of equipment, described the duties of the shop organization and carhouse forces. Representative hourly wage rates were: painters, 19.5 to 30 cents; wood workers, 25 to 30 cents; blacksmiths, 28 to 31 cents; helpers, 22 to 28 cents; toolmakers, 35.5 cents; machinists, 29 to 32 cents; machine hands, 22 to 28 cents; bench hands, 20.5 to 25.5 cents; overhaulers, 24 to 28 cents; firemen, 25 cents. Frank H. Brown, superintendent of the northern division, testified that in his opinion the maximum wage of motormen and conductors was sufficient. Several men who left the road's employ had returned stating that they could earn more money on the road than outside. Many of Mr. Brown's spare men were earning from $12 a week up, and regular men frequently earned $18 or $20. The younger men appeared less willing than the older employees to work hard.

Brayton E. Sweet, superintendent of the Mount Pleasant division, said that he was "old-fashioned enough to believe that if a man was not satisfied with his pay he could go elsewhere." The work of motormen and conductors in Providence had grown lighter in recent years. The majority of men having full day cars were very well satisfied with wages and working conditions.

William D. Mathewson, superintendent of the Olneyville division, thought the men were being paid enough under present business conditions. The point was brought out that the secret service branch of the company reported meritorious acts as well as violations of rules.

Charles E. Redfern, claim agent of the company, informed the board that the cost of accidents to the road in 1914 was more than $300,000. About 9000 were reported, of which between 3500 and 4000 called for a money settlement. Many accidents occurring in the neighborhood of cars did not, however, concern the company in any direct way. Ten adjusters were employed by the claim department.

Upon request of the union, the company presented data as to average earnings. In 1908 1343 employees averaged $606.17 a year, and in 1914 1634 employees averaged $714.74. In the week ending April 9, 1915, 151 spare conductors averaged $12.82 and 142 spare motormen $14.18. The weekly average for all uniformed men in 1914 was $13.

A. E. Thielson, superintendent of the Danielson division, testified that sixty-three men worked under his direction, including several power plant employees and linemen. Men in the freight service had no regular hours, but probably worked from twelve to thirteen hours a day, with an average wage of 28.5 cents an hour, and 33.5 cents an hour for all time above ten hours. On this branch of the system the chief engineer of the power station received $28 a week of seven days, working twelve hours a day; two oilers were paid $21 a week for a twelve-hour day; firemen worked eight hours daily for seven days a week at 25 cents an hour; track greasers worked ten hours a day at 20 cents an hour; trackmen received 20 and 22.5 cents an hour, and foremen 25 and 35 cents.

P. R. T. WITHDRAWS OPPOSITION

The Philadelphia (Pa.) Rapid Transit Company, in a formal document forwarded to the Public Service Commission on July 30, withdrew its opposition to the city's petition for a certificate of public convenience, a technical procedure necessary before the city can proceed to the building of the Broad Street subway and the Frankford elevated. The statement sent to Harrisburg sets forth that one of the reasons for withdrawing opposition to a certificate of public convenience is "in order that public improvements, duly authorized by City Councils, may proceed without delay." The memorandum as filed by the company follows in full:

"The Philadelphia Rapid Transit Company, while asserting its rights under the contract of July 1, 1907, to a ninety-day period within which to accept or reject the construction of the high-speed lines for which the city now asks a certificate or certificates of public convenience, and further asserting its contract rights on Broad Street vested in the Thirteenth & Fifteenth Streets Passenger Railway under the act of March 27, 1873, whereby, in consideration of that company surrendering its right to build and operate a railway along Broad Street, the State of Pennsylvania covenanted that said street should not be thereafter used for transit facilities competing with the lines of said company on the adjacent streets, viz., Thirteenth Street and Fifteenth Street, which contract rights it asserts are inviolable, subject only to taking with compensation under the power of eminent domain duly exercised.

"Nevertheless, in view of the evidence presented at the hearing before this commission, showing that more than twice as many citizens will be served by the high-speed lines if operated by the Philadelphia Rapid Transit Company than if operated by an independent company, and of the statement by the Director of City Transit that in his opinion it is preferable to have them operated by the Philadelphia Rapid Transit Company, and believing that at the proper time a contract for the operation of these lines will be offered by the city of Philadelphia to the Philadelphia Rapid Transit Company which can be accepted and which will fully and fairly protect it from a competition which it is asked to set up against itself, and in order that public improvements duly authorized by City Councils may proceed without delay, hereby withdraws any protest and objection which it may have entered in respect to the granting of the certificate or certificates of public convenience prayed for by the city of Philadelphia."

CHICAGO ELEVATED MEN REJECT OFFER

After a series of conferences between the officials of the employees' union and Britton I. Budd, president of the Chicago (Ill.) Elevated Railways, a tentative agreement was reached in the settlement of working conditions and wages. This was submitted to the employees in referendum, but was rejected by a vote of 1684 against to 659 for the proposal. The essential points in the company's offer to the men included an increase in the maximum wage, which was 34 cents an hour, of 2 cents an hour for the first year of the contract and an additional 2 cents an hour for the second year of the contract. It was also agreed that as soon as a man was made a regular motorman he would receive the maximum wage. Formerly men were required to serve for one year as regular motormen at 30½ cents an hour. The plan of advancement of trainmen on elevated railways in the past has provided that they should start as guards at 23 cents an hour, which amount in the offer was increased to 25 cents an hour at the close of the second year, and advanced successively to extra motormen and then to regular motormen. The offer to the employees provided practically no changes in the working conditions, which were deemed satisfactory. As a result of the refusal to accept the tentative agreement, all questions of wages and working conditions will be referred to a board of arbitration, of which Mayor Thompson will be the referee. State Attorney Hoyne, who represented the employees of the surface lines in their arbitration, will represent the elevated railway employees. Mr. Budd has not selected the company's representative in this arbitration. It is not regarded as likely that the hearings will be held until early in October.

INQUIRY INTO ELEVATED THIRD-TRACKING

The Thompson legislative committee continued on July 30 its inquiry into the work of the Public Service Commission for the First District. It was expected at the session to learn direct from the members of the commission the status of the rapid transit work now under way, but none of the members appeared before the committee. The offer of Travis H. Whitney, secretary of the commission, to testify was rejected. An executive session of the committee was called and it was decided to proceed with the work of looking into the rapid transit situation during the week ended Aug. 7, although the members of the committee had hoped originally to adjourn on July 31 until the fall.

On Aug. 2 Chairman McCall of the commission was questioned more particularly with respect to the third-tracking of the Fulton Street elevated line of the Brooklyn Rapid Transit System, to which objection has been raised by Brooklyn property owners. Mr. McCall objected to elevated structures, but he did not see how the city could afford to spend from $4,000,000 to $8,000,000 additional for subways. He said the Fulton Street third-tracking was before the courts, but he did not believe that the courts would decree the third-tracking to be a nuisance.

On Aug. 3 Charles L. Woody of counsel for the Brooklyn Rapid Transit Company said that the consents for the Fulton Street work had been validly and legally procured and that he was willing to lay the consents before the committee. Commissioners Williams and Cram also appeared before the committee on Aug. 3. At the conclusion of the session on that date the committee announced that it had decided to adjourn until Sept. 7.

NEW CLEVELAND GRANTS PROVOKE DISCUSSION

Business men along East Fifty-fifth Street, Cleveland, Ohio, are circulating papers indorsing the electric freight subway that is to be built under that thoroughfare by the Cleveland, Akron & Canton Terminal Railroad. This is an effort to counteract the clamor for a referendum vote on the franchise recently granted the company.

One of the principal objections to the franchise recently granted to the Cleveland & Youngstown Railroad aside from the electrification requirement, which has been promised through an amendment, is the fact that an agreement was not secured from the other railroads to build a union station on the lake front. Councilman Fitzgerald and other minority leaders fear that the New York Central and other large lines will use the station that will eventually be built by the Cleveland & Youngstown Railroad and will refuse to erect the imposing structure on the lake front that the city desires.

H. Holland, manager of the Trolley Supply Company, Cleveland, has suggested that flat, malleable-iron or steel tracks be laid in all the principal streets that have no street cars for vehicular traffic of all kinds. Mr. Holland believes the heavy trucks now in use are very destructive to pavements and that these tracks would cost less than the money required to keep the pavements in proper condition. The tracks should be 15 in. or 16 in. wide, he said, and the rails discarded by the railway company would make a good base for the vehicle tracks. In the wide streets he would have double tracks, and in the narrow thoroughfares a single track would do. Mr. Holland also believes this would keep the vehicles off the streets which have railway tracks and prevent congestion. He conferred recently with Peter Witt, street railway commissioner, in regard to the plan.

The interest fund of the Cleveland Railway on June 30 was $505,342. It is slowly increasing. When it reaches $700,000 the 1-cent charge for transfers will be removed. The receipts of the company for June were $721,115, a gain of $78,478 over the same month in 1914. The amount received from transfers was $65,291.

Cut Asked in Franchise Tax.—The trustees of the Rhode Island Company, Providence, R. I., have addressed a letter to the City Council reminding that body of the petition of last May, in which the trustees asked that the city reduce the company's franchise tax.

Hearing of Clay County Suit Postponed.—The motion for rehearing of the suit by the Interstate Railway against the Kansas City, Clay County & St. Joseph Railway, in which the plaintiff was awarded $1,500,000 damages, will be heard on Aug. 9 instead of Aug. 2, as first set.

Refund of Excise Tax Ordered.—Judge Dickinson has filed an opinion in the United States District Court at Philadelphia deciding that five subsidiary electric railways operated by the Philadelphia Rapid Transit Company were not carrying on business within the meaning of the excise tax law of 1909 and therefore were not liable to the tax. The government is ordered to refund $23,913.

Little Rock Honors Judge Kavanaugh.—State, city and county offices and every business house in Little Rock closed on Aug. 4 in memory of the late Judge W. M. Kavanaugh of Little Rock, president of the Little Rock Railway & Electric Company at the time of his death and for fourteen years president of the Southern Baseball Association, for whom Wednesday afternoon was set aside as Kavanaugh Day in the league.

Extension of Detroit Interurban Line Opened.—The 8-mile extension of the Detroit, Almont & Northern Railroad, Detroit, Mich., from Almont to Imlay City will be formally opened on Aug. 20. The new line affords direct connection between Detroit and Imlay City. It will be operated as one of the lines of the Detroit United Railway system. Residents of Imlay City and along the route subscribed funds sufficient to buy the right-of-way and fence it, following the same plan adopted in the extension to Almont fourteen months ago.

Offer to Operate at Cost Plus 10 Per Cent.—Bridge Commissioner Kracke of New York has announced that he is in receipt of an offer from the Third Avenue Railway to operate on the basis of cost of service plus 10 per cent profit, substantially the same local surface car service over the Williamsburg Bridge as that now afforded by the Bridge Operating Company. The contract with the Bridge Operating Company, which is controlled by the Brooklyn Rapid Transit Company and the New York Railways, was entered into by the company and the city in 1905. Mr. Kracke is also in receipt of an offer for service over the Williamsburg Bridge from the Manhattan Bridge Three-Cent Line, which now operates over the Manhattan Bridge.

Franchise Interpretation Requested.—The Gary, Hobart & Eastern Traction Company has asked the City Council of Gary, Ind., to interpret the section of the franchise regarding the entrance of interurban cars into the city over the tracks of the Gary & Interurban Railroad. It is the plan of the interurban line, if the matter of incoming interurban cars can be satisfactorily arranged, to ask for a franchise on Seventh Avenue or Eighth Avenue east to Virginia Street, north to the mill gates and west on Fourth Avenue or Fifth Avenue to Broadway and east on Fifth Avenue to the city limits, thus allowing the Hobart cars to make a loop and carry workmen to the Virginia Street entrance of the mill as well as handling traffic to the towns of Miller and Aetna.

Dr. Wilcox on the Public Service Law.—Dr. Delos F. Wilcox has submitted a statement to the New York legislative committee on investigation of the public service commission law, in which he makes a number of criticisms of the present law as well as a number of suggestions. Among the charges which he brings against the present law is a lack of responsibility of the commissioners to the local authorities in the case of the First District Commission, that the commission has power to enter into contracts with the same companies whose services it is called upon later to regulate, that the telephone and telegraph services in the first district are under the jurisdiction of the commission in the second district, that the public service law in some respects is inconsistent with the present railroad law, that some of the franchises are perpetual while others are limited or indeterminate, and that the commission does not have power to require extensions. He recommends the establishment of one State commission with local municipal commissions with certain powers to control the utilities in the larger cities of the State, and longer tenure of office, but with possibly the power of "recall" in the hands of the people. He also criticises professions on the part of commissioners of belief that the public service corporations are making every effort to serve the public interests.

Financial and Corporate

ANNUAL REPORTS

Philadelphia Rapid Transit Company

The comparative statement of income, profit and loss of the Philadelphia (Pa.) Rapid Transit Company for the years ended June 30, 1914 and 1915, follows:

	1915	1914
Earnings:		
Gross passenger earnings	$22,971,594	$23,356,876
Receipts from other sources	872,011	898,936
Total	$23,843,605	$24,255,812
Expenses:		
Maintenance and renewals:		
Maintenance	$2,435,415	$2,668,752
Reserve fund for renewals	1,141,126	969,620
Total appropriation	$3,576,541	$3,638,372
Operation of power plants	1,417,239	1,557,965
Operation of cars	6,205,100	6,297,115
General	1,329,829	1,527,387
Taxes	1,348,723	1,278,406
Total	$13,877,432	$14,299,245
Net earnings from operation	$9,966,173	$9,956,567
Fixed charges:		
Interest	$2,259,471	$2,161,696
Rentals	7,364,997	7,364,635
Sinking fund, city contract	120,000	120,000
Total	$9,744,468	$9,646,331
Surplus	$221,705	$310,236

The gross earnings showed a decrease of $412,207, or 1.7 per cent for the year, divided 1.65 per cent for passenger earnings and 3 per cent for other receipts. This is accounted for by the continuance of the general industrial depression experienced during the preceding fiscal year, which was aggravated by the further unsettling of business conditions occasioned by the outbreak of the European war in August, 1914, and also by the jitney competition commencing in the spring of 1915.

Although the taxes increased by $70,317, the total operating expenses decreased $421,813. This saving was accomplished by making all operating economies possible without impairing the standard of service. The operating ratio for the year was 58.2 per cent.

The fixed charges showed an increase of $98,137 on account of added interest charges. The resultant surplus for the year ended June 30, 1915, was $221,704, as compared to $310,236 for the preceding year, a decrease of $88,531.

The capital asset account "Leases, Franchises, Construction, Equipment, Advances to Leased Lines, Sinking Funds, etc.," as of June 30, 1915, amounted to $113,010,043, representing a decrease of $688,381 during the year. Charges for additions and betterments during the year amounted to $329,566.

The renewal reserve amounted to $1,269,036, as of June 30, 1915, as compared to $1,042,962 at the beginning of the year, the increase being occasioned by the appropriation from income for renewals exceeding the expenditures during the current year. This balance of $1,269,036 to the credit of the renewal reserve represents the accumulated total of amounts charged to operating expenses to provide for renewals in excess of the actual expenditures for renewals during the five years to June 30, 1915. The renewal fund as of June 30, 1915, amounted to $1,250,000, of which $128,246 was in cash. This renewal fund is held against the renewal reserve for the purpose of financing the expenditures for renewals when they may be incurred in the future.

The company's equipment trusts, Series B and C, dated March 1 and May 1, 1913, respectively, provided for a total issue of $6,144,000 of 5 per cent car trust certificates maturing in equal semi-annual instalments during a twelve-year period from 1913 to 1925. A total of $1,024,000 of these certificates has been retired during the two years ended June 30, 1915.

The accident reserve amounted to $1,042,555 as of June 30, 1915, as compared to $1,110,703 at the beginning of the year, the decrease being caused by the settlement of cases pending at the first of the year. The total suits pending were reduced from 2529 to 2167 during the year. The records for the four year period ended June 30, 1915, show a reduction of suits pending from 4367 to 2167, a decrease of more than 50 per cent, whereas the accident reserve during the same four years was reduced only about 20 per cent, or from $1,311,996 to $1,042,555.

Washington Railway & Electric Company

Net earnings of $1,103,942 for the first six months of 1915 are shown in the semi-annual report of the Washington Railway & Electric Company, Washington, D. C. The gross earnings during these six months were $2,601,738, as compared with $2,527,747 during the first six months of 1914. A comparative statement of earnings and expenses follows:

	1915	1914
Gross earnings	$2,601,738	$2,527,747
Operating expenses and taxes	1,454,263	1,394,665
	$1,147,475	$1,133,082
Depreciation of equipment	43,532	30,000
Net earnings	$1,103,942	$1,103,082
Miscellaneonus income and profit and loss items	37,524	12,257
	$1,141,466	$1,115,338
Fixed charges	593,212	578,059
Net income	$548,254	$537,279
Dividends (preferred and common)	440,000	440,000
Balance	$108,254	$97,279
Sinking fund	52,700	49,160
Surplus	$55,554	$48,119

Announcement has been made of the resignation of William B. Hibbs from the directorates of all public utility corporations the securities of which he handles in the capacity of a broker. They include the directorates of the Washington Railway & Electric Company and its subsidiary companies. Mr. Hibbs' resignation was prompted by ethical reasons. As a broker he was called upon to buy and sell securities of the several companies of which he was a director, and he was often placed in embarrassing positions. Under the circumstances he felt that it would be better for him to withdraw from the directorates.

Lima Light, Power & Tramways Company

The Empresos Electricas Asociadas (Lima Light, Power & Tramways Company), which holds practically a monopoly of the electric railway, power and light service in Lima, Callao and several of the suburban towns around these cities in Peru, secured revenues from its various branches during 1914 amounting to $1,913,368, as compared to $1,981,560 in 1913, a reduction of $68,092. Gross expenditures were $1,328,223 in 1914 and $1,420,594 in 1913, representing an economy of $92,371, In view of the fact that these results were obtained during the most abnormal year in the history of the company, and the net receipts were the largest yet obtained, the year's results were considered highly satisfactory. The two principal factors affecting the revenues were the disturbed political situation during the first half of 1914 and the consequences of the European war during the second half.

The gross receipts of the urban and interurban tramways amounted during 1914 to $997,719, a decrease of $45,511 in comparison with 1913. The gross receipts of the Lima urban tramways were $457,533, or $18,560 less than the preceding year. This section was augmented during the year by twelve new American-built cars of the latest type. There was a reduction in the revenues of the Lima-Cherrillas tramway of $11,689, the gross revenues of the year being $280,616. The branch from Lima to Callao also suffered decreased revenues to the amount of $17,465 in comparison with 1913. This was caused by the suspension of maritime traffic and the limitation of business in Callao. The Magdalena Interurban Tramway was the only one that showed an increase in gross receipts, which were $35,271 in 1913 and $37,481 in 1914. The number of passengers transported on all the tramway lines fell from 29,020,888 in 1913 to 28,120,425 for 1914. A dividend of 1 per cent was distributed during 1914 in accordance with an agreement entered into with the bondholders.

NEW KANSAS CITY PLAN PRESENTED

Judge W. C. Hook of the United States District Court of Kansas City, Mo., on July 29 in Chicago presented suggestions relative to a reorganization plan for the Kansas City Railway & Light Company. The plan of Judge Hook is now being circulated for signatures among the various security committees, and a few details still to be settled are under discussion. The plan is said to be satisfactory to the city officials, and according to City Counsellor Evans it meets the terms of present franchises and the pending ordinance. Attorneys for the Metropolitan Street Railway are now working on the plan and a new franchise, which will be taken up later by the city.

Judge Hook's plan involves the complete exchange of old securities and the separation of the railway and the light properties. In outline it provides for an indebtedness allowance of $28,700,000 for the present companies, which is to be borne by two new companies, one representing the railway and the other the lighting interests. This indebtedness includes some underlying liens and some collateral liens of the holding company.

It was decided by Judge Hook that approximately $5,000,000 of the indebtedness allowed should be borne by the new light company. This would be divided about three-fifths in first mortgage bonds and about two-fifths in second mortgage bonds. The railway company should issue approximately $8,000,000 of 5½ per cent three-year notes; an open first mortgage, of which $10,000,000 of first mortgage 5 per cent bonds, for purposes of the plan, should be issued, and $5,700,000 of second mortgage bonds. The holders of the present securities would be expected to accept the new securities at par and maintain as far as possible the existing liens. There would be issued $1,000,000 of bonds for immediate capital expenditures on the railway. All of the bonds would mature in 1944, but a sinking fund has been provided in the case of the second mortgage, which would retire all of that issue before maturity.

The plan provides for a board of readjustment managers, composed of Kuhn, Loeb & Company, Blair & Company, Lee, Higginson & Company and H. L. Stuart, the latter acting in an individual capacity for Judge Hook.

SIX PER CENT RATE FOR BOSTON

In reference to the quarterly dividend of 1½ per cent on the stock of the Boston Elevated Railway, payable on Aug. 16, as announced in the Electric Railway Journal of July 31, the directors issued the following statement:

"Although we do not know whether the earnings for the year ending June 30, 1916, will be sufficient to pay four quarterly dividends of 1½ per cent each, the directors have not deemed it just to reduce the established rate, as there is a chance that 6 per cent may be earned. An estimate has been prepared by the treasurer of the probable net earnings for the current year, which shows about 5½ per cent. This is upon the basis that no additional requirements for depreciation shall be imposed upon the company.

"The 6 per cent rate is only about 5 1/3 per cent on the money actually paid in to the corporation by its stockholders, and is less than a reasonable return on the actual investment. Further, the ability of the company to earn and pay at least 6 per cent, with a sufficient margin for depreciation and contingencies, is necessary in order to maintain the credit of the company so that it can obtain from time to time additional capital for the extensions to its service which the public desires.

"The net income of the company has been seriously affected by the large increase in the cost of labor and materials and by the large burdens which have been constantly imposed upon the company, and in the judgment of the directors, it is not likely to be sufficient to provide for continuous 6 per cent dividends, unless some relief is had either by an increase in the unit of fare or otherwise."

Boise (Idaho) Railroad.—It is expected that the old Boise (Idaho) Railroad will soon be segregated from the Idaho Traction Company and that the line and all its equipment will be turned back to E. H. Jennings and his associates, the former owners. The line was sold three years ago, when the three city lines in Boise were consolidated. The old owners have asked the directors to return the property and resign as agreed in the foreclosure case of the other properties of the Idaho Railway, Light & Power Company recently decided in the federal court, as noted in the Electric Railway Journal of May 8. Two eastern directors have already resigned, and the local directors are expected soon to follow suit. It is understood that H. E. Dalton, who formerly managed the Boise & Interurban Railway, which was financed by Mr. Jennings, will take charge of the Boise Railroad. This railway consisted of the line running from the Natatorium to Main and Thirteenth Streets, thence north of Thirteenth Street to Eastman Street, west on Eastman Street to Eighteenth Street and north on Eighteenth Street to Irene Street. The lines on Eastman and Eighteenth Streets were taken up when the property was acquired by the Idaho Traction Company. The company also owned the line on North Eighth Street as far as Eastman Street, which portion is now used as a part of the city belt line. The South Eighth Street line, which operated into the Riverside Park district and a portion of which was taken up, was also owned by the old company. This is now used for the Cole school car and a portion of it for the interurban cars running to Nampa. Just what the new company will do in connecting up its lines after the transfer is made is not known, but looking toward that end it has connected the loop line at Eighteenth and Bannock Streets and put in additional switches.

Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont.—An announcement will be made to the Canadian Stock Exchange and also in London, England, that the directors of the Brazilian Traction, Light & Power Company, Ltd., have decided upon a 2 per cent reduction in the company's dividend. This action is taken in view of the unsettled conditions surrounding exchange in Brazil and the prolongation of the war. A dividend of one-half of 1 per cent has been announced, payable on Sept. 1, 1915. As the 4 per cent dividend applies for the year 1915, and two quarterly disbursements of 1½ per cent each have already been made this year, shareholders on the present basis should receive another 1 per cent in dividends divided into the two last quarterly payments. The new arrangement is expected to meet with the entire commendation of conservative financiers. The reduction is made in the face of steady increases in net earnings almost month by month for the nine months' war period from September, 1914, to May, 1915, inclusive. The increase in earnings are the more interesting because the general impression prevails that conditions in Brazil are bad.

Chicago (Ill.) Railways.—The directors of the Chicago Railways have declared a dividend of $4 on the Series 1 participating certificates, payable on Sept. 1 as of Aug. 1 to holders of record of May 20. The last distribution on the Series 1 certificates was $4 last June, the payment due on Feb. 1, 1915, having been deferred until that time.

Chicago (Ill.) Surface Lines.—The Illinois Public Utilities Commission has authorized the Chicago City Railway to issue first mortgage 5 per cent gold bonds amounting to $2,242,000, the Calumet & South Chicago Railway to issue first mortgage 5 per cent gold bonds amounting to $500,000 and the Chicago Railways to issue similar bonds for $2,726,000. These issues are to cover contemplated capital expenditures for 1915 and are provided for in the 1907 settlement ordinances. Whether they will all be sold at one time or in amounts as funds are required depends upon the condition of the bond market. This item supersedes a notice in the Electric Railway Journal of July 24.

Denver (Col.) City Tramway.—The dispute between the city of Denver and the Denver City Tramway over the tax rate for 1912, 1913 and 1914 has been compromised through the payment by the company of $378,061 to cover the balance of taxes in 1912 and all of the 1913 and 1914 taxes in question. Under the assessed valuation made by the State Tax Commission the taxes for the three years amounted to $579,273, including interest and penalties up to July 1. The compromise figures, therefore, show a reduction of about $200,000. Under the terms of the settlement the company gave a bond to the city and county of Denver covering any claims the State may make for its proportion of the taxes as assessed by the State commission. It is not expected that this figure will be more than $25,000, even if the State is successful in its claim. Following the payment of taxes the city dismissed the suit for receivership which was started on account of the non-payment of taxes.

Glendale & Montrose Railway, Los Angeles, Cal.—The California Railroad Commission has authorized the Glendale & Montrose Railway to issue 400 shares of stock, par value $100, to J. Frank Walters for the purpose of reimbursing him for capital expenditures made in behalf of the company. A change in the company's articles of incorporation must be made to provide for this issue. The application for this issue was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 20.

Newark & Marion Railway, Newark, N. Y.—The sale of the Newark & Marion Railway, which was advertised for July 20, has been postponed until Aug. 26. This line, which runs from Newark to Marion, a distance of 10 miles, is temporarily operated by steam. Harold C. Beatty is the receiver.

New York (N. Y.) Railways.—The Public Service Commission for the First District of New York on July 27 denied the application of the New York Railways, intervenor, for a modification of the commission's order of Dec. 10, 1912, ordering the company to set aside for depreciation each month an amount equal to 20 per cent of its gross operating revenue. This action was taken without prejudice, however, to the right of the company to renew its application after the courts have decided the certiorari proceedings brought to review orders made by the commission in the Metropolitan reorganization cases. The company desired the commission to modify its order so that 20 per cent of the gross passenger revenue would be set aside for depreciation instead of 20 per cent of the gross operating revenue. In conformity with the order the company had set aside the required amount from Jan. 1, 1912, to Oct. 31, 1914, totalling $7,868,008. During this time the company spent for maintenance $6,224,140, leaving a balance in the reserve of $1,623,867. An amount representing 20 per cent of the gross passenger revenue would have accumulated $1,348,867, which the company asserts would be ample for all depreciation accrued during the period in question.

Northern Ohio Traction & Light Company, Akron, Ohio.—The Ohio Public Utilities Commission has authorized the Northern Ohio Traction & Light Company to issue $500,000 of one to five-year 6 per cent collateral trust notes, maturing in five equal installments beginning with July 1, 1915, and ending with July 1, 1920. The notes are secured by an assignment to the trustee of the bonds deposited under the $1,500,000 collateral trust issue of Aug. 1, 1913, subject to the terms of the indenture securing the latter issue. The bonds when released from that issue will be automatically turned over to the trustee for the security of the new issue. The proceeds are to be used to reimburse the company's treasury for money previously expended from income or to pay obligations for construction work, amounting to $209,421, and to reimburse the treasury for $300,000 expended from income for the redemption of matured collateral trust notes used for construction purposes. The provisional sale of these notes to Hayden, Miller Company, Cleveland, pending the authorization by the commission, was noted in the ELECTRIC RAILWAY JOURNAL of June 12.

Public Service Corporation, Newark, N. J.—The directors of the Public Service Corporation of New Jersey have decided to issue monthly financial statements for the information of the general public, instead of the one customary statement preceding the stockholders' annual meeting. The first statement issued in accordance with the new policy is for the first six months of this year. Future statements will cover monthly operations as well as the operation for the proportion of the year up to the date of the report. The report now issued states that even with the unsettled conditions of the last six months the corporation shows a gain in gross earnings over the first half of 1914 amounting to $631,836, or an increase of 3.6 per cent. The balance available—after the payment of operating expenses, fixed charges, sinking fund requirements, etc.—for amortization, dividends and surplus amounted to $1,597,442. This means that the increase in surplus available for dividends over the corresponding period of 1914 was $149,596.

Rhode Island Company, Providence, R. I.—Judge Arthur L. Brown of the United States District Court has handed down a decision against George W. Sabre upholding the legality of the long series of transactions by which the ownership of the Rhode Island Company was brought to its present basis. Mr. Sabre has fought the case since 1902, asserting that the United Traction & Electric Company acted beyond its power in voting in favor of leasing the local street railway to the Rhode Island Company for a period of 999 years. The court held that, however just the criticisms made of the financing disclosed and of the mingling of business and speculation might be, the plaintiff had failed to show that the traction company had exceeded its powers or abused his rights as a minority stockholder.

Winnipeg, Selkirk & Lake Winnipeg Railway, Winnipeg, Man.—The Manitoba Public Utilities Commission has authorized the Winnipeg, Selkirk & Lake Winnipeg Railway to issue $1,400,000 of first mortgage bonds. The proceeds of this issue are to be used for the purpose of putting the interurban line and the Winnipeg Electric Railway on separate footings. The interurban line owes the Winnipeg Electric Railway $940,000 for money advanced for construction and equipment purposes, and the sale of the bonds will enable it to satisfy this claim. The bonds are to be sold for not less than 85 when approved by the stockholders.

DIVIDENDS DECLARED

Boston (Mass.) Elevated Railway, quarterly, 1½ per cent.

Brazilian Traction, Light & Power Company, Toronto, Ont., quarterly, one-half of 1 per cent.

Chicago (Ill.) Railways, 4 per cent, participating certificates, Series 1.

Citizens Traction Company, Oil City, Pa., 75 cents, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
CITIES SERVICE COMPANY, NEW YORK, N. Y.						
1m., June,	'15	$294,520	$14,023	$280,497	$40,833	$239,664
1 “ “	'14	269,586	8,947	260,639	29,167	231,472
12 “ “	'15	3,977,733	148,170	3,829,563	490,000	3,339,563
12 “ “	'14	3,399,187	90,985	3,308,202	298,062	3,010,140
COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO.						
1m., June,	'15	$244,059	*$150,250	$93,809	$39,341	$54,468
1 “ “	'14	249,684	*169,951	79,733	38,947	40,786
12 “ “	'15	3,059,929	*1,826,643	1,233,286	468,369	764,917
12 “ “	'14	3,056,760	*1,973,309	1,083,451	486,251	597,200
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.						
1m., June,	'15	$1,115,495	*$623,533	$491,962	$360,096	$131,866
1 “ “	'14	1,099,429	*607,077	492,352	332,875	159,477
12 “ “	'15	14,033,334	*7,536,389	6,496,945	4,321,269	2,175,676
12 “ “	'14	13,929,915	*7,703,892	6,226,023	4,018,689	2,207,334
EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.						
1m., June,	'15	$193,293	*$118,402	$74,891	$63,906	$10,985
1 “ “	'14	225,180	*140,968	84,212	55,435	28,777
12 “ “	'15	2,466,923	*1,450,641	1,006,282	755,812	250,470
12 “ “	'14	2,732,541	*1,707,886	1,024,655	619,123	405,532
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.						
1m., June,	'15	$474,569	*$256,295	$218,274	$185,589	$32,685
1 “ “	'14	530,974	*283,049	247,925	183,987	63,938
12 “ “	'15	5,737,866	*3,122,692	2,615,174	2,208,889	406,285
12 “ “	'14	6,701,878	*3,344,610	3,357,268	2,116,201	1,241,067
PUGET SOUND TRACTION LIGHT & POWER COMPANY, SEATTLE, WASH.						
1m., May,	'15	$618,364	*$382,464	$235,900	$159,643	$76,257
1 “ “	'14	706,470	*431,040	275,430	153,882	121,548
12 “ “	'15	7,983,915	*4,856,970	3,126,945	1,887,540	1,239,405
12 “ “	'14	8,717,661	*5,048,225	3,669,436	1,834,582	1,834,854
REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.						
1m., June,	'15	$246,691	*$155,948	$90,743	$57,550	‡$33,634
1 “ “	'14	247,828	*152,256	95,572	56,838	‡39,091
6 “ “	'15	1,456,919	*916,303	540,616	341,836	‡199,545
6 “ “	'14	1,495,732	*929,107	566,625	336,025	‡231,307
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.						
1m., June,	'15	$770,718	$490,359	$280,358	$132,696	$147,662
1 “ “	'14	790,334	470,892	319,442	129,607	189,835
6 “ “	'15	4,604,537	3,035,016	1,569,521	800,914	768,607
6 “ “	'14	4,517,553	2,859,475	1,658,078	780,790	877,288

*Includes taxes. ‡Includes non-operating income.

Traffic and Transportation

JITNEY JOTTINGS

Jitney Seen as a Picturesque Industry Defying Laws of Investment and Production

In commenting editorially on the refusal of the Public Service Commission of Indiana to assume jurisdiction over the jitneys, the Indianapolis *Star* said in its issue of July 30 under the caption "There is Reason in All Things":

"It is unfortunate for more than one reason that the Public Service Commission finds itself unable to take cognizance of the jitney complication in the street car situation. No one would wish to visit any needless hardship on this new and picturesque industry which cheerfully offers to defy all laws of investment and production; but if government is to be fair and just, it must sooner or later take account of losses sustained by public utilities as well as their profits.

"It is all very fine for the authorities of various powers and prerogatives to say that the street car company is making money and must raise wages all around and reduce fares and pay more taxes and build more extensions wherever real estate operators want them and pave 100 miles of track and take whatever the State or the Mayor or the Council or the Chamber of Commerce hands it and like it. But how about when things are going the other way? Does the State propose to go on indefinitely reducing the company's income and increasing its outgo and then when it asks for relief find that nothing can be done? The jitney incident is a small matter, of course; but there ought to be some sense of justice in the public mind toward these utilities in which so many of our citizens have invested their savings and upon whose ability to show earnings depend the quality and quantity of this indispensable public service."

Following the submission to the City Commissioners of Dallas, Tex., of an ordinance regulating the jitneys prepared by the jitney men with a petition for an election signed by 4500 voters, a compromise was made and an ordinance agreed upon by both parties containing features of both previous ordinances to become effective within the next ten days. The license fee under the new ordinance remains at $75, but $65 of this amount is for the regular operator and $10 for a substitute. The principal changes from the city's original law is the privilege to secure permission from the city automobile inspector to make special trips. Operators must live in Dallas sixty days before being granted a license instead of six months as formerly. Licenses may be taken out for a period of six months instead of one year. Not more than one-fourth of all the cars operated on one route may be taken off at one time; the section of the first measure requiring lights in the tonneau and the use of non-skid tires is eliminated. Otherwise the ordinance is similar to the original one, limiting the number of passengers, requiring inspection of cars and examination of drivers and barring smoking. The ordinance is said to be more liberal than any of the fifty passed in various cities and examined in Dallas.

Justice McBride in the Supreme Court at Salem, Ore., rendered an opinion on July 27 to the effect that the city of Portland must show that the local jitney ordinance was passed by the City Council before being approved by the voters. The decision is regarded as a purely technical one growing out of a multiplicity of petitions, plans for referendums, re-enactments, etc., and the court has declared that the city has a legal right to enact a regulatory ordinance. The opinion reverses the decision of Circuit Judge Gantenbein, sustaining the demurrer of H. R. Albee, Mayor and defendant, and the case is remanded with directions to the Circuit Court to permit an answer to be filed within a reasonable time.

One jitney ordinance, to embrace the features of the two that had been originally drafted for passage in the Board of Works and the Common Council of Newark, N. J., respectively, has been decided upon by the finance committee of the Council and the committee appointed by the Board of Works, headed by City Counsel Frazer, to provide regulations for the buses and their drivers. The ordinance provides for license fees ranging from $50 for a car carrying five passengers or less up to $100 for cars carrying more than sixteen passengers. The substitute measure also includes the regulations relating to overcrowding of cars, schedules, routes and other points that up to this time were contained in the ordinance that was to have been acted upon by the Board of Works.

The Wisconsin Assembly has concurred in the Senate bill providing for State regulation of jitney buses by the State Railroad Commission. The bill now awaits Governor Philipps' approval. The measure declares jitneys to be common carriers and provides that they shall not be operated except by permit issued by the State Railroad Commission. A jitney owner is required to file with his application for a permit a bond, to be conditioned on the payment of damages for personal injuries or death in a sum not to exceede $5,000 to any one person or $10,000 for any accident caused by negligent use or operation. The Railroad Commission is to determine whether the rate is reasonable.

In the ELECTRIC RAILWAY JOURNAL of July 31, page 207, a statement was quoted from the Baltimore *Sun* to the effect that the Baltimore Transit Company, in which the United Railways & Electric Company is interested, was having a score or more of buses made for it. The Baltimore Transit Company has in service fifteen auto buses and has placed an order for five additional cars. The bodies are being built by The J. G. Brill Company and the chassis by the Garford Company.

The Police Commission of Los Angeles, Cal., has notified the Pacific Coast Casualty Company, which is soliciting business from jitney bus drivers, that it must submit a new form of bond, to be approved by the city attorney and the commission. The commission limited the amount which the company may accept to $220,000, the equivalent of the bonds for eleven jitneys at $11,000 each. This is a severe setback for the promoters of the jitneymen's association, who have been waging a campaign for increased membership on the basis of some kind of a special deal with the casualty company through which members of the association secure their bonds at a reduced rate. The new bond must be presented to the commission by Sept. 30. The Employers' Indemnity Exchange is also soliciting jitney bond business.

The fight between the jitney operators and the Youngstown Park & Falls Railway, Youngstown, Ohio, continues. On July 26 the Jitney Bus Association filed warrants for the arrest of seven employees of Idora Park, owned by the railway company, for violation of Sunday laws. This was in retaliation for the admission charge to the park made to all persons who do not go there on the street cars. On July 22 the company brought suit against Justice of the Peace T. J. Skipp and ten jitney operators for $30,000 damages. The petition charges illegal arrest of several of its park employees for violation of the Sunday labor laws. In order to keep the affairs of the park and the railroad separate, the Idora Park Company has been incorporated with a capital stock of $10,000 by R. P. Stevens, E. G. Dunlap, John T. Harrington, Fred J. Hein and Richard Wilson. The park has always been operated separately from the railroad, although owned by it, but the incorporation of a company to own and operate it will result in an entire separation of their affairs. Messrs. Stevens and Dunlap are officials of the railway.

An ordinance has been introduced into the City Council of Springfield, Ill., for the regulation of jitney buses. It provides for the operation of jitneys for eight consecutive hours daily, with certain terminals, the filing of a bond to be approved by the City Council, which is to have power to revoke all licenses upon infringements of the ordinance.

Regarding the jitney situation in Philadelphia the *Ledger* said in its issue of July 29:

"War between the rival associations of jitneymen has had the effect of forcing scores of drivers out of both organizations and throwing the business back to where it was when the jitneys started in this city. It seems as if the predictions of those who had observed the rise and fall of the jitneys in Western cities are to be borne out here. Yesterday some of the local jitneymen themselves admitted that they could not afford to do business at the 5-cent rate, except on Sundays and holidays when they were busy all the time. It is the opinion of many of the jitneymen themselves that next winter will see the end of about half the business in this city, and that the resumption of the business next spring will bring out only a small fraction of the present number of jitneys. Therefore they are not worrying about court action on the jitney regulating ordinance. Having forestalled it until Sept. 20, they are now prepared to let it go by default and regard with unconcern any further action City Councils may take, going out of business rather than submit to strict regulation."

NIAGARA FALLS WRECK INQUIRY

One hundred and seventy-three passengers, not including a number of children under five years old, were aboard the car of the International Railway when it was wrecked on the grade near Queenstown, Ont., four weeks ago.

Among those at the inquest at Queenstown on July 28 were N. F. Davidson, K.C., of Toronto, Ont., who conducted the session, representing the attorney general of the province of Ontario, Canada; A. Monroe Grier, K.C., Toronto, and Alexander Fraser, K.C., Niagara Falls, Ont., who have been retained as special counsel of the International Railway; T. Herbert Lennox, Toronto, representing the street car union; County Crown Attorney Brennan of Lincoln County; High Constable Boyle of the provincial police; F. Armour, K.C., of the Canada Steamship Lines, Ltd., and counsel representing the St. John's and Woodgreen Methodist churches, of which the excursionists were members.

The superintendent of the International Railway in company with Vice-President Dickson and General Counsel Penney, made a minute inspection of the rails and roadbed on the steep grade where the disaster occurred and they declared everything was found to be in good condition. The motorman of the car testified at the inquest that weeds had grown over the rails, thus adding to the slippery condition of the tracks caused by the rain. As the result of the wreck, orders have been issued by the Ontario Railway Board that there is to be no overcrowding of electric railway cars in the province.

Mr. Dickson was arraigned by the Canadian police on Aug. 5 charged with criminal negligence resulting in death in connection with the Queenstown Heights disaster. He was released in $20,000 bail. The hearing will be held on Sept. 1.

GROUP INSURANCE OFFER IN BROOKLYN

Outline of Liberal Insurance Terms Secured for Brooklyn Employees

The Brooklyn (N. Y.) Rapid Transit Company has entered into an arrangement with the Travelers Insurance Company, Hartford, Conn., whereby that company will insure the lives of the employees of the transit system who wish to take advantage of the opportunity under the so-called "group" plan. The offer is extended to all employees who have been in active service for two years or more. Those eligible number more than 8000. The company will pay one-half of the annual premium on insurance up to $1,000, and in certain cases will pay the entire premium. Any employee, if he chooses, may take insurance up to $5,000, subject to the approval of the insurance company as to his physical condition. If at least 5000 employees take advantage of the opportunity no medical examination will be required. If at least 1000 come into the group, and less than 5000, a medical certificate from the Brooklyn Rapid Transit Company physicians will be required. Assuming that all the employees who are eligible to the insurance join the group and take the minimum amount, namely $1,000, the total insurance will be upward of $8,000,000.

The policy is the so-called "term" insurance, namely, insurance taken for one year but renewable from year to year indefinitely. The rate differs with the age of the employee, and the annual premium, which will be paid in the first place by the Brooklyn Rapid Transit Company, is believed to be the lowest at which such insurance has ever been written. For the employees it will mean that those under thirty-two years of age will have their lives insured for $1,000 upon the payment of about 7 cents a week; employees more than thirty-two and less than forty about 8 cents a week, and so on, gradually increasing as the age of the insured employee increases. The company has agreed to assume the entire premium in the following cases and under the following conditions:

(a) In the case of employees who, after taking out this insurance, may thereafter be retired under pension pursuant to the rules and regulations of the pension bureau.

(b) In the case of employees, who, taking out this insurance and having served at least ten years with the company, are obliged by reason of partial disability not due to accident in the service of the company to accept with the company employment materially reducing their earning capacity from what had been their average annual earnings for the ten years last preceding such change of position.

(c) In other special cases calling for particular consideration.

The company states that in making this offer it desires to reward continuous and faithful service, and by assuming the entire premium in such cases will in effect be furnishing such employees with a paid-up policy for $1,000 at a time of life when the payment of an insurance premium might be a burden. Employees have the option of discontinuing the insurance after the expiration of any year.

Special privileges have been obtained from the insurance company, whereby any employees not remaining in the service of the transit company, may, within a limited time after leaving such service, take one of the regular life or endowment policies of the insurance company as of the age at which he entered the insurance group by paying the difference in premiums applicable to the different kinds of policies. The insurance policy contains also provision for total and permanent disability, whereby before death the amount of the policy will be paid in installments.

New Louisiana Line Completed.—The construction of the Orleans-Kenner Electric Railway has been completed between New Orleans and Kenner, and it is expected to establish service between those places soon.

New Limited Car Placed in Service.—The Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., has placed in service a new limited car between Indianapolis and Columbus, Ind., to be known as the Columbus Limited.

Near-Side Stop Established in Texarkana.—The city lines of the Southwestern Gas & Electric Company in Texarkana, Tex., have established the near-side-stop practice in order to comply with an ordinance recently passed by the West Side City Council.

Decrease of 25 Per Cent in Accidents.—The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., reports that accidents have decreased 25 per cent during the last two years while the company has been active in its safety-first campaign.

Permission to Reduce Wages Asked.—The British Columbia Electric Railway, Vancouver, B. C., has requested of the arbitration board of Vancouver the privilege of reducing the existing wage scale for employees by 15 per cent. The financial and business depression, the general reduction in wages in practically all industries, and an alleged drop in the cost of living since 1913, are cited as reasons for making the request.

Plans for Skip-Stop in Milwaukee.—The members of the Railroad Commission of Wisconsin, City Attorney Hoan of Milwaukee and the officers of The Milwaukee Electric Railway & Light Company have reached an agreement under which the skip-stop plan will be tried for three months on the Wells-Farwell, the Greenfield Avenue and the Walnut Street lines of the company. A vote of the passengers will then be taken and it is stated that the commission will be governed regarding its permanent order by the sentiment expressed by riders at the conclusion of the experimental period.

Massachusetts Northeastern Wages Adjusted.—The members of the local union of employees of the Massachusetts Northeastern Street Railway, Haverhill, Mass., have voted to accept the final offer of the company, which grants an increased wage scale, with a maximum increase of 2 cents an hour to 28½ cents, to be reached in the sixth year instead of the eighth, as formerly, and readjusts hours and other working conditions. The union first demanded 30 cents an hour as a minimum wage and 35 cents as the maximum rate, the same as was made by the employees of the Bay State Street Railway.

Personal Mention

Mr. J. H. Larmonth has resigned as superintendent of the Edmonton (Alta.) Radial Railway.

Mr. A. W. Richardson has been appointed trainmaster of the City Light & Traction Company, Sedalia, Mo.

Mr. Moritz Rosen has succeeded Mr. George W. Bacon as vice-president of the United Railways Investment Company, New York, N. Y.

Mr. M. R. Botkin has been appointed roadmaster of the Denver & Inter-Mountain Railroad, Denver, Col., to succeed Mr. O. C. Harrington.

Mr. I. N. Randall has been appointed assistant to the general manager of the Ocean Shore Railroad, San Francisco, Cal., to succeed Mr. F. S. Brooks.

Mr. Norman Coryell has been appointed master mechanic of the Moncton Tramways, Electricity & Gas Company, Ltd., succeeding Mr. R. A. McCharles.

Mr. H. A. MacLean has been appointed accountant of the Moose Jaw (Sask.) Electric Railway, vice Captain C. E. McGee, who was killed in action on May 24.

Mr. Guy E. Tripp, formerly president of the West Penn Traction Company, Pittsburgh, Pa., has been elected chairman of the board of directors of the company.

Mr. George S. Skeen has been appointed superintendent of transportation of the San Diego & South Eastern Railway, San Diego, Cal., to succeed Mr. R. Craig.

Mr. W. M. Barnum, New York, has been elected a vice-president of the Pacific Coast Railway, San Luis Obispo, Cal., to succeed Mr. G. H. Higbee, San Francisco, Cal.

Mr. Roy Chambers of the inspection staff of the Springfield (Mass.) Street Railway, has been appointed superintendent of the Westfield Division, succeeding Mr. V. F. Fabian.

Mr. R. Niver, who has been connected with the power department of the City Light & Traction Company, Sedalia, Mo., has been appointed superintendent of the traction department of the company.

Mr. Francis Blossom of Sanderson & Porter, New York, N. Y., has been elected vice-president of the Trinidad Electric Transmission, Railway & Gas Company, Trinidad, Col., to succeed Mr. L. C. Gerry.

Mr. Oscar Kellogg, who has been publicity man for the East St. Louis & Suburban Railway, East St. Louis, Ill., for the last year, has resigned to accept a position in a similar capacity in Philadelphia.

Mr. George B. Williams, superintendent of the Lansford Division of the Eastern Pennsylvania Railways, Pottsville, Pa., has been appointed general superintendent of the company to succeed Mr. C. F. Crane.

Mr. J. W. Crosby, secretary, treasurer and auditor of the Ocean Shore Railroad, San Francisco, Cal., has, in addition to his present offices, succeeded Mr. F. S. Brooks as purchasing agent of the company.

Captain N. C. Pilcher, general manager of the Sherbrooke Railway & Power Company, Sherbrooke, Que., is in the Fifth Mounted Rifles and is going to the front with the Canadian overseas expeditionary forces.

Mr. F. A. Miller, superintendent of power and equipment and master mechanic of the Oakland, Antioch & Eastern Railway, Oakland, Cal., has succeeded Mr. C. M. Mardel as chief engineer of the company.

Mr. B. A. Duncan, superintendent of the traction department of the City Light & Traction Company, Sedalia, Mo., has been appointed general manager of the Cumberland & Westernport Electric Railway, Cumberland, Md.

Mr. J. J. Callaghan, heretofore superintendent of transportation of the Montreal & Southern Counties Railway, Montreal, Que., has been appointed manager of operation of the London & Port Stanley Railway, London, Ont.

Mr. C. A. Vermillion, superintendent of car service and telegraph of the Spokane, Portland & Seattle Railroad, has had his jurisdiction extended to include the Spokane & Inland Empire Railroad and the Great Northern Pacific Steamship Company.

Mr. J. W. Hale, formerly with the United Railroads, San Francisco, Cal., has been appointed manager and purchasing agent of the Humboldt (Cal.) Transit Company, to succeed Mr. F. C. Morrison, who resigned some time ago on account of ill health.

Mr. Albert Haines, vice-president of the Burlington County Transit Transit Company, Mount Holly, N. J., has been elected president of the company to succeed Mr. I. Snowden Haines. Mr. John D. Johnson, Jr., succeeds Mr. Albert Haines as vice-president.

Mr. Samuel Insull, a director of the West Penn Traction Company, Pittsburgh, Pa., president of the Commonwealth Edison Company, Chicago, Ill., and well known in the central station field, has been elected president of the company to succeed Mr. Guy E. Tripp, who is now chairman of the board.

Mr. O. O. Henson, master mechanic of the Gadsden, Bellevue & Lookout Mountain Railway, Gadsden, Ala., has in addition been appointed superintendent and electrical engineer of the company. The position of superintendent with the company is a new one. Mr. Henson succeeds Mr. H. W. Foote as electrical engineer.

Mr. A. J. Mitchell, comptroller for Mackenzie, Mann & Company, and assistant to the vice-president of the Canadian Northern Railway, Toronto, Ont., has been elected vice-president of the Chatham, Wallaceburg & Lake Erie Railway, succeeding Mr. J. D. Morton, assistant comptroller of the Canadian Northern Railway, Toronto.

Mr. Charles A. Barton, master mechanic of the Rio de Janeiro Tramway, Light & Power Company, Rio de Janeiro, Brazil, has been appointed superintendent of equipment of the company. Mr. Barton has been with the company eight years. He was formerly superintendent of equipment of the Worcester (Mass.) Consolidated Street Railway.

Mr. W. M. Whitenton, formerly general manager of the first district of the Chicago, Rock Island & Pacific Railway, and later with the Chicago electrification committee, has been appointed operating assistant of the Texas & Pacific Railway, reporting to the general superintendent and first vice-president, with headquarters in the city of New Orleans.

Mr. V. F. Fabian, superintendent of the Westfield (Mass.) Division of the Springfield Street Railway, has been appointed superintendent of transportation for the system, with headquarters at Springfield. Mr. Fabian has been in the company's service at Westfield for the last five years, and had previous railroad experience in clerical, dispatching and power station work on the lines controlled by the New England Investment & Security Company. He was at one time engaged in steam railroad work in the West.

Dr. A. S. McAllister, editor of the *Electrical World*, has just resigned and will be succeeded by Mr. F. M. Feiker. Dr. McAllister had been connected with the *Electrical World* since 1905 and had been editor-in-chief during the last two years. He will continue as consulting editor of the paper. At a farewell luncheon extended to him at the Engineers' Club on Aug. 6 by his former associates with the McGraw Publishing Company, Inc., Dr. McAllister was presented with a gold watch from the staff of the *Electrical World*. Dr. McAllister was graduated from Pennsylvania State College in 1894 and received the degree of doctor of philosophy from Cornell University in 1905.

Mr. C. F. Crane, superintendent of railways of the Eastern Pennsylvania Railways, Pottsville, Pa., has been appointed superintendent of transportation of the Wilkes-Barre (Pa.) Railway. Mr. Crane became connected with the Eastern Pennsylvania Railways in 1907 as general passenger agent. In January, 1911, he was appointed superintendent of railways of the company. Before becoming connected with the Eastern Pennsylvania Railways Mr. Crane was passenger and freight agent of the Rochester & Eastern Rapid Railway. The employees of the Eastern Pennsylvania Railways presented a gold watch to Mr. Crane as a token of their confidence and esteem for him.

Mr. Byron T. Burt, who was recently appointed vice-president of the Rutland Railway, Light & Power Company, has also been appointed general manager of this company, the Western Vermont Power & Light Company and Pittsford Power Company, to succeed Mr. I. M. Frost, resigned. Mr. Burt was formerly manager of the Chattanooga Electric Company until its consolidation with the Chattanooga Railway & Light Company. When the Chattanooga & Tennessee River Power Company was organized to construct the hydroelectric plant at Hale's Bar on the Tennessee River he was made general manager of the company. He later resigned that position to become vice-president of the Rutland Railway, Light & Power Company.

Mr. W. E. Moore, vice-president and general manager of the West Penn Traction Company properties, has resigned his position with the various companies to go into business under his own name as consulting engineer, opening an office in Pittsburgh. Mr. Moore has been with the West Penn properties for more than twelve years, during which time they have grown from gross receipts of approximately $500,000 to about $5,000,000. The properties consist of 316 miles of city and interurban railway system, much of which was built under Mr. Moore's direction. There are also many electric lighting companies scattered over the western part of Pennsylvania, a portion of Ohio, and West Virginia, embracing about 125 municipalities. The companies' power system now consists of 80,000 hp. in generating plants and has connected approximately 125,000 hp. in motors, electric railway, and power, besides a large amount of lighting, most of which has been added during Mr. Moore's incumbency. Mr. Moore is to continue with the company until the staff can be reorganized, his successor not having yet been appointed.

Mr. F. M. Feiker, who has been appointed editor of the *Electrical World*, has for the last three years been chairman of the editorial board of the A. W. Shaw Company, Chicago, publisher of *System*, *Factory*, and books on business. Born in 1881 at Northampton, Mass., Mr. Feiker was in 1904 graduated from the electrical engineering course of Worcester (Mass.) Polytechnic Institute, and spent the following year in special research work on high-potential generation and transmission as private assistant to Prof. H. B. Smith of Worcester. From 1906 to 1907 Mr. Feiker served as technical journalist for the General Electric Company. Joining the staff of *Factory* magazine at Chicago in 1907, he was appointed technical editor, and in 1909 managing editor. In the latter position he continued until 1912, when he was made chairman of the editorial board of both *Factory* and *System*, which post he held until his resignation to join the staff of the *Electrical World*. In 1912 Mr. Feiker delivered a course of lectures on industrial organization at Harvard University. He is an associate member of the American Society of Mechanical Engineers and of numerous organizations for the advancement of science, education and management. He is a member of the Engineers' Club, New York City; the University Club, Chicago, and the City Club, Chicago.

OBITUARY

George William Smith, who was president of the Frederick & Middletown Railway, Frederick, Md., before it was consolidated with the Frederick Railroad, now the Hagerstown & Frederick Railway, is dead. Mr. Smith was born near Frederick eighty-three years ago.

Clark O. Simpson, statistician of the accounting department of the New York (N. Y.) Railways, died on July 17, after an operation for appendicitis. Mr. Simpson was born in Troy, N. Y., on Aug. 20, 1865. At an early age he went to the Southwest, where he took up ranching for a few years. He then entered railway work and held positions with the United Railways, St. Louis, Mo.; Meridian Light & Power Company, Meridian, Miss., and the Birmingham Railway & Power Company, Birmingham, Ala. In 1902 he was appointed auditor of the Montgomery (Ala.) Street Railway, and two years later became manager of the Little Rock Railway & Electric Company, Little Rock, Ark. In 1905 he went into the banking business, but in February, 1909, he entered the service of the receivers of the Metropolitan Street Railway, New York. He was shortly afterward promoted to the position of statistician, which he held until his death. Mr. Simpson is survived by his widow and two sons and two daughters.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Jackson & Eastern Railway, Jackson, Miss.**—Incorporated in Mississippi to build a steam or electric railway from Jackson to Union. Incorporators: S. A. Neville, R. W. Harris and C. J. Currie, Meridian.

***Cleveland & Sharon Rapid Transit Company, Cleveland, Ohio.**—Incorporated with a capital stock of $10,000. Incorporators: C. A. Blake, C. H. Felton, A. J. Schneider, C. A. Snyder and P. J. Potter.

***Dayton & St. Marys Traction Company, Covington, Ohio.**—Incorporated to build a section of electric railway that will furnish a short line between Dayton and St. Marys. Incorporators: Judge Dennis Dwyer, Dayton, well known in electric railway circles; Julius Boesal, Thomas J. Brennan, C. V. Ruenke, J. B. Raterman, G. M. Apple, J. Guy O'Donnell, R. F. Alberry, Perry Moyer and F. E. Ratcliff. Capital stock, $10,000.

***Mitchell Street & Interurban Railway, Mitchell, S. D.**—Incorporated in South Dakota to construct 30 miles of trackage in Mitchell and vicinity. Capital, $200,000. Incorporators, O. E. Cassem, L. E. Cassem, D. N. Hill, A. N. Hill, F. E. Hill, all of Mitchell.

FRANCHISES

***Mt. Clemens, Mich.**—A Mr. Jacobson of Detroit has asked the Council for a franchise to construct an electric railway through Mt. Clemens. The line is to extend from Mt. Clemens to Armada.

Charlotte, N. C.—The Charlotte Electric Railway has asked the Council for a franchise to change the location of its First Ward line. The company desires to take up its tracks on Seventh Street from Davidson Street to Brevard Street and on Brevard Street from Seventh Street to Eleventh Street, and extend its line on Davidson Street from the point where the removal of tracks is begun to Ninth Street.

Portland, Ore.—The County Commissioners of Multnomah County have approved two franchises, one for O. M. Clark and associates, and the other for the United Railways, for use of the St. Helens Road to Linnton. The franchises approved were redrafts of franchises submitted by the two interests. Should the franchise to O. M. Clark and associates be accepted, work of constructing the railway to Linnton must begin in ninety days, and must be completed within one year. The United Railways already have track and equipment in place, so no time limit was made. The franchise granted to the United Railways provides only for freight traffic, while the Clark franchise provides for both freight and passenger service to Linnton, with twelve passenger trains daily each way, and a 5-cent fare.

***Bingham Canyon, Utah.**—Harry S. Joseph has asked the Council for a franchise to construct an electric railway in Bingham Canyon to connect with the Salt Lake & Utah Railroad.

TRACK AND ROADWAY

Alabama Power Company, Anniston, Ala.—This company is considering the advisability of building an electric railway between Anniston and Blue Mountain City as an extension of the lines of the Anniston Electric & Gas Company.

Pine Bluff (Ark.) Company.—This company is rebuilding its line on Cherry Street at a cost of $30,000. The orders for material have all been placed.

San Jose Traction Company, San Jose, Cal.—This company has placed in operation its 3-mile line from South Jacksonville to Hollywood.

Danbury & Bethel Street Railway, Danbury, Conn.—Plans are being made by this company to reconstruct its tracks on Main Street and Franklin Street. An extension will also be built to connect with its present road operating from Bridgeport to Long Hill, thereby making a through route from Danbury to Bridgeport. The company is also extending its power lines.

Connecticut Company, Hartford, Conn.—The Public Utilities Commission of Connecticut has approved the application of this company for permission to build in Hartford on Myrtle, Grove, Broad and Washington Streets and Farmington and Commonwealth Avenues for a distance of about 7200 ft.

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company has established regular service to Jones Pool, a popular bathing beach.

Peoria & Chillicothe Electric Railway, Peoria, Ill.—At a meeting of the stockholders of this company held in Peoria on July 24, the following officers were elected: E. A. Mitchell, Chillicothe, president and treasurer; John F. Lynch, Chillicothe, vice-president, and Arthur C. Black, Peoria, secretary. [July 17, '15.]

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company is now operating cars on schedule time between Wabash and Huntington, repairs to the tracks during the recent heavy rains having been made. It will not be necessary for this company to build new track as was feared at the time of the storms a few weeks ago.

Union Traction Company of Indiana, Indianapolis, Ind.—This company is reballasting its Muncie and Portland line between Portland and Red Key. Twenty thousand new ties will also be used in repairs on this line.

Arkansas Valley Interurban Railway, Wichita, Kan.—Material has been received and work will be begun at once on the extension of this company's line on Avenue A to the east limits of the city.

Ohio Valley Electric Railway, Ashland, Ky.—An extension of this company's line from Ashland to Russell is under consideration.

***Winnipeg, Man.**—Plans are being made to construct a line from Winnipeg to Transcona, 10 miles. Gasoline motor cars will be used. It is expected that the line will be completed by October and will be extended to the south side of Transcona early in 1916. H. W. Adcock, Winnipeg, is interested.

Bay State Street Railway, Boston, Mass.—It is expected that the work of extending the double tracks of the Bay State Street Railway in Methuen will start soon. The new line will extend from the present terminus at the corner of Hampshire, High and Lowell Streets to Railroad Square on the east side of the tracks of the Massachusetts Northeastern Street Railway.

Worcester (Mass.) Consolidated Street Railway.—Work has been begun by this company repairing its track in Grafton.

***Hillsdale, Mich.**—N. H. Pound, who has been at work on the proposition to establish an electric railway between Hillsdale and Pioneer, is said to have received a communication from the Toledo & Western Railroad offering to lease the line, furnish the rolling stock and operate it, giving to the builders of the line 5 per cent on their investment, and splitting all earnings above that amount. Mr. Pounds may be reached through the Hillsdale Improvement Association.

Cleveland, Alliance & Mahoning Valley Railroad, Alliance, Ohio.—This company is now operating its new extension from Ravenna through Leavittsburg to within 4 miles of Warren. The company expects to complete the line to Warren this fall.

Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, Cincinnati, Ohio.—It is stated that negotiations are under way for the building of a high-speed electric railway from Anderson's Ferry, the terminus of the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, into the business center of Cincinnati. The lines of the company stop 6 miles from Cincinnati, and are without an entrance into the city. Plans now provide for securing a franchise from Cincinnati for the new line, which would be built on private right-of-way and would cost about $100,000 a mile.

Sand Springs Railway, Tulsa, Okla.—This company plans to extend its lines 8 miles to the coal mines.

Shenandoah, Frackville & Pottsville Railway, Pottsville, Pa.—J. B. Trexler, 165 West Windsor Street, Reading, Pa., has been awarded the contract for grading between Frackville and St. Clair, 5 miles distant, for the new line of this company. The Shenandoah, Frackville & Pottsville Railway will connect at St. Clair with the Eastern Pennsylvania Railways.

***East Berlin & Abbottstown Railroad, York, Pa.**—About 100 citizens of Abbottstown, Gettysburg and East Berlin met at the latter place recently for the purpose of considering the question of restoring railway communications to East Berlin and Abbottstown. It was decided to organize a company to be known as the East Berlin & Abbottstown Railroad, with an authorized capital stock of $70,000. A committee of twelve, which is virtually a temporary board of directors, was appointed to devise ways and means to perfect a permanent organization. This committee is composed of U. L. Gladfelter, S. K. Sowers, E. S. Brown, Dr. T. C. Miller, P. C. Smith, I. S. Miller, D. E. Brandt, H. J. March, W. D. Myers, C. C. Spangler, W. T. Baker, John O. Bosserman. A portion of the roadbed of an abandoned railroad was purchased several days ago by a private citizen for $8,000, and the interest of this man will be handed over to the new company. The road is about 9 miles long, and extends from East Berlin to what is known as East Berlin Junction, where there is a connection with the Western Maryland Railroad. The motive power of the road has not yet been determined upon.

Washington Water Power Company, Spokane, Wash.—The municipal affairs committee of the Chamber of Commerce, in proposing the Clear Lake aviation site to the War Department Commission, which is searching for a suitable site for an aviation school, states that this company will extend its Medical Lake interurban line to the aviation grounds, providing the Clear Lake site is selected. The proposed extension would be 4 miles.

SHOPS AND BUILDINGS

Arkansas Valley Interurban Railway, Hutchinson, Kan.—The construction of the new brick passenger station of this company on Second Street East, Hutchinson, will be begun as soon as the present frame structure now on the site has been razed.

Detroit (Mich.) United Railway.—The company's engineering department has been instructed to proceed at once on plans and estimates to replace the Chelsea depot of the Detroit, Jackson & Chicago Railway, destroyed by fire last year.

Oregon Electric Railway, Portland, Ore.—The Oregon Electric Railway plans improvements to its local freight terminals in Eugene which will almost double their capacity. The company has under way a warehouse 50 ft. x 100 ft. at Harrisburg, for the storage of grain, wool, hops, etc., and warehouses at Forrest Grove, Woodburn and Butteville.

Southern Pacific Company, Portland, Ore.—It is reported that the Southern Pacific Company will construct a downtown station in Corvallis for its electric trains after the West Side line between Whiteson and Corvallis is electrified. The company has an option on property bounded by Sixth, Monroe, Fifth and Madison Streets, where it is thought the station will be built.

POWER HOUSES AND SUBSTATIONS

Ogden, Logan & Idaho Railway Company, Ogden, Utah.—This company has ordered from the Westinghouse Company two stationary substations, each consisting of a 500-kw. motor-generator set; 2300-volts, three-phase, sixty-cycle, 900 r.p.m. synchronous motor; 1500-volt d.c. generator; 10-kw. d.c. exciter; three 235-kva., single-phase sixty-cycle O.I.S.C. transformers, 45,000/2300-volts and a switchboard to control same; also a portable substation with similar equipment using three 187½-kva. transformers. This apparatus is in addition to the original order given the Westinghouse Company a year ago and is for the completion of the line between Ogden, Utah, and Preston, Idaho.

Manufactures and Supplies

ROLLING STOCK

Salina & Northern Railroad, Salina, Kan., has ordered gasoline locomotives for the passenger equipment of its new 100-mile line from the Internal Combustion Locomotive Company, Wilmington, Del. Delivery will be made in November.

Ogden, Logan & Idaho Railway, Ogden, Utah, noted in the ELECTRIC RAILWAY JOURNAL of July 10 as having ordered six trailers from the American Car Company, has specified the following details of this equipment:

Seating capacity	72
Bolster centers, length,	39 ft. 10½ in.
Length of body	51 ft. 2½ in.
Length over vestibule,	61 ft. 7¾ in.
Width over sills	9 ft.
Width over all	9 ft. 2 in.
Height, rail to sills	42½ in.
Sill to trolley base,	9 ft. 8½ in.
Body	all steel
Interior trim,	polished bronze
Headlining,	hard finished Agasote
Roof	plain arch
Underframe	metal
Air brakes	West.
Axles	Brill
Bumpers,	angle iron, Am. Car Co.
Cables	West.
Car trimmings,	Brill and Dayton
Junction boxes	West.
Couplers	O. B.
Curtain fixtures	Nat'l L. W.
Curtain material	Pantasote
Pilots	Am. Car Co.
Hand brakes	Lord
Heaters	Consol.
Journal boxes	Brill
Paint	Am. Car Co.
Sash fixtures	Nat'l L. W.
Seats	Brill "Winner"
Seating material,	dark green leather
Springs	Brill
Step treads	Universal
Trucks, type,	Brill 27-MCB-3X
Varnish	Murphy
Ventilators	Ry. Utility

TRADE NOTES

Ohio Brass Company, Mansfield, Ohio, has issued a folder on its flexible extruded trolley wire ears.

R. M. Campbell, for several years with the Ohio Brass Company and later with the Detroit Graphite Company, has resigned to accept a position with the Electric Cable Company, New York, N. Y.

Federal Signal Company, Albany, N. Y., has appointed S. J. Turreff, formerly superintendent of construction of its Western district, as office engineer with headquarters in New York City.

Automatic Ventilator Company, New York, N. Y., has received an order to equip with ventilators the compromise-type roof car which the Public Service Railway is constructing in its shops.

Cleveland Fare Box Company, Cleveland, Ohio, has received an order to equip with sixty No. 2 aluminum fare boxes the new cars recently purchased by the Detroit United Railway. This type of box is a size larger than the standard box used by this company.

Edgar F. Fassett, formerly general manager of the United Traction Company of Albany and for a number of years representative of the National Products Company, New York, N. Y., has been appointed special representative of the Electric Cable Company, 17 Battery Place, New York, N. Y.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has appointed W. P. Cochran, formerly branch manager at Baltimore, as assistant district manager of the Philadelphia district, including Baltimore, with headquarters in the former city. M. H. Jones, assistant to manager, will have charge of the Baltimore branch office of the company.

Edwin G. Hatch, New York, N. Y., consulting engineer, has been retained by the Victoria Falls & Transvaal Power Company, London, England, to handle the testing and inspection of a 9000-kva. transformer now building at the Westinghouse works at East Pittsburgh, Pa. Five similar transformers were shipped to the company's plant in South Africa in 1912.

Electric Cable Company, New York, N. Y., has established an office in the People's Gas Building, Chicago, Ill., under the management of James W. White, who, for a number of years, has been connected with the Union Switch & Signal Company as special representative and assistant to the vice-president in charge of sales. James M. Brown, formerly with the Lorain Steel Company, and Cyrus R. King, formerly with the Pittsburgh Steel Products Company, have also been assigned to Chicago.

S. K. F. Ball-Bearing Company, New York, N. Y., has received recent orders for journal bearings from the following electric railways: New York State Railways, for one experimental maximum-traction truck car, the body of which is now being built by the G. C. Kuhlman Car Company; Binghamton (N. Y.) Railway, for one Baldwin maximum-traction truck car, the body being built by the Cincinnati Car Company; Norton and Taunton Street Railway, Norton, Mass., for eight Brill single-truck cars, the bodies of which are being built by the Wason Manufacturing Company.

H. M. Byllesby & Company, Chicago, Ill., have organized a trading company to build up commerce between the United States and Central and South America. This concern is already incorporated and doing business under the name of the Byllesby Mercantile Corporation, with offices at 17 Battery Place, New York City. H. M. Byllesby of Chicago, for thirty-five years prominently identified with the development of electrical and other utilities, is president; vice-presidents are H. P. Schuck, formerly with W. R. Grace & Company, T. K. Jackson, president of the Mobile Electric Company; general manager, Chester H. Lewis, formerly of London, England. The new corporation will do a general exporting and importing business with Central and South America, Mexico and the West Indies, and its radius of activity may later be enlarged. It will be conducted entirely separate from the Byllesby steamship enterprise, the Caribbean & Southern Steamship Company, which is operating freight lines to Central and South America, Russia and Sweden.

ADVERTISING LITERATURE

McKeen Motor Car Company, Omaha, Neb., has issued a catalog describing and illustrating the latest developments in its railroad gasoline motor cars. The catalog contains illustrations of a 200-hp. gasoline motor car built by this company for the Central New York Southern Railroad, and of a 70-ft. post-office, express, baggage and power (300 hp.) car for the Union Pacific Railroad which pulls a standard steel passenger coach. The catalog also contains views and data of the McKeen highway coach, which may be equipped with rubber tired wheels for street and road service, or with railroad flanged wheels, for operation on urban rail lines. This highway coach is equipped with individual chairs, which have special pneumatic shock-absorbing cushioned seats.

Electric Service Supplies Company, Philadelphia, Pa., has recently issued a booklet "How Dollars Are Lost," in which there is an interesting calculation of the losses which result from poor rail bonding. For the purpose of illustration, a single-track railway 5 miles long was selected, with rails laid on rock ballast or on dry sand soil so that conductivity of the earth as a return conductor could be neglected. The resistance of the bonds, contacts and rails, under perfect conditions, is given as 0.2178 ohm, and a return current is assumed averaging 500 amp. at 600 volts, flowing 18 hr. per day, 365 days per year, at a cost 1 cent per kilowatt-hour. Then the annual loss due to resistance in the rail return will amount to $3,577, of which $3,292 is chargeable to the resistance of the rails themselves and $284.78 to the resistance of the bonds. But if the bond resistances showed increase to an average of 10 ft. of unbroken rail, the cost of the increased loss would be $849, or fixed loss, or if the bond resistance should increase to an average of 30 ft. of unbroken rail, the annual additional loss would amount to $3,117. It has also been calculated that should 25 per cent of the 1758 bonds installed in the 5 miles of road have a resistance of approximately 0.001 ohm each that they would cause an annual loss of $1,951 in addition to the normal or fixed loss. The book also contains data on rail, contact and bond resistances never before compiled in a single book.

Electric Railway Journal

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IT'S A POOR RULE—

A brief note in this issue reports that a British Columbia railway has asked what is apparently a permanent arbitration board for permission to reduce wages 15 per cent. This occasions surprise for the same reason that while we should give scant attention to the report that a dog had bitten a man, a report that a man had bitten a dog would be news of the highest order. But why not? If wages are to be raised on the application of employees because business is good and the cost of living high, why should not railway employers seek to reduce wages when, as is set forth in the Vancouver case, business is depressed. reduction in wages is general and the cost of living is going down? Of course, in an "arbitration" such as that by which the Chicago strike was ended, evidence on such issues has no particular weight. But if we are to depend upon arbitration as a means of adjusting wages it is just as reasonable to propose it as a means of lowering wages, when the employer thinks they should be lowered, as it is for employees to seek arbitration as a means of increasing wages. It would have a very healthy effect on public opinion if there were more offers to submit proposals to reduce wages to impartial adjudication—but preferably not to an "arbitration" in which a mayor with his eye on the labor vote has the deciding voice.

PROFIT AND LOSS SHARING

The acclaim accorded the prospect of a profit-sharing system for the employees of the Wilkes-Barre (Pa.) railways seems to have been wasted, for the Board of Arbitration, as announced elsewhere in this issue, is now to be reconvened to determine whether it erred in its recent award. According to the union representatives, the basic agreement did not authorize the board to fix any profit-sharing plan, and the award has never been signed. This state of the case merely shows the opposition of many men to assume any part of the risk and responsibility which partnership in any business enterprise entails. In taking this attitude, any individual and any body of men are entirely within their rights. Some people are so constituted that they prefer to get the money returns for their work at regular intervals in a pay envelope. Others are willing to take a risk for a possible larger reward. Each plan has its advocates and its advantages, but it is unreasonable for a man to demand as a right and in addition to his wages a share in the profits of a concern when he is unwilling to accept a share in the losses. A partnership plan, having for its basis an equitable division of future increased earnings between company and employee, works out in theory to the immediate and material advantage of both employer and employee, especially in an industry where the latter comes into direct contact with the patrons. But the question arises, would the average employee be willing to divide the future losses as well as the future profits? In practice, and taking the average man, we believe he would not. Until partnership agreements meet the stress of such negative circumstances, their real potency as a solution of labor difficulties will not be fairly established.

CUMULATIVE VOTING IS DESIRABLE

In the great potpourri of proposals that have been placed before the New York constitutional convention, there is one deserving more attention than it has heretofore attracted. We refer to the plan of compelling corporations to adopt cumulative voting at stockholders' meetings for the election of directors. Under this practice each share of stock has as many votes as the number of directors to be elected, and the votes may be scattered among the nominees or concentrated on one or more as desired, with the result that the majority stockholders are not able to elect all the board of directors, the minority securing at least a representation. We believe that this method is an ingenious and praiseworthy way of conducting corporate elections so as to conserve the rights of minority stockholders and ameliorate the abuse of directorships. Under the usual American custom, the controlling stockholders elect not merely the majority but all of the directors, and the minority stockholders are often left unrepresented and powerless. To offset such an evil English companies very commonly limit by a graduated scale the number of votes allowed to one stockholder, the restriction falling most heavily on the largest stockholders. On account of the possibility of a man splitting up his holdings, however, this practice is not so desirable or effective as the cumulative plan adopted by some corporations in this country.

PRACTICE CONSERVATIVE AND JUST

The cumulative plan is not a radical one but a conservative protection of the rights of minority stockholders. There is no more justice in saying that minority stockholders should be content under government by a majority board than in propounding the preposterous idea that upon the election of a Republican or Democratic President all legislative and executive bodies throughout the country should be changed so as to conform *in toto* with the political status of the elected candidate. Minority representation is peculiarly an American right, and it is not shunned by intelligent majorities. There are, of course, some objections to such representation in corporate affairs, such as the possibility of the election of persons without standing as directors, but it would be a safe wager that the average minority director could be as valuable an asset as the average overestimated and uninterested director-in-name-only. The disadvantages of the practice are certainly more than offset by the much greater advantages. Whether it should be secured by constitutional amendment, however, may be debatable. We do not favor the clogging of State constitutions with multitudinous details that would better be left to corporate by-laws and legislative enactments, but in this particular case we feel that the reluctance of corporate majorities to provide for cumulative voting in the by-laws and of legislatures to intervene in protection of minority stockholders rather urges constitutional provision for the plan. The State of Pennsylvania has satisfactorily handled this question in its fundamental law.

STARTING RESISTANCE OF ELECTRIC CARS

In starting cars, particularly in city service, the principal resistance is due to inertia rather than friction. The force required to overcome acceleration resistance is practically 100 lb. per ton per mile per hour per second, including a 10 per cent allowance for spinning the armatures. That is to say, at the ordinary rate of 1½ m.p.h.p.s. a tractive effort of 150 lb. per ton is required. Compared with this, the starting friction is small, but it becomes relatively more important as the rate of acceleration is reduced.

There are indications of increasing interest in car friction at low speeds as greater attention is directed to the reduction of energy consumption. There are numerous formulas, with curves based thereon, which indicate a minimum resistance at zero speed, although this condition is known not to exist. The fact is that these formulas are based upon data obtained at ordinary running speeds, and the constant term which they all contain is correct only under the conditions of the experiments. It is misleading, therefore, to plot curves from these formulas down to zero speed. This fact is referred to in the recently issued sixth annual report of the Board of Supervising Engineers, Chicago Traction, page 425, where we read: "None of the empirical curves for free-running train resistance recognizes the fact that the resistance during acceleration is considerably greater than indicated by this curve, * * * that the curve of resistance is very high at the start, minimum at a moderate speed, rising with increasing wind resistance at higher speed." The board's engineers use 22½ lb. per ton for their calculations of train resistance during acceleration of city cars, or nearly double the free-running resistance.

To quote another specific case: On page 239 of the issue of the Electric Railway Journal for Aug. 7 are given the results of friction tests made on a 13-ton car by the Third Avenue Railway in New York. The resistance falls from 18 lb. per ton at zero speed to about 4¼ lb. at 11 m.p.h., rising to 5 2/3 lb. at 30 m.p.h., the average between zero speed and 15 m.p.h. being slightly more than 6½ lb. The ratio of the maximum to the minimum was, therefore, 4¼ : 1 and of the average to the minimum about 1½ : 1.

Elsewhere in this issue are given some results of starting-resistance tests made upon the Purdue University test car during the past year. The values obtained are quite high because this car is not in constant use, but they should be useful for comparison among themselves and with the results of free-running resistance tests described in the issue of the Electric Railway Journal for Aug. 15, 1914, page 304.

All of these examples indicate that the familiar "friction of rest" plays a part in acceleration resistance. Fortunately, lubrication improves rapidly as speed increases, and the energy loss represented by the excess of resistance at low speed is not serious. At the same time more exact information on starting resistance is greatly desired. The condition is thus stated in the Chicago report: "The great diversity of opinion and results among various investigators suggests the necessity for further analysis, especially differentiating between train resistance during acceleration and during free running."

THE DETROIT SITUATION

Within a few weeks the people of Detroit will decide whether or not they want to purchase and operate the surface lines of the city, beginning Jan. 1, 1916. The outcome of the forthcoming plebiscite is forecasted by the vote taken in 1913 when there was created the Board of Street Railway Commissioners, empowered to negotiate for the purchase of the city lines. Various articles in this paper have described how the city is to acquire these lines at a price fixed by the Wayne County Circuit Court. Thirty days after a vote favorable to the purchase has been taken and suit begun by the city to compel performance of the purchase contract, the company must surrender its property, the profits from operation thereafter going to the city.

This situation is suggestive of what may happen in any city where franchises expire and there arises simultaneously a demand for municipal ownership. Obviously under such circumstances the city has the whip hand in negotiations that may be undertaken to acquire the property, and about all the owners of it can do is to protect themselves against confiscation. The fact that good service has been rendered and exceptionally low fares charged will not save a railway system from municipalization—if Detroit is to be taken as a ruling precedent.

It is true that the vote has not been cast, but the atmosphere is one in which a vote favorable to purchase by the city is most likely. Out of eleven men interviewed in Detroit ten agreed that the service was good and the rates low; that there was no reason for municipalization except the "feeling that the city ought to own its car lines." This feeling has been actively promoted by the most widely-read Detroit newspaper and a number of leading citizens. If Detroit does buy the urban lines it will be done not on the basis of reason but as the outcome of a "feeling." Against an influence of this kind the exercise of reason is helpless.

If reason entered into the transaction the city's experience with its municipal paving plant would have a bearing upon the transaction, for without allowing anything for overhead, profit or a guarantee, the city cannot compete with private contractors in laying pavements. It nevertheless is drifting into municipalization of a much more complicated and difficult business. As to the lessons to be gathered from the experience of other cities in the electric railway business, those engaged in the industry and familiar with the results of municipal ownership and operation will be surprised to learn from the columns of the newspapers already referred to that municipalization is uniformly successful —in fact, a blessing wherever tried. The articles written by correspondents dispatched to various parts of Canada and the United States to investigate the subject prove this to be true.

So why argue about it? If the people want it or think they want it, they are going to have it. Those who have built up the Detroit system and have given not only good but enlightened and progressive service, and at the same time reduced fares to a minimum, have at least this satisfaction, that municipalization will not come about as a consequence of their errors but as a result of an artificially created sentiment, opposition to which would only have increased its intensity.

CORPORATION AND PUBLIC MORALITY

As a result of a persistent campaign, with Righteousness on its banner and the usual conglomeration of human motives in the hearts of its leaders, the idea has been widely spread that the conduct of corporations is on a lower moral plane than that where walks the average man, and immeasurably below the plane from which, in a rarified atmosphere of virtue, our rulers dispense a government guided by supreme wisdom, strict justice and a constant regard for moral values. This is what we are told, and it has been reiterated so frequently and so loudly that many of us have come to believe it. But it isn't true.

What "franchise grabber" has ever duplicated our performance in seizing the Panama Canal zone? The justification of this act or its condemnation is not to the point so far as this discussion goes; the point is that there was no general public disapproval of the government's act. Nor was there any considerable disapprobation heard when it was proposed to tear up the scrap of paper upon which the Clayton-Bulwer treaty was written and discriminate as to toll charges in favor of our shipping. Where was our enlightened moral sense when these things were going on? This question is pertinent because we are told that it is a wave of moral ideas that has swept men in the mass and governments in particular to the safe if shifty sands of probity and left the corporations struggling in the breakers of their own iniquity.

No rebate-taking corporation or discriminating railroad has ever duplicated the performance of the government in the parcel-post business. It has ruined two express companies and has the others struggling to preserve their existence. In accomplishing this the government has not merely accepted rebates; it has demanded and received free transportation for the greater part of the parcel post. There has been some sympathy for the railroads in this connection, but has anyone observed a moral revulsion against the unfairness of the government, the postmaster-general or the committees of Congress having this matter in charge? Seemingly the public is willing to accept the position of *particeps criminis* and enjoy participation in the ill-gotten gains secured by cheap parcel-post rates. We are glad to see, however, that the railroads are planning to seek justice in the courts. Last month seven of the principal railroads in New England filed claims for various sums ranging from $4,424,713 down and making a total of $10,880,865 on the plea that they have been wrongfully deprived of their property by governmental act.

The latest example of governmental disregard of property rights is the order issued by the Secretary of the Treasury, effective on Aug. 16, that all public money and securities be transported by mail instead of express. This is said to be a "reform" by which the government, by means of its frank, will save money. In other words, the government will let the railroads worry about the increased weight, the extra precautionary measures needed and the higher costs. If the transmission of this matter by the mails is desirable, the order to put it in force would have come with better grace if it had awaited the decision of the Court of Claims on the recent petition of the seven New England railroads, which involved as one of its counts the enforced carriage of gold as mail of the fourth class "in violation of law and without compensation to carriers."

The "you-are-another" argument never proved anything. It is not the purpose to employ it here. The purpose is to show that our governments do things so unmoral that no corporation would dream of doing them and that the public, far from condemning these things, frequently applauds them and in no case refuses to profit by them.

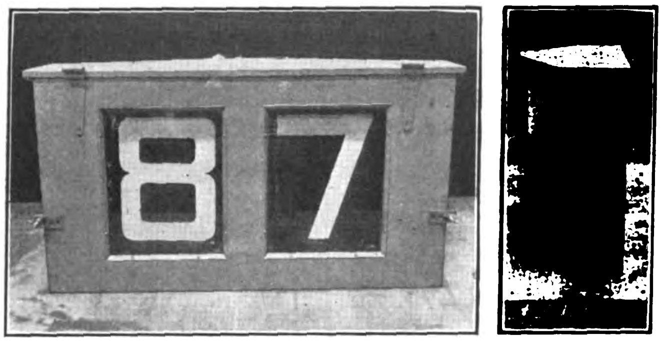
This is convincing evidence to reasonable minds that our government is, to say the least, no better than those whom it is supposed to instruct in good morals and to keep in the paths of rectitude. It suggests that the existence of new and higher moral standards is largely a myth so far as the general public is concerned; for of what value is "moral consciousness" if it remains awake only for its own profit and sleeps while the other fellow is being deprived of his rights? By all means let us have the highest standards of conduct for everybody, but let us not deceive ourselves into the belief that morality means the crucifixion of one class for acts which are approved or condoned if performed by another class. We are not likely in this way to maintain high standards in any part of the social organization or greatly to impress the supposedly unregenerate with the enormity of their crimes.

Route Signs for Surface Cars

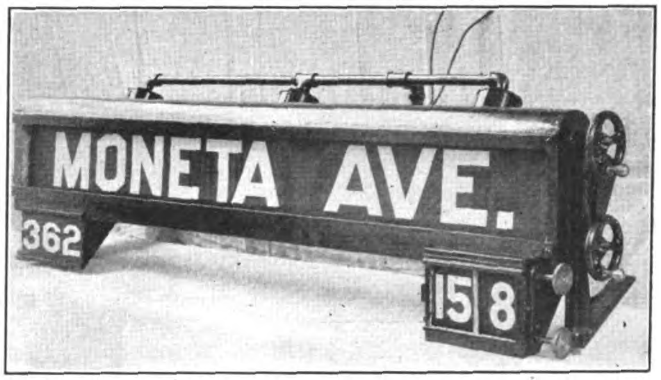
Description of Novelties in Car Signs in Several Different Cities—Development of Route Numbers in Place of Destination Signs—Car-Diversion Signs in Boston

The importance of keeping the riding public informed as to street-car routes has, of course, been recognized at all times. In the early days of the street railway industry, when even the smallest cities had a half-dozen railways, cars were identified not only by their colors but by very elaborate lettering on the sides of the car showing the terminals and all intermediate places of importance. Some cars even carried elaborate paintings of the "moving van" school of art. As the small systems were consolidated, the scheme of colors for identification was abandoned, and the signs were reduced to the simple route indications still in common practice in this country. The principal departures in the East from this standard practice are found in Philadelphia and Buffalo.

The signs in those cities were the outcome of the development of the near-side car when a special study was made of car signs in this country and abroad. As a result a system was developed in the belief that it includes the best features of European practice, namely, a simple outside sign which can be seen by a passenger at a great distance, and a long descriptive sign posted inside the car, usually over the archway, where it can be read at leisure. The departure from the European practice is that the letter or initial sign is carried in the vestibule window instead of being placed on top of the hood, and the roof has no long, wooden signs. The inside sign is like those used abroad with the exception that it is not found necessary to refer to the schedule of the line, since the headway in large American cities is much shorter than on most of the European routes and since cars are operated during a longer period of the day.



ROUTE SIGNS—ILLUMINATED ROOF SIGN USED ON PITTSBURGH CARS

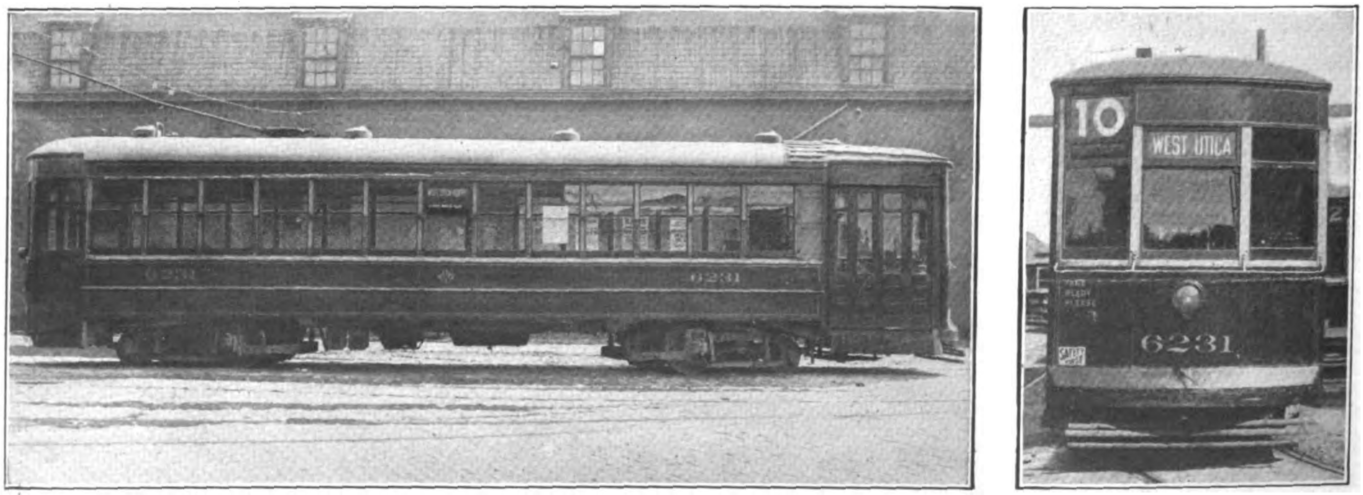


ROUTE SIGNS—LOS ANGELES FRONT-END SIGN WITH ROUTE AND CAR NUMBER

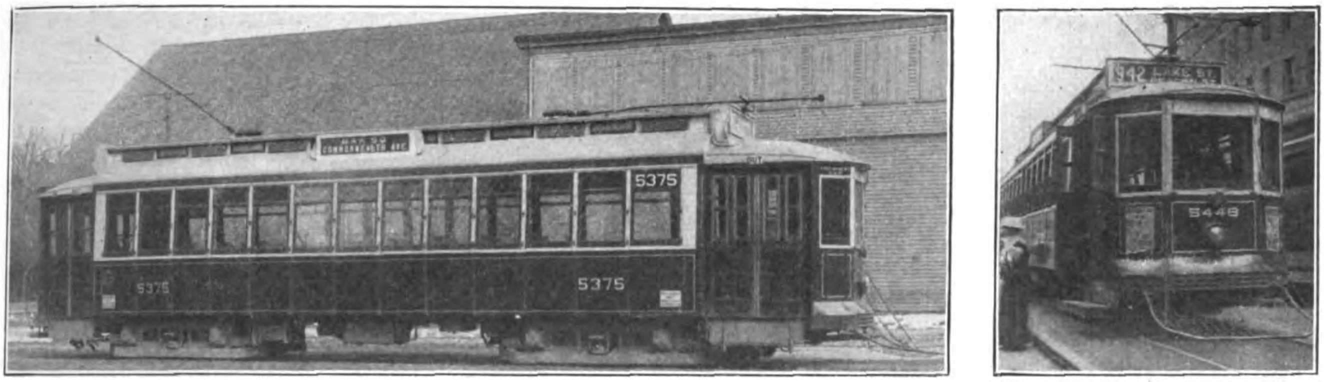
In Philadelphia each line is indicated by a separate number. Experience has shown that a distinctive numeral is the simplest method of designating a street car route, not only because it is easily remembered but because it lends itself most readily to display as a large illuminated sign on the front of a car, which can be easily distinguished as the car approaches.

Auxiliary to this route number sign, the destination toward which the car is moving is indicated immediately beneath the route number. A recent refinement in this sign system is a red band or signal which can be dropped into place by the motorman so that it shows diagonally across the illuminated route number on the front of the car. This signal is used whenever the car is destined to turn "short" of the full route or is scheduled to go into the depot before reaching the end of the trip. The object is to call the attention of prospective passengers to the fact that the car is carrying a "short" destination sign, so that they may avoid boarding a car which is designated to turn before reaching the through terminal.

The name of the line and the route number are also



ROUTE SIGNS—VIEW OF INTERNATIONAL RAILWAY CAR, SHOWING LOCATION OF SIDE AND FRONT SIGNS



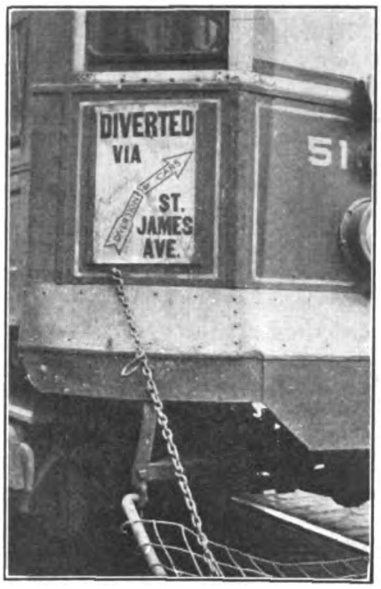
ROUTE SIGNS — FRONT AND SIDE SIGNS USED IN BOSTON

shown on both sides of the car in the panels immediately forward of the first window, the theory of this location being that passengers can thus get more particulars just as they are preparing to enter the car than they can get from the route number. For the further information of the public, a descriptive sign showing the route number and the names of the streets traversed is displayed inside the car in the arch at the forward end.

In Buffalo much the same system is used except that a side sign is carried below the eaves in the middle of the car. The front signs invariably indicate the names of the route, and the side signs indicate the routing. For example: the name "West Utica" shown in the accompanying illustrations indicates the name of that particular line. The side sign, "West Utica-Ferry," indicates the general route of that line.

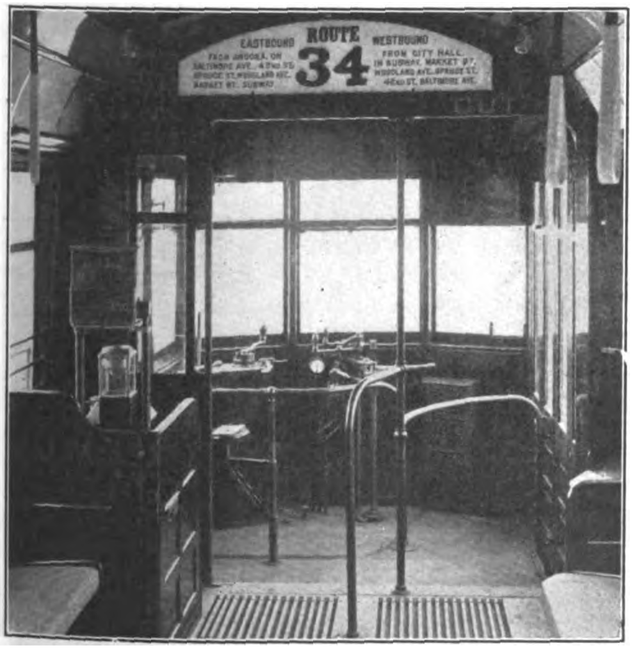
Numbered route signs are a feature of the Pacific Coast electric railways. It is stated that the presence of large numbers of strangers is customary in the west coast cities, and it is much easier to explain to them the method of reaching a given point in a city by giving the number of a route than by repeating a combination of names. The use of the number also relieves regular passengers from reading more than one sign and in addition makes possible a very large indication. Illuminated interior signs, furnished both with ground glass having the number painted thereon and with perforated metal plates, are widely used, the advantage of the latter being that when a change in route is made the metal plate may be shifted with less danger of breakage than one made of glass.

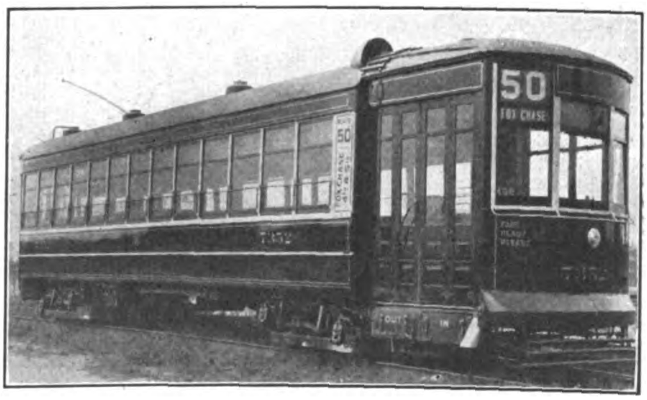
One of the illustrations on page 260 shows a novel route sign used in Pittsburgh. This is made of sheet metal with a hinged top of wood, the numbers showing white on a black background and being illuminated at night by interior lamps. The signs are mounted on the roofs of the cars, one being located near each end, facing toward the end of the car.



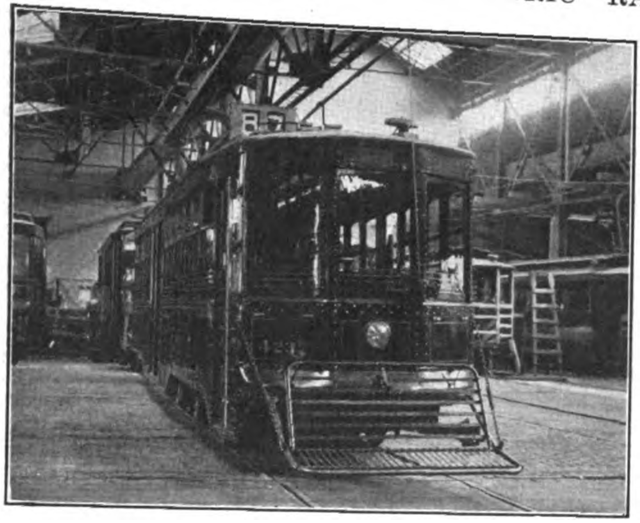
ROUTE SIGNS—CAR-DIVERSION SIGN USED IN BOSTON

A novel illuminated end destination sign is manufactured by the Los Angeles Railway Corporation for its city cars. The case is of No. 24 gage galvanized iron, stiffened with two 3/8-in. x 1-in. iron bars and supported by cast end brackets. "Hunter" sign cloth with soft copper edges is used. This keeps the curtain straight and prevents the annoyance of raveling on edges. The cloth is 55½ in. wide and 40 ft. long, and the block letters are 5 in. high. The present number of names used is fifty-four, and there is sufficient spare cloth for seventeen additional





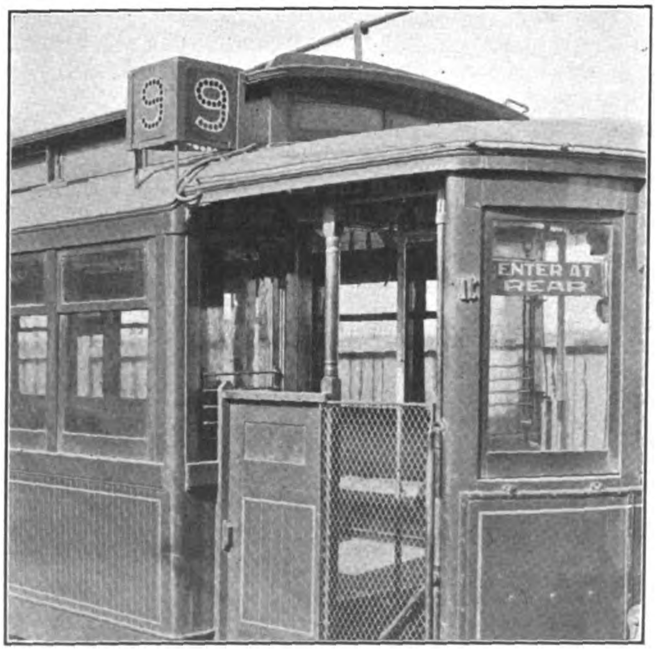
ROUTE SIGNS—PHILADELPHIA SYSTEM—THE VIEW AT THE LEFT SHOWS AN INTERIOR SIGN; THE VIEW AT THE RIGHT SHOWS ROUTE NUMBER AND LINE ON SIDE PANEL AND ROUTE NUMBER AND DESTINATION ON FRONT WINDOW



ROUTE SIGNS—VIEW SHOWING LOCATION ON CAR OF PITTSBURGH ROUTE SIGN

names. The car number is shown at the lower left-hand side of the sign. It is 2⅝ in. high and is painted directly on the glass. The run number appears at the lower right-hand side of the sign, is 3 in. high and is made on two separate strips of cloth. One strip, 3½ in. wide by 7 ft. long, carries numbers from 0 to 9, and the other strip, 3½ in. wide by 9 ft. long, carries numbers from 1 to 20, thus giving a range of numbers from 1 to 200. The sign is illuminated by three inside 16-cp lamps, which are connected by wires running through ½-in. gas-pipe supports. The extreme dimensions of the sign are 16 in. x 11 in. x 5 ft. 3½ in., and it is reported that the sign may be read distinctly one block away during the day or night. The cost of construction, ready to be installed on the car, is $23.75.

Standard surface car route signs on the Boston Elevated Railway are numbered according to a system by which the number of the division is indicated by the first figure and the number of the route by the two right-hand figures. Thus, the meaning of the number 942 is Route 42 in Division 9. The standard end sign is 5½ ft. long by 11 in. high and contains a possible set-up of about twenty-three routes and destinations.



ROUTE SIGNS — PERFORATED METAL SIGN USED BY THE UNITED RAILROADS OF SAN FRANCISCO

In the latest equipment the sign box is built into the monitor, as illustrated. The Boston Elevated Railway also employs on its surface lines a system of car-diversion signs which is of great convenience to the public when normal routes are altered. An illustration on page 261 shows one of these signs used on lines of cars which ordinarily traverse Boylston Street between Exeter and Arlington Streets, but were diverted on account of subway construction. The diversion signs are 14 in. wide by 21 in. high, and are printed on pink paper inserted in tin clips attached to the dash. The main feature is a broken arrow calling attention to the change of route and the name of the thoroughfare temporarily traversed in place of the normal route. The arrow is 1½ in. wide. In some cases these signs are used in pairs at each end of the car, when the diversion involves more than one important street.

Diversions or the establishment of new routes are explained by the Twin City Rapid Transit Company in advertisements published in the daily papers. Such advertisements are used in connection with the company's regular advertising of special features along its line, such as parks and other pleasure resorts. In Topeka, Kan., also the changes in routing or schedules are advertised in the daily papers. However, it is found here that the press generally considers the matter of schedule or route changes to be of sufficient importance for classification as "news." Topeka also advertises special events on its lines, and states in these notices where cars are to be found when an occasion such as a concert warrants storing a number of extra cars to take care of the rush of traffic at its conclusion.

Fire Insurance

The Writer Describes the Three Kinds of Insurance Companies and Gives Suggestions as to Forms of Policies

BY W. H. FORSE, JR., SECRETARY AND TREASURER UNION TRACTION COMPANY OF INDIANA

The Association of Lloyds, with offices in London, insures ships and cargoes on every sea. The organization is more than 200 years old and still clings to its ancient custom of tolling a bell and crying the name of a vessel which has been lost. It is said that when news was received in the Lloyd's board room, of the loss of the German cruiser Emden which had sunk numerous British vessels, the members of the association drowned out the noise of the tolling bell in applause. The Emden had destroyed so many ships and cargoes insured by the Lloyds that its removal was a distinct relief to the brokers who were carrying marine risks.

Within recent years the Lloyds Association has extended its activities to embrace risks of almost every conceivable description. The underwriting members of the association deposit securities to guarantee their engagements, and when a ship or other risk is offered for insurance, each member indicates the amount he will underwrite, the insurance being effected as soon as the amount has been made up. The members generally act in groups through an agent, and there may be fifty to 100 or more underwriters to one policy, not all of whom assume the same percentage of the risk. Each underwriter under such a policy deposits with the committee of Lloyds a policy of insurance against his insolvency, in a form approved by the committee.

In the year 1913 the Brooklyn Rapid Transit Company transferred about $22,000,000 of its fire insurance from companies represented by the New York Fire Insurance Exchange to the Lloyds of London, thereby saving about $27,000 a year in premiums. This action was taken, according to President Timothy S. Williams of the transit company, because the rate of premium had been arbitrarily raised from 34.7 to 62.3 per $100 by the exchange representing the companies which had been carrying the insurance. In 1914 the transit company again placed its insurance with American stock companies. It was stated at the time the insurance was placed with Lloyds that the Brooklyn Rapid Transit Company had for some years been accumulating an insurance fund which then aggregated $600,000, and it was hoped that the company would eventually carry all its own insurance.

Within the past two years, Lloyds of London has written a few policies for American electric railways, indemnifying them for sums which they shall be required to pay persons, not employees, as compensation for injury or damage arising out of accidents caused by or growing out of the operation of the cars of the railways. It is expressly stipulated in these policies that Lloyd's shall be liable only for an accident whose total cost is more than $20,000, and then only up to $100,000 for such accidents. In other words, if a company has an accident causing the payment of damage claims to the amount of any sum less than $20,000 it is not insured; if the claims paid amount to $20,100, Lloyds will pay $100; if the accident costs $120,000 or more Lloyds will pay $100,000, the amount of excess over $20,000. This is specific insurance against an extraordinary casualty, and as such is written at a much lower rate than a policy which insures the carrier against any and all accidents.

The premium for insurance against bodily accident which the ordinary individual carries is written at a high rate because it includes provision for minor accidents and partial disability, which are by far the most numerous; on the same principle the insurance company must charge a prohibitive rate if it takes all the risk of public liability of the railway. The Lloyd's plan, which is mentioned, corresponds, in a sense, to the payment of the capital amount only under an ordinary accident policy, and as such is correspondingly cheap.

FACTORY MUTUAL AND STOCK COMPANIES

Factory mutual fire insurance was originated by Zachariah Allen, a prominent manufacturer of Providence, R. I., eighty years ago, and the policy always followed has been to conduct a business without purpose of profit but based on recognizing and encouraging apparatus and organization for fire prevention. When the automatic sprinkler was invented, almost its sole encouragement during the first decade was found in the factory mutual risks, and to-day the risks insured in factory mutuals are almost without exception equipped with automatic sprinklers.

The six senior companies associated in the office of the Manufacturers' Mutual Fire Insurance Company had at the end of 1914 almost $888,000,000 of fire insurance in force. These companies have reduced the cost of insurance from 84 cents per $100 in 1835 to 5.9 cents per $100 in 1914, notwithstanding they suffered in the year 1914 the heaviest loss in their history.

The factory mutuals have not confined their protection to textile mills or to factories. They are at the present time carrying insurance on carhouses and other properties of electric railways. When such buildings are equipped with automatic and other devices designed to prevent and extinguish fires, arrangements can be made with the factory mutuals to carry the insurance at rates which are exceedingly reasonable. In cases where the sprinklered risks are a goodly percentage of the amount of property insured, the factory mutuals have in very rare instances agreed to write the sprinklered buildings in their own association and to underwrite the unsprinklered portions in the "old line" or stock companies. The stock companies will usually meet the competition of rates on sprinklered properties made by the factory mutuals, and competition of this sort, at living rates, is good for the industry.

A very large percentage of the total fire insurance written in the United States is carried in "stock" companies with stockholders incorporated to engage in the insurance business for profit. There are about 200 American stock companies and about fifty foreign companies with American branches writing fire insurance with assets ranging from a few hundred thousand dollars to more than $20,000,000 each.

FORMS OF POLICIES AND TENDENCIES OF PREMIUMS

It is customary for the insurance company to demand the insertion of a "co-insurance" clause in return for a concession in the rate which is charged. The insertion of such a clause compels the assured to carry a stated percentage of insurance to value or, in the absence of such insurance, to carry a portion of the risk, thus acting as co-insurer of his own property. These percentages commonly range from 80 per cent to 100 per cent, the latter percentage being applied to rolling stock, because it is considered, of all electric railway property, to be that which is most subject to destruction by fire. It is necessary, when a loss occurs under a blanket form item, to make an inventory of appraisal of all the damaged and undamaged property under that item in order to be certain the proper percentage of insurance has been carried. If the item is rolling stock, for instance, this is objectionable on the score of inconvenience and the possibility of differences of opinion regarding values. The form should contain a provision to the effect that an inventory or appraisal is not necessary or required when the loss does not exceed a certain percentage (say 5 per cent) of the total amount insured under that item. This is very convenient and obviates the necessity of making an inventory or appraisal after the majority of rolling stock fire losses. Its inclusion, if insisted upon, will save considerable inconvenience and expense to the insured.

It is encouraging to note that because of the constant improvement in construction standards, in wiring specifications and in fire-protective devices, the premium rates of electric railways tend downward. The premiums paid by the Chicago City Railway Company were reduced from $2.22 in July, 1905, to 68 cents in October, 1907, and 48 cents per $100 of insurance in November, 1909. The Public Service Corporation of New Jersey in December, 1914, carried $29,000,000 of insurance at 35.4 cents, which was a decrease from 38.3 cents in 1913 and 44 cents in 1912. In June, 1914, the Philadelphia Rapid Transit Company took out policies of insurance aggregating $23,000,000 for three years to June, 1917, which was written at the annual rate of 25 cents per $100. There had been previous reductions from 50 cents in 1911 to 45 cents in 1912 and 35 cents in 1913.

Deliveries have been begun on the 478 all-steel car bodies with which the Interborough Rapid Transit Company is replacing all the composite bodies in its subway system. The shipments will probably be completed before the end of the year. The bodies will be the same as the latest type of all-steel bodies in service in the subway. The new bodies will be equipped in the railway shops with trucks, wiring and control. New controllers will be applied.

Ironing Out the Wrinkles

The "Wrinkles" to Which the Author Refers Are the Annoyances, Fancied or Real, Felt by Passengers—Examples Are Given, with an Account of the Methods by Which the Company "Irons" These Wrinkles Out

BY A. W. WARNOCK, GENERAL PASSENGER AGENT TWIN CITY LINES, MINNEAPOLIS AND ST. PAUL

Wrinkles are always annoying. They tend to disturb peace of mind, they indicate wrong conditions, and they are always an economic waste even though they may be unavoidable. Wrinkles are only another name, in the transportation business, for complaints. Executives the country over are busy these days ironing out the wrinkles and, to continue the metaphor, endeavoring to keep the fabric smooth.

What are the general basic causes for complaint on the part of patrons as far as street railway trainmen are concerned? Undoubtedly there are some standard mistakes that trainmen the country over make every day with resulting trouble to the employing companies. As years have gone by, we have been interested to list the causes that have come under our observation.

First, there is the general fault of incivility on the part of employees, and that sweeping charge can easily cover a multitude of offenses. If all employees were civil and used good judgment under all circumstances, most of the other complaints would vanish. Then comes the collection of cash fares, disputes over the amount of money paid by the passenger and the change returned by the conductor, the collection of fare twice from persons not sitting together for whom fares have already been paid by some other member of the party, as well as the familiar one, sometimes anonymous, that the passenger did not see the conductor ring up his fare or that of others. Then there is the complaint of the passenger who, in payment for his fare, tenders a bill of large denomination which the conductor is unable to change.

Transfers are a fruitful source of complaint. We all know the passenger who complains because the conductor did not give him a transfer, usually because he refused to accept the transfer when it was offered. Transfers that are not valid make much trouble, and the reason for non-acceptance is as likely to be the fault of the passenger as of the conductor. Perhaps the passenger has used his transfer as a stop-over ticket and still feels that he has a right to continue his ride on it. A transfer that is mispunched as to time or direction, exposing the passenger to trouble with the second conductor, is a mistake clearly attributable to the conductor. While a conductor may issue a mutilated transfer to a passenger, the chances usually are that when such a transfer is tendered to the second conductor, it was the passenger's fault in the way he took care of the transfer, or rather the way he did not take care of it after it was given to him. Companies have always reasonably required that transfers should be used at regularly designated transfer points, so that when passengers get on at the wrong place by walking some distance away from the transfer point, maybe to do some errand, another complaint is sure to arise.

The responsibility for mistakes in change usually may be divided evenly between the passenger and the conductor. There are passengers who are sure they received short change. Others are sure that the bad coin they got was given to them by a conductor, while other passengers object strenuously if they do not receive exactly the kind of change they ask for. One passenger wants nothing but paper money, while another wants nothing but quarters or half dollars, and if they do not receive exactly what they request they feel that the conductor should be severely reprimanded.

Other passengers complain because conductors allow disorder on cars, intoxicated persons, whether objectionable or not to passengers, as well as spitting and smoking in cars. While there may be ordinances against spitting, nevertheless, passengers may do so surreptitiously. Some passengers feel that the conductor should have spitters arrested, even though the conductor did not see them commit the offense. The same principle applies to smoking, which is permitted in many cities under certain circumstances.

It is proverbial that many passengers (usually women) have easy consciences as to the age of children in their charge, and while conductors may properly put questions, the average passenger resents strenuously the implication thereof, asserting that the child should not pay fare and that doubting the child's age is an insult. Other passengers of the genus "butt-in" who are not inconvenienced themselves complain because they see children, for whom fares have not been paid, occupying seats. The refusal of a conductor to allow a baby go-cart to be taken on a car starts more trouble. This is a privilege that may be allowed if the go-carts are of a certain size and type. It is hard to argue with a parent that there is a difference in baby carriages. One woman contends plausibly that, if her neighbor is allowed to carry a go-cart of collapsible shape, there is no reason why she should not take a perambulator aboard with her.

Watches do not always agree, yet many a passenger who has missed his car is sure the train crew wilfully left the terminal ahead of time and want the men laid off for a week, particularly in view of the fact that the passenger says he "gives the road 20 cents a day." Just as though we gave him nothing in return!

We all know that it is a difficult matter to have conductors use tact in seeing that the seats are properly occupied. No matter how gently they may hint that passengers move over, resentment is likely. The passenger who is looking out to regulate the company's business feels sure it is easy for the conductor to see that all of the seats are properly filled and that no passenger plays the rôle of car-hog to the inconvenience of his neighbor.

If all our conductors had good carrying voices and were never distracted from such a duty, how our patrons would appreciate it if they would always call the names of streets or stations clearly! As we know, that is a feature of service that is not always well done, and so the man looking for trouble has another grievance.

A passenger may get on a car without knowing where the car is going, and if he finds he is on the wrong car he will complain with vigor that the signs on the car were not only set wrong in the first place but were changed en route in the second place. Sometimes such a mistake is made by a conductor, but more often the passenger has only himself to blame for not making sure that he was getting on the proper car.

Companies generally take great pains to restore lost articles to their owners, so some passengers take it for granted, when they do not recover their articles, that they have been taken by the conductor. A man is sure he left the article on the car and, because he has not been able to find it, that the conductor must be in possession. How often have well-meaning persons maintained that such and such a conductor is dishonest without any evidence on which to base such a charge! Only recently we had a case where a woman was positive that she had lost a well-filled purse on a car, that the conductor was the only man on the car when she got off and that he had her property. She was a woman of high character, and her assertion necessarily was taken seriously. We had a careful check made. The conductor stoutly maintained that he was innocent. Three days elapsed and, to the credit of the woman be it said, she came to the office and frankly admitted that she had not lost the purse in the car at all but had left it at home on her dressing table. Passengers often think it unjust not to be allowed to reclaim their articles from conductors without the articles going through the lost article department, providing they meet the car on its return trip and know that the article has been found. They do not stop to think that when they get off they ceased to be passengers and that it is the duty of the company to have the property go through authorized hands, only with the idea of restoring it to its proper owner.

We all wish to make good transfer connections between lines that intersect, but in rush hours it is impossible to hold cars any considerable time to do so. When a passenger misses connections because one car does not wait for the other, he rarely stops to think that a wait of several seconds means delaying a large number of other passengers.

Some passengers blame us if they get on wrong cars either as to route or direction. They do not seem to think it necessary to ask a question or two to make sure that they are getting on the car they need. Others, regardless of the comfort of fellow passengers, open or shut windows in inclement weather to suit their own convenience, and conductors are held responsible for such lack of consideration. Timid passengers are positive that cars run too fast and make serious charges against trainmen of reckless operation. Trainmen forget to throw off bundles of newspapers, and then complaints come from those for whom such service is rendered.

The failure of motormen to stop cars to take on passengers, to stop exactly on crosswalks, at station platforms, or when bell signal is given for the next stop, opens up other avenues of trouble. Perhaps the car has a heavy load and cannot take on more passengers; perhaps the rails are slippery and the car may slide by the crosswalks or the station platform; or perhaps the signal bell, like any mechanical contrivance, has suddenly got out of working order so that the signal bell in the motorman's cab does not ring. The passenger is likely to feel that the motorman has wilfully inconvenienced him.

General criticism of service is perennial. Insufficient service and interrupted service, no matter what the cause, are sure to bring down a shower of protests. Is there ever a time when everybody feels that he is getting sufficient service and that conditions are entirely satisfactory? Sometimes we are inclined to question whether that happy condition can be realized, and in our pessimistic moments we feel that nothing we are doing is being done properly.

In the early days of street railways, patrons were not captious about the distance between stops, but every street railway to-day is besieged with applications for new stops. Every passenger seems to feel that he must be carried to his doorstep. He can see no fairness in the idea that regularly opened streets are not sufficient stops to take care of the public.

Some patrons have a cold-air monomania, while others are warm-air crazy. What a difficult matter it is to have cars ventilated and heated to the satisfaction of all! When one considers the odors clinging to many passengers, is it any wonder that sometimes, particularly in the winter time, the air does not resemble a fresh rose? Persons with soiled, wet clothing, working men with the smell of their toil on their garments, as well as sick persons exuding an unhealthy fragrance, seriously vitiate the air in any car, no matter how efficient the ventilating system may be. While we may be doing the best we can to supply efficient service in that respect, nevertheless there are passengers who feel that if they could look after the heating and ventilating of equipment it would be done much better. The passenger who is sure that Car No. 8003 has a flat wheel is numerous, and the one who declares the brake on Car No. 7008 is particularly and peculiarly noisy, has many following in his train. Sometimes, by the way, both complaints are true.

There is just complaint from passengers when they see employees in uniform occupying seats to the exclusion of cash-paying passengers. There are those who feel that they should be permitted to carry their dogs or cats a few blocks on cars and that the rule forbidding it infringes on their rights as free-born American citizens.

Perhaps you will think of other causes for criticism and will feel that the above list is incomplete. Perhaps it is incomplete, but we are inclined to the opinion that all matters of criticism will readily classify themselves under one of these headings, if not under the general heading of incivility. So many folks have been insulted, humiliated, abused and on most occasions because of trivial errors on our part which might have been avoided.

With such causes for criticism, what is the best way to meet the complaining passenger and iron out the particular wrinkle he brings?

ANSWERING COMPLAINTS

For a long time we have made a practice of advertising for complaints in frequent newspaper advertisements, and in a card displayed in every car we always have a foot line in large type reading as follows:

"Complaints and Suggestions Always Receive Prompt, Courteous Attention."

We believe the policy expressed in that line carefully carried out will do more to make good will than can be easily estimated. Furthermore, we do everything in our power to back up such a promise with faithful performance and make good in that policy in every practicable way. It has worked and is working to our great satisfaction.

To carry out such a policy it is necessary to have strong faith in human nature and to entertain the feeling that the average passenger is as responsive to good treatment and is as desirous to be fair as we are. In the executive offices of a large mercantile establishment the writer remembers to have seen this motto: "The Customer Is Always Right." That is a principle which can certainly be applied by transportation companies to the hundreds of minor complaints. Of course, such a principle would be disastrous if followed in the claim department, but in the present article we are discuss-

TWIN CITY LINES—Cash Fares and Transfers

Please try to provide yourself with small change—a dollar or under—with which to pay your fare. It is physically impossible for conductors to carry enough silver conveniently to break many bills or gold coins. Conductors are frequently obliged, when large bills or coins are offered, to give passengers small and bulky change, often to the annoyance of the recipient. If the passenger will exercise a little forethought, not only to see that he has money for his fare, but that it is not of large denomination, he will escape change annoyances.

Ask for and see that you receive your transfer when you pay your fare. While the conductor is supposed to offer a transfer to the passenger when he collects the fare, there is also a responsibility resting upon the passenger to see that he gets his transfer. Conductors are permitted to issue transfers only at the time of receiving fare. This is the convenient system used in all large cities and it is designed particularly for the benefit of patrons. It disposes of the entire fare transaction at the one time. Remember to get your transfer!

Be sure to tell the conductor to what line you desire to transfer, so that he may punch your transfer correctly. Always bear this in mind, and you will be better served.

Do you know the general conditions under which transfers are issued? Have you ever read the few paragraphs on the back of a transfer, stating the general privileges extended by the Company to you?

We reprint here the information borne on the back of our transfers. It is easily understood. If any of these conditions are not quite clear to you, we will be pleased to make them so on request, and will gladly furnish any other transfer information you desire.

In all cases of dispute regarding cash fares or transfers, passengers are requested to pay conductor's claim and report the facts for prompt adjustment. Patrons will appreciate that conductors are governed by rules which they are not authorized to change. Necessarily they must be guided by rather rigid rules in such matters. A passenger can depend upon it that we will always make right any overcharge or adjust any fare troubles he has had. Compliance with this suggestion of bringing all such matters to our attention, without controversy with the conductor, will save you annoyance.

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ing the average complaint, which has no farther-reaching effect than that it may continue to irritate the passenger who has had the experience in such a way that he will tell his story to many persons and harbor a grudge against the company. In the aggregate such grudges work serious detriment.

Lincoln contended that yielding larger things to which one could show no more than equal right, and yielding lesser ones though clearly one's own, was the best way to avoid a quarrel, and our experience would lead us to believe that making all reasonable concessions to patrons not only irons out the wrinkles but is the best way to make friends.

Take the matter of making change. A passenger claims that the conductor said that he received only a nickel, whereas the passenger says he gave him a quarter. The old-time method of handling a complaint of that kind was to take the matter up first with the conductor and let the passenger wait a while. The conductor, of course, says he was right. After great delay perhaps the matter was settled as the passenger desired, but with no thanks on his part. Why would it not have been better to have accepted the passenger's word at the outset and handed him back 20 cents at once, or whatever was the disputed amount of money, usually not large? We have settled hundreds and hundreds of cases of this kind, and it has been our experience that the amount of money in dispute would not average over 35 cents in each case. We never had a "repeater," despite the possible charge that we were easy and could be worked, all of which shows the honesty of the average passenger. Every time we have settled we have pleased the passenger. Scores of appreciative letters have come to us after such incidents.

A passenger claims that he himself, his wife, or some member of his family received discourteous treatment at the hands of a conductor. Why not admit to the passenger that the conductor was wrong and that he will be checked at once, even though results may show, when the matter is investigated, that the conductor was not entirely to blame? The law's delays have never been any more aggravating than the delay a passenger experiences if he puts in a complaint as to some injustice which he thinks has not received the attention it deserves. Delayed apologies never do the same good that apologies do directly after the trouble. That's human nature. Making apologies in a straightforward way does anybody good.

We are all striving for the good will of our patrons. It is our sincere intention to give our patrons the very best possible service under all circumstances, and we want the friendly support of the people who give us their nickels every day. Perhaps some patrons bring us complaints that are amusing or unfair, but nevertheless the executive who receives the complaints, whether from the person direct, by letter or by telephone, should exercise good humor, kindness and sympathy to the complainant in such a way as to mollify him. Take his point of view. Never become embittered and never resent hotly any charges made. There is not one occasion in ten thousand when we can afford to lose our tempers, although undoubtedly we all fall short of that standard. Losing tempers has done much to cause hostility to "big business." There's nothing gained by riding a high horse.

Long-winded arguments over trivial points do not convince, they only irritate and annoy, and after such an argument the patron, who may have become angry, leaves with hatred rankling in his breast, whereas with tactful treatment he might have left with the kindliest feelings toward the company. It is not always possible to win over everybody, and we all regret when a patron comes in wrought up over some trifling matter and it is impossible to iron out his wrinkle, try as hard as we may. To the credit of human nature we believe that such cases are exceptional. The average case can be handled in the manner suggested and an enemy turned into a friend, with the resulting corollary of a liability being turned into an asset. We believe that the average kicker can be turned into a staunch supporter if he sees that our disposition is to treat him fairly. Ignorance of conditions is the reason why many find fault. If you can explain to him, talk or write to him, you will find the average passenger disposed to be fair and reasonable.

The average suggestion for the improvement of service received from patrons may be impracticable, but once in a while we have received a good suggestion, and its adoption has meant a step forward in serving the

TWIN CITY LINES—General Suggestions

Many patrons, desiring to assist us in giving good service and for the comfort of all, have suggested that we remind passengers to help abate the following nuisances, some of which are against health:

Do not bring dead or smoldering cigars into a Car.

Do not spit in any part of a Car. The law forbids this practice, and in the interest of health, comfort and cleanliness you are asked to comply with this sanitary regulation.

Do not deposit nutshells, fruit skins, papers or other litter in any part of the Car.

We desire to keep our Cars in a clean and sanitary condition and we are employing every means to do so. To achieve this result we must have the co-operation of passengers.

Be sure that you get on the right Car. Sometimes a passenger will get on a Short Line Car, taking it for granted that he is getting on a Long Line Car, and then later finds, to his inconvenience, that he is not being carried to his destination. It is always best to be sure that the Car you are boarding is the one you need. Look at the signs the Car carries.

Do not occupy more than one seat. If a passenger will extend the courtesy of "moving over" for others, he will find other passengers more disposed to extend a like courtesy to him. We are sure that a little consideration also extended to the conductor will inspire him to a much higher quality of service.

Some writer has wisely said: "There is no place in which the Golden Rule can be so effectually employed or will pay such large dividends, both as to one's relations with the Car employees and fellow passengers, as on a modern Street Car."

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TWIN CITY LINES—STREET CAR DELAYS

Delays to Minneapolis Street Car Service on Thursday, April 15, were as follows:

An automobile broken down on the track at Laurel Ave. and Ash St., held the Bryn Mawr line at that point 66 minutes from 9:35 a.m.

The Snelling-Minnehaha line was held 20 minutes from 2:15 p.m. by a fire at Bates Ave. and 7th St., St. Paul.

On account of trolley wire being torn down at Virginia and Como Aves., St. Paul, by a grading machine, the Como-Harriet line was delayed 17 minutes. This gap in the service reached Central Ave. and 4th St. S.E. at 2:41 p.m. from which point the station filled in for the delayed cars.

As the result of sand and water on the track at Como and Bedford Aves., St. Paul, the Como-Harriet line was held at that point 32 minutes from 5:25 p.m.

Complaints and Suggestions Always Receive Prompt, Courteous Attention.

A. W. Warnock, General Passenger Agent.
Telephones—Main 4580—Center 3134.

ADVERTISEMENT USED BY TWIN CITY LINES

public. We acknowledge with gratitude having received many good ideas from patrons in answer to the invitation we extend to send in suggestions as well as complaints. Of course, we have received hundreds of half-baked, amusing ideas, but given in such evident good faith that the smile was repressed. Perhaps the blue ribbon suggestion of this class was given to us recently by a very tall, thin gentleman wearing bushy side whiskers and wearing his hair brushed back, as George Ade said, "like a sea lion." He wanted to sell hot coffee, sandwiches and "sinkers" from a little counter to be installed on the rear platform of each car. He said that such a quick lunch service would make us very popular with those who had hurried off without their meals and would be a boon to husbands whose wives were away on vacations. He also pointed out that it would be rather sociable to see a carload of passengers munching sandwiches and drinking hot coffee together!

In the past year we have printed many newspaper advertisements with the idea of taking patrons into our confidence and of asking their co-operation to reduce the little frictions between them and our conductors. The gist of some of these advertisements, with the text as printed in the papers, is given herewith. Perhaps they may be suggestive to JOURNAL readers.

"Safety First" is good, but "Safety and Courtesy First" is better, and we believe that is the general watchword all along the line in electric railway circles to-day. We all want our trainmen to live up to our highest ideals as to proper treatment of passengers. No matter how hard these men may try to perform their duties efficiently, there is bound to be a crop of dissatisfied passengers. Our work is to get after the dissatisfied passengers, no matter whether they are right or wrong, try to get their point of view, try to straighten out their difficulties, and do everything reasonable to show them that we want to serve them well. It is the best and most sensible policy to pursue in building up a good feeling in the community which we serve.

Engineering Congresses at San Francisco

More Than A Quarter of the Enrollment for the International Engineering Congress Is Foreign

The ten days from Sept. 16 to Sept. 25 will be devoted to engineering congresses in San Francisco. The largest four engineering societies will hold separate conventions on Sept. 16 and 17, the A. S. C. E. at the St. Francis Hotel, the A. S. M. E. at the Native Sons' Hall, the A. I. M. E. at the Hotel Bellevue and the A. I. E. E. at the Civic Center Auditorium. Sept. 18 and 19 will be given up to excursions and Sept. 20-25 to the International Engineering Congress.

On July 12, 1915, 2927 members were enrolled for the International Congress, the membership of the five participating societies being represented as follows: American Society of Civil Engineers, 780, or 10.1 per cent; American Society of Mechanical Engineers, 454, or 7.4 per cent; American Institute of Electrical Engineers, 393, or 5.1 per cent; American Institute of Mining Engineers, 320, or 6.4 per cent; Society of Naval Architects & Marine Engineers, 69, or 8.3 per cent. The foreign membership is 27 per cent of the total enrollment. California leads the States with 466 members, New York comes next with 446, Pennsylvania has 176, Illinois 111, and Massachusetts 88. Among the foreign enrollments are: Canada, 106; Great Britain, 91; Germany, 59; France, 58; Japan, 54; Australia, 41, and Brazil, 40. Official delegates have been appointed by Switzerland, China and the Royal Institute of Engineers of the Netherlands.

On July 12, 1915, 192 papers had been received, distributed as follows:

Vol. 1	20	Vol. 7	9
Vol. 2	21	Vol. 8	11
Vol. 3	16	Vol. 9	27
Vol. 4	19	Vol. 10	22
Vol. 5	18	Vol. 11	7
Vol. 6	22		

Mr. Brownell Continues Popular Safety Lectures

An account of the safety educational work of H. L. Brownell, safety inspector Chicago Surface Lines, by means of moving picture lectures in parks and schools, was contained in the ELECTRIC RAILWAY JOURNAL of April 17, 1915. Evidence that this safety work, which Mr. Brownell has conducted regularly for the third summer in the Chicago parks, cannot be classed as being merely of the spasmodic "brass band" variety is well shown by the accompanying flashlight photograph of part of an audience of 10,000 persons who gathered to hear him. The photograph was taken from the marble grandstand in Lincoln Park.

AUDIENCE AT A SAFETY LECTURE IN LINCOLN PARK, CHICAGO

In connection with his safety work Mr. Brownell has recently issued a pamphlet entitled, "Safety for You and I," which contains a series of safety instructions, divided into three parts; instructions for small children, instructions for older children and those for grown-ups.

In a recruiting campaign inaugurated in Toronto during July one of the Toronto Railway cars was utilized. It was decorated with bunting, and bore a destination sign of Berlin and signs of various sorts to induce men to enlist.

Scientific Coasting at Oakland

Even with Faster Schedules, Coasting Has Increased from an Average of 15 Per Cent to 34 Per Cent and Energy Consumption Has Decreased Materially

During the early part of the year 1913, the San Francisco-Oakland Terminal Railways installed for trial use ten Rico coasting recorders, enough to equip completely all cars on its West Eighth Street line at Oakland.

For seven weeks before the trial, weekly records were made of total kilowatt-hours, of kilowatt-hours due to propulsion alone (average lighting hours and number of heating units being known), total car-miles, total car-miles of coasting clock cars alone and total passengers. Similar records were made weekly during the four-weeks' test period, from May 24 to June 21, and for four weeks following the test period. The three sets of observations gave these significant results: Before the recorders were installed the energy consumption per car-mile averaged 3.31 kw.-hr., or 174 watt-hours per ton-mile, and coasting was but 7.84 per cent, although it may be added that the coasting average for the system as a whole was about 15 per cent.

With the inauguration of the coasting clocks and instruction service on the cars the percentage of coasting rose to 27.60 per cent, and for the week ending the test the coasting was 41.70 per cent. The result is reflected in the averages of 35.34 per cent coasting, 2.5 kw.-hr. per car-mile and 131 watt-hours per ton-mile shown in the accompanying graph, the whole meaning a saving of 24.5 per cent in energy.

The need for the continued use of recorders and a regular follow-up system was quickly demonstrated in the period after the coasting recorders had been removed. During these four weeks the energy requirements rose from 118 watt-hours per ton-mile to 157 watt-hours, so that for the last week of the period the energy saving over the original conditions was but 9.3 per cent.

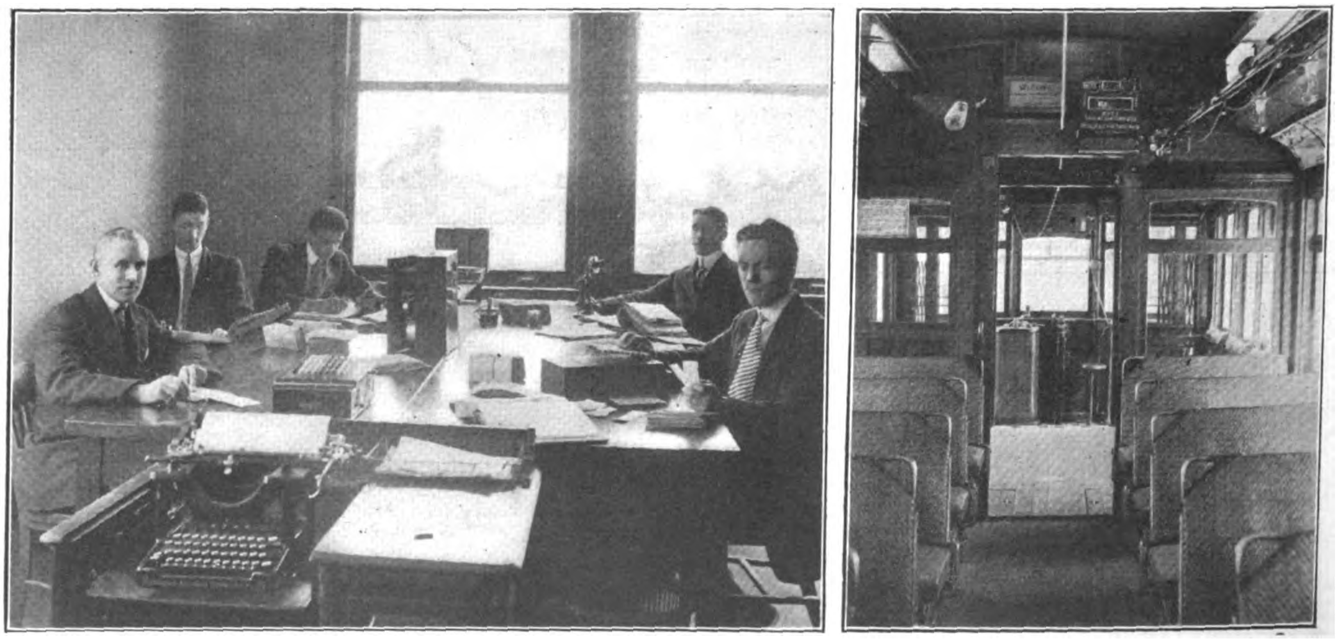
Appreciable savings in brakeshoe wear were also made on the same line. Thus between April 13 and May 6, 1913, before the use of coasting clocks, five cars averaged 22.4 lb. wear per 1000 miles; whereas four cars of the same type and in the same service, but equipped with coasting recorders, averaged only 13.5 lb. wear per 1000 miles between June 11 and June 22, 1913—a saving of 39.7 per cent. The money value of the brakeshoe saving was estimated at 3 cents per pound, which for 65 per cent wear of the shoes worked out at a saving of $5,256 a year on the basis of 35,000 car-miles or 480 lb. shoe wear per day.

As the result of these tests on the West Eighth Street line, the company placed an order for 350 coasting recorders, enough to cover all the city and high-speed suburban lines. All cars were so equipped by May 31, 1914.

RECORDS AND FOLLOW-UP WORK

All records are in the hands of the efficiency department, which was organized originally as the coasting department when the clocks were installed; however, since November, 1914, the department has borne its present title. Its work, which is under the direction of U. S. Sliter, now embraces also traffic counts and analyses (including jitneys), transfer checking, cost of operating specific services and accident analyses.

The coasting tape records as taken from the clock show in order the number of the car, which is also that of the clock; the coasting minutes record, and the number of the motorman, an "E" being added to indicate an extra. In adding coasting time, a horizontal line is drawn across the tape for every hour, the number of coasting minutes being written in the hour space formed by the horizontal lines. This is done for convenience in making additions at the office of the efficiency department. The envelope for holding the tape differs from others in not bearing time-clock stamps. Instead the envelope carries the detail story of each run, including not only time on and off but also a record of all layovers and delays. Any delays exceeding three



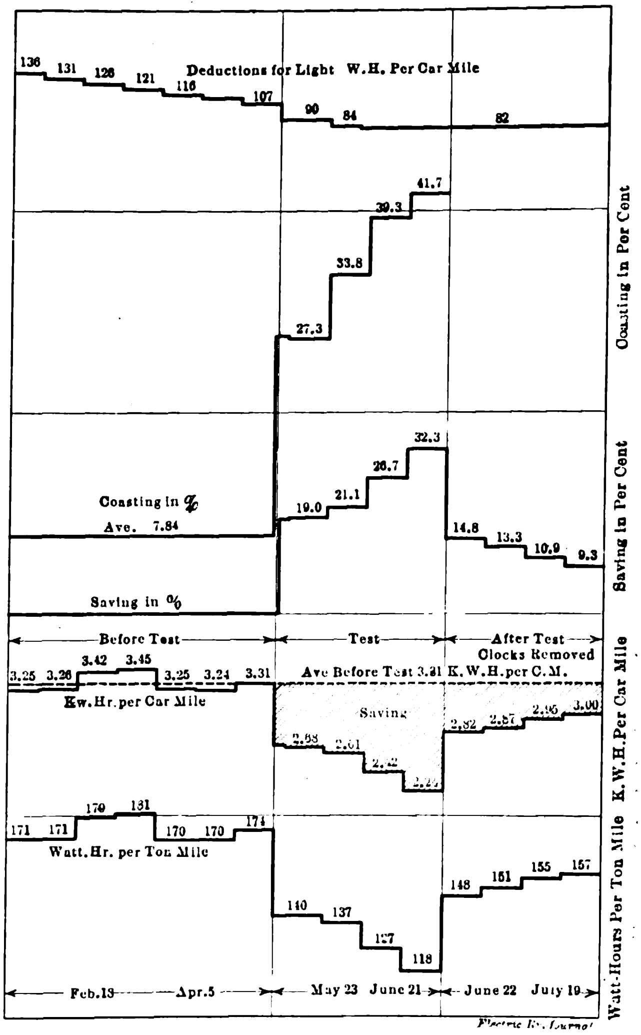
OAKLAND COASTING—MAIN ROOM OF EFFICIENCY DEPARTMENT, SHOWING ADDING MACHINES AND OTHER EQUIPMENT; LOCATION OF RECORDER OVER BULKHEAD OF CAR

TABLE I—SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS—SUMMARY SHEET OF TEST

Date	Total Kw.-hr.	Kw.-hr. Less Deductions	Total Car-Miles	Total "Rico" Car-Miles Metered Section	Total Passengers	Kw.-hr. per Car-Mile	Watt-hours per Ton-Mile	Coasting, per Cent	Saving, per Cent
Before Test Period									
Feb. 22....	10,593	10,168.20	3,312.30	3,123.65	39,581	3.25	171	7.84	..
March 1...	14,973	14,402.86	4,687.90	4,420.90	55,585	3.26	171	7.84	..
March 8...	15,700	15,144.25	4,687.90	4,420.90	59,678	3.42	179	7.84	..
March 15...	15,795	15,260.32	4,687.90	4,420.90	58,986	3.45	181	7.84	..
March 22...	14,875	14,362.20	4,687.90	4,420.90	59,694	3.25	170	7.84	..
March 29...	14,880	14,382.45	4,713.24	4,444.80	58,921	3.24	170	7.84	..
April 5.....	15,090	14,617.25	4,687.90	4,420.90	57,279	3.31	174	7.84	..
Total and Average..	101,906	98,337.53	31,465.04	29,672.95	389,724	3.31	174	7.84	..
Test Period									
May 24....	3,660	3,541.80	1,393.70	1,314.32	17,135	2.69	141	27.60	18.7
May 31....	12,350	11,297.00	4,687.90	4,222.90	59,417	2.68	140	27.30	19.0
June 7.....	11,910	11,508.00	4,687.90	4,410.66	56,996	2.61	137	33.80	21.1
June 14....	11,040	10,683.60	4,687.90	4,420.90	58,760	2.42	127	39.30	26.7
June 21....	10,260	9,898.20	4,687.90	4,420.90	57,969	2.24	118	41.70	32.3
Total and average ..	49,220	46,929.60	20,145.30	18,789.68	250,277	2.50	131	35.34	24.5
After Test Period—Recorders Removed									
June 28....	12,840	12,478.20	4,687.90	4,420.90	56,168	2.82	148	....	14.8
July 5.....	13,060	12,698.20	4,687.90	4,420.90	58,505	2.87	151	....	13.3
July 12....	13,150	12,795.20	4,590.16	4,328.73	55,023	2.95	155	....	10.9
uly 19.....	13,350	12,995 20	4,590.16	4,328.73	57,913	3.00	157	....	9.3

minutes are taken into account in calculating the percentage of coasting minutes.

The records as taken from the coasting recorders are turned in daily to the district and division superintendents for inspection and they in turn forward them to the efficiency department. Coasting percentages are then computed by means of Burroughs listing and non-listing machines and a comptometer. These calculations are first made on a semi-monthly basis, line for line, but divided according to regulars and extras. These semi-monthly lists are posted conspicuously at the district and division headquarters concerned. Monthly lists are made up to show what percentage of men are making certain coasting records. These lists also show the record of the preceding month. Other monthly records are worked up into graphs which compare the northern, eastern, central and western districts of the traction division, also the Key division, according to their coasting averages and according to the average coasting on the system as a whole. Another set of graphs shows the coasting percentages and the average number of passengers carried per diem plotted against watt-hours per ton-mile and kilowatt-hours per car-mile.



OAKLAND COASTING—GRAPH DERIVED FROM COASTING TESTS AS DETAILED IN LOG SHEET

Men whose coasting records are low are placed in the charge of a coasting instructor, who devotes an entire day to the delinquent. If necessary the treatment is repeated two or three times. On these occasions the motorman and conductor check the instructor to see that he is making all the time points correctly. The very next day the motorman is likely to do just as well as the instructor, and if he fails to keep this up it is evident that his backsliding is due to the fact that he is paying less attention to the refinements of operation. Generally speaking, about 90 per cent of the men have been thoroughly educated to the meaning of efficient coasting. Should a man prove incorrigible after repeated instruction, but be satisfactory otherwise, he is disciplined by being placed on the extra list or treated as a recruit motorman. Naturally an experienced motorman does not care to be seen in the rôle of a student who has to learn his lessons all over again. So far it has not been necessary to discharge one man because of poor coasting alone.

The progressive improvement in coasting is shown not only by the figures quoted, but by the fact that some 400 motormen are kept up to high coasting pitch with the aid of but one instructor. At first two coasting teachers were constantly engaged.

A large number of men had the impression that the best coasting records were to be obtained by allowing the car speed to die down and then jerking the controller handle over for a short spurt and so on repeatedly. Of course, this mode of operation is disagreeable to passengers, and it does not produce the best coasting records. The men are taught that the best results are

TABLE II—SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS—BRAKESHOE WEAR TEST

Car Number	Pounds Applied	Date	Pounds Removed	Date	Pounds Worn from Shoe	Mileage	Miles per Pound Wear	Pounds Wear per 1000 Miles
Without Coasting Clocks								
354	180	4-13-13	112.5	5-6-13	67.5	3,595	53.2	18.42
369	207	4-13-13	149.0	5-6-13	58.0	3,087	53.2	18.42
403	180	4-13-13	135.0	5-6-13	45.0	1,576	35.0	28.55
405	180	4-13-13	128.0	5-6-13	52.0	2,263	43.5	22.98
410	180	4-13-13	100.5	5-6-13	79.5	2,966	37.5	26.65
Total.....	927		625.0		302.0	13,487	44.6	22.40
With Coasting Clocks								
351	180	6-13-13	167.0	6-22-13	13.0	1,077	82.8	12.06
352	180	6-14-13	171.5	6-22-13	8.5	508	59.7	16.73
354	180	6-11-13	160.5	6-22-13	19.5	1,336	68.5	14.58
355	180	6-12-13	167.0	6-22-13	13.0	1,074	82.6	12.10
Total.....	720		666.0		54.0	3,995	74.0	13.50

TABLE III—SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS—CLASSIFICATION OF COASTING SKILL OF MOTORMEN

	PER CENT OF MOTORMEN ON				PER CENT MOTORMEN ON TRACTION DIVISION	
Coasting Percentage	Central District	Western District	Northern District	Eastern District	Period Ending May 31	Period Ending June 15
20 to 25	2.3	4.0	0.0	2.0	4.11	2.41
25 to 30	23.4	20.2	6.8	5.1	22.60	17.10
30 to 35	43.0	36.4	43.2	31.3	36.76	39.04
35 to 40	21.0	26.3	31.8	31.3	23.97	25.44
40 to 45	7.0	6.1	13.7	18.2	9.13	9.87
45 to 50	3.3	7.0	4.5	9.1	2.74	5.48
50 or Over	0.0	0.0	0.0	3.0	0.69	0.66

secured by accelerating and braking to maintain a uniform rate of speed and by anticipating stops so that the car will do part of the braking.

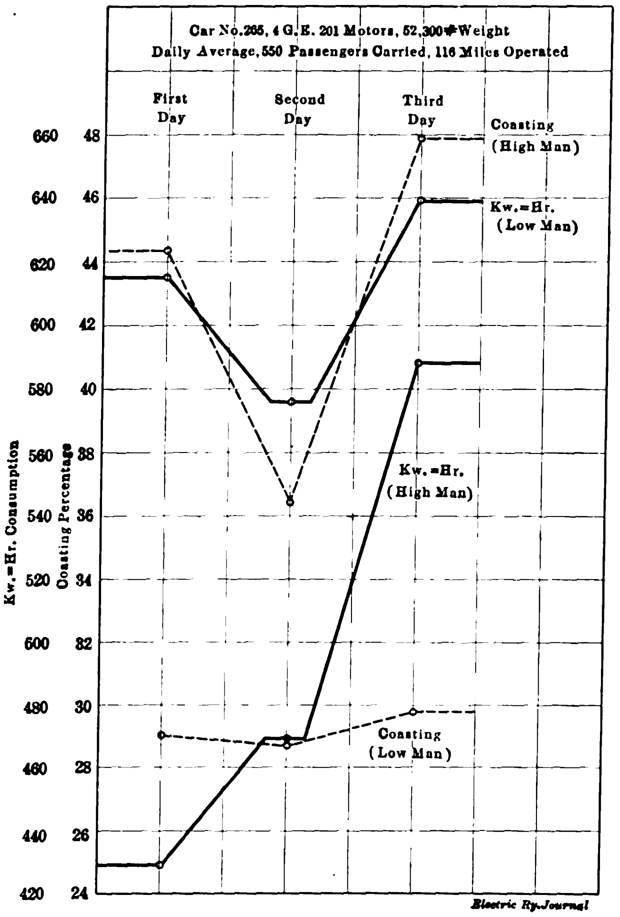
Hitherto the low and high-coasting men have met separately to discuss their records, but now joint meetings are held. A number of the high men have freely undertaken to show others how they obtain their records. The degree of coasting still shown by the men is presented in the accompanying classification by percentages.

Coasting Bogies

Reference has already been made to the subdivision of coasting records by lines and classes of men. To afford a still fairer basis of comparison, the coasting instructor began about April 1, 1915, to work up a bogie or standard for each line instead of determining standards from the work of all men. In one instance the visit of the instructor on a certain line to make this determination spurred on the local motormen to improve their average coasting 5 per cent. This improvement was made within the two weeks that the instructor was making the tests.

Should a time-table be changed, the instructor rides all over the line again to establish a new standard if that appears necessary. However, the fact that there is often room for a little more efficiency appears from individual cases of time-table change. For example, when the running time between Oakland and Berkeley was cut from thirty-five minutes to thirty minutes, the coasting percentage showed a decrease until the instructor demonstrated that it was still possible to maintain the same ratio.

For certain reasons on another occasion the most rigid adherence to schedules was desired and this fact gave some of the men the impression that they would have to do less coasting. The result of this wrong impression appears clearly in the graph showing the record of the Key division. In this case energy consumption went up from 3.25 kw.-hr. to 3.65 kw.-hr. per car-mile as the coasting went down from 42.8 per cent to 37 per cent between September, 1914, and January, 1915. To correct this condition a special coasting campaign was inaugurated and the instructor found that even with 40 per cent coasting the schedule could readily be maintained. The coasting on the Key division now averages 40 per cent or better.



OAKLAND COASTING—THREE-DAY TEST SHOWING RESULT IN ENERGY CONSUMPTION OF HIGH COASTING AS COMPARED WITH LOW COASTING PERCENTAGE

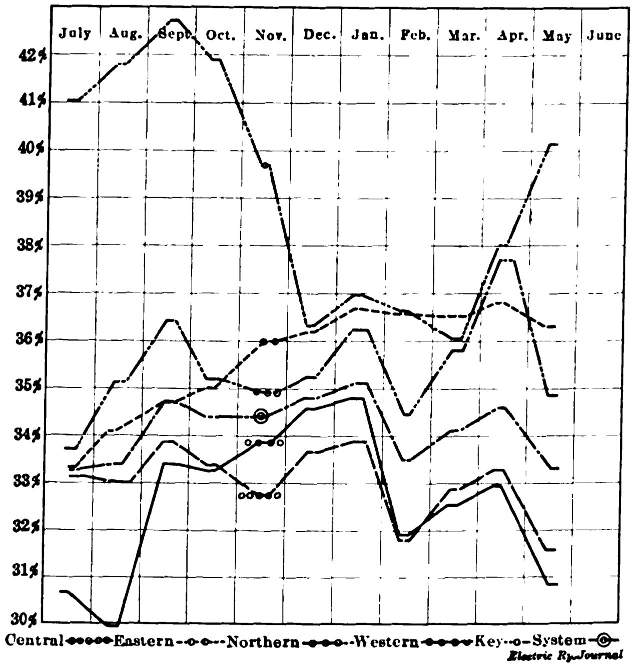
In making coasting tests on the Key division, the instructor operated one-half of his time during the rush period. All delays incidental to operation were included in running time. A statement showing the result of these tests under date of May 17, 1915, gave the following standards for these lines:

Line	Per Cent	Line	Per Cent
Berkeley	34.40	Twelfth Street	51.98
Piedmont	36.27	Claremont	40.39
Twenty-second Street	36.33	Northbrae	44.50
Average			40.07

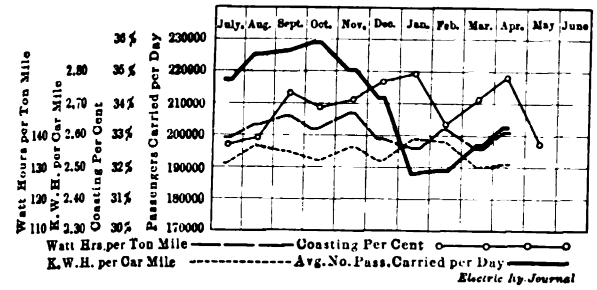
Although the company has maintained careful analyses of accidents by divisions, it did not begin until recently to check against the coasting records those accidents, like collisions and thrown passengers, which might be promoted by a too eager desire to coast. As yet there is no evidence to show that increased coasting has added to the number of accidents. It has been observed, however, that following the semi-annual selection of runs, accidents tend to go up until the men who have changed are accustomed to new conditions.

Maintenance Records

Clock troubles are recorded on a defect sheet similar to that shown on page 1200 of the June 26 issue. This sheet was devised by the Railway Improvement Company. During the first four months of 1915 the failures of clock mechanisms were respectively 30, 28, 31, and 20. Failures of printing mechanisms were 30, 23, 22 and 19, and other failures were 24, 27, 33 and 28. The average number of troubles per car per month were 0.248, 0.231, 0.254 and 0.198. One of the earlier



OAKLAND COASTING—COMPARATIVE COASTING RECORD GRAPHS OF VARIOUS DISTRICTS OF THE TRACTION DIVISION AND OF THE KEY DIVISION



OAKLAND COASTING—RECORD OF TRACTION DIVISION WITH RELATION BETWEEN COASTING AND ENERGY CONSUMPTION

sources of trouble was in the piston and contact plates. This has been overcome largely by substituting grease for oil in the motorman's valve. Formerly, the oil from this valve would be blown through the air pipe into the relay box, thus causing poor contact in the armature. Another trouble, that of dirty mechanism causing slow clocks, was due to the entrance of dust into the clocks by way of the paper chute. However, this is not allowed to interfere with operation to any appreciable extent. Clocks reported slow are checked during a trial coasting period by means of a stop watch.

CHECKING WITH WATT-HOUR METERS

One feature in the education of the trainmen was the publication of the results of a three-day test when a low-coasting and a high-coasting motorman were checked by means of watt-hour meters. This test demonstrated conclusively that the man who did the most coasting was using the least energy, and that low coasters consume power to the value of $1 to $2 a day more than high coasters, even when energy is figured at but 1⅛ cents per kilowatt-hour. The test, its results, and its purpose were placed before the trainmen in the following circular posted Nov. 11, 1914:

"To All Concerned:

"In order to determine the exact amount of power consumed by a motorman with a low-coasting record as compared with a man with a high-coasting record, we have caused a test to be made for a period of three days on the northern district. We have taken the same car, same run, which has made practically the same number of miles and handled the same number of people.

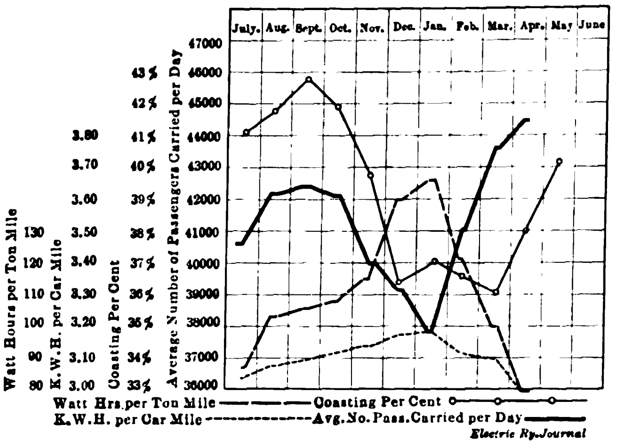
"We are posting these figures in order that the employees may study the results and be convinced beyond a question of doubt that the cost of power consumed in operating a car depends entirely upon the coasting record made, showing a three-days' test on Run No. 17, Richmond line, with a coasting record of 29.1 per cent.

	Coasting Per Cent	Kw.-hr.	Passengers	Miles	Cash
First day	29.0	615	598	116.16	$33.40
Second day	28.7	576	592	116.16	33.15
Third day	29.8	639	496	116.16	27.80
Total	87.5	1830	1686	348.48	$94.35
Average	29.1	610	562	116.16	31.45

"Showing a three-days' test on Run No. 17, Richmond line, with a record of 42.9 per cent.

	Coasting Per Cent	Kw.-hr.	Passengers	Miles	Cash
First day	44.3	429	589	116.16	$33.85
Second day	36.4	469	472	116.16	26.95
Third day	47.9	588	509	116.16	30.10
Total	128.6	1486	1560	348.48	$90.90
Average	42.9	495	526	116.16	30.30

"You will note that the man coasting 42.9 per cent of the time only consumes an average of 495 kw.-hr. as compared with the man coasting 29.1 per cent, consuming an average of 610 kw.-hr., making a difference of 115 kw.-hr. in favor of the man with the high-coasting record.



OAKLAND COASTING—RECORD OF KEY DIVISION WITH RELATION BETWEEN COASTING AND ENERGY CONSUMPTION

"Figuring the cost of the power at 1⅛ cents per kilowatt-hour we find that the man with the low-coasting record costs $1.29 more for power on a run of nine hours and twenty minutes, making an average of 116 miles per day, than the man with the high-coasting record. The average power consumed by the low man was 5.26 kw.-hr. per mile. The average power consumed by the high-coasting-record man was 4.25 kw.-hr. per mile.

"This shows that the high-coasting man operates his car under practically the same conditions as the low-coasting man with 0.991 kw.-hr. less per mile, or a little over 1 cent less per mile.

"Employees who read this bulletin and give a few seconds' thought will readily understand why this company is anxious to increase the coasting records of the low men. The low men are consuming too much power and costing all the way from $1 to $2 per run more for power than the high-coasting men.

"Your hearty co-operation is earnestly solicited. Men whose records are low are requested to give their full time and attention—concentrating their minds on the operation of their cars and increase their records.

(Signed) "J. P. POTTER,
Superintendent of Transportation."

The result of the test described is also embodied in the graph reproduced on the opposite page.

CONCLUSION

The company, in viewing the advantages of its car recorders, naturally is gratified at the savings obtained. But it is still more gratified by the fact that the proper use of such devices produces better men. From an attitude of skepticism, the men have been converted to see in the recorder a device which makes their work lighter and more interesting in many ways.

Jovian Convention in Chicago

The thirteenth annual convention of the Jovian Order will be held at the Hotel Sherman, Chicago, Ill., Oct. 13, 14 and 15. The program outlined includes a reception and dance on the evening of Oct. 12. On Oct. 13 there will be a business session in the morning, luncheon as guests of business associations of Chicago, an outing trip in the afternoon and an elaborate pageant and entertainment in the evening. On Oct. 14 there will be a business session in the morning, degree team competition in the afternoon and the annual rejuvenation in the evening. On Oct. 15 there will be a business session in the morning, closing session and election of fourteenth congress in the afternoon and banquet in the evening.

Car Service Inspection in Seattle

Methods Followed by the Department of Public Utilities in Checking Car Loading and Blanks Used for Recording Data Are Described

BY J. W. MC CLOY, CAR SERVICE INSPECTOR DEPARTMENT OF PUBLIC UTILITIES, SEATTLE, WASH.

Practically all of the street railway franchise ordinances granted in Seattle contain the clause providing that cars shall be run over the various lines at such reasonable intervals between 6 a. m. and 12 o'clock midnight as the City Council may from time to time prescribe by ordinance. This, apparently, put within easy grasp of the Council the matter of adjusting street railway schedules to suit the public convenience, but in practice the authority so conferred was found difficult of enforcement from the fact that the Council had no adequate means at its disposal of determining just what a reasonable service would be. Furthermore, the obvious impossibility of a legislative body like a city council successfully attempting to assume so purely a managerial function as schedule making will be readily appreciated by those familiar with the constantly fluctuating demands of street railway service in a large city.

From time to time numerous and frequent complaints were made of the service, general and in particular, and although no serious attempts were ever made by the Council to assert its prerogative it was evident that some means of exercising the city's regulatory functions must be devised.

In April, 1908, the responsibility for the enforcement of franchise obligations was more clearly defined in an amendment to the city charter authorizing the appointment by the mayor of a superintendent of public utilities, and in perfecting the organization of the department thus created provision was made for the appointment of an inspector of car service.

The Alaska-Yukon-Pacific Exposition was held in Seattle during the summer of 1909, and realizing that abnormal travel conditions would be the rule during this event, the department confined its activities to service and equipment inspection of a general nature, and it was not until early in the following year that the problem of determining a standard of reasonable car service was seriously taken up. At the very outset a difficulty in the shape of an almost total lack of precedent presented itself. As far as could be learned there were no American cities where a definite standard of loading was prescribed or followed, and it was not thought advisable, in view of the excessive overcrowding which had characterized the travel on certain of the local lines and which had come to be looked upon as part of the regular order of things in all large American cities, to attempt to insist upon the standards of the municipally-owned European tramway systems. There arose the doubt as to what constituted excessive overcrowding, where the line was to be drawn between good service and bad, what the traveling public had the right to expect, and what the limit of good service was which would still permit the operating companies to make a reasonable return upon their investments. Such data as could be gathered from reports on traffic conditions in Eastern cities were of little value from the fact that the standard of loading was usually found to be higher than was deemed desirable to establish in Seattle.

Consequently it devolved upon the Department of Public Utilities to pioneer in the field of traffic regulation, and as a preliminary thereto an extended series of passenger checks was taken, covering particularly the hours of heaviest travel and extending over a period of several months. In this manner data were secured from which it was possible to determine with a fair degree of accuracy the average number of passengers carried into and out of the downtown delivery district on each line and group of lines during the so-called rush hours. The department was then in a position to determine the characteristics of travel of the various lines and to make a critical analysis of the service.

The evening rush-hour period was interpreted to include that interval between 5 p. m. and 6.30 p. m. when the cars of the various lines were passing the points of maximum load on the way out of the downtown delivery district; the morning rush period varied considerably according to the class of patronage served, and different classifications were made to suit the varying characteristics of the different lines.

It was early decided to make no attempt to limit individual car loads but simply to prescribe a certain standard of service which would extend over the entire rush-hour period. Analysis of the service checks had shown that of the total number of passengers carried past the points of maximum load during the evening rush-hour period the number obliged to stand ranged all the way from 10 per cent on certain lines to as high as 45 per cent on others, with a number of routes on which the total number of seats furnished actually outnumbered the passengers carried. After careful consideration it was finally decided to fix the allowable overload at 25 per cent, in other words, to require a service which would supply sufficient cars on all of the most heavily traveled lines to provide seats for at least 75 per cent of the total number of passengers which would, under normal conditions, be carried past the points of maximum load. The inability to provide such a service on a certain few lines owing to physical conditions, such as grades, insufficient trackage, etc., was recognized, but in all its general particulars this idea has been followed ever since and, while refusing officially to recognize this principle as a standard, the largest of the local operating companies has tacitly agreed to accept the figures of the Department of Public Utilities and to increase its service whenever it can conclusively be shown that a maximum overload in excess of 25 per cent consistently exists.

How closely this standard of service has been observed can be gaged by the fact that prior to the December, 1914, holiday season the principal electric car lines of Seattle were on the average week-day evening between 5 p. m. and 6.30 p. m. hauling out of the downtown business district an average total of about 27,500 passengers, of whom 20,635, or just a fraction more than 75 per cent, secured seats.

The jitney invasion reached Seattle about the middle of December, 1914, and within six weeks had assumed such proportions as to reduce the street car travel by nearly 20 per cent, thus upsetting for the time being all of our carefully prepared statistics. In the face of this decrease in business the operating companies have continued to run practically the same service as before with the result that the percentage of passengers obliged to stand has been very materially reduced on all lines. Within the last few weeks, however, conditions from a street railway standpoint have improved, and there is every evidence that within a short time the jitney bus, owing to regulative legislation and the pressure of the economic law, will have ceased to cut much of a figure in the local field of urban transportation.

As a general rule in securing traffic data all lines passing the point of maximum load are checked simultaneously, an actual count, in so far as it is possible, being made of the passengers. This is a practice which comes easily with experience, as the checkers are familiar with the seating capacity of the cars and have only to count the standing passengers in order to obtain very accurate results. From these data a report is made up on a form provided for this purpose showing the car number, time at which it passes the point of observation, the interval between cars, and the number of passengers. This is further summarized so as to show the average interval, weather condition, cars in service, total number of passengers, total number of seats and, finally, the percentage of passengers obliged to stand. Those lines which serve the same contiguous territory are grouped in preparing these reports.

Portions of a typical form used for recording these data are shown in the accompanying table. The group of lines reported is the Westport Avenue lines, of which there are six. After leaving the business district these six lines follow the same tracks for about 2 miles to the point where check is taken. From that point the lines pair off, serving various of Seattle's northern suburbs. The Union Street Loop, from which the Phinney Avenue and Green Lake cars, marked (X), are operated, is located about ¾ mile from the depot loop, the downtown terminus of all the lines. It is the intention to have these Union Street loop cars pull out immediately ahead of the through cars as they arrive at Union Street and pick up all passengers from that point out. In theory about one-half of the traffic originates beyond the Union Street loops. The summary shows how well this theory works out in actual practice.

This method of presenting the traffic count is preferred to the more generally practiced scheme of using a graphic chart for a number of reasons. To begin with, the numerical statement is considered more convincing and accurate, both in showing the load and the interval than any system which involves the use of the graphic curve. By showing the car number a definite record is made which is useful in the event of a dispute and also establishes the seating capacity. As many as six lines, all operating into the same general territory, can be shown on one form, and the effect of the travel on one line on the travel on another traversing and serving adjacent territory can be noted. Another advantage of the typewritten report is that duplicate copies can be made as desired. Duplicates of all traffic counts are furnished to the transportation department of the Puget Sound Traction, Light & Power Company, operating the majority of the Seattle lines, and the company's operating officials will testify to their value in assisting in the study of traffic conditions whereon to establish schedules.

CITY OF SEATTLE

DEPARTMENT OF PUBLIC UTILITIES

CAR SERVICE

Route, Westlake Avenue Lines.
Taken at Westlake Avenue & Stone Way

Date, June 22nd, 1914.
Weather, Pleasant.
By Hadeen.

Car	Route	Out-bound	Interva								Load
547	Fremont-Ballard.....	4:37	p.m.								53
592	Meridian Avenue.....	4:38									36
525	Phinney Avenue.....	4:39									63
581	Wallingford Avenue...	4:42									29
560	Green Lake..........	4:43									37
571	West Woodland	4:44									37
587	Phinney Avenue.....	4:45				6					59
599	Meridian Avenue.....	4:46			8						47
540	Fremont-Ballard.....	4:47		10							41
709	Green Lake..........	4:49						6			42
530	Phinney Avenue.....	4:50				5					44
552	Wallingford Avenue...	4:54					12				61
539	Phinney Avenue.....	4:56				6					73
565	West Woodland......	4:57							13		43
708X	Green Lake..........	4:58						9			51
597	Meridian Avenue.....	5:00			14						61
541	Fremont-Ballard.....	5:00		4							55
710	Green Lake..........	5:01						3			35
535	Wallingford Avenue..	5:02					8				45
585	Phinney Avenue.....	5:05				9					98
707X	Green Lake..........	5:06						5			38
586	Wallingford Avenue...	6:26	p.m.				7				55
540	Fremont-Ballard.....	6:27		3							55
548	West Woodland......	6:28							6		40
535	Wallingford Avenue...	6:28					2				66
553X	Green Lake..........	6:29						5			67
589	Meridian Avenue.....	6:30			7						70
704	Green Lake..........	6:30						1			74
527	Wallingford Avenue...	6:30					2				45
583X	Phinney Avenue.....	6:32				7					90
585	Phinney Avenue.....	6:33				1					79
692	Meridian Avenue.....	6:34			4						48
555	Green Lake..........	6:36						6			56
541	Fremont-Ballard	6:38		11							87
529	Wallingford Avenue...	6:38					8				56
563	West Woodland......	6:39							11		37
542X	Phinney Avenue.....	6:41				8					66
557	Phinney Avenue.....	6:42				1					61
703	Green Lake..........	6:43						7			80
598	Meridian Avenue.....	6:44			10						71

SUMMARY 5 P.M. TO 6.45 P.M.

	Average Interval in Minutes	Cars in Service	Total Passengers	Total Seats	Per Cent Standing
Wallingford Avenue....	7½	11	905	672	26
Meridian Avenue.......	7	12	1093	868	21
Fremont-Ballard.......	7	14	998	720	28
Phinney Avenue.......	3⅓	25	1995	1506	25
West Woodland........	11	7	605	480	20
Green Lake............	4½	17	1592	1332	16

Fifty-two per cent of the Phinney Avenue cars operated from the depot loop carrying 53 per cent of the passengers. Sixty-three per cent of the Green Lake cars operated from the depot loop carrying 64 per cent of the passengers. Cars marked thus (X) operated from the Union Street loop.

SERVICE AND EQUIPMENT INSPECTOR.

FORM USED FOR RECORDING CAR LOADING AND SERVICE, DEPARTMENT OF PUBLIC UTILITIES, SEATTLE

Care is taken not to jump at conclusions or to follow first impressions in recommending improvements in the service. Whenever a check shows a certain line to be overcrowded an endeavor is made to ascertain the reason therefor. If the overload is an unusual occurrence on this line it is usually found that there is some extraordinary condition, not apt to be repeated, which is responsible. If, however, subsequent checks show a frequently recurring overload with no apparent cause excepting increase in travel, this line is closely studied for several weeks, and if the overload seems likely to continue a demand is made for more service. The department is frequently able to point out that, while more service is needed during certain periods, a slight change in the schedule, using the cars to a better advantage, will afford the necessary relief without the necessity of adding more cars.

Early in the study of car-service inspection it became apparent that the one thing above all others to be sought for in the operation of the cars was regularity. It was very evident that an irregular headway resulted in the excessive overcrowding of certain trips, while others immediately following would scarcely have their seats filled. It has therefore been the aim of the Department of Public Utilities to assist by every means possible in securing an uninterrupted operation of the cars. To this end several ordinances have been passed making it a misdemeanor for teamsters or others willfully or carelessly to interfere with the expeditious operation of the cars. While conditions are still far from being entirely satisfactory in this respect, substantial progress has been made and better results are looked for in the future.

Union Traction Safety Magazine

The Author Tells How the Publication of This Magazine Has Been of Assistance to the Various Safety Committees

BY E. E. SLICK, CLAIM ADJUSTER UNION TRACTION COMPANY OF INDIANA, ANDERSON, IND.

Demand for an organ of communication among the company's employees to improve esprit de corps and encourage enthusiasm in the safety movement was met by publishing the Union Traction Company of Indiana's magazine *Safety*. The first issue of this magazine appeared in April and contained twelve pages, including the cover. The Union Traction Company has one of the oldest safety organizations in the country, having been organized in May, 1912, and the safety magazine is really an outgrowth of the demand for closer relations between the various local safety committees. The headquarters of these committees are established at five terminals on this company's lines and each committee consists of sixteen members. These members are taken from all departments of the road and serve for a period of six months. Each committee holds monthly meetings, and the chairman and secretary of the local committees meet with the general board once each month. The general board is composed of all department heads, who serve permanently.

JUNE, 1915
SAFETY
402
UNION TRACTION COMPANY
OF INDIANA

FRONT COVER OF SAFETY MAGAZINE

At the March meeting of the general safety board it was decided that an organ of communication among the employees devoted to the subject of safety and other matters of common interest was necessary. Accordingly the claim adjuster, who was secretary of the board, was appointed editor, and plans were immediately perfected so that the first issue of *Safety* appeared early in April. Interest in the safety movement has been kept up from the beginning, but through the medium of the magazine additional enthusiasm among employees has been encouraged.

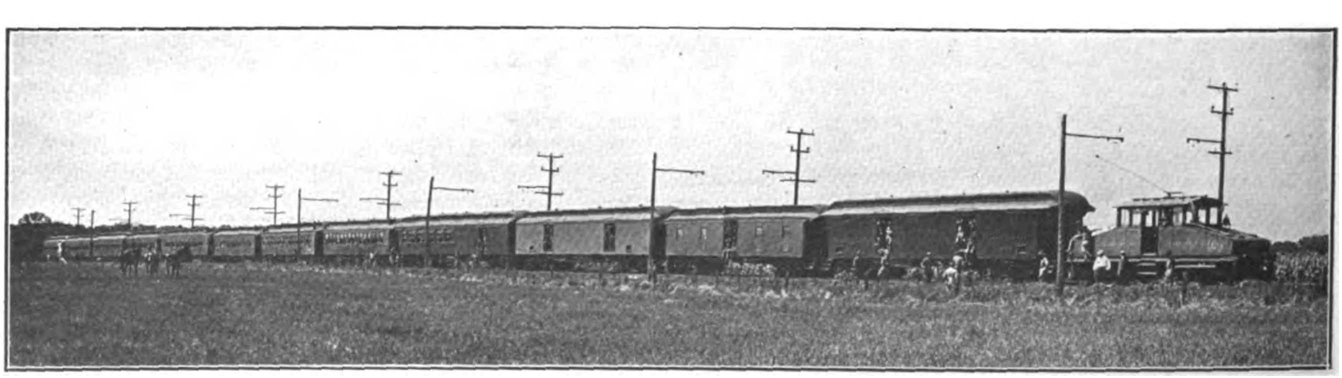
All articles are furnished by deparement heads and employees generally, and every article deals with some phase of the safety movement or welfare work, directly or indirectly. Each issue is well illustrated, particular attention being given to portraits and biographies of old and faithful employees and the local safety boards. The editor being the secretary of the general safety board is in close contact with the work of the local as well as the general organizations. The magazine is distributed free to all employees through department heads, and the expense of its issuance has been amply justified by the increased interest in safety and welfare work.

Handling Troop Trains in Iowa

Inter Urban Railway of Des Moines Meets Severe Test in Carrying Troops from Their Various Headquarters to the State Encampment

Recently the electrical equipment and the transportation department of the Inter Urban Railway of Des Moines, Iowa, were put to a severe test when it was called upon to move 3500 Iowa troops over a section of its line. The troops arrived in cars containing fifty or sixty men, or in trains containing from 200 to 500 men. The contract to move them from the steam road connection to the place of encampment was obtained only by the transportation department's agreeing to move troops as fast as they arrived. Consequently all trains were special and during the period the troops were being transported regular service, which provides for a one-hour-and-fifteen-minute schedule, was operated without any delays. At the steam road connection considerable time was consumed in transferring the men and their baggage. The total time required, however, to move the 3500 men and their baggage was five hours. The troops were handled in trains of from one to twelve cars each and the movement from the connection to the place of encampment was 25 miles.

In connection with the handling of these troops it is interesting to note that one train of twelve steam road passenger cars arrived at the connection. To eliminate transferring, the entire train was delivered to the electric road. One of the company's electric engines was coupled to this train and moved it over the road and up grades averaging about 1 per cent without delaying regular service. A view of this train and the electric engine is shown in the accompanying illustration. On the return trip at the close of the encampment, the same electric locomotive moved a train of fourteen cars, and the maximum ascending grade in this direction was 3 per cent. These electric engines are equipped with four GE-207-D, 110-hp., 600-1200-volt motors and Type M control. The total weight of the locomotive is about 55 tons and the effective tractive effort at 160 amp. input is 3700 lb.



VIEW OF TWELVE-CAR TROOP TRAIN, DES MOINES INTERURBAN RAILWAY

COMMUNICATIONS

Contact System Nomenclature

McHENRY & MURRAY, ENGINEERS

NEW HAVEN, CONN., Aug. 10, 1915.

To the Editors:

Referring to the editorial on "New Technical Terms in Heavy Electric Traction," which appeared in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 7, I would offer the following suggestions regarding conductors and collectors in electric railway service:

Classification of Elements of Contact System.
- Contact Conductors
  - Contact wire.
  - Contact rail—"Third-rail."
- Contact Collectors
  - Contact trolleys—"Trolleys."
  - Contact rollers.
  - Contact shoes—"Sliders."

Contact shoes may be further classified under—
- "Engine shoes."
- "Motor-car shoes."
- "Pantagraph shoes."

The suggested classification at least has the merit of uniformity.

The term "trolley wire" is certainly inapplicable when sliding shoes are used for making contact, and the term "contact wire" which may be more generally applied and is in common use upon the New Haven system, seems to be altogether better. It is improbable, however, that the suggested terms "contact rail" and "contact trolleys" will displace the older and better established names "third-rail" and "trolleys." The trolley-wheel form of contact is so narrowly limited to this particular use as to make unnecessary a further descriptive prefix, but it is believed that the term "contact shoes" will be considered preferable to the term "sliders" and will secure universal acceptance.

The writer confesses to a prejudice in favor of the older form of spelling "pantagraph," as preferred by the lexicographers. E. H. McHENRY.

Nominal Rating of Railway Motors

GENERAL ELECTRIC COMPANY

SCHENECTADY, N. Y., Aug. 6, 1915.

To the Editors:

Now that the committee on standards of the American Institute of Electrical Engineers has reached a decision on the subject of rating railway substation machinery, and has issued the new rules, I wish to express my belief that the committee acted most wisely in retaining in the rules the so-called "nominal rating" for railway apparatus. One of the strongest reasons for retaining this rating, in my mind, is the fact that the nominal rating, involving the two-hour overload after a continuous run, has been in general use in this country for many years, is well understood by railway engineers and operating men generally, and has been entirely satisfactory in the vast majority of cases. The proposition to eliminate this form of rating and substitute a single continuous rating has, so far as I know, arisen within the institute and not from any general dissatisfaction with the existing rating.

I most thoroughly indorse the excellent work of the standards committee of the institute and sympathize heartily with their attitude as respects the simplification of ratings. At the same time I have been much impressed with the opportunity for the institute to solidify and extend its prestige in the railway industry generally by recognizing in its standardization rules the established good practice in the art.

It is a debatable question as to how far the institute should endeavor to create new engineering methods through the medium of its standardization rules. I think that we should assume a progressive attitude in formulating these rules, but it is not the medium through which we should endeavor to create radically new engineering practices. The open forum of the institute is the proper place to present and discuss new ideas, theories and practices. The standardization rules, it seems to me, should be the crystallization of the best practice of the times, with the supreme object of receiving general approval and adoption in practical work.

There are many situations in which the continuous rating is preferable and, if the general practice can in course of time be brought around to the exclusive use of the continuous rating, it will be most appropriate for the institute to then discontinue the recognition of the nominal rating. The rules as issued recognize either the flat, continuous rating or the nominal rating, and in this respect, as in substantially all other essential matters, appeal to me as being in excellent practical shape and should be left unchanged for a considerable period so they may be digested and assimilated into the regular commercial channels of the industry.

W. A. Del Mar, in his communication printed on page 21 of the issue of the ELECTRIC RAILWAY JOURNAL for July 3, advocates the continuous rating to the exclusion of the nominal rating, but at the same time proposes that a special specification be prepared for every individual case in which there would appear not only the continuous rating, which represents the energy-dissipating ability of the machine, but also some expression representing the thermal capacity. It is entirely conceivable that for every situation there is an ideal relation between continuous capacity, short-time capacity and momentary capacity, and it is also possible with complete knowledge of the railway service to express these different requirements in a specification in each individual case. Railway engineers who are familiar with the industry will realize, however, that this would be practically very difficult if not impossible. The capacity of railway motors for rolling stock is determined in this way, but this is a relatively simple problem as compared to a similar method for substation apparatus because the load or duty on railway motors is not subject to a great deal of change after the initial determination. If it were possible to specify the exact railway service and exactly to match the service requirements as to continuous and overload capacity when the substations were installed, the requirements undoubtedly would be modified so radically, as the business of the railway company increased or when its lines were extended, as to make the apparatus unfit unless a large factor of safety were applied in the first instance. It would, moreover, be manifestly very undesirable to impose upon the manufacturers the great variety of converter, generator and transformer specifications that such a scheme would entail. This would tend to make all machines special and vitally affect the cost and deliveries. The attempt to use such an ideal scheme would in a short time, I believe, evolve a general rating which would probably be expressed in terms very similar to, if not identical with, the present nominal rating, which does take care of continuous capacity, short-time overload capacity and momentary maximum capacity.

While the present nominal rating may not accurately represent the duty in every particular case it does in a general way define those characteristics of the apparatus which are important and makes it possible to compare different machines in a way that represents their ability to meet the service for which they are intended.

G. H. Hill, Assistant Engineer,
Railway and Traction Department.

Girder and High T-Rail Renewals

Detroit, Mich., Aug. 7, 1915.

To the Editors:

The article on girder and high T-rail renewals in the Electric Railway Journal of July 31 was of unusual interest. One year ago my assistants and I wrote letters to the chief or maintenance engineers of steam roads with whom we were acquainted and asked for the limit of wear, or the life of rails, in their practice. On these roads the traffic and management differ widely. Extracts from the answers to our letters follow:

Union Pacific.—"On main track, on main lines, the wear on the head of 80-lb. and 90-lb. A.S.C.E. and A.R.A. open-hearth rail when released is seldom more than 1/8 in. At this time it has carried 100,000,000 tons of traffic, but there are many other factors, such as threatened breaking down of the head, excessive batter at joints and the development of defects of various kinds in increasing number as the rail gets older. On tangents, the wear on the side of the head is usually a negligible quantity."

M. K. & T.—"In main-line service using 75-lb. A.S.C.E. sections, the limit of wear is not more than 1/4 in., or about 15 per cent of head area."

Missouri Pacific.—"On main lines we allow from 4/16-in. to 5/16-in. vertical rail head-wear, by measurement directly over the inside line of the web. On branch lines, 6/16-in. wear is permitted."

Rock Island.—"Have considered that when 10 per cent of the rail, or 25 per cent to 30 per cent of the head area, is worn, the rail should be scrapped. This may not be definite but is representative."

A. T. & S. F.—"We generally replace main-line tangent A.S.C.E. rails when they are worn about 1/4 in. from flange wear."

Michigan Central.—"In most cases, main-line rail is not renewed on account of a worn head, its life being generally determined by the battering of the ends at joints. Our rail-saw foreman advises that 7/64 in. is the average amount that our 100-lb. rails, taken from the main track, are worn down when they are turned in for sawing before relaying on branch lines."

Grand Trunk.—"We permit our 70-lb. to 90-lb. rails to wear on the heads about 1/8 in. before removing them from main lines to side tracks."

In the appraisal of electric railway properties, the railographs of the actual wear of the rail head show the following:

On interurban lines in high-speed service, the wear at the flange side of the rail head is as great and is as important as the wear on the top of the rail head. Flange wear at the middle of the rail is usually greater than at the ends.

On city lines in low-speed service with standard 7-in., 91-lb. T-rail and welded joints, the wear on the head of the rail is much greater than the gage side, therefore wear on the head of the rail determines the life. In a comparison on the basis of service, a rail which is well worn may be safe for low-speed service and not safe for high-speed service.

In a comparison on the basis of height of rail, a careful examination of 7-in. and 9-in. rails with continuous joints and with about the same sectional area in the base and in the head and under the same traffic shows that the surface bend, caused by low joints, is much less in the 7-in. than in the 9-in. rail. The reason for this is not clear to the writer although it is the usual cause for renewals.

The wear of rail heads is not proportional to years of wear but to car traffic, particularly since automobiles have become common for trucking. Data are much needed on the number of million tons of ordinary double-truck car traffic which will wear out the rail head of common 7-in., 91-lb. T-rail, when laid with welded joints.

The writer, after making thousands of railographs and after long experience in track construction and renewals and in track appraisals, holds to the following:

1. Rail heads of modern 7-in., 91-lb. T-rail with welded joints, laid on broken stone or on concrete ballast, on tangent level track, can be worn to 50 per cent of the rail-head area with safety.
2. Common concrete ballast with 8 in. of concrete surrounding the ties, in paved streets, lasts twice as long as the rail.
3. Common oak ties buried in concrete, on paved streets, will last thirty to thirty-six years.
4. Economy of operation demands that advantage be taken of the above three facts in planning future renewal of rails, ballast and ties.

Edward P. Burch, Consulting Engineer.

Hand-Brake Pressures

Office of Albert S. Richey, Electric Railway Engineer

Worcester, Mass., July 29, 1915.

To the Editors:

One may be led astray in trying to compare the formulas corresponding to Figs. 3 and 1 in the instructive and valuable article by Mr. Horne on page 67 of the Electric Railway Journal for July 10, 1915, in the manner suggested in that article. The following study gives a comparison of the total available truck-rod tensions resulting from a given hand-brake rod tension applied to each of the systems illustrated by Figs. 1 and 3, respectively. In the original article the ratio between the length *h* and the length *g* in Fig. 3 is one-half the ratio of *h* to *g* in Fig. 1. The distances between the truck rods and between the hand-brake rod and the truck rods are respectively the same in both figures. Therefore, if the two systems are to be compared, it is necessary to give the lengths their true values. To accomplish this it is convenient to express the length *h* in Fig. 3 in terms of *h* in Fig. 1. This gives the true value *h*/2, which should be instead of *h* in connection

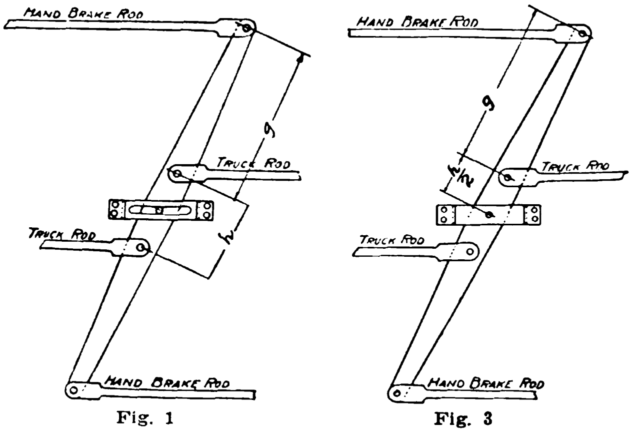


Fig. 1 Fig. 3

BRAKE RIGGINGS WITH FLOATING AND PIVOTED LEVERS RESPECTIVELY with Fig. 3. This has been indicated on the accompanying drawings reproduced from the article but with the change suggested.

If now the hand-brake rod tension X be applied to the system shown by Fig. 3, we have the equation of equilibrium

$$X\left(g+\frac{h}{2}\right)=P_f\left(\frac{h}{2}\right)+P_r\left(\frac{h}{2}\right) \qquad (1)$$

from which the sum of the tensions in the truck rods is

$$P_f+P_r=\frac{X\,(2\,g+h)}{h} \qquad (2)$$

Considering now the system shown by Fig. 1. The tension X in the hand-brake rod will give the tension in the front truck rod

$$P_f=\frac{X\,g}{h} \qquad (3)$$

and in the rear truck rod

$$P_r=\frac{X\,(g+h)}{h} \qquad (4)$$

Adding equations (3) and (4), the sum of the tensions in the front and rear truck rods is

$$P_f+P_r=\frac{X\,g}{h}+\frac{X\,(g+h)}{h} \qquad (5)$$

$$=\frac{X\,(2\,g+h)}{h} \qquad (6)$$

The right-hand members of equations (6) and (2) are equal, therefore a given tension applied to the hand-brake rod will produce the same total truck-rod tension in the systems shown by Figs. 3 and 1.

WILLIAM C. GREENOUGH.

[NOTE.—A copy of Mr. Greenough's letter was sent to Mr. Horne, who replied as below.—EDS.]

LORD MANUFACTURING COMPANY
NEW YORK, Aug. 12, 1915.

To the Editors:

I think that Mr. Greenough's points are very well taken and that perhaps my explanation of the formulas might have been more clearly set forth. However, the data contained in the article referred to are absolutely correct, but I find upon going over the entire matter that my illustrations may have been somewhat misleading, and I am sure it was the illustrations that led Mr. Greenough astray when perusing the article.

The figures illustrating the article were taken from the Lord Manufacturing Company's "Hand-Brake Bulletin" and, as the illustrations were on different pages of the bulletin, it was not noted that the dimension h shown in Figs. 1 and 3 was not made to the same scale. Assuming that the dimension h is equal for both of the types of brake rigging shown, the formulas contained in the article on hand-brake pressures will be found to be correct.

L. W. HORNE, General Manager.

Safety Commission at Portland, Ore.

Portland, Ore., has one of the most representative "safety" commissions in this country. The chairman is H. P. Coffin, an active member of the Automobile Club of Portland and an indefatigable worker for safety. The other members are as follows: B. F. Boynton, claim agent Portland Railway, Light & Power Company; John T. Moore, captain of police and chairman of the bureau of the city in charge of traffic; B. F. Dowell, chief of the fire department; Jay Stevens, fire marshal, who has personally delivered a number of lectures during the past year to the school children on safety; H. E. Thomas, city editor *Oregonian;* R. L. Withrow, *Evening Telegram;* Marshall N. Dana, *Oregon Daily Journal;* L. R. Alderman, superintendent of schools; A. S. Kirkpatrick, city traffic engineer, who has installed about 500 warning signs in various parts of the city, drawing the attention of the drivers of vehicles to conditions ahead; Guy Talbot, president Pacific Power & Light Company; F. L. Burkhalter, general superintendent at Portland of the Southern Pacific Railway and chairman of the committee of safety in transportation; A. M. Churchill, a prominent attorney, and A. H. Averill, a well-known merchant.

Southern California Committees

The southern California committees, the headquarters of which are 794 Pacific Electric Building, Los Angeles, are getting together on a plan of entertainment for the delegates of the American and Manufacturers' Associations to the convention. While no definite plans for entertainment have yet been made, the general plans have been discussed and the following organization is in charge: General chairman, J. McMillan, Pacific Electric Railway; secretary-treasurer, K. E. Van Kuran, Westinghouse Electric & Manufacturing Company, and the following committee chairmen: Finance, Paul Shoup, Pacific Electric Railway; San Diego entertainment, B. M. Warner, San Diego Electric Railway; reception, Seymour Swarts, Great Western Smelting & Refining Company; publicity, D. W. Pontius, Pacific Electric Railway; program, R. H. Husbands, Pierson-Roeding Company; club courtesies, C. A. Henderson, Los Angeles Railway; transportation, A. W. Arlin, General Electric Company; barbecue and music, L. O. Lieber, Los Angeles Railway; evening entertainment, S. I. Wailes, manufacturers' agent; Catalina trip, F. F. Small, Pacific Electric Railway, and San Francisco registration, H. H. Hale, Galena Signal Oil Company.

There is very great interest in the coming of the visitors in Los Angeles, Pasadena and San Diego. The southern California railway men are also planning for a special train to San Francisco, with provision for the comfort and convenience of the delegates from this section.

Joint Order by New York Commissions

For the first time in the history of the Public Service Commissions of New York State a joint order was adopted during the week ended Aug. 7 at a joint meeting of the two commissions. Commissioner J. Sergeant Cram acted as chairman of the commission for the First District, while Chairman Seymour Van Santvoord was presiding for the second district. The joint order provides for the removal of grade crossings and other obstructions on the lines of the New York & Harlem Railroad (New York Central) and the New York, New Haven & Hartford Railroad near 241st Street in The Bronx. It also orders a shifting of the tracks and the construction of a viaduct to carry the street, so that present dangerous and inconvenient conditions will be done away with and the full effect of recent grade-crossing improvements in Mount Vernon will be enjoyed. Mount Vernon is in the second district, and the improvements there were ordered some time ago by the second district commission, but owing to conditions in New York City, just south of the Mount Vernon line, the new highway there could not be used until a connection from the New York City end was provided, and the joint order adopted during the week is to bring about the completion of the improvement on the New York City side.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Trolley Wheels of 10-In. Diameter

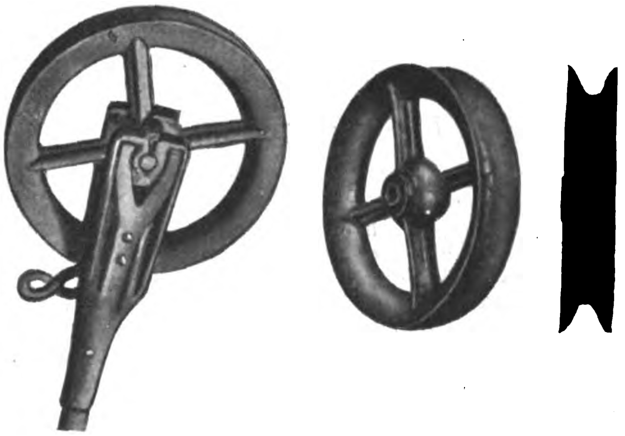
BY F. A. MILLER, SUPERINTENDENT POWER AND EQUIPMENT OAKLAND, ANTIOCH & EASTERN RAILWAY

On Sept. 3, 1913, the Oakland, Antioch & Eastern Railway commenced to operate trains between Oakland and Sacramento, Cal., a distance of 85 miles. This distance is covered in from two hours and forty-five minutes to three hours; from nine to eleven minutes of this time is taken by the train ferry, 38 miles from Oakland. Direct current at 1200 volts is used, and each motor car is equipped with four 120-hp. motors, Westinghouse Type 322-E, two trolleys of the ordinary type and a pantograph collector for operation over the lines of the San Francisco-Oakland Terminal Railways. Figs. 1 and 2 show the appearance of the cars with trolley up over the pantograph and with the trolley down and the pantograph up.

The trolley wheel first in use was the No. 4 Kalamazoo. This size gave trouble at the very start. During September and October more than 50 per cent of delays due to car defects were caused by trolley wheels and poles. While trains were crossing on the ferry the trolley wheels would be changed, and in the case of limited trains they had to be changed again at Sacramento. Even then many wheels were lost because the arcing was so severe that the pins would be burnt off. Of course, the wheels became very rough. In particular, where the old type of overhead construction was used, they would jump off the trolley wire a great deal, damaging the overhead, bending trolley poles and causing other trouble common to trolley operation.

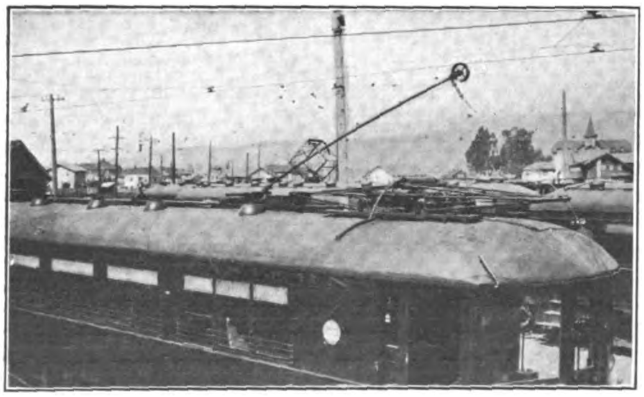
On Oct. 2, 1913, the first of the 10-in. trolley wheels was placed in service on car No. 1011. This was exactly like the No. 4 Kalamazoo except for the larger diameter. A trolley harp of the Kalamazoo type was made to take this large wheel. The same contact springs, washers, bushing and ⅝-in. pin were used as for the No. 4 wheel, so that if the large wheel should be lost on the road the small one could be installed. Up to Nov. 6, 1913, Car No. 1011 had made more than 5200 miles and it was evident from an inspection at that time that the bushing would outwear the wheel. Other wheels installed have a similar history. Since Nov. 1, 1913, trolleys and trolley poles have caused 5 per cent of the delays chargeable to car defects, and at present a trolley defect is almost unknown.

Fig. 3 shows a 10-in. wheel and harp. Figs. 4 and 5 show a 10-in. wheel which has been worn through after the car on which it had been installed had run 5600 miles. The bushing shows very little sign of wear. The wheel weighs 10½ lb. and operates on a tension of 35 lb. 21 ft. above the rail; the harp is made of manganese bronze. The price of the wheel is $3.20 f.o.b. Oakland complete with bushing, and the price of the harp is $1.20. The ordinary car oil used to lubricate the wheels seems to be of just about the right consistency for this work. The most noticeable difference in the operation of these two sizes of wheel is the absence of arcing with the larger one. The wheels have a very smooth appearance after having made the mileage stated, and present operating conditions show an average life of 6500 trolley-wheel miles.

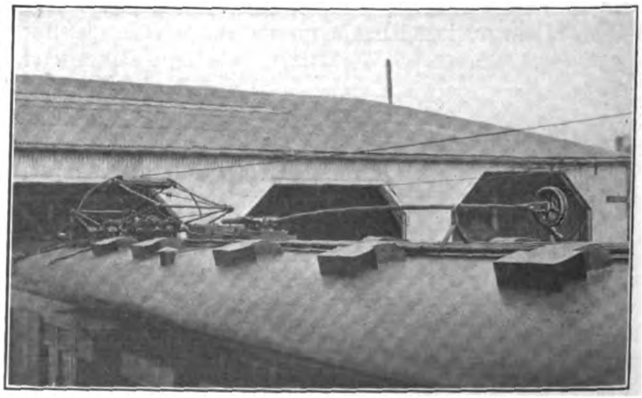


A 10-IN. TROLLEY WHEEL—FIGS. 3, 4 AND 5—THE 10-IN. WHEEL NEW AND AFTER 5600 MILES OF SERVICE

At the present time bus lines have been installed so that one trolley can supply more than one motor car, and one trolley is used on five-car trains consisting of two motor cars and three trailers on a maximum grade



A 10-IN. TROLLEY WHEEL—FIG. 1—WHEEL UP FOR O. A. & E. SERVICE AND PANTOGRAPH DOWN



A 10-IN. TROLLEY WHEEL—FIG. 2—PANTOGRAPH UP FOR KEY-ROUTE SECTION AND WHEEL DOWN of 4.6 per cent. Under these conditions one wheel collects as high as 900 amp. continuously for thirty minutes and 450 amp. continuously for one and one-half hours, there being no noticeable heating until 1200 amp. has been reached.

Train Resistance of Electric Cars at Starting

BY D. D. EWING, ASSISTANT PROFESSOR OF ELECTRICAL ENGINEERING PURDUE UNIVERSITY, LAFAYETTE, IND.

A vast amount of experimental work has been done and much has been published on the general subject of train resistance. There is not, however, a great deal of published material available on the subject of train resistance of electric cars at starting. Some interesting data on the subject have been obtained during the past year by means of the Purdue University test car which has the dimensions and equipment, as shown in Table I.

As this car is not in regular service it is, no doubt, "stiffer" than one which works the usual daily mileage, and the starting-resistance values obtained are higher than those to be ordinarily expected. The tests are to be continued on cars in regular service. The results of the present tests are of interest for comparison with running resistance for the same car and with such few starting resistance data as are available.

To determine the effect of track characteristics on starting resistance, tests were made on sections of track having different characteristics. These characteristics are tabulated in Table II.

The average super-elevation of the outer rail of track "C" was 3⅛ in. The minus sign before the per cent grade for track "C" indicates that the grade was a descending one for forward motion of the car. The alignment of the rails was good but not first class.

Two different methods of determination were used. In the first, or current-tractive effort method, the starting resistance was determined by measuring the motor current that was just sufficient to perceptibly move the car and then, from the performance curves of the motors, finding the tractive effort which corresponded with this current. The motor performance curves had been determined in a previous test. In making the starting resistance tests the motor current was increased very gradually until the car started to move, by decreasing the resistance of a water rheostat which was connected in series with the motors.

In the second method the external force applied at the drawbar, which was just sufficient to start the car, was measured by a traction dynamometer. This force was applied by means of a windlass. The dynamometer used was calibrated by checking its readings against those of an Olsen testing machine.

In both methods of determination the car was moved alternately forward and backward over the test sections of track. As the current or force was always a maximum the instant before the car started to move, in taking readings it was only necessary to note the maximum current or force exerted during the starting period.

A summary of the test data is given in Table III.

The tests were not all made on the same day, but they were made under similar weather conditions and, as may be seen in the column of Table III headed, "Air Temperature," the temperature of the air for the different tests was approximately the same.

Two different bearing conditions are recorded in Table III. In all of the tests the wheels were turned over a sufficient number of times to insure a film of lubricant between bearing materials, but in the third group of tests the car was operated for a sufficient length of time to bring the bearings up to the condition which they might be expected to have after an extended run.

Under the heading, "Total Applied Force," the minimum and maximum observed values as well as the average of the observed values are recorded. The variations in the applied force seemed to be caused largely by faults in the rail alignment, the minimum values obtaining when the car was started with one or more wheels moving down into a depression and the maximum values obtaining when the wheels were moved out of the depression. The great majority of the observations gave results which were very close to the calculated average.

The force in pounds per ton of car weight was calculated by dividing the total applied force by the weight of the car.

The figures in the last column of Table III were found by taking the arithmetical average of the averages for forward and backward motion of the car.

Comparing the results obtained by the two methods it will be noted that the results agree very well for straight level track. In general, for the data which are comparable, the dynamometer method gave slightly higher values than the current-tractive effort method. This is as it should be, since the tractive effort which was read from the motor performance curves was computed from the torque of the motor as measured at the motor shaft, and, therefore, did not include the tractive effort necessary to overcome the motor journal and brush friction.

Some measurements were made with the dynamometer with the car on track "C," but they were not very satisfactory as it was difficult to keep the direction of

TABLE I—DIMENSIONS AND EQUIPMENT OF TEST CAR

Weight	27 tons (approx.)
Length over bumpers	43 ft. 4 in.
Distance between truck centers	20 ft. 11 in.
Length of rigid wheelbase	6 ft. 1 in.
Diameter of wheels	33 in.
Trucks	Brill No. 27
Motor equipment	4 Westinghouse No. 56 motors, gear ratio, 24:58
Wheel gage	A. E. R. A. Standard

TABLE II—TRACK CHARACTERISTICS

Track Section	Ballast	Tie Spacing, In.	Average Grade, Per Cent	Average Degrees Curvature
A	Concrete	..	0.00	0.00
B	Dirt (well settled)	24	0.00	0.00
C	Cinders	20	—0.25	17.50

Weight of rail .... 60 lb.

TABLE III—SUMMARY OF DATA

Method	Number of Observations	Track Section	Direction of Motion	Air Temperature	Condition Bearings	Total Applied Force Min.	Total Applied Force Avg.	Total Applied Force Max.	Force, Pounds per Ton Min.	Force, Pounds per Ton Avg.	Force, Pounds per Ton Max.	Force, Pounds per Ton Average Both Directions
Current-tractive	47	"A"	Forward	72	Cold	660	990	1190	25	37	44	38
Current-tractive	59	"A"	Backward	72	Cold	740	1060	1340	27	39	42	
Dynamometer	106	"A"	Forward	75	Cold	840	1050	1320	31	39	49	39.5
Dynamometer	60	"A"	Backward	65	Cold	840	1070	1350	31	40	50	
Current-tractive	9	"A"	Forward	72	Warm	760	860	1000	28	32	37	36
Current-tractive	27	"A"	Backward	72	Warm	790	1100	1300	29	41	48	
Current-tractive	20	"B"	Forward	70	Cold	860	1020	1200	32	38	44	38.5
Current-tractive	20	"B"	Backward	70	Cold	940	1060	1400	35	39	52	
Dynamometer	50	"B"	Forward	70	Cold	800	1100	1480	30	41	54	40.5
Dynamometer	50	"B"	Backward	70	Cold	800	1070	1120	30	40	42	
Current-tractive	20	"C"	Forward	70	Cold	900	1200	1580	33	44	58	47
Current-tractive	20	"C"	Backward	70	Cold	1150	1340	1540	43	50	57	

the moving force parallel to the car axis and so they were not recorded in the summary. However, the data thus secured seemed to indicate that on curved track the dynamometer method gave lower values of starting force than the current-tractive effort method, although the values of starting force thus secured were, as might be expected, higher than for straight track. The fact that with driven wheels on a curve there is greater tendency for the wheels to climb the outer rail than with trailing wheels may explain the reason for the lower values of starting force secured with the dynamometer method in the curved-track tests. With the exception of the second group of dynamometer tests the results indicate that a larger starting force was required for the backward direction of car motion than for the forward direction. No satisfactory explanation was found for this difference. If the current-tractive effort method only had given such results the difference might have been attributed to the motor-brush settings. As far as the past history of the car is concerned, it has been operated as much in one direction as in the other and therefore unequal wear of the gearing as a cause for the difference seems to be out of the question.

With the bearings warm, the average value of the starting force for both directions of car motion was lower than for bearings cold, other conditions being similar. Also the average value for the starting force in the backward direction was slightly higher than for the same direction of car motion over the same track with bearings cold. The difference is not great, however, and as fewer observations were taken with the bearings warm there is greater chance of the difference being due to observational errors.

The dirt ballast of track "B" was well settled and as the ground was dry the track was almost as rigid as track "A." Both methods of determination gave slightly larger starting forces for track "B" than for track "A."

The grade of track "C" caused a greater difference between the starting forces for forward and backward car motion than was found in the other two track sections. The effect of grade averages out, however, if the average force for both directions is found. As shown in the last column this average force is 9 lb. per ton greater than was found by the current-tractive effort method for straight, level, rigid track. This difference is partly due to the curve and partly to the ballast, as the cinders used in ballasting the curve made a roadbed which was somewhat elastic. With the data in hand it is not possible to separate the above difference into its components. Comparing the average results, both directions, secured by the current-tractive effort method on tracks "B" and "C," the train resistance of the car on track "C" is 8.5 lb. per ton greater than on track "B." It is quite probable that a small part of this difference is due to the difference in ballast, but the greater part of it is due to the track curvature. If it all be charged to the account of curvature the curve resistance would be 8.5/17.5 or 0.48 lb. per ton per degree, a figure which compares favorably with that used by many engineers for curve resistance.

Of the two methods of determination employed, the current-tractive effort method was by far the most convenient in its application. On curves it gives values of starting force which are higher than those given by the dynamometer, but these values more nearly correspond with the actual conditions for motor cars while the dynamometer values would be more nearly correct for trail cars.

As was pointed out in a preceding paragraph, the force necessary to start a car is greater than that necessary to keep it moving. A number of tests showed that a force of approximately 600 lb., or 22 lb. per ton of car weight, was necessary to keep the car moving perceptibly on track "A," while Table III shows that an average force of 1060 lb. was required to start the car. Of course, part of the force necessary to start the car was required to accelerate it and its rotating parts but, as the rate of acceleration was very low, the accelerating component of the starting force was small.

Previous tests have shown that for track conditions a little below average, the train resistance of this car is about 12½ lb. per ton at 5 m.p.h., and 22.5 lb. per ton at 20 m.p.h. (Electric Railway Journal, Aug. 15, 1914, page 304). Its train resistance when just perceptibly moving is, therefore, equal to that at 20 m.p.h., approximately double that at 5 m.p.h. and one-half that which obtains at the instant of starting.

Briefly summarized the results show that for the particular car used and conditions of test:

The force necessary to start the car on straight track is about 40 lb. per ton.

The starting force is slightly less on a rigid roadbed than on an elastic one, but the difference is not great.

The curve resistance at starting is between 0.4 lb. and 0.5 lb. per ton per degree of curve, for curves of fairly long radius.

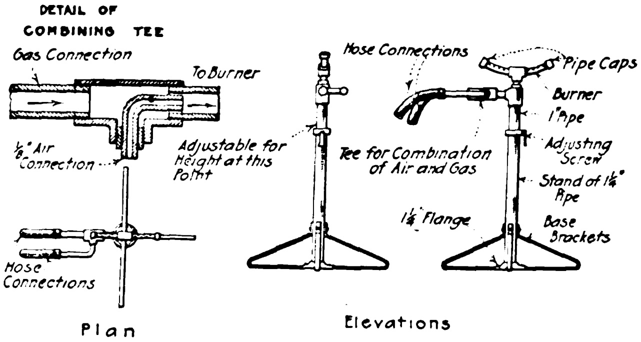
On straight level track the current-tractive effort method and dynamometer method give results which agree very well.

The tests described were carried out as thesis work by C. L. Lett and M. V. Kroft, under the writer's direction.

Gas Heater for Commutators

BY R. H. PARSONS, ELECTRICAL FOREMAN

To obtain the best results in soldering armature coil leads into the commutator bars, the latter should be preheated by means other than the soldering iron. The accompanying illustrations show a simple torch for this purpose, which operates with gas and compressed air and heats about one quarter of the commutator bars at a time. In operation it is placed underneath the commutator, thus heating one side while soldering is being done on the other. As the heater consists chiefly of pipe and pipe fittings, it can be made easily in any shop.



CONSTRUCTION OF GAS HEATER FOR COMMUTATORS

The standard is a piece of 1¼-in. pipe about 14 in. long, to the bottom of which is screwed an ordinary 1¼-in. pipe floor flange. Brackets made of ¼-in. x 1-in. flat iron are attached to the bottom of the standard extending in four directions and forming a stable base. On the top of the standard is shrunk a ¾-in. x ¾-in. ring for the purpose of holding the thread of an adjusting screw. The torch or burner consists of two pieces of ½-in. pipe bent in the arc of a circle to conform to the circumference of the commutator. It has a number of ⅛-in. holes bored in the top for the exit of gas and air, which have been combined in the combining tee.

The torch is supported on a 1-in. pipe which slides in the standard, being clamped thereto by means of a set screw. This arrangement permits of adjustment of the height of the torch.

The combining tee is the most important part of the torch, but is very simple, consisting of a ½-in. tee fitting, to the middle outlet of which is connected a ⅛-in. nipple, bushed to fit the ½-in. thread in the tee and extended well into the larger tee which forms a part of the torch support. The air nipple is made in the form of a nozzle, blowing straight ahead, in order to draw the gas along with it rather than to blow it back. This is necessary as the gas is let in at a low pressure.

The cocks which control the flow of gas and air are mounted on the wall so that there will be no more pressure than necessary on the air hose and gas hose. These must be of good material, light and flexible. In operating the torch the gas must be lighted first after having been turned on in nearly full volume. The air is then turned on and the pressure increased until all of the yellow flame disappears, as the blue flame gives the greatest heat.

The torch has been found useful not only in soldering but also in assembling and tightening commutators when repairing them. The large electrical companies recommend the application of heat for this purpose.

Dispenser for Drinking Water

BY R. W. PALMER, MANAGER CLEVELAND & ERIE RAILWAY, GIRARD, PA.

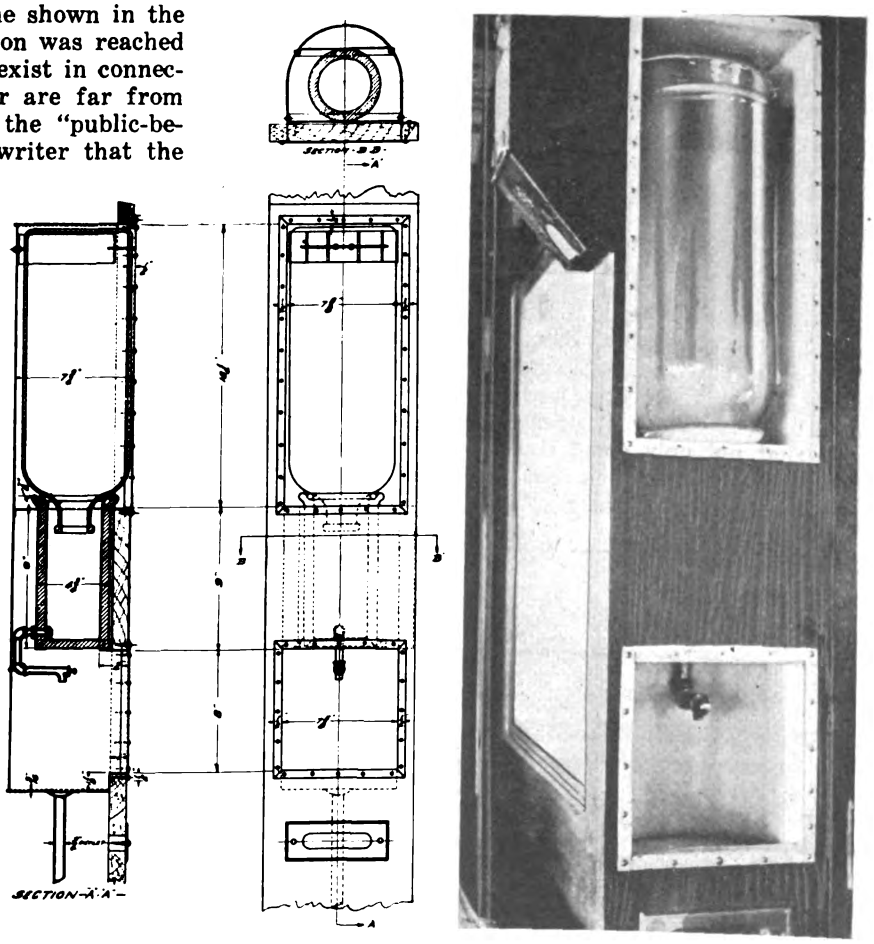
This company recently decided to equip all of its cars with water dispensers similar to the one shown in the accompanying illustrations. This decision was reached because the general conditions as they exist in connection with the supply of drinking water are far from satisfactory. In this day and age of the "public-be-pleased" policy, it has seemed to the writer that the very important duty of supplying the traveling public with pure drinking water has been overlooked by many interurban and steam railroads. Most up-to-date interurban cars are equipped with water tanks for this purpose and these tanks are filled and iced when the cars are first placed in service, but it is not surprising that the traveling public does not use the water drawn from the coolers as there is every reason to believe that it is not fit to drink. It is a common sight, where trains are being made up and there is a layover of sufficient length, to observe a car cleaner armed with a dirty hose climb to the top of a coach and after removing the cover of the water tank ram the hose, dirt and all, into the cooler to replenish the supply of "pure" drinking water which must, by law, be dispensed in sanitary drinking cups. After the necessary amount of water has been run in, the hose is removed and a second car cleaner fills the remaining space with ice as dirty as the hose.

Those who are fortunate enough to witness the tank-filling process promptly decide to forego the pleasure of quenching their thirst until the car or train has arrived at the end of the journey.

To overcome the objectionable features referred to, this company is supplying water from inverted glass bottles supported on porcelain jars. Fresh bottles of water are placed in the cars each morning and replaced during the day as required, and once each week the jars are thoroughly cleaned. The water is supplied from a spring located in the company's park and, as this water is analyzed periodically, the public can feel reasonably sure that pure water is being supplied. On account of the limited space available in the toilet rooms, which were already built in the cars, no arrangement has been made for icing, and so far the absence of ice has not been found objectionable. However, this can be taken care of by inclosing the porcelain jars in receptacles for holding ice, and such would be an ideal arrangement where a space of about 12 in. square to 13 in. square is available.

Free-cup dispensers are supplied and, since the cars were equipped with water in August, 1914, a total of 30,000 cups have been used, indicating the demand for service of this kind. The sanitary cups, including the printing on both sides, cost $1.40 per thousand, which expense is more than offset by the advertising that is obtained.

For the primary purpose of building up a freight business for the railway company, directors and officers of the company have organized a separate company to promote the sale of the spring water in Erie, Pa., and Conneaut, Ohio. On the water dispenser is some lettering stating the kind of water that is being dispensed, and this acts as an advertisement for the water company.

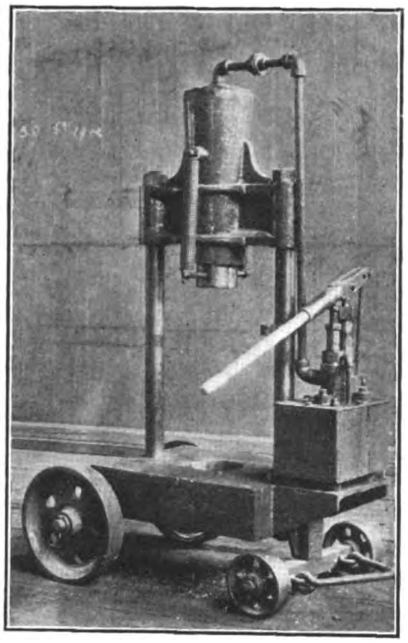


CLEVELAND & ERIE RAILWAY SANITARY WATER DISPENSER

Hydraulic Press for Bearing and Bushing Changes

BY E. L. STEPHENS, MASTER MECHANIC LOS ANGELES (CAL.) RAILWAY

A small hydraulic press of 15 tons capacity has been designed and built by the Los Angeles Railway. The press illustrated herewith was designed for pressing armature bearings in and out of the housing, and the same press is now used in various maintenance repairs, such as rebushing trolley base stands, trolley wheels, broaching of controllers and air-brake handles, and in handling many removable parts where bushings and pins are applied under pressure.



LOS ANGELES HYDRAULIC PRESS FOR BEARING AND BUSHING CHANGES

For this press there is also an attachment used for pulling and driving pinions, which has given excellent results.

United States Consul William J. Grace at Aden says that an electric railway between the various parts of Aden—Tawahi, Maala, Crater and Shaikh Othman—would undoubtedly pay well upon the comparatively small capital required for its installation. Mr. Grace says that not only could it carry passengers between these places, but also freight from Tawahi and Crater to the wharves at Maala.

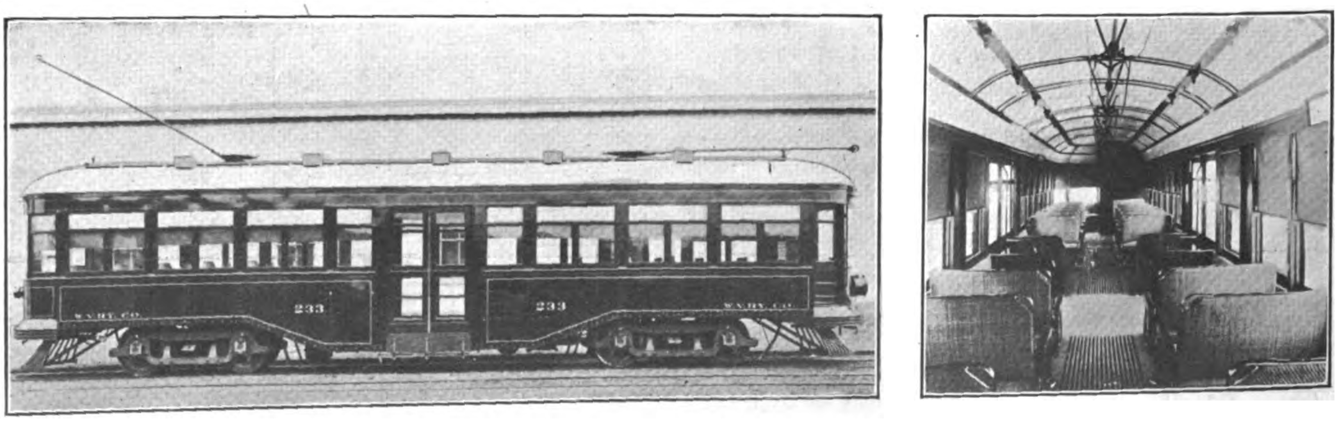
Center-Entrance Cars for Suburban Service

The Washington-Virginia Railway recently placed in service five new center-entrance, all-steel cars, for operation on the Mt. Vernon and Falls Church divisions of the system. The design was adopted because of the large tourist travel that exists on these lines in uncertain numbers during the mid-day hours the year round, as well as a heavy suburban commuter traffic during the morning and evening hours, these conditions creating a traffic problem of unusual difficulty. The company's lines extend from the business section of Washington, D. C., through the historic counties of Alexandria and Fairfax, and form the means of transportation to Mt. Vernon, the home of George Washington, which is maintained in the same state as it was when occupied by him. Service is furnished to Alexandria City, Arlington National Cemetery, Fort Myer and through Falls Church to Fairfax Court House. To the many points of historic interest en route several hundred thousand persons come each year to pay homage to past history, and it was to carry such pilgrims as these, together with the caring for the steadily increasing number of suburban commuters, that the lines were built.

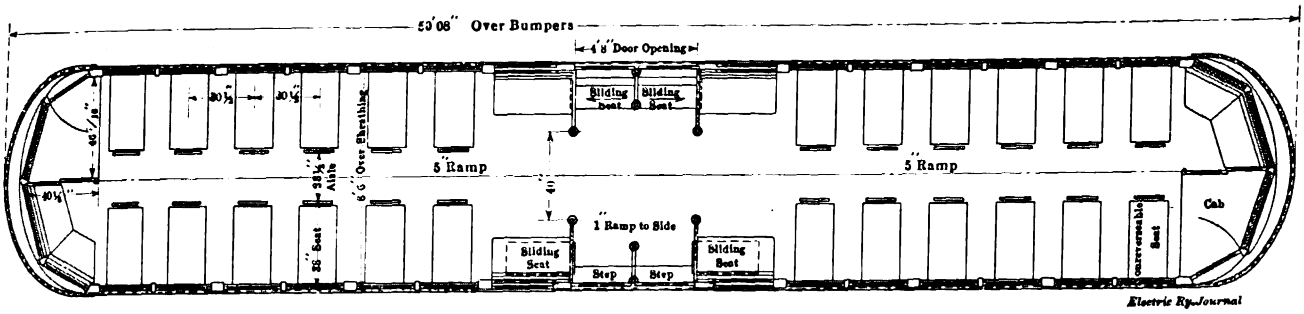
The traffic conditions encountered on one division at present necessitate the operation of two-car trains (motor and trailer), with a combined seating capacity of 104 and weighing 37 tons total, for handling the rush-hour traffic. During the mid-day and late evening, one fifty-two-seat car weighing 25 tons is insufficient and two fifty-two-seat cars are too much. The traffic encountered on the other division is handled by single forty-four-seat cars, weighing 22 tons each, which are insufficient during the rush hours, unless a large number of units are operated, but which are ample to handle the traffic during the mid-day and late evening. In order to meet all these conditions the new cars were designed with a seating capacity of sixty-four, thereby giving a flexibility of equipment suitable to the needs on both divisions and reducing the number of units that have to be operated. The use of a center entrance permitted this large seating capacity without excessive car length or weight, so that its incorporation in the design was an obvious step.

CAR BODIES

The new car bodies, which were built by the Southern Car Company, High Point, N. C., are all-steel, except the inside trim which is of cherry with a natural finish, and Agasote headlining with a white-enamel finish. A feature worthy of mention in connection with the center entrance is the elimination of the ob-



EXTERIOR AND INTERIOR VIEWS OF CENTER-ENTRANCE CAR FOR SUBURBAN SERVICE



SEATING PLAN OF WASHINGTON-VIRGINIA RAILWAY CAR

jectionable well at the center, a 5-in. longitudinal ramp in the floor permitting the use of 34-in. wheels without excessive step heights. One stationary step and one folding step are installed, making three steps to platform level, respectively 13½ in., 12½ in. and 9 in. high. The upper step leaves a 6-in. opening along the doorway, but this is entirely covered over at the blind side of the car by sliding seats, which are concealed under the longitudinal seats adjacent to the door openings when not in use. To secure observation facilities for passengers and a maximum seating capacity the motorman's cab has been made to occupy only one-half of the vestibule, the balance of the space at the ends being utilized for bulkhead seats. The seats are rattan covered and are supplied with aisle arm rests, cherry finish, and sanitary porcelain enamel grab handles. They are 38 in. wide and in general are transverse, with Hale & Kilburn reversible backs.

A table of the general dimensions of the car follows:

Length over bumpers	50 ft. 8 in.
Length over vestibule sheathing	49 ft. 4 in.
Length between bolster centers	28 ft.
Width over all	8 ft. 9 in.
Height from top of rail to top of trolley plank	12 ft. ¼ in.
Wheelbase of trucks	6 ft. 1 in.
Weight complete	58,000 lb.

The company's system of fare and ticket collection necessitated a door-opening device that would be under the conductor's control from any point within the car. This reduces to a minimum the time lost in opening and closing the doors, which are electro-pneumatically controlled but which are provided with hand control at the entrance for use in case of failure of the electric device. This control has a safety lock whereby the doors cannot be opened while the car is in motion nor can the car be started while the doors are open, the position of the door being indicated in the motorman's cab by means of signal lights.

The cars are heated by means of twenty electric heaters with thermostat control, these being distributed under the cross-seats. The passenger push-button buzzer system which operates from trolley voltage, together with the heating and door control system, was furnished by the Consolidated Car Heating Company. Ventilation is provided by ten Railway Utilities suction ventilators.

The straps for the conductor's signal bell, register rod and door control are suspended from the headlining by means of brackets run on the longitudinal center line of the car. The curtains are double covered Pantasote, fitted with Curtain Supply Company's inclosed groove-type fixtures. All windows are protected with outside-hung diamond-mesh guard and the upper sash are provided with plain pressed prism plate glass, Pullman style. The lighting layout provides for five circuits with five 23-watt Mazda lamps, each set on the perpendicular line over a seat. All auxiliary apparatus, switches and fuses are inclosed in an insulated steel cabinet that is located in the motorman's cab.

The trucks are the Standard Motor Truck Company's make, with Association standard axles and rolled-steel 34-in. wheels with 3½-in. treads and ⅞-in. flanges. The Westinghouse Air-Brake Company's type S.M.E. brake apparatus with type D.I.F. compressor, designed for continuous running, is installed, together with a pneumatic slack adjuster. The Sterling ratchet-type hand brake, with Pittsburgh drop handle, is provided.

The well-known H.L. electro-pneumatic control, providing for double-end and train operation, with a specially-designed electro-pneumatic circuit changer was supplied by the Westinghouse Electric & Manufacturing Company. The circuit changer was introduced because the cars have to run on the underground, metallic-return circuit over the streets of Washington, D. C., and on the rail or ground-return circuit outside of the city limits. Formerly, when going from one circuit to the other the change was effected by means of a double-pole, double-throw knife switch which was located in the motorman's cab, and as all current for every device on the car passed through this switch, it necessitated careful manipulation on the part of the motorman or else severe arcs would develop and cause considerable damage. All such circuits have now been removed from the platform, and a like function is performed with considerable saving in time and increased reliability by the adoption of the electro-pneumatic circuit changer, which, together with all other heavy current-circuit apparatus, is suspended from the under side of the car and is manipulated by means of low-voltage remote control from the motorman's cab. All control apparatus is interlocked to prevent current from getting to the motors before the reverser and circuit changer are in the desired positions, and the master controller has to be in the "off" position before the overload trip relay or the circuit breaker can be closed.

The motors are the No. 306-C-A, box-frame type, which embodies all of the well-known features of the Westinghouse design, including strap-wound, asbestos-ribbon, impregnated field coils, thoroughly secured against vibration by means of heavy springs. The commutator mica is undercut 3/64 in. and extends beyond the commutator bar ⅛ in. to prevent short circuits or other trouble arising from foreign matter accumulating at this point. All armature coils are reinforced at the ends of armature coil slots to prevent rupture of insulation. The gears are the Nuttall Company's BP grade with 22:62 ratio. The Standard oil and waste method of lubrication is used on all bearings. Maximum protection against lightning for all apparatus is secured by K condenser-type arresters with choke coils.

The general plan of the above cars was designed by E. W. King, general manager, and C. A. S. Sinclair, chief engineer of the Washington-Virginia Railway. The cars were built by the Southern Car Company at High Point, N. C., under the joint supervision of the railway engineer, and J. W. Rich, superintendent Washington-Virginia Railway.

A New Illuminated Warning Sign

STOP
LOOK OUT
FOR CARS
on Other Track

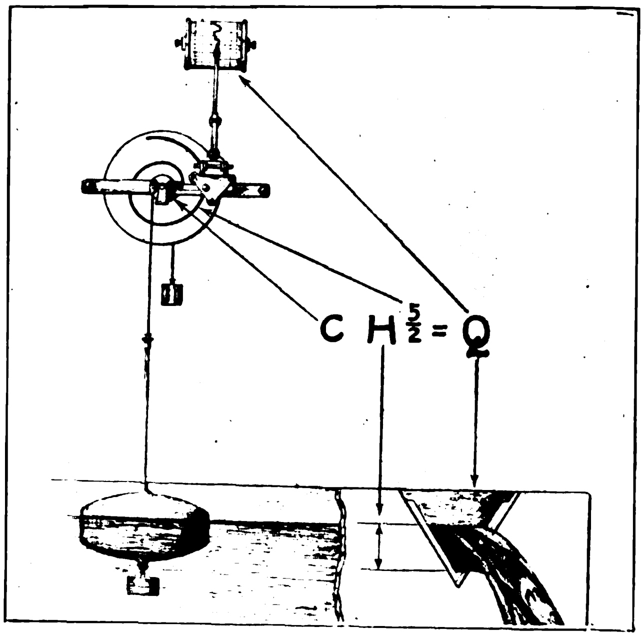
ILLUMINATED WARNING SIGN

The Pacific Electric Railway, Los Angeles, Cal., has designed and constructed an unusual type of warning sign, shown in the accompanying illustration, which is situated adjacent to a much-used station where several of the company's tracks intersect. This is one of the many safety-first signals that have been erected by this company. The sign performs effective service during the hours of the day, while throughout the night the warning, "Stop! Look out for cars on other track!" is brilliantly illuminated by light from an incandescent lamp situated in a box suspended above it, the light being reflected downward upon the sign. The wires which feed this light are run underground from the station a short distance away, and up through the hollow pipes which serve as supports for the sign.

Measuring Boiler Feed Water

The demand for an accurate continuous record of the weight of water evaporated by the boilers of every power station has led naturally to the development of the flow recorder, and one of these devices, which is illustrated herewith, is now regularly supplied with the Cochrane feed-water heater that is manufactured by the Harrison Safety Boiler Works, Philadelphia, Pa. This flow recorder makes use of the clearly-established law governing the flow of water through a V-shaped weir, practical application being made by dividing the storage tank under the feed-water heater by a diaphragm having a V-notch cut at the top. All water fed to the boilers must pass through this notch. The rate of flow through the weir is dependent upon the head of water, and the record that shows this rate is made automatically by continuous measurement of the water level in the first section of the storage tank.

The measurement is accomplished by means of a float that moves vertically in response to changes in head. This actuates the recording device, through a cam mechanism installed between the float and the recording pen to make allowance for the fact that the flow of water over a V-notch weir varies as the 5/2 power of the head. The cam is laid out as a spiral groove on a flat circular plate, and a small drum is mounted upon the cam spindle, a thin metal cable connecting this to the float and a counter-weight on another cable serving to keep the first cable taut. The cam serves for any weir, and to accommodate the recorder for use with weirs of different heights it is necessary only to substitute cable drums of the proper respective diameters.



FLOW METER FOR FEED-WATER HEATER TANKS

The cam follower is attached to the pen carriage and the pen rests lightly against a chart drum, the chart being driven uniformly by a clock. The pen, therefore, not only records the rate of flow at each instant, but the area under the pen line is proportioned to the total flow for any elapsed period. The total flow is registered directly without the use of a planimeter by an integrating attachment which consists of a counting train suspended from the pen carriage. This is driven by a small roller, which rests upon the center of an aluminum clock-driven disk. As the pen carriage is moved away from the zero position by increased flow the small roller is carried away the same distance from the center of the rotating disk, and hence is rotated at a rate corresponding to the amount of movement. The total movement of the counting train will therefore correspond to the total flow. A visible pointer moving along a large scale with open divisions is provided to make it possible to read the rate of flow from a distance.

Production of Bituminous Coal in Pennsylvania

Pennsylvania produced 147,983,294 tons of bituminous coal in 1914, according to figures made public by the United States Geological Survey, the value of the output at the mines being $159,006,296. The great economic loss due to strikes is emphasized by the statement that during the year an aggregate of more than 1,000,000 working days was lost on this account; at the same time the enormous magnitude of the Pennsylvania coal industry is shown by the further statement that this lost time represented only about 2½ per cent of the total amount of time worked. The number of men employed in the bituminous mines of the State was 184,201, the average production per man for each of the 214 days worked being 3¾ tons.

At the July meeting of the British Diesel Engine Users' Association it was decided that the allowance made for depreciation by wear and tear on Diesel engines by the revenue authorities was inadequate and that an allowance at the rate of at least 15 per cent a year should be provided. This high rate is interesting in view of the 5 per cent rate that is generally charged against steam-driven power plants.

News of Electric Railways

STRONG COMPANY PLEA FOR WAGE REDUCTION

Brief Review of Significant Statements Made by British Columbia Electric Railway in Its Plea for 15 Per Cent Reduction in Wages

At the opening session recently of the Conciliation Board meeting in the wage dispute between the British Columbia Electric Railway, Vancouver, B. C., and its employees officials of the company asserted that unless some method of reducing expenses was adopted it was only a question of time before the company would become insolvent. In his statement to the board W. G. Murrin, superintendent, proposed a general reduction of 15 per cent in all wages. He said that the alternative would be to cease altogether to give service in certain places, even though that would mean the forfeiture of the franchises. He is quoted as follows:

"Where companies are making big profits it is always urged as a ground for increasing the wage scale. We think it is a proper point to urge the opposite when we no longer are making profits. If we were making profits we probably would be quite willing to run on liberal lines and not urge the general depression. But we are now making no profits at all."

It was shown by means of figures and charts that whereas the use of the so-called tango, or eight for a quarter tickets, had increased the number of passengers on the company's cars, the receipts were slightly less and the cost of operation slightly more. For the month immediately preceding May 10 (the day on which the tango tickets were inaugurated) the passengers carried in the city totaled 1,630,000 and the receipts $79,898. For the month following the use of the tango tickets the passengers had increased to 2,051,000, but the receipts were only $79,042. In addition to the slight decrease in receipts the company ran 8000 more car-miles.

The chairman asked if the chief result of the reduction in fare to the company had been to discourage the jitney competition.

Mr. Murrin said:

"We must not blame the jitneys too much. I think the drop due to business depression has been underrated. There are probably 35,000 people who have left Vancouver, and of those who remain large numbers are out of work and do not, therefore, use the cars. The greatest drop in our traffic has been on some of the lines where there is no jitney competition, as, for instance, the interurban traffic on the Lulu Island branch."

Comparing June, 1913, with June, 1915, Mr. Murrin pointed out that in 1913 the receipts for June were $185,000, of which $50,000 had been paid in wages to car crews. In June, 1915, the receipts were only $84,000, while the wages of car crews were $41,000. Comparing the receipts and revenue for the railway system in the city Mr. Murrin is quoted as saying that it cost the company in May, 1915, 40 per cent more to operate than the receipts, and on the entire system 35 per cent more than the receipts.

The statement of capital invested and dividends for the last ten years showed that the capital had increased from $7,000,000 in 1906 to $46,000,000 in 1914. This was for all the company's enterprises, including its railway, light, gas and power properties, and represented actual cash subscribed by debenture shareholders. The largest dividend paid was in 1908, when on a capital of $9,000,000 the company had earned in the previous year 7.82 per cent. In 1913-1914, on a capital of $46,000,000, the company earned 4.69 per cent, and in 1914-1915, 2.76 per cent. Since June 30, 1915, there have been no profits; in fact, the earnings, after paying operating expenses, have not even been sufficient to pay interest on the debentures.

The Conciliation Board, before which the question of wages has been brought, is composed of A. G. McCandless, ex-president of the Board of Trade, named by the company; J. H. McVety, president of the Trades and Labor Council, named by the men's union, and Justice McDonald, of the Supreme Court, named by the Ottawa government, to act as chairman. Mr. Murrin and William Saville, chief of the payroll department, are presenting the case for the British Columbia Electric Railway, while the case of the employees is being presented by Fred A. Hoover, business agent of the Vancouver union, with Business Agent Yates, of New Westminster, and the local presidents of the unions assisting.

CALIFORNIA ENLARGES COMMISSION JURISDICTION

The public utilities act, re-enacted at the last session of the California Legislature, went into effect in that State on Aug. 7. It places under the jurisdiction of the Railroad Commission all privately-owned public utilities within municipalities in the State. Though many cites of California had by vote placed their privately-owned utilities under the control of the commission, a number, including some of the largest cities, had not. These, by constitutional amendment, now lose jurisdiction over the utilities in question, so that the fixing of rates for water, gas and electricity and other regulation of public service corporations is entirely in the hands of the Railroad Commission. The only exceptions are utilities owned by municipalities themselves. For instance, the Municipal Railway of San Francisco does not come under the jurisdiction of the commission, nor does the Owens River aqueduct and water system of Los Angeles. However, the commission has control of these in so far as they operate outside their municipal limits.

The California State Constitution was amended in 1911, so as to enlarge the power of the Railroad Commission, theretofore existing only over railroads, to control all classes of public utilities that the State Legislature should specify. This amendment took effect on March 23, 1912. The municipalities then had power under the constitution to regulate rates of all utilities, public or private, within their bounds as the constitution expressly stated that the cities should retain all existing control of these utilities unless they voted them to the Railroad Commission. The amendment which has just gone into effect was passed in November, 1914.

REVIEW OF MISSOURI COMMISSION

The Public Service Commission of the State of Missouri has issued a statement reviewing its work during the last two years. This statement, slightly condensed, follows:

"The commission, since its creation, has issued 631 formal orders, and so far the utilities have only appealed from nineteen of said orders. Not a single order of the commission has yet been set aside by the circuit courts of this State or the Supreme Court of this State. In every case passed upon by either of the courts mentioned the orders of the commission have been affirmed as reasonable and just. The Springfield light case and the Kansas City, Clay County & St. Joseph Railway commutation fare case are the only cases pending in the federal court to review orders of the commission. After two arguments in the Springfield case, the federal court has granted temporary injunctions, but only upon condition that the company put in a 10-cent rate instead of its old rate of 15 cents, which had been ordered reduced to 8 cents by the commission.

"In some instances the utility is only reviewing a certain part of the order. For instance, in the order issued by the commission against the United Railways, St. Louis, the company is accepting and obeying all of the provisions of the order with one exception. The commission ordered three extensions into new territory. These will require the company to obtain new franchises from the city. The new city charter of St. Louis provides that at the end of ten years the city may condemn the property of any utility accepting a franchise granted under the new charter. An interesting question of law is raised as to what will be the effect if the street railway accepts from the city franchises to make these three extensions under the new charter; that is, whether or not the acceptance of the franchises to make these extensions will place the old franchises of the company under the provisions of the new charter.

"The commission feels that a question of such a serious nature should be determined by the courts, so the effect of the new charter on the old franchises may be known by the company. All other provisions of the order, regulating the number of cars, sanitation, heating, etc., have been accepted by the company and will be complied with, pending the review of the above question in the courts.

"During the year the commission has adjusted more than 800 informal complaints, where no testimony was required to be taken or formal orders entered. The above figures show that the number of appeals from the orders of the commission is less than 3 per cent. This is far below the appeals taken from the judgment of the circuit courts of this State.

"The public service commission law provides a speedy and simple procedure for reviewing the orders of the commision. The commission in no way attempts to obstruct or prevent any utility from reviewing its orders if the utility is dissatisfied with the findings of the commission. The counsel to the commission does not invoke technicalities to prevent the courts from passing fairly and justly upon any order entered by the commission. In all hearings before the commission, all technicalities are disregarded and the commission attempts to get at the merits of the controversy as shown by the evidence."

NEW OHIO ROAD PERFECTING PLANS

The Cleveland & Ohio Central Electric Railway, formerly the Cleveland, Barberton, Coshocton & Zanesville Railway, has made a number of very important changes in its original plans, both as to route and mode of operation. The original route was from Cleveland to Orrville, through Barberton and Doylestown. The new route, approved by a certificate of the Secretary of State on July 19, extends from Cleveland to Wadsworth, thence by way of Rittman and Smithville to Wooster, which will be the southern terminus of the first division. The final destination of the line is Columbus.

The first division is 55 miles in length by the surveys. Most of the right-of-way and terminal rights have been secured and the contract to build and equip the first division has been awarded to the Lathrop-Shea interests, J. J. Shea, Buffalo, N. Y., being the president of the three construction companies included. The road will be equipped with gas-electric cars manufactured by the General Electric Company. It is also proposed to operate a freight service with 60-ton gas-electric locomotives. The tracks will be laid with 80-lb. rails. Limited cars will make the distance between Cleveland and Wooster in two hours. The road will enter Cleveland on West Twenty-fifth Street or Fulton Road. The contract calls for the completion of the road in 1916. The application for the change of name was made on June 5 and was granted on July 19. General offices are at 548 Rockefeller Building, Cleveland, Ohio. E. A. Norton is the general manager and has the original contract for constructing and equipping the line. George J. Hewlett is the secretary of the company.

PRIVATE LINE LIKELY TO ANTICIPATE FRANCHISE PROVISION

The franchise of the Kansas City Railways, the company which probably will succeed the street railway companies of Kansas City under reorganization, provides for the acceptance by the city of street car lines or extensions privately built, and for their operation by the street railway organization. The residents of a restricted district in a suburb have preliminary steps under way to take advantage of this franchise provision. This district extends from Broadway and Seventy-fifth Street (Seventy-seventh Street being the south city limits) westward to the State line, about half a mile. More than 150 families live in the restricted residence district in Kansas City, Mo., and a residence section is being exploited further westward, in Kansas. These people now walk half a mile to 1½ miles to the terminus of the street car line, Seventy-fifth Street and Broadway. They have subscribed $23,000 for the building of an extension westward to the State line. David M. Proctor has charge of the movement. The project has been discussed with city officials, who are said to have encouraged it. The building of the line probably will not take place soon, as it is represented that the present equipment of the street railway is needed for more urgent demands in more thickly settled and further-developed sections of the city. An argument pressed by the subscribers to the fund was that the street cars stood six minutes at the terminus, giving time for the car to run to the State line. Adjustments of service have recently reduced that idle time materially.

CONFERENCE CALLED ON VALUATION

A conference on the principles and methods of valuing public utilities, to be held under the auspices of the Utilities Bureau, will take place in Philadelphia, Pa., on Nov. 10 to 13. Among those who have already agreed to take part are Milo R. Maltbie, Clifford Thorne, John M. Eshleman, Charles A. Prouty, Prof. Edward W. Bemis, Dr. Delos F. Wilcox, Prof. John H. Gray and Max Phelan.

According to the announcement of the bureau: "The methods and principles adopted in arriving at 'fair value' will determine, if regulation persists, the rates and service standards for the patrons of all public utilities. Moreover, the question as to whether public ownership and operation will prove more advantageous than private ownership under regulations will be determined very largely by the relation that valuations bear to the cost of new plants.

"It is a matter of first importance, therefore, that all interested in the city's welfare should be informed as to the valuation, principles and methods that are being and should be adopted. It is equally important that experts and public service commissioners should not only be informed as to what the guiding principles are and should be, but also alert to the significance and future bearing of all these principles.

"It is the purpose of the Utilities Bureau to forward both of these ends through this conference on valuation. All experts on valuation, public service commissioners, public officials and interested citizens are invited to attend."

ELECTRIFICATION IN CHICAGO NOT FEASIBLE

Reported Conclusions on the General Situation Reached by Terminal Committee

Newspaper dispatches from Washington, D. C., purporting to contain authentic information taken from the forthcoming report of the smoke abatement and electrification of railway terminals committee of the Chicago Association of Commerce state that the committee has decided that the electrification of Chicago's terminals is impractical and impossible to finance. The proposed electrified zone contains 4501 miles of track of which 2819 miles are within the city limits. Some of the items of expense included in the estimates for electrification are 1600 locomotives at $40,000 each and several power houses having a total capacity of from 1,000,000 to 1,500,000 kw. and costing $100 per kilowatt. These, with the cost of the propulsion current conductors and changes in the existing property, make the total estimated cost $280,000,000. It is also said that the reports convey the impression that the fixed charges on this large investment would cripple some of the railroads beyond recovery. The report also attempts to show that electrification in Chicago is much more intricate than in other cities where such work has been done.

Another portion of the report devoted to the question of smoke pollution is said to contain the following figures: Percentage of the total fuel consumed within the city limits of Chicago: by steam locomotives, 11.9 per cent; by all other services, 88.06 per cent. Percentage of the total visibility of smoke emitted within the city limits of Chicago: by steam locomotives, 22.06 per cent; by all other services, 77.94 per cent. Percentage of total solid constituents of smoke emitted within the city limits: by steam locomotives, 7.47 per cent; by all other services, 92.53 per cent. Percentage of the total cases of combustion in smoke emitted within the city limits: by steam locomotives, 10.31 per cent; by all other services, 89.69 per cent.

From the foregoing information the committee is said to conclude that air pollution so far as it is affected by the smoke of railroad locomotives is not injurious to the city's health. While there is reason to believe that this information is correct, it was impossible to obtain a confirmation at the committee headquarters, in Chicago. The statement was made there that the first abstract of the report will be given to the press on or about Sept. 15, 1915.

TERMS OF NEW OAKLAND POWER CONTRACT

The Consolidated Electric Company and the San Francisco-Oakland Terminal Railways have filed with the Railroad Commission of California their proposed new contract under the terms of which the Consolidated Electric Company will sell electric energy to the Key Route railway. The commission will pass upon the contract.

The electric energy for the Key Route division of the San Francisco-Oakland Terminal Railways has heretofore been supplied by the United Light & Power Company. In a recent decision the commission found that the rate charged the Key Route was excessive and unreasonable.

The Consolidated Electric Company, which will be a subsidiary of the Great Western Power Company, has made arrangements to take over the properties of the United Light & Power Company, and will hereafter sell electric energy to the Key Route. Under the new contract the Consolidated Electric Company will charge the Key Route 9½ mills per kilowatt-hour. The contract will run for a period of seven and one-half years, terminating on Dec. 31, 1922. It is estimated that the new rates will save the Key Route company from $25,000 to $50,000 a year. The lease of the steam plant of the Key Route to the United Light & Power Company has been cancelled and the plant returned to the railways.

FIGURES OF LONDON MOTOR BUS COMPETITION

At a recent meeting of the London County Council the chairman of the highways committee said that there was at the present time motor-omnibus competition on 100 miles of the Council's tramway routes, the number of miles run annually by the omnibuses over the tramways being, roughly, 20,000,000, and the cost, at 8d. per mile, £666,000. The number of men employed on the omnibuses might be taken as 1500. The additional number of men which would be required on the tramways to carry the passengers now taken by the motor-omnibuses over the routes in question would be 460, and the additional number of cars 184. These figures only related to the county area and would be considerably increased if Croydon, West Ham, etc., were taken into account. Having regard to the pressing need for economy in men and money in the national interest, he would certainly bring the matter before the highways committee with a view to an early report as to the extent to which the traveling facilities provided by the Council were duplicated by private enterprise. When asked whether the highways committee had given consideration to the possibility of reducing redundant services on traffic routes in London, in co-operation with the motor-omnibus companies, with a view to releasing men and machinery for government purposes, the chairman said that the time was clearly coming when the committee would have to consider what steps should be taken to avoid wastage in money and labor in connection with the street services intended for passenger traffic.

STRIKE IN HOLYOKE

The lines of the Holyoke (Mass.) Street Railway are tied up by a strike which was declared on Aug. 8. Negotiations regarding wages and terms of service had been under discussion by L. D. Pellisier, president of the company, and representatives of the men for some time. The old contract between the company and the men expired on June 1. The principal differences were over the desire of the company to pay only for platform time and its insistence on a three-year agreement, whereas the men wanted a day rate and the contract to continue for one year only. Charles G. Wood, chairman of the State Board of Arbitration and Conciliation, attempted to bring the officers of the company and the men together, but without result. The directors of the company opposed accepting the service of the State Board as arbitrators. The representative of the executive committee of the men, on the other hand, reiterated the determination of the men to accept no other form of arbitration except that proposed by the State Board, and the men themselves subsequently rejected the proposition calling for an arbitration board consisting of three Holyoke men to whom it was proposed to submit the questions in dispute.

INTERSTATE RAILWAY SUIT HEARING

Judge E. E. Porterfield of Division 7 of the Circuit Court of Jackson County, Mo., heard on Aug. 9 and 10 arguments on a motion for rehearing of the case of the Interstate Railway against the Kansas City, Clay County & St. Joseph Railway, in which a verdict for $1,500,000 was awarded about a month ago. Judge Porterfield will receive briefs and probably give a decision in three or four weeks. The Kansas City, Clay County & St. Joseph Railway is now operating under Receivers Inghram D. Hook and J. G. L. Harvey, appointed by Judge Bird of the Circuit Court of Jackson County, as a result of an application of the Interstate.

The application for rehearing was argued by these attorneys: Senator James A. Reed and J. G. L. Harvey, for the Interstate Railway; Frank Hagerman, Henry M. Beardsley, William G. Holt, E. E. Yates, for the Kansas City, Clay County & St. Joseph Railway, the latter also being represented by Richard Saltonstall, Boston, and Charles German appearing for the estate of George Townsend. The defendants argued that the Interstate Railway had never legally secured its charter and was therefore not entitled to begin work on its line, the work being one element of the claim for damages; that the titles to right-of-way had never been perfected, claims being for such right-of-way; that failure to comply with various features of the statutes regarding railroads had resulted in vitiation of the charter and the company's privileges, so that it was in effect a "dead body" that could not be sued, and that could not sue; that the alleged "titles" to right-of-way were only options that had long ago expired; that these "titles" were largely promised privileges to cross certain lands, indefinite as to the places of location of such crossings, and therefore not enforceable; that numerous errors relating to testimony were in the record; that the instructions were inconsistent and improper; that the instructions commanded a verdict for the plaintiff if the plaintiff was found to have intended to build a line between St. Joseph and Kansas City, whereas the charter provided for a road to the Iowa line.

An eleventh-hour complication was an injunction suit brought in the federal court at St. Joseph, Mo., by Vinton Pike, an attorney of St. Joseph, Mo., in behalf of C. N. Atkinson, now of New York, formerly of St. Joseph, one of the original promoters and incorporators of the Interstate Railway. Mr. Atkinson claims to own practically all the stock of the Interstate Railway, and alleges that if anybody is to receive benefit from the verdict of $1,500,000, it is himself. He asks that the Kansas City, Clay County & St. Joseph Railway be restrained from paying the judgment until his claims are adjudicated, and that a receiver be appointed for the Interstate Railways. It is asserted by the present plaintiffs that Mr. Atkinson sold his stock in 1905. It is asserted by Mr. Atkinson's representatives that he was a contractor, an original promoter who owned all but a few shares of the stock of the Interstate Railway and that he still owns this stock. The federal court term in St. Joseph opens Sept. 20. Judge Van Valkenburgh will probably sit there then; the term in Kansas City opens Sept. 10.

Inquiries at Pittsburgh.—Inquiries have been received by the Foreign Trade Commission of Pittsburgh, Pa., for prices on an order which will aggregate many hundreds of thousands of dollars. The inquiry was from the purchasing department of the French government and includes the following items: 5835 cars and coaches; 1750 journal boxes and 80 tons of drawbars.

No Bids for Newport Franchise.—Not a bid had been received for the street railway franchise in Newport, Ky., at 11 o'clock on Aug. 2, the time set for closing the bidding by the City Commission. The franchise was passed on May 31. Commissioner McCrea opposed the condition that the successful bidder must pay $1,500 per route mile annually for the use of the streets on the ground that no company could afford such a rental, but he was overruled by the majority. Commissioner Morlidge is reported to have said that the Cincinnati, Newport & Covington Railway, which is now operating local lines, will submit a bid within a few weeks.

Dismissal of Complaint Against Seattle Asked.—Instead of filing an answer to the complaint of the Puget Sound

Traction, Light & Power Company, Seattle, Wash., made recently to the Public Service Commission, alleging that the municipality has entered into a campaign of harassment against the company, Corporation Counsel Bradford of the city of Seattle has filed a motion to dismiss the complaint of the company, on the grounds that the State Public Service Commission has no jurisdiction or power to hear or determine the matters set forth in the complaint. Until this motion has been acted upon the city of Seattle will not file its answer to the charge of the company.

Seattle Valuation Halted.—Councilman Allen Dale of Seattle, Wash., has introduced a resolution providing for a conference between members of the State Public Service Commission and the City Council, with a view to having the city aid the commission in completing a valuation of the Puget Sound Traction, Light & Power Company's properties in Seattle. The work of valuation is about three-fourths completed, according to a statement by Charles C. Reynolds, chairman of the commission, but because of a lack of funds cannot be finished until after the next session of the Legislature. Councilman Dale and other members of the Council believe that it would be to the interests of the city to extend such aid as is necessary in order to hasten the completion of the work.

Company Must Obey Terms of Franchise.—The Supreme Court of Michigan has decided in favor of the city of Monroe in its suit against the Detroit, Monroe & Toledo Short Line Railway, Detroit, Mich., to compel the latter to operate at least one car in both directions every hour. The railway took the position that jurisdiction rested with the State Railroad Commission as to the necessity of operating in accordance with the franchise provisions, but the Court held that inasmuch as the franchise was accepted before the change in the State railroad law, the railway must abide strictly by its terms. The company has been operating in accordance with the franchise in summer, but it has removed one car from the schedule in the winter months because business did not warrant its operation.

Power Contract Renewal.—The Chicago & Joliet Electric Railway, Joliet, Ill., announces the renewal of its contract for power with the Public Service Company of Northern Illinois to cover the period up to 1930. The terms of this contract have been submitted to the Illinois Public Utility Commission, which has informally approved them. Under the old contract the railway received all its energy from the Public Service Company's plant at Joliet, Ill. Under the new contract the local Joliet lines will continue to receive energy from the Joliet plant, but the interurban lines will be supplied from Blue Island, Ill. This change required the installation of a substation at Summit, Ill., a point on this company's interurban line near Chicago. The plant there is equipped with three 1000-kva. transformers.

Results with Surface Contact Systems at Lincoln, England.—The result of last year's working of the G.B. surface-contact system at Lincoln has been the slight increase in running costs per car-mile of from 5.91d. to 6.37d. The cost of repairs to the G.B. equipment, while slightly less than in the previous twelve months, is still considerably in excess of the average guarantee of £90 given by the company, and the actual average cost of repairs to the equipment has now increased to £110 per annum. The tramways manager, however, points out that evidently the £90 guarantee was on the basis that the G.B. system would be applied in many other towns, and that in consequence the cost of repair parts would be considerably less than was now actually the case when they all had to be made specially as required.

Temporary Extension of Manhattan Bridge Contract.—The present contract for the operation of surface cars on the Williamsburg Bridge, New York, will be continued until Nov. 30, by mutual understanding between Bridge Commissioner Kracke and the Bridge Operating Company. The agreement expires on Aug. 31, but to enable all the companies concerned in the controversy over the new contracts to reach some sort of a settlement the time has been extended by the Board of Estimate. Three railroad companies were concerned in the postponement of the expiration date—the Third Avenue Railway, whose offer for operation is the one now favored most by the Bridge Department; the Manhattan Bridge Three-Cent Line and the Bridge Operating Company, the stock of which is owned jointly by the Brooklyn Rapid Transit Company and the Third Avenue Railway.

Reconsider Strike Award.—Dr. John Price Jackson, commissioner of the Department of Labor and Industry of Pennsylvania, who served as umpire on the board which arbitrated the wage question between the Wilkes-Barre Railway and its employees, has notified officials of the union that he will reconvene the board of arbitration for the purpose of determining whether the board had erred in its award. The arbitrators fixed a sliding scale award, and the union officials say that the agreement gave the board no authority to fix anything but a flat rate. The union leaders contend also that the award was indefinite, and that the fixing of a profit-sharing plan was a mistake. The union leaders point out that the board sent them a communication notifying them of the award, but allege that the award has not been properly drawn up and has never been signed.

Detroit Purchase Argreement Signed by Mr. Couzens.—The proposed purchase agreement between the city of Detroit and the Detroit (Mich.) United Railway by which the city would take over the property of the company within the one-fare zone has been signed by James E. Couzens, president of the Street Railway Commission, who is now in California. It is expected that the agreement will be submitted to the Common Council on Aug. 17, at which time some committee probably will be empowered to report out a date for the special election necessary in connection with the proposition. Inasmuch as the agreement must lie on the table for thirty days it is probable the election will occur late in September or early in October. When the agreement is sent to the Council the Street Railway Commission plans to offer figures setting forth in detail the earnings of the company within the one-fare zone and showing what the city expects to get to meet its obligations after acquisition of the lines.

Bill of Particulars Filed Against New Haven.—The United States Government has filed in the Federal District Court the bill of particulars asked for by the officers and directors and counsel of the New York, New Haven & Hartford Railroad to enable them to answer the Sherman law indictment charging them with engaging in a conspiracy to monopolize interstate trade and commerce between the New England and other States. The government alleges that in each of the matters specified in the 188 paragraphs of the bill of particulars it was with the purpose and intent of aiding, abetting and carrying out the conspiracy that the defendants adopted the plans and became responsible for them. The bill of particulars, after explaining in detail the acquisition of the various railroads, electric railway and steamboat lines, states that it was the purpose of the alleged conspirators in making the combination to control each of the common carriers absorbed and to induce and compel them to engage in the combination.

Joliet Wage Demands to be Arbitrated.—The demand for an increase in the hourly wage of the employees of the Chicago & Joliet Electric Railway Company, Joliet, Ill., was refused, and the question is to be submitted to arbitration. Under the terms of the contract which expires on July 1, 1917, the employees were permitted to open the question of wages July 1, this year. Accordingly they demanded an increase in the present scale, which provides for 23 cents an hour for the first six months, 24 cents an hour the second six months, 26 cents an hour the second year, 27 cents an hour the third year, if they are promoted to the suburban division, and 30 cents an hour when they are advanced to trainmen on the interurban line between Joliet and Chicago. The employees demanded an increase to 25 cents minimum and 30 cents maximum on the city lines, a 34-cent scale on the suburban lines and a 36-cent scale on the interurban line. These demands did not include employees outside of the train service because the court had decided several years before that employees other than trainmen could not be included. There are about 150 employees in the train service. They have selected F. A. Drew, a Joliet attorney, as their representative in the arbitration. The company's representative will be selected within a short time.

Financial and Corporate

CONFIDENCE IS RETURNING

American business of to-day is like the small boy who, after he got through the woods, wondered why he had been scared. A year ago, at the outbreak of the European war, dire predictions of all sorts of certain disaster were made, but now the country is beginning to smile at its apprehension. The pessimistic view that saw only possible weaknesses and took no account of points of strength, gradually gave way to a feeling of optimism as the country at large came into a fuller recognition of its position in world commerce.

Last August the declaration of war overseas seemed to arouse here an immediate feeling of impotence and danger. There was an adverse trade balance of about half a billion dollars; it was deemed certain that our international commerce could be saved only by some desperate expedient like a government merchant marine; an extended raid on our coffers by foreign liquidation of American securities was feared; the cotton crop was doomed, and the price of capital for American use was sure to rise to prohibitive heights. Bugaboos, one and all!

The trade balance in favor of Europe settled itself. By July, 1915, the balance had shifted in favor of the United States to the extent of a net credit of $1,094,422,792, brought about by the tremendous excess of exports to Europe over imports from Europe. Instead of being a borrowing nation, this country found itself all at once the only country with capital, credit and goods to lend. We did not need any governmentally-owned marine, miraculously created out of credit, for Europe sent ships for the goods she wanted. The cotton crop financed itself with the aid of banks. Moreover, liquidation of European-held American securities on any very large scale failed to materialize, for it seems that Europeans unexpectedly believed that the United States, the only large neutral country endowed with sufficient industrial and financial powers to furnish Europe with the necessary food and goods for war consumption, was the safest place to have money invested. Last July, it is true, the bond market was overshadowed by some foreign selling to provide funds to meet the colossal British war loan, but the investment demand here was sufficiently keen to absorb such sales at comparatively small recessions in price. Nor has the price of American capital risen to prohibitive figures, notwithstanding the unexpectedly large war loans floated abroad. In June of this year New York City placed a large issue of 4½ per cent securities at a lower cost than in 1913, and fixed capital has been no harder to borrow this year than last. Interest rates on commercial paper, call money and time loans were lower in the first half of 1915 than in the corresponding period of 1914.

The foregoing are simply some of the features that mark the recovery of the United States during the last year and the recognition of its financial and economic independence. The position of this country in world commerce has become so powerful that the Bank of England has shipped more than $50,000,000 of gold and securities to these shores in order to strengthen British financial prestige in New York markets. It should not be understood, however, that the future will be one of unalloyed prosperity. With a long continuance of the war the cost of capital and of living may rise slightly, and the degree of engagement of the country's industrial capacity for foreign consumption and the sharing of profits with workmen may prove an embarrassing over-extension when war is ended, but America is now more experienced in its abiilty to adapt itself to economic conditions. The greatest encouraging general factor now is the prediction of favorable crops, with increased acreage, quantity and diversification. The National Chamber of Commerce stands sponsor for the statement that confidence in the future is growing apace with the steady progress of the crops and the slow but continual improvement in industrial affairs. Although electric railways have their own peculiar problems of rates, wages and now jitney competition that demand special solution, they and other carriers should be benefited by the present improvement, which it is believed would persist even in the face of our own entanglement in foreign troubles.

ANNUAL REPORT

Montreal Tramways

The statement of income, profit and loss of the Montreal (Que.) Tramways for the year ended June 30, 1915, follows:

Gross earnings	$6,525,231
Operating expenses	3,713,996
Net earnings	$2,811,235
Deductions:	
City percentage on earnings	$414,149
Interest on bonds and loans	825,415
Interest on debenture stock	800,000
Taxes	92,800
Total	$2,132,364
Net income	$678,871
Dividends	278,880
Surplus	$399,991
Transferred to contingent renewal account	275,000
Transferred to general surplus	$124,991

The gross earnings decreased during the year $617,572 or 8.65 per cent on account of the war and the financial depression. The operating expenses, however, decreased $492,118 or 11.70 per cent, so that the net earnings decreased only $125,454 or 4.27 per cent. The ratio of operating expenses to earnings was 56.92 per cent, compared to 58.89 per cent yast year.

The sum of $212,732 was charged to the contingent renewal account during the year, representing expenditures made for special renewals. An amount of $666,429 was expended in the maintenance of the company's properties, plant and equipment. This, together with the amount charged to renewal account, made a total expenditure on upkeep of $879,161. During the year there was expended on capital account the sum of $621,125. There was also redeemed and cancelled $144,906 of the underlying bonds of the company. The amount redeemed to date is $983,513. The total passengers carried during the year numbered 206,992,801.

LINE REORGANIZES TO ELECTRIFY

F. A. Dolph, Chicago, Ill., who purchased the property of the Cincinnati, Bluffton & Chicago Railroad, Huntington, Ind., last October, has announced the reorganization of the company under the name of the Huntington, Bluffton & Portland Railroad. When $113,000 of the purchase price of $357,000 is paid on Sept. 6, the deed for the property will be delivered to the new company. The first payment is being advanced by a three-year 6 per cent gold debenture issue limited to $150,000. When possession of the property is thus secured, the company plans to put out a first mortgage bond issue of $700,000 to refund the debentures, to pay the second and third installments on the purchase price and to provide for the electrification of the line. The organization will ultimately have $278,000 of common stock, $220,000 of preferred stock and $700,000 of bonds, a total of $1,200,000. The new company will be capitalized at only 40 per cent of the old.

The railroad is now operated as a steam line, with a present valuation of $901,964, according to the J. G. White Engineering Corporation. It has 50 miles of main line and 8 miles of branch and spur lines, operating in an ideal interurban territory. The betterments, electrification and equipment are estimated to cost about $300,000.

As noted in the ELECTRIC RAILWAY JOURNAL of June 19 and July 31, Mr. Dolph has made an offer for the Fort Wayne & Springfield Railway, Decatur, Ind., which was scheduled to be sold on Aug. 12. It is reported that this interurban line would become part of a 420-mile electric railway system reaching into Ohio and northwestern Indiana.

Aberdeen (S. D.) Railway.—The Aberdeen Railway has been sold at receiver's sale to Charles A. Howard for $21,000. It is reported that the stockholders of the old company will reorganize a new corporation sufficiently financed to operate the system. Already more than 85 per cent of them have joined in subscriptions to the new company, and it is expected that practically all of them will be so interested.

American Railways, Philadelphia, Pa.—The directors of the American Railways on Aug. 10 declared a quarterly dividend of 1 per cent on the common stock, payable on Sept. 15 to stock of record on Aug. 29. This dividend compares with a last previous dividend of 1¼ per cent. In explanation of the reduction the directors issued the following statement: "The falling off in earnings of the subsidiary companies, caused almost entirely by business depression and the rainy summer, and very little by jitney competition, made the board feel that the conservative thing to do was the reduction of the common stock dividend to a basis of 4 per cent per annum."

Ardmore (Okla.) Electric Railway.—David E. Booker has been appointed receiver for the Ardmore Electric Railway to succeed John F. Easley, resigned. The appointment of Mr. Easley was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 16.

British Columbia Electric Railway, Ltd., Vancouver, B. C.—The directors of the British Columbia Electric Railway, Ltd., state that, owing to the large decrease in the company's earnings since the first of the year, they are unable to recommend any further dividends on the preferred and the deferred ordinary shares of the company for the fiscal year ended June 30. The net earnings for the last six months of 1914 were $942,500, a decrease of $306,000. For the first six months of 1915 the decrease was $761,500, making the total decrease for the fiscal year approximately $1,068,000, or 44 per cent. The net earnings for the year ended June 30 were $1,352,500.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio.—The Cincinnati, Dayton & Toledo Traction Company recently settled two judgments, for $5,479 each, obtained in the United States District Court in December, 1914, and representing the principal and interest of debenture bonds of the subsidiary Dayton Traction Company. The company made an arrangement to pay $3,125 on each claim at once and the remainder on Dec. 24, when a rental instalment will be received from the Ohio Electric Railway. There is no connection between the above mentioned debentures and the $250,000 of first mortgage 5 per cent gold bonds, due on July 1, 1916, of the Dayton Traction Company.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky.—The stockholders of the Cincinnati, Newport & Covington Light & Traction Company have authorized the directors to agree to a plan for the refunding of the bonded indebtedness of the Union Light, Heat & Power Company proposed by the Columbia Gas & Electric Company, which leases the property from the Cincinnati company. Under the plan the present bonded indebtedness, which matures in 1918, will be refunded by a new issue of $5,000,000 of fifty-year bonds, which will be used to take up the present issue of $2,000,000 with the remainder held for betterments. The Columbia company will provide a sinking fund for the new bonds.

Cleveland & Ohio Central Electric Railway, Cleveland, Ohio.—The Cleveland, Barberton, Coshocton & Zanesville Railway on July 19 received permission to change its name to the Cleveland & Ohio Central Electric Railway. An amendment also approved at this time, changing the route of the company from that prescribed in its charter, is to go into effect on Aug. 14. The new route is described elsewhere in this issue.

Denver (Col.) Tramway.—The Denver Tramway has notified holders of the first and refunding sinking fund mortgage twenty-five-year 5 per cent gold bonds of the Denver City Tramway, its predecessor company, that it will pay to the Bankers Trust Company, New York, successor trustee, a sum equal to 1 per cent of the principal issue of the bonds and an additional sum equal to the annual interest on all the bonds, amounting in the aggregate to about $124,000, to be used for the redemption of bonds for the sinking fund. Sealed proposals for the sale of the bonds will be received by the Bankers Trust Company on or before Aug. 24 at not exceeding 105 and accrued interest.

Dominion Power & Transmision Company, Hamilton, Ont.—The talk in financial circles of the purchase of the plant of the Dominion Power & Transmission Company by the Hydro-Electric Power Commission of Ontario was alluded to on Aug. 4 in a statement by W. C. Hawkins, managing director and secretary of the company. Mr. Hawkins declared that no negotiations were on at the present time. The last deal for the sale of the property, which was with Toronto financiers, fell through. The price mentioned at the time was $16,000,000. The fact that the company is erecting a steam plant at a cost of about $2,000,000 is taken as evidence that it has no plans at present for selling out, despite the fact that civic officials here understand that as soon as the Canadian Northern Railway resumes activity in this district it will endeavor to secure the private power plant in opposition to hydro-radials.

Hagerstown & Frederick Railway, Frederick, Md.—The total operating revenues of the Hagerstown & Frederick Railway for the year ended June 30 were $424,347 as compared to $404,088 last year, an increase of $20,258. The operating expenses for 1915 were $255,373 as compared to $261,911 last year, a decrease of $6,538. The operating income for 1915 was $168,973, an increase of $26,796. Income from other sources was $9,662 in 1915 and $1,566 last year. The gross income this year was $178,636, as compared to $143,743 in 1914.

Hudson & Manhattan Railroad, New York, N. Y.—The board of directors of the Hudson & Manhattan Railroad has declared a semi-annual interest payment of 1 per cent or $10 on each $1,000 adjustment income bond for the half year ended June 30, 1915, payable on Oct. 1. This payment is at the usual rate.

Interurban Railway & Terminal Company, Cincinnati, Ohio.—The report of Charles S. Thrasher and Charles M. Leslie, receivers of the Interurban Railway & Terminal Company, to the Common Pleas Court for the nine months ended June 30, states that the receipts amounted to $180,874 and the expenses to $168,668, leaving a net income of $12,205, from which had to be deducted taxes of $9,791. There was a net surplus of $2,562 for June, but there is a deficit of $1,086 for the nine months. The car-miles operated during the nine months numbered 752,107.

Minneapolis, Anoka & Cayuna Range Railroad, Minneapolis, Minn.—The Minneapolis, Anoka & Cayuna Range Railroad, the successor of the Minneapolis & Northern Railway, on July 28 filed for the purpose of record a $2,500,000 mortgage to the American Trust Company and C. H. Bowen, Boston, as trustees. President F. H. Stevens is reported to have said that under the new mortgage $250,000 is already available and of this amount $125,000 will be applied to the purchase of the railway property from C. P. Bratnober and others, who came into possession by foreclosure liens for labor and material. The other $125,000 will be used to complete the connection with the street railway line at Marshall Street, Minneapolis, and the electrification of the service. The company expects now to complete promptly the plans for through passenger service from Anoka to the corner of Marquette Avenue and Sixth Street in Minneapolis. It is expected that electric cars of the type used for the Twin City Rapid Transit Company will be running by Sept. 1. Pending completion of the trolley construction this line is being operated by steam.

Nova Scotia Tramways & Power Company, Halifax, N. S.—The Nova Scotia Tramways & Power Company, which was incorporated in 1914 to take over the Halifax Electric Tramway, Ltd., has asked the Nova Scotia Public Utilities Commission that its capital be increased to $10,000,000 and that $5,000,000 of first mortgage thirty-year bonds be issued at 5 per cent, $3,000,000 to be presently issued, and the balance only to be issued for future requirements under restrictions against 80 per cent of expenditures on capital account. The petition also requests the board to approve $3,000,000 par value of bonds, 32,500 shares of preferred stock and 62,500 shares of ordinary or common stock, to the order of the Nova Scotia Light & Power Company. The proceeds would be devoted to the following purposes: $800,000 to the retirement of mortgages outstanding on the Halifax Electric Tramway, Ltd.; $1,227,780 to construction of works; a certain amount to provide for taking over of the various properties, and the balance for contingencies and working capital. A report by The J. G. White Company showed that within only 55 miles of Halifax on the property owned by the company there is a lake area that would give a storage of 2,000,000 cu. ft. of water, which would produce about four times the electric power at present available in Halifax. The estimated cost of works necessary for the development of this power was put at $1,534,000. The report of P. Sothman, formerly chief engineer Hydroelectric Power Commission of Ontario, confirmed this report.

Pacific Gas & Electric Company, San Francisco, Cal.—The California Railroad Commission has authorized the Pacific Gas & Electric Company to acquire the capital stock of the West Sacramento Electric Company, now owned by George F. Detrick and H. W. Furlong. Messrs. Detrick and Furlong have agreed to sell all their interests to the Pacific Gas & Electric Company, which pays $27,000 to the former and $3,000 to the latter, they to invest the money in preferred stock of the purchasing company at $82.50 a share. The Pacific Gas & Electric Company already owns and operates the electric railway lines in the territory served by the purchased company.

Port Jervis (N. Y.) Traction Company.—A Philadelphia syndicate headed by Edward E. Mandeville has formed a merger of the public utility companies, including the Port Jervis Traction Company and the Port Jervis Light & Power Company, in the territory around Port Jervis. The new company will be known as the Orange County Public Service Company.

Richmond & Rappahannock River Railway, Richmond, Va.—The Richmond & Rappahannock River Railway has filed a mortgage to secure $500,000 of first mortgage bonds, due in 1935. This line operates between Richmond and Pamunkey, 7.5 miles by electricity and 17.9 by steam. It is expected that the line will be extended to Urbana in the near future.

San Joaquin Light & Power Corporation, Bakersfield, Cal.—The California Railroad Commission has issued an order authorizing the San Joaquin Light & Power Corporation to pledge as collateral security $205,000 of first and refunding mortgage forty-year Series "C" 6 per cent bonds for an issue of promissory notes not exceeding $153,750. The notes are to be in such ratio that their face value shall not be less than 75 per cent of the face value of the pledged bonds, and are to mature on or before two years and to bear interest of not more than 8 per cent, April 1, 1916, being the limit of issuance.

Toledo, Ann Arbor & Jackson Railroad, Toledo, Ohio.—On Aug. 5 the Ohio Public Utilities Commission authorized this company to sell $523,000 of 5 per cent bonds at 85 to secure funds to complete its line to Dundee, Mich. The company was authorized in June, 1913, to sell $850,000 of bonds at 80 for the purpose of extending the road to Ann Arbor, but according to report was never able to sell them.

Underground Electric Railways, Ltd., London, England.—The directors of the Underground Electric Railways, Ltd., have declared a distribution of interest at the rate of 6 per cent per annum (free of income tax) on the non-cumulative income bonds of 1948 for the half year ended June 30, payable on Sept. 1. This is the rate paid for the last three years. Among the controlled companies the Metropolitan District Railway has declared a dividend at the rate of 3 per cent per annum (less income tax) on the second preferred stock for the half year ended June 30, and the London Electric Railway at the rate of 1 per cent per annum (less income tax) on ordinary shares, interim, these payments being the same as those of last year. The London General Omnibus Company has declared a dividend at the rate of 6 per cent (free of income tax) on ordinary shares, interim, as compared to 8 per cent in 1914. The City & South London Railway has declared an interim dividend at the rate of 5 per cent on the outstanding preferred stocks of 1891, 1896, 1901 and 1903, while the Central London Railway has declared an interim payment at the rate of 3 per cent per annum on the ordinary stock and at the rate of 4 per cent per annum on the preferred stock.

United Light & Railways Company, Grand Rapids, Mich.—Under the offer noted in the ELECTRIC RAILWAY JOURNAL of June 12, holders of $1,617,300 of 3 per cent second preferred stock of the United Light & Railways Company had up to July 17 converted their holdings into 6 per cent cumulative first preferred stock. The second preferred stock outstanding before the exchange privilege was offered amounted to $2,108,700. The privilege extends until Aug. 15, when the company may exercise the right to designate whether the stock still outstanding shall be converted into first preferred stock or common stock.

West End Street Railway, Boston, Mass.—F. S. Moseley & Company, Boston, are offering, to yield 4½ per cent, the unsold portion of the two and three-year maturities of the $4,743,000 of securities recently sold to them by the West End Street Railway, as noted in the ELECTRIC RAILWAY JOURNAL of July 31. These one, two and three-year 5 per cent obligations are known as "serial debenture bonds," dated Aug. 2, 1915, and maturing $1,581,000 each on Aug. 1, 1916 to 1918, inclusive, without option of prior redemption.

DIVIDENDS DECLARED

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Massachusetts Consolidated Railways, Greenfield, Mass., quarterly, 1⅝ per cent, preferred.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, original preferred and first preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.					
1m., June, '15	$60,968	*$34,019	$26,949	$19,160	$7,789
12 " " '14	71,595	*41,215	30,380	17,567	12,813
12 " " '15	780,504	*375,107	405,397	211,518	193,879
12 " " '14	782,952	*365,001	417,951	208,791	209,160
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.					
1m., June, '15	$87,846	*$60,831	$27,015	$30,371	†$3,356
1 " " '14	91,477	*58,434	33,043	28,190	4,853
12 " " '15	1,042,100	*707,321	334,779	349,613	†14,834
12 " " '14	1,162,036	*707,128	454,908	320,791	134,117
GRAND RAPIDS (MICH.) RAILWAY					
1m., June, '15	$92,411	*$70,399	$22,012	$13,961	$8,051
1 " " '14	109,413	*70,651	38,762	13,361	25,401
12 " " '15	1,226,269	*834,703	391,566	163,156	228,410
12 " " '14	1,297,010	*837,793	459,217	157,880	301,337
JACKSONVILLE (FLA.) TRACTION COMPANY					
1m., May, '15	$53,337	*$36,881	$16,456	$15,323	$1,133
1 " " '14	76,647	*44,571	32,076	11,523	20,553
12 " " '15	654,297	*452,217	202,080	151,492	50,588
12 " " '14	727,975	*459,214	268,761	140,074	128,687
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.					
1m., June, '15	$67,446	*$40,379	$27,067	$16,011	$11,056
1 " " '14	62,002	*40,257	21,745	15,579	6,166
12 " " '15	703,897	*459,876	244,021	187,543	56,478
12 " " '14	677,723	*458,174	219,549	184,834	34,715
NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.					
1m., June, '15	$165,511	*$102,583	$62,928	$42,101	$20,827
1 " " '14	184,538	*109,548	74,990	41,337	33,653
12 " " '15	2,180,942	*1,282,296	898,646	492,793	405,853
12 " " '14	2,242,003	*1,405,496	836,507	486,516	349,991
NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.					
1m., May, '15	$134,790	*$86,142	$48,648	$24,533	$24,115
1 " " '14	178,918	*98,380	80,538	23,179	57,359
12 " " '15	1,866,673	*1,065,484	801,189	289,689	511,500
12 " " '14	2,154,828	*1,207,578	947,250	270,247	677,003
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.					
1m., May, '15	$21,927	*$14,334	$7,593	$6,891	$702
1 " " '14	24,552	*15,571	8,981	6,856	2,125
12 " " '15	295,356	*188,897	106,459	80,943	25,516
12 " " '14	307,163	*195,688	111,475	80,567	30,908
PORTLAND (ME.) RAILROAD					
1m., June, '15	$90,039	*$56,808	$33,231	$21,160	$12,071
1 " " '14	93,108	*55,584	37,524	20,143	17,381
12 " " '15	1,043,735	*647,596	396,139	261,730	134,409
12 " " '14	1,046,674	*642,867	403,807	247,561	156,246
TAMPA (FLA.) ELECTRIC COMPANY					
1m., May, '15	$81,422	*$42,851	$38,571	$3,630	$34,941
1 " " '14	83,719	*44,264	39,455	3,698	35,757
12 " " '15	991,481	*509,481	482,000	43,933	438,067
12 " " '14	921,648	*511,968	409,680	46,588	363,092

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*Includes taxes. †Deficit.

Traffic and Transportation

JITNEY JOTTINGS

New York and California Commissions Have Jitney Regulatory Problems Before Them—Further Legislative Developments

The Second District Public Service Commission of New York has taken the first steps toward the enforcement of the so-called jitney bus law passed at the last session of the Legislature by applying through its counsel to Supreme Court Justice Hasbrouck at Kingston for a permanent injunction restraining James E. Adams, Corning, and Elmer G. Booth, Rochester, from operating jitney lines without the consent of the local authorities or a certificate of public convenience and necessity from the commission. Justice Hasbrouck will hear the petition on Sept. 4 in Kingston. Other proceedings will also be brought against other alleged violators of the statute. This statute requires all bus lines, motor vehicles, stage routes, any vehicle carrying passengers for 15 cents or less, or any vehicle operating in competition with a common carrier required to procure the consent of the local authorities, to obtain a certificate of public convenience and necessity from the Public Service Commission before operating in the streets of any of the cities of the State. Hitherto the commission has considered the enforcement of this law in the hands of the local authorities and has withheld action on its own part until the local authorities had been afforded time to act. Recently, however, a number of complaints have been lodged with the commission against so-called jitney bus lines apparently operating without authority. At the last session of the commission its counsel was directed to take court action against the alleged violators mentioned. Complaints also have been received against other alleged violators and these will be handled either in the regular way before the commission, or before the courts. The statute in specific terms makes all persons and corporations engaging in the jitney business, as defined, common carriers and subject to all provisions of law as such. The present applications to the Supreme Court are under Section 57 of the public service commission law which authorizes the commission to apply to the court for injunctions to restrain violations of this law.

The United Railroads, San Francisco, Cal., has filed with the Railroad Commission a complaint against the Peninsula Rapid Transit Company, asking that the commission require the Peninsula Company to file with the commission a schedule of rates, fares, charges and classifications, as prescribed by the public utilities act; that the company obtain from the Railroad Commission a certificate of convenience and necessity, as required by that act; and that the company otherwise fully comply with the provisions of the public utilities act. The complaint says that the Peninsula Rapid Transit Company is a California corporation, authorized as a common carrier of passengers for hire, particularly in San Francisco and San Mateo Counties; that the company carries all persons offering for hire from San Francisco through Daly City, Millbrae, Easton, Burlingham to San Mateo and return; that the company operates automobile buses with a capacity of twenty each, on regular schedules, and that for those reasons it is a common carrier and should be under the jurisdiction of the Railroad Commission, but that it has not secured from the city and county of San Francisco, nor from San Mateo County, nor from the governing bodies of the other cities whose streets it uses, authority as a common carrier.

The United Railroads' complaint says that it has franchises and authorization as a common carrier, and has invested many hundreds of thousands of dollars in securing its right-of-way and building and maintaining its suburban railroad line between San Mateo and San Francisco, and was operating this long before the other line began. The complaint says further that the railroad company gives an adequate service at all times between these points, and that there is no necessity for the establishment of the service of the Peninsula Rapid Transit Company.

Action has been brought against the Wichita Transportation Company, a recently established auto-truck service between San Diego, Cal., and the Imperial Valley, by the Western Association of Short Line Railroads. This association has asked the California Railroad Commission to declare all auto lines running on regular schedules and having fixed passenger and freight rates public utilities and to take jurisdiction in their operation and financing. This is the first time since the start of the jitney craze that concerted action on the part of steam railroads has been taken.

The gross receipts of the Puget Sound Traction, Light & Power Company, Seattle, Wash., have fallen off $360,000 in the past six months. Since the city gets 2 per cent of this gross a reduction in the city revenues form this source has been at the rate of $14,200 per year. The decrease is attributed largely to the jitneys. During March between 600 and 700 jitneys were in operation in Seattle. At the height of their prosperity these machines are estimated to have carried 45,700 people a day, cutting heavily into the off-peak load, which affected the company much more seriously than inroads during peak traffic. There are now only about 350 jitneys operating and they cut into the off-peak load very little, as their traffic is chiefly during rush hours. There are now ten to fifteen applications a week for new jitney driver licenses, but cars are deserting the business faster than new ones enter it. The business of the company is now about 14 per cent below normal. The average for the last six months was 19 per cent below normal and it has been at times as far as 25 per cent below normal. As stated previously in the ELECTRIC RAILWAY JOURNAL the company is considering a light-weight one or two-man car to compete with the jitneys. The company has put competitive jitneys in Everett and has driven the independent jitneys out of business there to a large extent.

F. T. Griffith, president, and F. I. Fuller, vice-president, of the Portland Railway, Light & Power Company, Portland, Ore., are concerned with the recent complication of the jitney problem resulting from the act of the Supreme Court on July 26 in invalidating the jitney ordinance. The jitneys in Portland are not now required to carry surety bonds and the company is in just about the same position as it was when the jitneys arrived. Both Mr. Fuller and Mr. Griffith look upon the jitneys as more or less of a permanent institution. While they have not yet definitely settled upon a solution to the problem, they are looking toward lighter cars and quicker service.

The jitney regulatory ordinance passed in Scranton, Pa., to go into effect on Sept. 1, provides briefly that automobiles in public service in that city shall secure a license from the director of public safety; that the names of the owners and operators shall be filed with the city, together with facts about the cars, such as name, seating capacity, etc.; that the routes shall be specified; that a bond in the sum of $2,500 shall be filed for each vehicle having a seating capacity of not more than five passengers, including the driver, with $500 additional for each permanent seat in excess of the seating capacity of five; that any person owning more than one car shall be permitted to substitute a general bond covering all of his cars, such bond to be in the sum of $25,000 for not more than ten vehicles, for $50,000 for not more than twenty-five vehicles and for $100,000 for more than twenty-five vehicles. The license fee for each vehicle seating five people or less is placed at $10, for each vehicle seating six or seven people $15 and for each vehicle seating more than seven people $25. The carrying capacity of vehicles is fixed at the seating capacity and it is made unlawful to charge more for transportation along and over the route designated than the amount set forth in the license.

After eliminating the provisions calling for the payment of license fees, the Board of Works of Newark, N. J., on Aug. 5 passed the jitney ordinance on first reading. The sections relating to fees were taken out on the advice of City Counsel Frazer. The finance committee of the Common Council had agreed at a recent conference with a Board of Works committee to the fees that should be paid, placing them at $50 for a car carrying five passengers or less and ranging as high as $125 for cars carrying more than twenty passengers. The jitney owners and operators will be heard in opposition to the measure on Aug. 17.

The "owl" and "anywhere" jitneys operating in San Francisco have been excluded from the jitney bus class by order of the San Francisco Police Commission. Hereafter jitney drivers must keep to specified routes and limit charges to 5 cents and 10 cents. Otherwise they come under the livery class, must have stands and load at certain points, with charges regulated by ordinance.

The local branch of the street railway employees' union at Portsmouth, Ohio, asked the City Council on Aug. 5 to pass an ordinance regulating jitney buses and jitney-bus traffic in that city. The men ask that the ordinance contain provisions for a license fee of $80 annually, fixed routes and terminals, the number of passengers to be carried to be limited to the rated seating capacity of the vehicles, the deposit of $5,000 by each owner as a protection for passengers who may be injured, and such other measures as govern the operation of utilities.

The City Council of Temple, Tex., has formally adopted the jitney ordinance which it has had under consideration for the past two months. The ordinance becomes effective immediately after publication. The new law follows that of Fort Worth rather closely.

Judge Brumm at Pottsville, Pa., has refused the application of the jitney owners of Pottsville for a permanent injunction against Pottsville city officials, preventing the enforcement of an ordinance regulating the jitneys, but said that he would permit the temporary injunction against the city to stand until September, to give the jitney owners and city officials a chance to agree on a compromise.

Alderman Dodd of the City Council of New Westminster, B. C., has introduced a jitney regulation by-law containing the following provisions: Before a license is issued, the inspector shall satisfy himself that the auto to be used is in good order; driver must be twenty-one years of age, speak English, be physically and mentally fit to operate a car, and skilled therein, and not be addicted to the use of intoxicants or drugs; passengers must not be carried in excess of the seating capacity of the machine; passengers must not be permitted to board or alight from a car, nor may the driver collect fares or give change, while the car is in motion; Council may from time to time designate routes, say where cars will be allowed to stand; drivers must not solicit passengers on business streets; no Asiatic or negro may be allowed to enter a car in which there are already white passengers; every jitney must put up a bond, the amount of which has not been determined.

Enforcement of the jitney bus ordinance in Flint, Mich., in which city the Detroit United Railway operates a city service, has been held up by the Circuit Court issuing an order for the city to show cause why a permanent injunction should not be made restraining the municipality from enforcing the provisions of the ordinance.

George K. Weeks, president of the San Francisco-Oakland Terminal Railways, was quoted recently as follows in regard to the jitney decrease in Oakland: "At the end of last week (July 16) there were 177 jitneys of all sorts plying in Oakland and the transbay cities, in comparison with more than 300 when the craze was at its height. The fact that the Superior Court has refused the injunction demanded by the jitney bus owners, and that consequently the ordinance is to be strictly enforced, should result in diminishing the number very materially. At the same time it must be remembered that so long as jitneys were untaxed and unlicensed they operated in an irregular way, chiefly during the hours of the greatest pressure of travel. The licensed cars, on the other hand, ply on a more or less regular schedule. I am convinced from a close study of the problem that if the gasoline car is to become a permanent factor in the transportation business, its proper field of usefulness will be the interurban run and not in congested city streets. Were the jitneys taxed, as are the street cars, and made to comply with paving requirements, they would not last twenty-four hours. They exist only by virtue of legislative discrimination."

An ordinance before the Council at Akron, Ohio, prescribes severe conditions for the jitney bus operators and taxicabs. Jitney bus drivers must be men of good character, must not smoke while carrying passengers, and must not carry more than the rated seating capacity of their machines. They must specify the routes they wish to traverse, and must cover them each trip. The license fee has not been determined. The fare charged by taxicabs is limited to 25 cents a mile by the ordinance.

TRANSFER ORDER IN ALBANY

On the complaint of the Civic League of Albany against the United Traction Company and the Schenectady Railway, the Public Service Commission for the Second District of New York has made an order directing that when local passengers are accepted on the west-bound cars of the Schenectady Railway a transfer must be issued on request for any of the intersecting lines of the United Traction Company between State Street and Broadway and Watervliet Avenue inclusive, such transfers to be issued in all respects in accordance with the rules of the United Traction Company. The traction company is directed to accept these transfers.

One of the clauses of the commission's order in the general case against the United Traction Company, made on Dec. 11, 1914, provided that the Schenectady Railway must give transfers to passengers boarding its east-bound cars within the city limits, and that order is now being complied with. The present order rounds out the transfer situation between the two companies so far as it relates to local traffic. The latest order of the commission says:

"It is not the regular practice of the Schenectady Railway to pick up west-bound local passengers destined to points east of Watervliet Avenue, but only passengers bound beyond the limits of the city of Albany. However, it does carry such passengers from time to time, but they do not receive a transfer to the lines of the traction company. If it was the regular practice to carry such passengers it would, of course, be very detrimental to the through service. * * * The commission is of the opinion that if the Schenectady Railway voluntarily carries west-bound local passengers it should give to any such passenger who may request the same a transfer good on the connecting lines of the traction company. * * *"

SAFETY-FIRST SINS OF OMISSION BY EMPLOYEES

An interesting safety-first suggestion comes from A. D. Garriott, foreman of a carhouse of the Louisville (Ky.) Railway Company. Mr. Garriott says:

"If the principle of safety was as readily followed as is the sometimes careless indifference to our rules and regulations, we would all soon be perfect and avoidable accidents would be a thing of the past. But it is much easier for us to see the carelessness of the public or of some one else than it is to hold ourselves from violating some of the principles of safety and of the company's rules. How often we see men who advocate safety first and make suggestions along this line, and men who are really interested in the safety movement, do things on a sudden impulse of the moment that are a bad example to anyone who may see them. We see a car approach a carhouse or some place that is not a regular stop, the motorman catching the front of the car while it is in motion. We see employees run after cars or climb over the rear dash or ride the coupling to the next stop. Again we see motormen stand on the lifeguard and reach through the front vestibule and move the car. We see carhouse employees stand in passageways where cars might split switches and cause serious accidents. We could also show where track men and men in all departments of the company violate the principle of safety. Now we cannot say that these things are done deliberately, or simply because we do not think, or to save a few steps or a little time. I think if every man would make a resolution to set an example of safety, much good could be accomplished. Don't look for some defect in equipment or something some one else should have done, but ask yourself the question: 'What am I doing to prevent accidents and am I practising safety first?'"

REFUSAL TO EXTEND FARE LIMIT

The Connecticut Company, New Haven, Conn., has refused the request of residents of Prospect Beach who requested the company to extend the fare limit on its line out of New Haven from Cox's to Sea Bluff. In its reply the company said in part:

"In regard to the fare limit, we are obliged to advise you that we cannot under present conditions extend this beyond its present location at Cox's. This seems to us the logical place for the fare limit, and when the length of ride for 5 cents is considered from Church and Chapel Streets, New Haven, to Cox's, a distance of 4.82 miles, with transfer privileges of anywhere from 2 to 9 miles further, Lighthouse Point, a distance of 9.60 miles; Short Beach road, 9.90 miles; Dixwell Avenue terminus, 9.15 miles; Barnes and Quinnipiac Avenue, 0.20 mile; you certainly must agree with us that our rate is more than reasonable.

"As you are well aware, the last decade has seen a tremendous increase in the cost of material of every description, labor charges are much higher, in fact, every item entering into the operation of street railways has made this business more expensive. On the other hand, our fares have remained the same, and while the purchasing power of the nickel to us has vastly decreased, we are, in many cases, giving a very much longer ride for the same money.

"In addition to the increase in operating expenses, the street railways at the present time are laboring under extremely heavy burdens imposed by State and municipal governments, expensive permanent pavements, oiling and sprinkling of streets, maintenance of highway bridges; these charges, combined with the recent unrestricted competition of the jitney which is extremely serious, inasmuch as it is taking from us our profitable short-haul passengers, all tend to make street railway returns less profitable each year."

Licenses Trolley Cars.—At the meeting of the Commissioners of Hoboken, N. J., on Aug. 4, an ordinance was adopted under which every car of the Public Service Railway, Newark, entering Hoboken must have a license, for which it must pay $25.

Cash and Transfer Registers in Springfield.—The new system for the use of cash and transfer registers on all cars on the Springfield (Mass.) Street Railway went into effect on Aug. 1. Under the new system a minute report of the various details of operation is required. Passes are no longer issued to employees or others, but tickets have been issued to replace them. This facilitates the accounting. Each car is equipped with two registers. The one is used to record cash fares, while the other records transfers and tickets received.

Westchester's Punctuality Record Better Than Ever.—In connection with the details of the New York, Westchester & Boston Railway's remarkable punctuality record for the last twelve months ending June 30, 1915, which were published in the ELECTRIC RAILWAY JOURNAL of July 31, additional figures now availiable for the month of July show that this railway's average for promptness is still on the increase in spite of the narrow margin possible for improvement. Out of 6536 trains run during July 6505 trains, or 99.5 per cent, were on time, as compared with this company's average for the last twelve months of 99.2 per cent.

Enforcing the "Jim Crow" Law.—The State law requiring the separation of whites and blacks in railway trains is being strictly enforced by the Louisville & Interurban Railway, Louisville, Ky. Since cards have been posted stating the terms of the State law there has been little difficulty in obtaining compliance with the measure, although this is sometimes grudgingly given. The compartment in each car reserved for the negro traffic is not as commodious as that for the whites, although it is not as frequently filled. On Sundays, however, there are sometimes more colored passengers than can be accommodated in their compartment regularly and easily and delays while they pass along the aisles are unavoidable.

Express Service Between Springfield, Worcester and Providence.—The electric express service of the Springfield (Mass.) Street Railway was extended on Aug. 2, when special service between Springfield and Providence by way of Worcester was begun. The decision of the officials to run a special car making the through trip in twenty-two hours was made in response to a demand which has been most pronounced from Providence shippers. Starting from Springfield over the lines of the Springfield Street Railway, the new express car travels over the tracks of five separate railway systems. From Worcester to Uxbridge the route is over the lines of the Worcester Consolidated Street Railway. From Uxbridge to Milford the route is over the Milford & Uxbridge Street Railway, and from Milford to North Attleboro via the Milford, Attleboro & Woonsocket Street Railway. From North Attleboro to Providence the trip is over the Interstate Consolidated Street Railway and the lines of the Rhode Island Company.

St. Louis Skip-Stops Allowed.—The Missouri Public Service Commission has made an order authorizing the United Railways, St. Louis, to abolish 102 stops for three months. Sixty-two of the stops to be eliminated in the test are on the Broadway line. The remainder are on the Olive-University, Olive-Delmar and Olive-Maryland lines. The opinion holds that the United Railways in asking that 770 stops on various lines be eliminated did not submit sufficient proof that the changes sought would not inconvenience the public or result in greater safety to passengers and pedestrians. The experiment eliminating the 102 stops will begin on Sept. 1. The order states that if at the expiration of the test period it is determined that better service can be rendered to the majority of passengers on those lines, the United Railways will be permitted to petition the proper municipal authorities of St. Louis for the necessary modification of regulations to eliminate all useless stops.

P. R. T. to Carry Postmen for $24,000 a Year.—The Philadelphia (Pa.) Rapid Transit Company and the United States government have entered into a new contract dating from July 1, 1915, and extending to June 30, 1916, under which letter carriers will be carried at an annual rate of $24,000, an increase of $10,000 over the contract executed five years ago by the government with the company at a rate of $14,000 a year. When the agreement expired on July 1, the company refused to renew it on the ground that the rate was too low. An investigation by the company is said to have shown that it would collect $95,000 a year in fares from carriers at a 5-cent cash charge. In declining to renew the agreement the company is said to have suggested $71,000 per annum as compensation under a new contract. The postal officials demurred and it was finally agreed to grant an extension of the old agreement for one month, or until Aug. 1, to allow a further investigation in an effort to reach an adjustment of the dispute which would be acceptable to both sides.

Favorable Brooklyn Accident Record.—On the subject of safety the Brooklyn (N. Y.) Rapid Transit Company's activities have been numerous and far-reaching. According to the annual report of the company the various departmental organizations were completed during the autumn of 1914. In each of the last six months boarding and alighting accidents, car collisions, accidents in which cars strike persons, and car and vehicle collisions, make a more favorable showing than in any one of the corresponding months of the previous year—and this in spite of the fact that the hazard of accident was increased substantially by the reconstruction of several of the elevated lines and the construction of new lines, with operation over the same routes proceeding uninterruptedly during the progress of the work. While there were 1333 fewer accidents on the system during the fiscal year than during the preceding year, the payment for damages showed an increase owing to the fact that the number of actions tried representing accidents of previous years shows an increase of 42 per cent.

Excursions by Trolley and Boat to Niagara.—The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has adopted a joint passenger tariff in connection with the Ohio Electric Railway, the Detroit & Cleveland Navigation Company, the Cleveland & Buffalo Transit Company and the International Railway, Buffalo, naming excursion rates from various points on the Fort Wayne & Northern Indiana Traction Company's line to Niagara Falls, N. Y., and return. The Union Traction Company of Indiana is also concurring in the excursion, routeing people from Indianapolis and points on its line in connection with the Fort Wayne & Northern Indiana Traction Company to Fort Wayne and turning them over to the Ohio Electric Railway. The full excursion fare to Niagara Falls from La Fayette, the most westerly point on the line of the Fort Wayne & Northern Indiana Traction Company's line, is $10. This, of course, does not include meals, berths or staterooms. The route from La Fayette is via Logansport, Peru, Fort Wayne and Lima to Toledo, and thence by boat across Lake Erie.

Causes of Delays Advertised in Kansas City.—The receivers of the Metropolitan Street Railway, Kansas City, Mo., recently advertised in the daily papers of that city in a space 11 in. square a record of delays in service. The statement introducing the tabulation of interruptions to service follows: "Reports of every delay in the street railway service are made to the headquarters at Grand Avenue and Fifteenth Street. Whenever a delay occurs the nearest division station is immediately notified and either a repair motor truck or car is at once ordered to the scene. Many of these delays are due to causes over which the company has no control. Last week two were due to parades, one tying up most of the downtown service from ten to forty minutes. Fires, wagons or automobiles breaking down on car tracks and freight train blockades are other instances. Where possible cars are routed around blockaded sections. In all cases the street railway company uses every means to overcome obstructions to regularity in service. A record of delays in service for five days of last week is given here in the belief that it will be of interest to the patrons of the company."

Order Regarding Substitution of Open Cars for Closed Cars.—Under date of April 15, 1913, the Public Service Commission of the District of Columbia notified the Washington Railway & Electric Company that open cars could be substituted for closed cars on the basis of five open cars to furnish the service supplied by eight closed cars. Subsequently it passed an order prohibiting passengers from standing on the running boards. This resulted in passengers standing between seats on open cars. In a letter to the company on Aug. 6 the commission states: "The commission recognizes the objection to the practice of passengers standing between the seats and therefore believes that this space should not be taken into account in calculating the capacity of cars. While open cars have much greater seating capacity than the closed cars, these restrictions reduce the standing room in open cars to such an extent that the capacity of the two types of cars, including standing passengers, is nearly the same. It, therefore, appears to the commission that the capacities of open cars and closed cars do not warrant the substitution of only five open cars for eight closed cars, and that they should be considered on the same basis, and when open cars are operated the same number of open cars should be placed in service as is called for by the schedule in effect during the period of closed-car operation."

Fourth Report of New Jersey Welfare Committee.—The fourth annual report of the welfare committee of the Public Service Corporation of New Jersey has just been issued. As its name implies, the committee administers the welfare work of the corporation and its subsidiary gas, electric and railway companies, which work covers sick benefits, pensions and life insurance. In addition the committee looks after the payments made necessary by the employers' liability and workmen's compensation act. The corporation's voluntary welfare work and the operation of the State law are made somewhat reciprocal in that the employee receives the benefit of the one which redounds to his greater advantage. For instance, if the company's own plan called for a larger payment than the liability law in any specific case, the company would not stand on the strict letter of the law, but would make the larger payment. During the four years that the plan has been in effect the company has disbursed to employees, their relatives or dependants $370,990. Of this amount $144,697 was compulsory under the State law, the balance, or $226,292, having been voluntarily paid for pensions, sick benefits and life insurance under the corporation's own plan. For the last year the corporation paid $68,744 under the head of welfare work and $53,301 required by the compensation act, a total of $122,045. This was an increase over the preceding year of $12,319 in voluntary payments and of $5,443 in compensation required by the State law. The corporation has close to 15,000 permanent employees.

Personal Mention

Mr. Clinton D. Kellogg, Chicago, has been appointed general superintendent of the Gary, Hobart & Eastern Traction Company, with headquarters in Hobart, Ind. He succeeds Mr. B. J. Schramm resigned.

Mr. W. H. Given has resigned as assistant general manager of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., to become manager of the Arkansas Valley Interurban Railway, a new position with that company.

Mr. R. W. Emerson, superintendent of the New York & North Shore Traction Company, Flushing, N. Y., has resigned effective on Aug. 20, to become assistant superintendent of the Cleveland (Ohio) Railway, a newly created position with that company.

Mr. J. C. Blackburn has accepted a position as superintendent of the street car lines in Marshalltown, Iowa, effective Aug. 1. Mr. Blackburn has been associated with the lines in Galesburg, Ill., since horse cars were used. He was also in service in Cedar Rapids, Iowa.

Mr. Milo R. Maltbie, formerly a member of the Public Service Commission for the First District of New York, and recently chairman of the valuation committee of the National Association of Railway Commissioners, has been appointed a member of the advisory board to Mr. C. A. Prouty, director of the valuation division of the Interstate Commerce Commission, Washington, D. C.

Mr. William H. Hitchcock, formerly general manager of the Trenton & Mercer County Traction Corporation, Trenton, N. J., has been appointed general superintendent of the Jersey Central Traction Company, Keyport, N. J., to succeed Mr. Samuel Barnes. Mr. Hitchcock began his career as a conductor in Washington, D. C., in 1896, and served the Washington Railway & Electric Company in several capacities until 1910, when he was appointed superintendent of transportation of the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company, Wilmington. In January, 1913, he was appointed general superintendent of the Trenton & Mercer County Traction Corporation, and subsequently was made manager.

Mr. Cecil G. Rice has been appointed assistant to the president, Mr. James D. Callery, of the Pittsburgh (Pa.) Railways, the Duquesne Light Company and the Beaver Valley Traction Company. The position of superintendent of the claim department, formerly held by Mr. Rice, has been abolished, and the work handled by that department will be divided among five associated bureaus with Mr. R. B. Gribble, chief of clerical bureau; Mr. C. C. Mullen, chief of inspection bureau; Dr. W. M. Holtz, chief of medical bureau; Mr. Augustus Baker, chief of adjustment bureau; Mr. H. B. Ockington, principal adjuster; Mr. G. E. Clarkson, chief of litigation bureau, and Mr. F. A. McKenry, auditor of associated bureaus. Mr. Rice will direct the work of these bureaus in addition to looking after such other matters as may be assigned to him by the president. Mr. Rice was born in Harrisville, W. Va., on Nov. 15, 1878. He attended the State Normal School at Fairmont, W. Va., and the University of West Virginia. Upon the completion of his studies he read law and later took up newspaper work. Before engaging in such work in Pittsburgh, he was city editor of the Parkersburg *Daily News*. Although not a resident of Pittsburgh he was selected by the Mayor, George W. Guthrie, now ambassador to Japan, for special work, and in this capacity served the city for two and one-half years. In January, 1907, Mr. Rice was appointed private secretary to Mr. Callery, president Pittsburgh Railways, later being made general agent of that company and still later being employed in different capacities in the operating department at the shops and carhouses. In August, 1908, he temporarily left the traction field to become credit manager of the Colonial Trust Company and also represented that institution as a member of the Pittsburgh Stock Exchange. In July, 1909, he assumed direction of the claim department of the Pittsburgh Railways, the Duquesne Light Company and the Beaver Valley Traction Company. In addition to introducing advanced ideas in connection with the handling of claims, Mr. Rice has for years been a close student of scientific management and business psychology.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

San Jose, Cal.—The San Jose Railroad has applied to the Board of Supervisors of the County of Santa Clara for a franchise to construct, maintain and operate a single or double track standard gage electric railroad with the necessary sidings, turnouts, switches, poles, etc., over a specified route in the county.

Macon, Ga.—The Macon Railway & Light Comapny is authorized to lay double track on Broadway between Boundary and Giles Streets.

***Berwyn, Ill.**—A petition has been received by the City Council of Berwyn, Ill., from E. G. Wright and others stating that they are ready to build a street railway upon Harlem Avenue from Thirty-ninth Street north to Twelfth Street, to be operated at a 5-cent fare with transfers from all crosstown lines, provided they are guaranteed a twenty-year franchise.

United Railways & Electric Company, Baltimore, Md.—This company will extend its Columbia Avenue double-track line 2100 ft. from the present terminus at Gwynn's Falls to Lansdowne.

Fairhaven, Mass.—The Selectmen have voted unanimously to grant a franchise to the Massachusetts Highway Service Company, Boston, to install wires on poles of the New Bedford Gas & Edison Light Company and the New England Telephone Company, along the Sconticut Neck Road from Washington Street to the Daniel W. Dean farm, a distance of 2½ miles, and to operate trackless trolley buses over that route. The company has arranged to purchase its power for the operation of its Sconticut Neck line from the Union Street Railway.

Pottsville, Pa.—Pottsville City Council has granted a franchise to build an electric railway to St. Clair, a distance of 3 miles. The Pottsville & St. Clair Electric Railroad is the name of the new corporation.

Petersburg, Va.—The Wythe Street franchise for an electric railway from Petersburg to City Point, for which a bid of $25 was made by the Petersburg & Appomattox Company, has been awarded to R. H. Mann and S. W. Zimmer of Petersburg, who have taken over the interests of the Appomattox company.

Petersburg, Va.—The City Council awarded to the Petersburg & James River Corporation the Bollingbrook Street franchise for the proposed electric railway from City Point to Petersburg.

TRACK AND ROADWAY

Fresno (Cal.) Interurban Railway.—Construction work on the extension of the Fresno Interurban Railway has been started at the Barton Vineyard. It is possible that 3½ miles of the line may be finished before it is announced whether the road will go to Clovis or Centerville.

Municipal Railways, San Francisco, Cal.—The city of San Francisco has been requested by the United States Army authorities to extend its Union Street line through the army reservation to Fort Scott. The government is preparing plans for extensive new officers' quarters at the Presidio, to cost about $400,000, and the new line would care for the additional traffic expected by the erection and occupancy of the proposed army buildings. City Engineer M. M. Shaughnessy and T. W. Ransome, chief engineer of the railway company, are investigating the feasibility of the extension. Work on the Church Street extension of the Municipal Railway in Market Street and the proposed Twin Peaks Tunnel line of the same company is being held up, it is claimed, on account of delay by the Board of Supervisors in declaring a policy toward questions of franchise requirements as they affect competing lines. The charter provides that when a new street railway franchise is granted the company obtaining the franchise may use existing lines of a competing company for ten blocks on any street, providing proper maintenance provisions are made. Otherwise such tracks may be used for a distance of only five blocks under the same conditions. The city is ready to begin laying tracks in lower Market Street, it is asserted, and Mr. Shaughnessy has asked the board for an early declaration of policy on the matters in question so that the work may proceed.

San Francisco-Oakland Terminal Railways, San Francisco, Cal.—Assurances were received from the San Francisco-Oakland Terminal Railways at a recent conference between officials of the company and the city of Berkeley that work would begin within a comparatively short time on the improvement of the company's roadbed on Adeline Street from Woolsey to the Oakland line, to be followed by rebuilding of the company's line on Bramcroft way from College to Telegraph Avenue. The work contemplated will cost about $28,000.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—Employees of the Wilmington & Philadelphia Traction Company have begun the work of connecting its lines with the People's Railway, which was recently purchased. Several miles of track will be taken up and the running direction of other lines will be changed.

Jacksonville (Fla.) Traction Company.—The committee recently appointed to prepare a statement showing the advantage to the company should it extend its tracks from Ortega to the State camp grounds, has completed its labors, and has submitted to Hardy Croom, manager for the company, a report which tells in detail of the immense amount of development work accomplished and still going on at the grounds, as well as a sketch of its history, its prospects for the future, and a statement of the probable earnings of the proposed extension.

Evanston (Ill.) Railway.—This company has promised service to a now unoccupied tract of desirable building lots if the city will annex the tract and provide it with sewers and water. The company has begun operation on its Howard Street extension.

Chicago & Milwaukee Electric Railway, Highwood, Ill.—This company has been asked to consider the possibility of a west side loop for Evanston, Ill.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—A statement in regard to the plans of this company was made by Judge Albert Akers, Quincy, following a meeting of the directors on July 24. Judge Akers is quoted as stating: "A large banking house has come forward with an offer to take sufficient bonds from us to provide funds not only for the building of the first section of the interurban line but the entire line. Coincident with this offer has come the Talbott Construction Company's written proposition, which the board of directors has accepted, making it practically a contract, stating that the construction company regards this bond issue as cash and that the company will undertake the building of the entire line from Peoria to Quincy." [July 12, '15.]

Lafayette & Northwestern Traction Company, Lafayette, Ind.—A hearing was held on July 24 before Commissioners McClure and Edwards of the Indiana Public Service Commission to inquire into the matter of the Lafayette & Northwestern Traction Company, which recently announced that it contemplated the construction of a road from Lafayette to Chicago, and which, it was stated, had undertaken to issue securities without the permission of the Public Service Commission. O. L. Brown, general manager of the proposed line, stated that the Tippecanoe Construction Company had been organized among local farmers to finance the preliminary steps in building from Lafayette to Rensselaer; that about $10,000 in stock had been sold, and that about $6,000 in notes had been issued. Subsidies had also been voted by some of the townships through which the proposed road was to pass.

Topeka (Kan.) Railway.—The contract for a concrete bridge over Shunganunga Creek, Kansas Avenue and Twentieth Street, has been let to Arthur E. Allen, Topeka, at $15,468, of which the Topeka Railway will pay $4,500. The street railway will extend its line on Kansas Avenue to Twenty-first Street and over the bridge as soon as the structure is finished.

Detroit (Mich.) United Railway.—This company's 1915 program contemplates 14 miles of city track reconstruction in Detroit and a new crosstown line, including ¾ mile of double track and 1 mile of single track in Flint, Mich. In addition the company will double track 7500 ft. of the Michigan Avenue line in Detroit and extend the Kercheval Avenue line 4500 ft. Interurban line extensions for this year include 7½ miles from Almont to Imlay City, Mich. This will form a part of the new Detroit, Almont & Northern Railroad, and it will be opened for service about Aug. 20.

Electric Short Line Railway, Minneapolis, Minn.—Plans are being contemplated by this company to construct a 45-mile extension of its lines. Two plans are under consideration. One is for an extension from Winsted to Clara City, via Hutchinson. The other plan is to build south.

***Faribault, Minn.**—W. K. Palmer, Kansas City, is contemplating the construction of an electric railway from Faribault to Waseca and possibly to Blue Earth, Minn.

Twin City Rapid Transit Company, Minneapolis, Minn.—As soon as the company receives permission from the War Department for the use of a right-of-way over a short strip of government property, the work on the extension direct to the Snelling Speedway will begin. A double track line will be laid to within a few feet of the St. Paul side of the racetrack, with a tunnel leading to the track for the ingress and egress of passengers.

Fallon (Nev.) Electric Railroad.—This company, which has completed the grade for its line between Fallon and Sand Springs, is reported to have arranged to proceed at once with construction work.

United Traction Company, Albany, N. Y.—General Managers Carl H. Graf of the Municipal Gas Company and Charles F. Hewitt of the United Traction Company have agreed to recommend to their respective boards of directors the placing underground of electric wires in South Pearl Street from Madison Avenue to Fourth Avenue.

Buffalo (N. Y.) Southern Railway.—This company will extend its tracks through Buffalo Street, Long Avenue, and Pierce Avenue, Hamburg.

Hornell (N. Y.) Traction Company.—The directors of Hornell Traction Company have decided to double track the lines of the company through Main Street and part of Broad Street.

New York, N. Y.—P. Clingman, 33 Pine Street, New York, N. Y., and certain property holders are interested in a plan to built a single-track electric railway along public highways between the towns of Sea Cliff, Glen Cove, Oyster Bay and Roslyn, to connect there with the New York & North Shore Traction Company's line. Three routes have been suggested and preliminary surveys have been made. No incorporation has yet been made and the proposition is still in its preliminary stages. Storage-battery cars may possibly be operated.

Schenectady (N. Y.) Railway.—The Public Service Commission for the Second District has authorized the extension of this company's lines from their present terminus at Nott Street and Wendell Avenue, Schenectady, along Nott Street to the Grand Boulevard at East Alley and thence along the Grand Boulevard on private right-of-way in the town of Niskayuna to Van Antwerp Road. The franchise for the extension was approved by the Common Council, Mayor and Board of Estimate last January.

Northern Ohio Traction & Light Company, Akron, Ohio.—A special committee of the Council of Canton will confer with the officers of the new industries now being located in the northeast manufacturing district and will then take up with the traction company the question of the best route to be followed by the railway extension which is to be built into the district now being so rapidly developed.

Cleveland (Ohio) Railway.—Director of Public Service Sidlo of Cleveland, Ohio, after making an investigation, will recommend to the City Council that the proposed extension of the East Seventy-ninth Street crosstown line of this company to Broadway and Aetna Road be built on two parallel streets instead of having a double track on one street. At a meeting of business men, city officials and county officials at the Chamber of Commerce on Aug. 5, the proposed subways to the new high-level bridge across the Cuyahoga River were discussed. If such a plan is carried out, one of them will extend from the Public Square through Superior Avenue to the river for the eastern approach. On the west side of the river two lines would be necessary, one on Detroit Avenue to West Twenty-ninth Street and the other on West Twenty-fifth Street to Franklin Avenue. These tubes would be for the use of street cars only. County Engineer Stinchcomb estimated the cost of the subways at $2,200,000.

Butler & Grove City Railway, Grove City, Pa.—This company has contracted and bought nearly all the material for the equipment of its line. Eleven carloads of rails have been received and these are now being laid. Two cars and material for three bridges remain to be purchased.

Chattanooga (Tenn.) Traction Company.—The extension of this company's lines to Hixon, north of the city, is being considered. It is suggested that later the extension might go on to Dayton, in the north end of the county.

Dallas (Tex.) Consolidated Electric Street Railway.—This company is relaying with new rails the portion of its Oak Lawn line along Bowen Street, between McKinney Avenue and Cedar Springs Road, and is welding the joints with thermit.

El Paso (Tex.) Electric Railway.—Plans are being made by this company to construct a line on Piedras Street from Tularosa Street to Alameda Avenue, El Paso.

Ogden, Logan & Idaho Railway, Ogden, Utah.—This company plans to purchase the right-of-way surveyed last fall for a new interurban line from Ogden to Brigham City. As soon as possible after the right-of-way is secured, construction work will be started. Although the right-of-way was secured and a new line is to be constructed, the present line from Williard to Brigham City will continue to be operated by the company, making two interurban routes to Brigham City. The new line will parallel the Oregon Short Line, with the exception that it will run through the center of Parry and Williard. Operation has been begun on this company's extension to Huntsville.

Petersburg & James River Corporation, Petersburg, Va.—The Petersburg & James River Corporation has begun the construction of an electric railway between Petersburg and Hopewell. Three miles of the road have been graded. J. Walter Long, president of the corporation, says the road will be completed and open for traffic by Dec. 1.

Richmond & Rappahannock River Railway, Richmond, Va.—This company is said to contemplate extending its line to Urbana in the near future.

Tacoma Railway & Power Company, Tacoma, Wash.—It is reported the City Commissioners have received the assurance of Louis Bean, manager of the company, that the Pacific Avenue line will be extended as a concession for a franchise to cross South Tacoma cars over the new Tacoma Avenue fill.

SHOPS AND BUILDINGS

Municipal Railways, San Francisco, Cal.—The contract for constructing the second story of the Municipal Railway carhouse at Geary Street and Presidio Avenue has been awarded by the Board of Works to James L. McLaughlin for $26,747.

Union Traction Company of Indiana, Indianapolis, Ind.—This company expects to remodel its station at Pendleton.

Albuquerque (N. M.) Traction Company.—George Roslington, receiver of this company, has been authorized by the court to replace the carhouse of the company destroyed by fire recently.

Philadelphia & Western Railway, Upper Darby, Pa.—This company is working on plans for a proposed overhead station on Swede Street, Norristown. When these plans are finished the Council will be asked to permit the company to cover over two and a half squares of Swede Street in an effort to overcome the congestion complained of by the Town Council in making a station of the public street at the courthouse at Swede and Penn Streets, where both the Philadelphia & Western Railway and the Lehigh Valley Transit Company have been loading and unloading passengers.

Manufactures and Supplies

ROLLING STOCK

Worcester Consolidated Street Railway, Worcester, Mass., expects to purchase twenty-four four-motor equipments.

Indiana Railways & Light Company, Kokomo, Ind., has ordered two very light cars from the Cincinnati Car Company.

Butler & Grove City Railway, Grove City, Pa., expects immediately to purchase two cars for its new line. John Carruthers is president.

San Francisco Municipal Railway, San Francisco, Cal., has ordered one work car body from the Pacific Car & Equipment Company, to be equipped with Westinghouse motors.

TRADE NOTES

Charles F. Etter, Harrisburg, Pa., manufacturer of ready change carriers for street railway conductors, has moved his Harrisburg office from 904 North Second Street to 907 North Front Street.

Ohmer Fare Register Company, Dayton, Ohio, has issued a folder describing the economical service provided by this system. The folder reports that since January, 1915, the company has received forty-three contracts covering various types of registers for registering collections ranging in denomination from two to sixty different classes of fares.

Spray Manufacturing Company, Boston, Mass., recently incorporated to construct Spray cooling systems, gas scrubbers, odor and fume condensers, etc., has changed its name to the American Spray Company, as it will engage in general engineering work involved in the use of spray systems. The management of the company remains unchanged.

Pratt & Whitney Company, Hartford, Conn., has opened an office and showroom at 16 and 18 Fremont Street, San Francisco. S. G. Eastman, formerly manager of the Chicago office, is in charge. A large stock of machinery, small tools and gages will be carried for the convenience of customers. The company has been appointed agent for the entire Niles-Bement-Pond line of machine tools, cranes, steam hammers, etc.

International Oxygen Company, New York, N. Y., has received an order from the United States Navy Department for the erection of a hydrogen generating plant for ballooning purposes at the Aeronautic Station of the Navy Yard at Pensacola, Fla. This company has also received an order from the Government for the installation of a system for generating oxygen and hydrogen at the Washington Navy Yard, Washington, D. C.

Joseph T. Ryerson & Son, Chicago, Ill., have just completed new warehouses on Westside Avenue, Jersey City, N. J. The company has maintained an office at 30 Church Street, New York City, and steel warehouses at Boonton, N. J., for some time. This new move, however, will increase its stock and service to a marked degree and will mean a great deal in immediate shipments to steel buyers of the Eastern territory. The new warehouses have been built on a 10-acre site of the junction of the Hackensack River and Newark Bay, thus affording facilities for making water shipments to all parts of New York harbor and adjacent waters and for transshipment to ocean liners. The plant is provided with switches from the Central Railroad of New Jersey. The company has also acquired, in addition to the former trucking capacity, a fleet of motor trucks for making deliveries in Greater New York.

Latin-American Public Works Corporation is the name of a new company which will be organized for the general purpose of developing business in Latin-American countries. The activities of the company are to be directed specially toward the acquisition, on favorable terms, of concessions and contracts for public works and also of existing public utility or other properties which may require extension or improvement or both. It is also planned to conduct studies and investigations of business opportunities in South and Central America. The authorized capital will be $1,000,000, divided into 10,000 shares of the par value of $100 each. The shares will be all of one class, and there will be no promotion profit of any kind whatever in connection with the organization of the company. It has also been arranged that a representative of the company shall visit some of the localities where the best opportunities now exist, for the purpose of securing, subject to the approval of the directors, such business as can be negotiated on a decidedly favorable basis. Application for a charter has been filed at Dover, Del. The incorporators are: J. G. White, president of J. G. White & Company, Inc.; Douglas I. McKay, assistant to the president J. G. White Engineering Corporation, and Severo Mallet-Prevost, of the firm of Curtis, Mallet-Prevost & Colt.

ADVERTISING LITERATURE

Templeton, Kenly & Company, Ltd., Chicago, Ill., have issued a catalog describing its various types of Simplex jacks for electric railway use. The catalog contains convenient instructions for the proper operation of these jacks when moving or setting machinery, such as lathes, lifting or straightening telephone or trolley poles or extricating trucks or removing wreckage from tracks. These jacks are made in a number of different sizes and capacities from that suitable for track or ballast work to that required for lifting heavy cars.

Sauvage-Ward Brake Company, New York, N. Y., has issued a catalog describing the savings effected in the life of brakeshoes by the use of its S. W. automatic shim slack adjusters. A 95 per cent increase of life for brakeshoes is asserted to have been saved on a certain road by the use of the slack adjuster. These adjusters have been adopted by seventy-five roads throughout the United States. The catalog contains a trial offer to equip from one to twenty-five cars at the expense of the manufacturer for a period of from two to three months.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 44407, which describes the GE-225-B, 600/1200-volt ventilated commutating pole railway motor. This type of motor has characteristics which adapt it especially to high-speed interurban service. It is built on substantial mechanical lines, and in details of design and construction follows the general GE practice for railway motors. The bulletin gives a complete description of the construction details and shows some characteristic operation curves. Bulletin No. 44090 gives an analysis of the equipment for various forms of up-to-date railway substations, and specifies suitable apparatus for different voltages. The details of the apparatus required are given for permanent indoor and outdoor substations, and also for portable substations. The bulletin is amply illustrated from photographs of typical installations, supplemented by detailed views of substation apparatus, complete tables of ratings and dimensions, together with drawings showing the location of the apparatus in both indoor and outdoor substations. This bulletin should be of particular interest to the practical railway operator for the reason that, in addition to the data specified above, it gives a very comprehensive set of railway switchboard wiring diagrams.

NEW PUBLICATIONS

The Utilities Magazine. Vol. I, No. 1, July, 1915, published by the Utilities Bureau, 216 City Hall, Philadelphia. Price, $1 per copy.

The organization of the Utilities Bureau, as the outcome of the convention of mayors in Philadelphia last November, was reported at the time in the ELECTRIC RAILWAY JOURNAL. Under the direction of the bureau, of which Morris L. Cooke is acting director, "The Utilities Magazine" has been published "as one medium through which the Utilities Bureau will give to officials and city residents information of interest and usefulness in utility matters." The need of such a magazine is explained by the statement that "so many magazines misrepresent the truth as to public plants." The first number contains a digest of jitney ordinances, a discussion of the right of a plaintiff to examine the books and property of a utility company, the decision of the New York Public Service Commission, First District, in the New York Edison-Stadtlander case and one or two shorter articles. No statement appears in the first number as to whether the magazine is to be published at regular intervals or spasmodically.

Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of Street Railway Journal Journal and Electric Railway Review

Vol. XLVI NEW YORK, SATURDAY, AUGUST 21, 1915 No. 8

RECALLING PLANT STATISTICS

An engineer's ability to remember plant dimensions and the sizes and capacities of apparatus under his charge is not much of a test of his fitness to hold his position, but, for a little thing, a poor memory as to essential details unquestionably plays its part in giving a bad impression of an operating man on superficial acquaintance. Even at the cost of repeated efforts, it pays to remember such data as the general dimensions of boiler and engine rooms, the exact ratings, main dimensions and speeds of prime movers, height and diameter of the stack, dimensions of the more important pumps, capacity of the coal pocket and a few other "bird's-eye" statistics that visitors often inquire about. All of these data can, of course, be extracted instantly from a loose-leaf book, but useful as such a book is, it should not be allowed to become an entire substitute for the engineer's personal recollections. Prompt and accurate answers to questions about the plant indicate a live interest in its service with an alert and responsive mind, and defects in this direction are decidedly worth eliminating.

COASTING AND RUNNING TIME

When coasting recorders are first installed by a railway company its chief aim is to decrease the cost of energy and of brakeshoes. But experience has shown that the savings possible in another respect are far greater than either of these items. After the recorders have been in service for some months the men have approached the maximum percentage of coasting. Now, assuming the absence of severe down grades, this percentage of coasting is a good measure of the slack in the schedule running time. For example, if a line runs 35 per cent to 40 per cent coasting time it is evident that by a longer period of energy-using time the running time will be decreased. If a condition of this kind is developed on a line with, say, fifteen-minute headway and few cars the running time might be reduced to permit possibly a thirteen-minute headway with the same number of cars. In this case it might be found more profitable to get maximum coasting than to speed up the line, as the headway improvement might not be enough either to get more business or to cut out one car. On the other hand, if the line is operated on a five-minute headway a reduction of coasting time under conditions of maintained coasting ability would be far more likely to permit a reduction in the number of cars. Of course, some slack must always be allowed in any schedule, but when coasting regularly exceeds, say, 30 per cent, the economy of fewer cars for the same headway as before must greatly exceed the extra cost of energy and brakeshoes. In short, in this relation of coasting to running time the coasting recorder has proved an even greater means of economy in practice than in theory.

SPECIFICATIONS AND PROGRESS

The increasing activity of the American Electric Railway Engineering Association and other organizations concerned with applied technology in preparing detail specifications of materials and appliances is a sign of the times. These are the contributions of the large roads to the small ones and are an evidence of a highly commendable spirit of co-operation. They constitute the text-book of the technical departments of the industry. They result from the combined efforts of user and manufacturer. Specifications are simply definitions of good usage in their field, and their purpose is not primarily to prevent manufacturers from foisting unsatisfactory products upon customers but rather to indicate the quality which is most suitable, that is to say, most economical, under given conditions. Specifications should lean toward a somewhat better quality than is absolutely necessary so that they may exert an influence in the direction of progress. This practice also provides a factor of safety and a reserve capacity. While specifications make dry reading, it is the manifest duty of the members of the Engineering Association to study those which have been laboriously prepared by their representatives in the committees and to apply them as far as possible. There will be an unusual opportunity for preconvention assimilation this year.

BEAM-TYPE TRACK FOUNDATION IMPROVED

While the old style, beam type of track foundation has been abandoned by most street railway companies the conclusion must by no means be drawn that improvements which overcome the disadvantages of this old type will not resurrect it. In this issue of the ELECTRIC RAILWAY JOURNAL E. R. Horton, Jr., of the Southern Public Utilities Company, is quoted as describing a type recently installed by that company. Improvements in his construction include an 8-in. plate under the rail base, intended to spread the track loads over a wider area on the beam and consequently to reduce or possibly to eliminate the tendency of the concrete to pulverize under traffic vibration. The reinforcement at the bottom of the beam should also prevent its breaking up under track loads when the sub-foundation is properly prepared. Hook bolts used to fasten the rail also serve to bind the beam and the rail together vertically. The hooks pass around the reinforcements in the bottom of the beam, hence provide a secure anchorage. Another feature in this construction is the provision of reinforcing channels under the joints in addition to the 8-in. plate under the rail. Wooden washers on the anchor bolts below this bearing plate provide for shrinkage in the concrete when it sets. Under track loads these washers will compress until the space beneath the bearing plates has been closed. It is quite possible that this form of construction will prove satisfactory on light traffic lines, and it may be that the improvements in the beam construction would give it merit under comparatively heavy traffic. In any event this foundation construction is worth watching to determine its serviceability.

TRANSMISSION LINE PROGRESS

Since the security of a transmission system depends chiefly on the performance of the line it is imperative to take every possible step toward securing continuity of service by suitable construction. In the case of traction lines in particular, the loss of power even for a short time works disaster. It not merely cuts off the load but disorganizes the system for a much longer time than that covered by the mere interruption. It therefore behooves the engineer to look a little way ahead and see what can be done to render the electrical supply more secure.

Taking up the situation as it stands, the three elements in line construction are the poles, the wires and the insulators. As regards the first-named there seems little doubt that, more and more, steel must be the material as it is now in a large number of cases. But when a steel line fails it is likely to fail rather badly, and, looking ahead, the indications are that whenever practicable one should not trust even to a single well-designed tower line but for many transmissions should provide a complete duplicate tower line. To do this economically means higher voltages than those commonly employed because the size of the members in the supporting structure must be determined by the stresses put upon it. A good deal of the work in the past has been on the basis of using public rights-of-way in such cases, and these have generally been fitted for modest voltages only. At present, when private rights-of-way are becoming common, there seems to be no good reason why the voltage should not be higher and hence the wires which have to be carried considerably lighter than they now average. As Dr. Steinmetz wisely remarked in a recent discussion, the insulator is no longer the weakest point in the line, and there is no good reason from the standpoint of insulation why the general average of working voltage could not be doubled with positive advantage. Given a light line, the conditions of supporting it become very much relieved so that it should be possible to use fairly long spans on lighter supporting structures than are now usual.

As regards the line itself experience has shown that failure of the wires, except from short-circuits, is a very unusual contingency. Break-downs, when they occur, are commonly at the supports, and the wires themselves are not at fault. As a rule, even under the most severe conditions, when storms cause the failure of many electrical circuits, transmission lines come through all right. As regards the insulators, there is no difficulty now in taking care of 50,000 or 60,000 volts as easily as half this pressure was handled a few years ago. The suspension insulator has saved the day for high voltages, and on more modest ones such as those mentioned renders it easy to get a large factor of safety. Lightning is the most serious danger to be considered, and it seems to have been sufficiently well demonstrated that not even well-installed ground cables can entirely relieve transmission lines from this particular risk. The use of arc extinguishing devices seems to offer a very considerable measure of relief and deserves more extensive use than at present.

The general line of progress then would seem to be the employment of rather high voltages with duplicate main supply lines, suspension insulators giving a large factor of safety, and persistent study of methods of lessening the danger from lightning which at present is dominant.

A YEAR OF THE DEPARTMENT ON "EQUIPMENT AND ITS MAINTENANCE"

When the subscribers to a periodical become contributors in large numbers direct evidence is afforded that they are active rather than passive readers. This condition indicates that degree of intimacy between readers and editors which is essential if the paper is to serve its clientele in a truly successful way. From this point of view the editors of the ELECTRIC RAILWAY JOURNAL view with satisfaction the record of the department on "Equipment and Its Maintenance." This department now numbers in its widening circle of contributors more than a hundred men who are directly engaged in using and bettering electric railway equipment.

With the first issue of the ELECTRIC RAILWAY JOURNAL for 1914 the practice of segregating short articles on details of equipment practice was inaugurated. Allowing a half-year for the promotion or accelerating period we may consider that the new department was well under way by the end of June, 1914, and therefore completed a year of mature life a few weeks ago. An examination of the pages devoted to this department will show how fully the results justify the effort to secure descriptions of those devices and methods which have produced maintenance economies or aided equipment reliability.

During the period mentioned signed articles from ninety-five writers, located in sixty-one cities in twenty-two States and five foreign countries were published. Omitting the numerous descriptions of recent manufacturing developments there were 217 signed and eighty-six unsigned editorial and contributed articles in the following divisions of the electric railway field: Shops and shop practices, eighty-two, or 27 per cent; car equipment, fifty-four, or 17¾ per cent; track and paving, forty-five, or 14¾ per cent; power generation and distribution, thirty-seven, or 12¼ per cent; transportation kinks, twenty-nine, or 9⅝ per cent; overhead and return circuit, twenty-seven, or 9 per cent; cars and car construction, twenty, or 6⅝ per cent, and records and costs, nine, or 3 per cent. In addition every new device of interest to railway men, of which information could be obtained, was carefully described. No expense has been spared in the effort to give the man in the shop, on the line and the track or in the power house, the information which he needs but finds it difficult to get.

A comparison of the above data with the tabulated results of an analysis of readers' preferences, printed on page 52 of the issue of this paper for Jan. 2, 1915, indicates that the supply of articles follows closely the desires of the readers. The canvass made last year showed that a very considerable portion of the readers take great interest in the department on equipment and maintenance, although at that time it was still in its infancy.

It is obvious that this department of the paper more than any other must depend upon the co-operation of those who benefit from its work. Its future is in the hands of its friends. The editors look forward to the time when each of several hundred successful equipment men will send in, as a matter of course, short descriptions of every new "stunt" which makes their own work lighter. With the field work of its own staff supplemented in this manner, the ELECTRIC RAILWAY JOURNAL well may claim that it is in the closest touch with every worth-while development of electric railway operation.

INFLUENCE OF AUTOMOBILES IN DENVER

The actual figures submitted with the exceptionally thorough traffic analysis that is outlined on another page of this issue by Roger W. Toll, chief engineer Denver Tramway Company, have a value that is largely local; at the same time, the inferences that may be drawn from them can hardly fail to be of general interest. The most striking feature is, of course, the fact that the automobile and bicycle combined appeared to have gained during the year almost exactly what the street cars lost. Compared with the preceding year, the net decrease in total traffic, including pedestrians, was 1.2 per cent, but, strange to say, there was practically an equal decrease in the number of pedestrians, so that the total number of riders of all classes actually remained the same as on the corresponding count during the preceding year.

The gain for the automobile was equivalent to about 8 per cent of the street car passengers, and the increase was caused by three factors, namely, an increased number of trips per day, an increased number of passengers per trip, and an increased number of automobiles in service. Although the latter factor is the largest of the three, its importance is minimized by the fact that the bulk of the street railway traffic is, of necessity, drawn from that part of the population which does not own automobiles and never will do so unless unforeseen reductions in the cost of their maintenance and housing take place.

The thing that is important is that the use of individual automobiles is evidently extending. If this extension is caused by an increase of those who ride principally for entertainment and would not patronize the street cars if automobiles were not available, there is nothing very alarming about the movement. On the other hand, if these riders are drawn from the ranks of the railway's patrons, the result will be a diminution of receipts that will ultimately become a very serious matter.

However, every figure in the Denver analysis is in support of the first-mentioned possibility, and therein the results are distinctly encouraging. It is apparent from the report that the travel for purely business purposes (not for amusement), included in the 1915 totals of the Denver traffic, is less than in 1914, the condition being due, no doubt, to the business depression accompanying the European war. Evidence to this effect will be found in the decreased total travel, in the decreased number of men on freight vehicles, and above all, in the marked decrease in the number of pedestrians. Consequently, the total number of riders of all classes should have decreased also under the influence of these abnormal circumstances.

The fact that the total number of riders actually remained constant can be ascribed only to non-business riders in automobiles. In short, it appears to be unlikely that the increased use of the automobile, as recorded, came about by anything other than joy-riding, so that after all, the gasoline vehicle could not have been a basic cause of the street railway's traffic loss. As a matter of fact, the 9 per cent loss of the street railway might well be considered as a natural sequence of the 4 per cent decrease in pedestrians, and, although the decreased walking might appear to indicate an increased riding habit, it could do so only in times of business prosperity that would be accompanied by a great increase in total travel in and out of the business district.

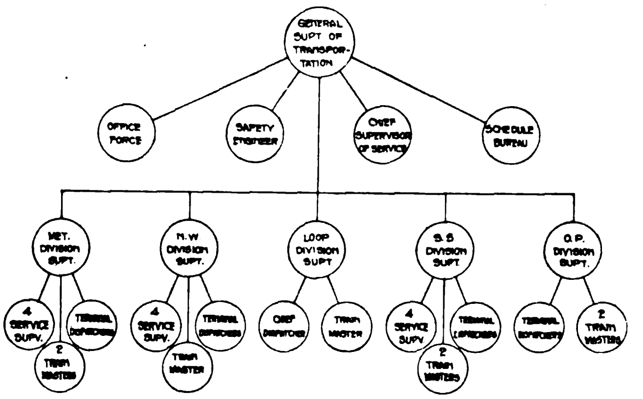
Among the other interesting items that appear in the analysis is that of a 10 per cent increase in the use of the bicycle. We had been of the opinion that this form of locomotion had become a negligible consideration, yet in Denver it appears to serve some 5 per cent of the traffic, a figure which may be otherwise expressed as a number equal to no less than one-fifth of the number of pedestrians. The freight automobile also shows up in an interesting light, as the increase for the year was offset by the retirement of roughly the same number of horse-drawn trucks, about four of the latter making way for three of the former. From the figures, the rate of replacement of horse-drawn trucks by automobile trucks appears to be less than 10 per cent per year, and if this is the case in general, the gasoline truck can hardly be such a gold mine as it is pictured by some of its advocates.

Safety of Trains on the Chicago Elevated

The Organization of This Property Has Been Built Around the Safety Idea—Special Fitness for Safe Train Operation Governs the Selection of All Employees

More and more interest is taken by the traveling public in the protective measures provided by transportation companies. This is justly so and, in recognition of this fact, a general outline of that part of the organization of the Elevated Railroads of Chicago, Ill., bearing most directly on the safety of their patrons is given.

The Elevated Railroads of Chicago transport 170,000,000 people annually, hence the responsibility for their welfare and safety is not a light one, a fact which is thoroughly appreciated by both the management and the employees. They believe that safety is, after all, largely a matter of the personal equation, and to get the proper results great care is exercised in the selection of men for each responsible position. After that, the make-up and routine of the organization enters very largely into the kind cf results that are obtained.


GENERAL SUPT OF TRANSPORTATION
OFFICE FORCE
SAFETY ENGINEER
CHIEF SUPERVISOR OF SERVICE
SCHEDULE BUREAU
MET. DIVISION SUPT.
N.W DIVISION SUPT.
LOOP DIVISION SUPT
S.S DIVISION SUPT
O.P. DIVISION SUPT.
4 SERVICE SUPV.
2 TRAIN MASTERS
TERMINAL DISPATCHERS
4 SERVICE SUPV.
TRAIN MASTER
TERMINAL DISPATCHERS
CHIEF DISPATCHER
TRAIN MASTER
4 SERVICE SUPV.
2 TRAIN MASTERS
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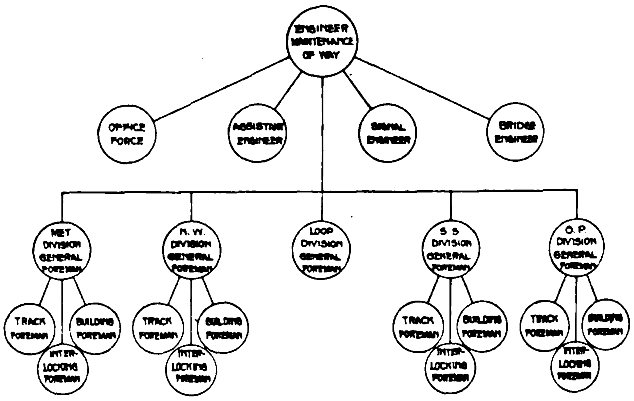
SAFETY ON CHICAGO ELEVATED—ORGANIZATION CHART OF TRANSPORTATION DEPARTMENT


ENGINEER MAINTENANCE OF WAY
OFFICE FORCE
ASSISTANT ENGINEER
SIGNAL ENGINEER
BRIDGE ENGINEER
MET DIVISION GENERAL FOREMAN
N.W. DIVISION GENERAL FOREMAN
LOOP DIVISION GENERAL FOREMAN
S.S DIVISION GENERAL FOREMAN
O.P DIVISION GENERAL FOREMAN
TRACK FOREMAN
INTER-LOCKING FOREMAN
BUILDING FOREMAN
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SAFETY ON CHICAGO ELEVATED—ORGANIZATION CHART OF MAINTENANCE OF WAY DEPARTMENT

Accordingly, a description is given cf the operating and maintenance departments, their relation to the special work of the safety engineer and his committees, and the work of the medical department as it bears on the safety both of employees and passengers.

TRANSPORTATION DEPARTMENT ORGANIZATION AND METHODS

First in the public mind, so far as safe operation is concerned, is the transportation department because it is this department with which the public is in closest contact. The head of this department is M. J. Feron, general superintendent of transportation, who has been twenty years in the service, having started as a switchman and advanced from dispatcher, trainmaster and division superintendent to his present position. Previous to entering the service of the Elevated Railroads Mr. Feron was for several years in the operating department of the Chicago & Northwestern Railroad.

Under the general superintendent, there are five division superintendents in direct control of train operation in their respective parts of the city. Each of these division superintendents has his office and corps of assistants at a convenient point on the division. The assistants of the division superintendents are the day and night trainmasters and the service inspectors. There are four to each division, and to supervise the operation of the trains and the crews, they are kept on the road continually. Dispatchers who are in immediate charge of the motormen and trainmen and the dispatching of trains are stationed at each of the terminals. All of these transportation officials have been promoted through the ranks, the dispatchers and service inspectors being selected from the motormen and switchmen classes and the superintendents and trainmasters from the dispatchers. A chart of this organization is shown in one of the illustrations.

Selecting and training the rank and file of the transportation department also receive careful attention. The first step to obtain employment on the Elevated Railroads after being tentatively appointed as an extra trainman, is the physical examination by the medical examiner, Dr. H. E. Fisher, whose methods have been described in detail in the ELECTRIC RAILWAY JOURNAL, issues of June 26 and Aug. 7, 1915. An extra trainman is instructed for a period of one week by an experienced conductor in the proper handling of gates, bell signals and calling stations. He must serve as an extra trainman for two or three years before he is given a regular run. To break in as conductor, the trainman is taken to the yards and shops and instructed in the mechanical and electrical features of the equipment. To break in as motorman he must make a more detailed study of the equipment, after which he is required to spend about three months in learning to handle a train and to read signals in actual operation. At the end of this time the extra trainman is certified by the instructing motorman, after which he is finally examined by the trainmaster and division superintendent to determine his fitness. If these various tests are passed satisfactorily, the student is eligible to work as an extra motorman.

An applicant may break in as a switchman or towerman, providing that he shows sufficient aptitude for this work to give his superiors confidence that he will make good. In either of these classes he is instructed by a regular towerman or switchman, certified and finally examined by the trainmaster and the superintendent. A towerman also must be examined regarding mechanical and electrical details of a plant by the division interlocking foreman. From the foregoing, it will be appreciated that much attention is given to schooling prospective employees. Moreover, after a man is considered qualified for the service, he is closely supervised by the department and a permanent record of his work is kept for reference. In this connection it is interesting to show a list of the periods of employment of the regular motormen and conductors who have been in the employ of the Elevated Railroads of Chicago for periods varying from five to twenty-three years:

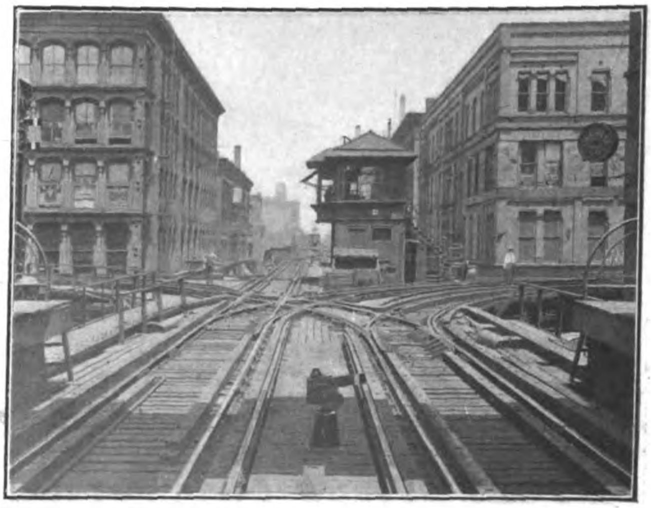
Period of Employment	Motormen	Conductors
Less than six years	...	...
Six to ten years	114	247
Ten to fifteen years	149	102
Fifteen to twenty years	97	21
Twenty to twenty-three years	57	5
Total number at present employed	417	375

WAY DEPARTMENT ORGANIZATION AND WORK

Public interest is next attracted to the maintenance of way department, which maintains the tracks, structure, signals and buildings in proper condition for the operation of trains. At the head of this department is B. J. Fallon, engineer maintenance of way, who has been eight years with the Elevated Railroads in this capacity, and eight years in the engineering department of the Chicago, Burlington & Quincy Railroad. Immediately under him is an assistant engineer, who has been in the service ten years, and a signal engineer who supervises and inspects all signal and interlocking work, who has also had ten years' experience with the signals. The way department staff also includes a bridge engineer, who supervises and inspects the elevated structure, bridges and buildings.

A general foreman is in charge of the men in the maintenance of way department on each one of the five divisions of the elevated lines. He has full supervision of all the work of this department and inspects the condition of the property periodically. The physical property under this foreman is divided into the following three classes; track work, structure and buildings, and interlocking and signal devices. An experienced foreman is in charge of each class on each division, and he in turn is aided by competent assistant foremen.

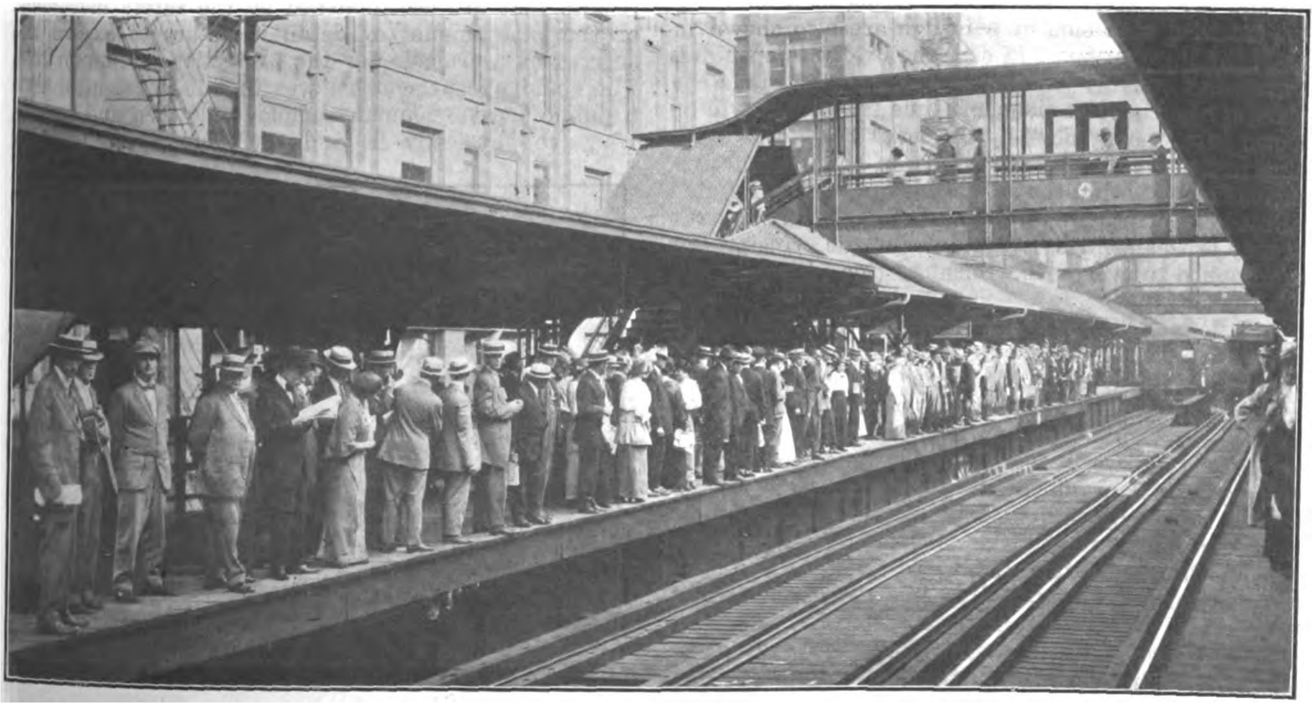
All electrical work, including the maintenance and installation of electrical circuits and the third-rail, is handled by a separate department. This is under the electrical engineer, who with his assistant has jurisdiction over the division electrical foremen. There are about sixty men engaged in the work of the electrical department, outside of power houses and substations. These, together with the regular force of the maintenance of way department, comprise about 300 men. This number is increased by approximately 200 men during the months from April to November, when most of the construction and rehabilitation work is done.



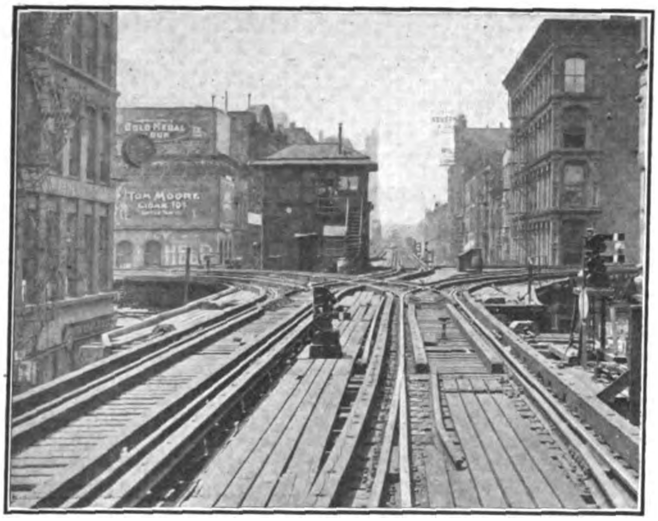
SAFETY ON CHICAGO ELEVATED—VIEW AT JUNCTION SHOWING HEAVY EXTRA GUARD RAILS AND FIRST-AID STATION SIGN

At each track junction on the Elevated Railroad system a modern interlocking plant has been installed. These plants protect all train movements on tracks through the junctions, and are so constructed that the failure of any part of the apparatus automatically stops all traffic on the tracks controlled by the plant. All of these plants are under the direct inspection of experienced interlocking repairmen, one or more being stationed at each important junction.

Each of the five elevated railroads is divided into track sections, and a number of section men or track walkers are regularly assigned to each. These men continually walk and inspect their track sections and make all light repairs necessary for safe operation. Extensive repairs and renewals are made by track con-



SAFETY ON CHICAGO ELEVATED—VIEW OF CROWDED TRANSFER PLATFORM AND BRIDGE. ALSO SHOWS CLOSE TIE SPACING



SAFETY ON CHICAGO ELEVATED—VIEW OF SIGNAL AND TRIP IN STOP POSITION

struction gangs. During the last several years the Elevated Railroads have maintained a large force of extra men to improve the various physical features of the property. Tie renewals are constantly necessary and in addition, as shown in one of the illustrations on page 303 of a crowded loop platform, the ties have been placed unusually close together. This was done throughout the Union Loop to deaden noise and at the same time it resulted in a perfectly safe track without the use of tie plates. Incidentally at all platforms where crowds assemble during the morning and evening rushes several guards are stationed to safeguard the public.

The loop junction at Fifth Avenue and Lake Street, illustrated on page 303, shows a special outer guard rail of very heavy construction. This has been provided along track special work to keep inside the outer guard rails any cars which may be derailed. Another of the accompanying illustrations of the same junction shows a track trip installed beside the semaphore signal. In case a train fails to stop at this signal the trip sets the air brakes. The signal set at danger, the track trip and the diverting track terminating at a bumping post installed each side of a bridge are also shown in one of the illustrations. In case the bridge is open and a motorman runs by the signal, the train will take the diverting track and at the same time the brakes will be thrown into "emergency" by the track trip. The foregoing protective devices are typical of the unusual precautions taken within the last few years by the Elevated Railroads of Chicago to avoid accidents. This is true not only of the operation of trains, but the principle has been applied to every department of this railroad.

THE SAFETY ORGANIZATION

The management of the elevated railroads was quick to recognize the value of the safety-first movement, and a number of years ago perfected a permanent safety organization. Experience soon demonstrated that satisfactory safety work could only be accomplished by forming special organizations and committees to supplement and co-operate with the regular operating organization. All safety work is under the supervision of J. H. Mallon, safety engineer. He is aided by a central committee composed of two department heads and himself. In addition, there are four division safety committees working in conjunction with the central committee. The chairman of these division committees is the division superintendent. He is aided by the division general foreman of the way department, and the other committee members are the division general foreman of the shop department, the supervisor of service and a representative from the claim department. Thus a diversity of viewpoints is brought to bear on all safety problems.

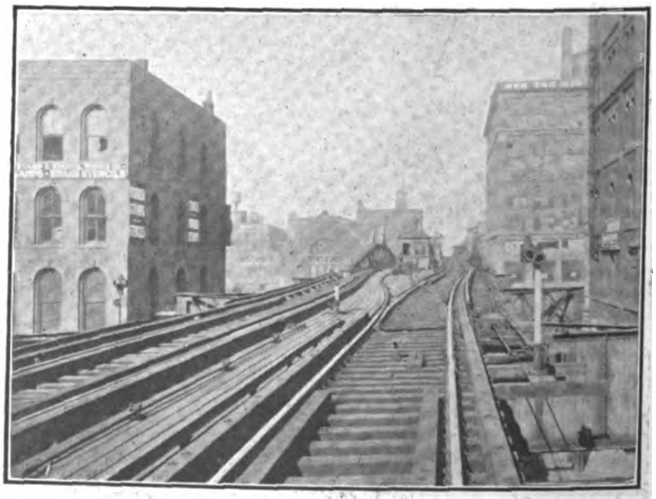
All of the safety committees hold weekly meetings at which they discuss suggested improvements, and the causes of accidents that may have occurred, while from time to time inspections are made. A record is kept of each committee meeting. These records are exchanged with the other committees and in this way all committees may benefit. Safety suggestions are submitted to the department heads or the general manager for action.

Each month the central committee publishes a "Safety Bulletin," which keeps constantly before the men the principles of safety. The articles contained in these bulletins are written by employees and department heads. To supplement the bulletin, the safety engineer periodically gives lantern slide lectures, both for employees and the public.

Perhaps the most unique and helpful feature of the safety work of this company is a carefully prepared "Safety Rule Book." This is given to each employee upon entering the service, along with a safety-first button which is worn quite generally. The safety rule book is a compendium of the findings of the safety organization since its inception. Through it the new employee may benefit by the experience of his predecessors. The contents of this rule book are revised and extended from time to time to keep it up to date. It was carefully compiled by the department heads so that not only is the motorman able to see at a glance the rules for the safe handling of a train, but the lineman has before him the rules for safe handling of live conductors. The back of the rule book contains complete first-aid instructions. In the maintenance of way, shop and electrical departments, these rules are read and discussed periodically.

SAFETY IN THE MEDICAL DEPARTMENT

The medical department plays an important part in safeguarding and assuring the patrons of the Elevated Railroads of Chicago that every possible precaution is taken for their safety. The public scarcely realizes the results that are accomplished by the safety movement or the vast amount of detail necessary to assure the success of a crusade for the protection of human life. The company surgeon believes that it is essential that a public service company employ only men and women who are physically fit and not handicapped by poor



SAFETY ON CHICAGO ELEVATED—VIEW OF DIVERTING TRACK AND SIGNALS AT A CHICAGO RIVER BRIDGE health or physical defects. Transportation or railroad work is hazardous at best and for that reason it is especially necessary to have men in charge of the operation of trains who will assure the maximum degree of safety to the thousands of passengers intrusted to their care.

To guard against physical defects being either the direct or indirect cause of accidents, the medical department was organized. When an applicant seeks a position in any of the departments, he is obliged to undergo a thorough physical examination to ascertain whether he is physically equipped to bear the responsibilities which will devolve upon him. In the train service every employee and applicant has his sight, hearing, color sense and physical condition carefully examined. Only those men are employed who have successfully passed the medical examination, hence equal the standard set by the medical department.

Perfect sight is essential to safe train movements, as a trainman must be able to see long distances perfectly to interpret signals. At night the safety of train operation is largely controlled by the signal lights, and for that reason it is necessary that an employee have perfect color vision or perception. Unfortunately, it is a fact that the two colors that are most often confused by people who are color blind are the two principal colors used for train operation, viz., red and green. The public quickly appreciates the great care that must be exercised in examining trainmen for this condition, as it is the chief factor in assuring safety at night.

Trainmen must have perfect hearing to be efficient, a fact so readily recognized that further comment is unnecessary. To insure safety in operation, railroads can hold no place for men with weak hearts or any heart disease. Quite frequently the heart fails at the critical moment when a trainman should have full possession of all of his faculties. All employees are examined every two years, and all new men are examined at the time of entrance into the service. Every employee in every department except the office force and the ticket agents receives a physical examination, and each department has a set of standard physical requirements.

The medical department has organized and had in practical operation for two years a first-aid-to-the-injured system. Regardless of all the safety-first measures adopted there will be accidents, and to meet these emergencies the first-aid system was inaugurated. It includes more than 100 first-aid stations located at frequent intervals over the entire mileage. At each station is a complete surgical and medical outfit containing all the necessary supplies required to give aid. Each station is designated by a red cross in a white circle conspicuously displayed. In connection with the first-aid system it was necessary to train employees in the rendering of intelligent first aid. More than 400 employees of the Elevated Railroads have received lectures and practical demonstrations in giving first-aid treatment, and the work of these men during the past two years has been instrumental in saving a number of lives and in preventing complications in injuries.

THE METROPOLITAN WEST SIDE ELEVATED RAILWAY COMPANY

CHICAGO..................191..

INSTRUCTION BLANK

Motorman................, Badge No. ....

Mr........................, student motorman, has been assigned to you to be instructed in the duties of a motorman.

You must see that the student thoroughly understands the operation of a train in accordance with the rules and regulations of this Company, and is fully acquainted with all conditions, a knowledge of which is necessary for safe operation.

You will be in charge of the train and will be responsible for its safe operation.

You will permit the student to operate the train only when in your judgment it is safe to do so.

You will keep close by your student so as to be able to act quickly.

When following train ahead closely, or approaching signals, keep right at the student's elbow.

Keep a specially close watch when the rail is bad.

* * * * *

I have instructed student motorman.......................... badge No....., in the safe operation of a train in service, and have fully acquainted him with all signals, speed limits, station stops, and general conditions existing on the...........branch.

................191.. Signed....................

* * * * *

I have received instructions from the motorman whose name appears above in the safe operation of a train in service, and have been fully advised as to all signals, speed limits, station stops and general conditions existing on this railroad.

................191.. Signed....................

* * * * *

Mr. J. A. Jarvis,
Asst. Superintendent.

Dear Sir:

I have examined the student whose name appears above, and am fully satisfied that he is competent to operate a train with safety and according to rules and regulations of this Company.

................191.. Signed....................

SAFETY ON CHICAGO ELEVATED—INSTRUCTION FORM LETTER TO MOTORMAN

ELEVATED

SAFETY FIRST CHICAGO, ...191..

This is to certify that I, ...,
was called to the office of the Superintendent of the Metropolitan West Side Elevated Railway Company on the ....day ....191.. and instructed as to the safe and proper way to run my train when working as motorman.

I was positively forbidden by the Superintendent to ever take a train out on the road, from any yard or terminal, before testing the brakes on my train, and I was instructed that I must be positive and sure brakes are working properly on all cars on my train before starting out with same.

He also called my especial attention to the danger of rounding curves at a higher speed than that designated on Speed Boards placed at the entrance to all curves.

My attention was also called to the extra caution I must take when operating over the road in foggy, thick or stormy weather, and I thoroughly understand that I must always operate my train, and have it under such control, that I am positive I can stop in the distance I can see.

This especially so, in foggy weather, or when my view is obstructed from any other cause.

Signed in presence of....................................
This........day of ....191...

....

SAFETY ON CHICAGO ELEVATED—RECORD OF CAUTIONING TRAINMAN

From the foregoing the valuable work accomplished by this class of procedure may be readily observed. It assures passengers on the elevated trains that the men in charge are in good physical condition and that their health is constantly under observation. It also assures the public that in time of accident when injuries may occur there are at hand the necessary first-aid supplies and employees competent to render the necessary relief until a physician arrives.

Standards for Graphic Presentation

The joint committee on the above subject, comprising representatives of sixteen national societies and the United States Bureau of Standards, has prepared a preliminary report which is being published by the American Society of Mechanical Engineers, by which the committee was organized. The committee makes a number of suggestions regarding the preparation of diagrams and illustrates these by means of typical diagrams. The purpose of these suggestions is to foster the development of as uniform a style in the making of diagrams as is possible. This will increase the legibility of diagrams and will tend to promote the use of graphical presentation of data. The suggestions in general conform to usual good practice which they merely attempt to codify. Sample suggestions are these: "For a curve the vertical scale, whenever practicable, should be so selected that the zero line will appear on the diagram. If the zero line of the vertical scale will not normally appear on the curve diagram, the zero line should be shown by the use of a horizontal break in the diagram. The zero lines of the scales for a curve should be sharply distinguished from the other co-ordinate lines." Copies of the report can be secured from the A. S. M. E. office, 29 West Thirty-ninth Street, New York, N. Y., at 10 cents each.

Operating Cost and Shifts in Service

Cost of Service Should be Considered in Making Schedules—Increased Rush-Hour Service Causes Higher Unit Costs—Standard Is Greatest Good to Greatest Number

BY F. W. DOOLITTLE, DIRECTOR BUREAU OF FARE RESEARCH, AMERICAN ELECTRIC RAILWAY ASSOCIATION

The peculiarities of traffic, and the various methods used to determine them with the idea of using the information in the construction of time-tables, were discussed at some length in a previous article.* Before proceeding with a further discussion of schedules, however, it will be well to consider in some detail the fact that the "car-hour" is not a basic unit of cost. It is obvious that while the average cost of operation per car-hour may be $2.75, it will cost a company very much more than $27.50 to place ten cars in service for an hour at the time of the evening rush. This fact, which is evident upon a consideration of the factors entering into cost, is made the basis of the present article, in which it is shown that the schedule which provides for the smallest number of standing passengers is not a schedule which keeps constant throughout the day the relation between seats and passengers. In other words, a standard for car loading permitting more passengers per car during rush hours than at other times is justified on the grounds of the greatest good to the greatest number of passengers.

In the example which is here worked out, it is shown that, owing to the high cost of rush-hour service, the use of a lower standard of car loading at that time permits a saving of 350 car-hours, which, with advantage to the patrons and at the same cost to the company, can be replaced by 890 car-hours during other periods of the day—a gain of 540 car-hours for the use of the passengers. The net result in the case assumed is the seating of 16,950 more passengers out of a total of 300,000 riding.

The first step is the determination of the cost of operation per car-hour at different periods of the day, operating expenses and depreciation, taxes and return on investment being taken into account. When a detailed study is undertaken of each element of cost, the effect of the occurrence of a large part of the riding during two short periods of the day—or "concentration of traffic"—is strikingly evident. The increased unit costs following increased service during the rush hour arise from a number of facts, among which are:

1. Operating expenses for platform labor are materially increased per car-hour run where additional service is furnished for short periods. Under usual operating conditions, only a limited number of men can be secured for rush-hour service at the usual rates, in anticipation of advancement to full day runs. Additional inducements must be made in order to secure labor for a few hours per day. The operating conditions of the company do not readily present other types of employment by which such labor can be employed during non-rush hours in order to secure a full day's work.

2. Rush-hour service creates a peak on the generating plant and the cost per kilowatt-hour for electrical energy for cars is much increased during such peak periods. Investment in necessary generator and transmission capacity must lie idle during the greater portion of the day and in readiness for rush-hour service. The ordinary fixed charges upon such investment cannot be spread over the company's output, as would be the case where the service furnished had a demand uniform throughout the twenty-four hours.

3. The liability to accident during rush hours is proportionately greater than during non-rush hours, owing to the congested condition of the streets and the haste of passengers at these periods.

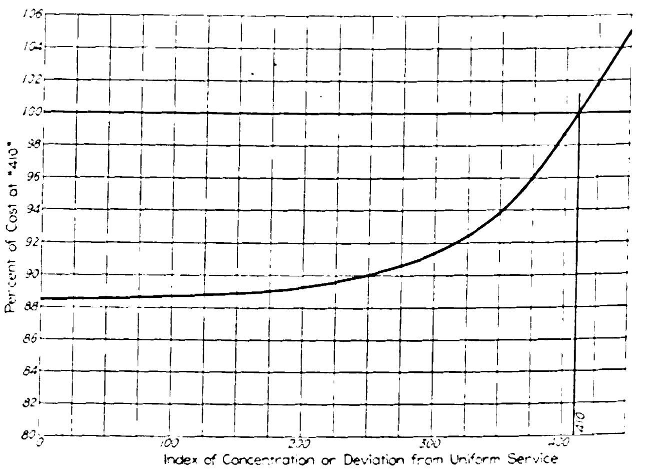
4. Investment in additional cars, car-housing facilities and car-handling facilities, being idle during the non-rush hour period of the day, fixed charges upon such investment are accordingly higher per unit of service during the rush hours.

The results of this study of costs may be stated in two ways. In the first place, Table I shows for a hypothetical urban electric railway the costs per car-hour at different periods of the day and the cost for each increase in the number of car-hours per hour. For instance, an increase of 3650 car-hours over the service rendered from 6 a. m. to 7 a. m. costs $6 per car-hour, and a similar increase from 160,600 car-hours between 6 p. m. and 7 p. m. to 164,250 car-hours between 5 p. m. and 6 p. m. costs $11.50 per car-hour. This illustrates very forcefully the fact that in the construction of time-tables attention cannot be confined to car-hours to the

TABLE I—SHOWING INCREMENT COSTS FOR CAR-HOUR

Period of Day	Car Hours per Hour per Period of Day	Increment in "Car-Hours per Hour"	Total Costs per Hour per Period of Day	Increment in Total Costs	Cost per Car-Hour for Period of Day	Costs per Car-Hour for Each Increment in Car Hours per Hour
12 a. m.— 5 a. m.	6,570	.....	$17,322	......	$2.635	$2.635
5 a. m.— 6 a. m.	41,975	35,405	101,778	$84,456	2.420	2.385
8 p. m.—12 p. m.	70,445	28,470	170,436	68,658	2.420	2.410
9 a. m.— 4 p. m.	77,745	7,300	189,612	19,176	2.440	2.620
7 p. m.— 8 p. m.	99,280	21,535	248,676	59,064	2.510	2.745
8 a. m.— 9 a. m.	118,625	19,345	323,059	74,383	2.725	3.840
4 p. m.— 5 p. m.	122,275	3,650	340,673	17,614	2.785	4.825
6 a. m.— 7 a. m.	127,750	5,475	366,206	25,533	2.870	4.655
7 a. m.— 8 a. m.	131,400	3,650	388,058	21,852	2.958	6.000
6 p. m.— 7 p. m.	160,600	29,200	573,459	185,401	3.570	6.350
5 p. m.— 6 p. m.	164,250	3,650	615,449	41,900	3.735	11.500

Note.—This table is based on one year's operation.



TRAFFIC SURVEY—FIG. 1—SHOWING INDEX OF CONCENTRATION OR DEVIATION FROM UNIFORM SERVICE

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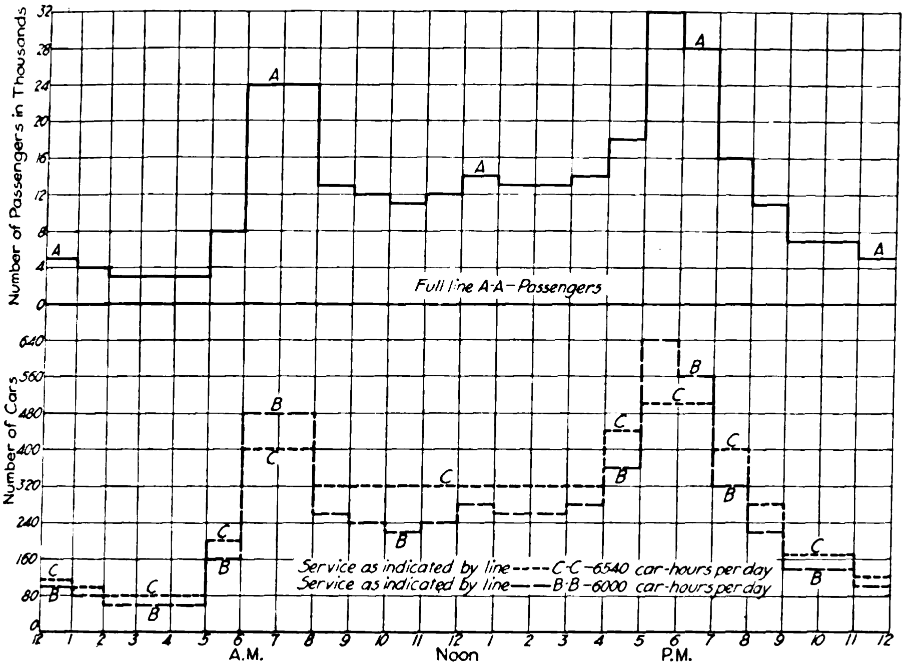
*ELECTRIC RAILWAY JOURNAL, July 17, 1915, page 94.



TRAFFIC SURVEY—FIG. 2—SHOWING HOURLY RELATION BETWEEN PASSENGER TRAFFIC AND SERVICE ON TWO DIFFERENT BASES

exclusion of the time of day at which they occur. Reduced to its simplest terms, the proposition gains force. Compare the cost of operating twenty-four cars between 5 p. m. and 6 p. m. with the cost of operating one throughout the twenty-four hours. This seems too elementary to warrant statement, but it has been so often overlooked, in attempts to regulate service by those unacquainted with the facts, as to make its inclusion here important.

The second way of stating the results of the studies of costs above referred to involves a measure of the concentration of the service rendered as shown by the cars in service at different hours of the day. Assuming as the zero of concentration, from which to measure, a schedule which is uniform throughout the twenty-four hours, it is obvious that 10 per cent of the service is rendered in 10 per cent of the time, 20 per cent of the service in 20 per cent of the time, 70 per cent of the service in 70 per cent of the time, etc. Taking the schedule of cars in use on the lines of a typical company, it was found that in one hour, or 4 1/6 per cent of the time, only 1 per cent of the car-hours occurred; in the six hours when the fewest cars were in service, or 25 per cent of the time, 7 2/3 per cent of the car-hours; in 75 per cent of the time, 52 2/3 per cent of the car-hours, etc. This is shown more fully in Table II. The use of this means of measuring concentration and its relation to cost assumes of course the same general distribution of traffic throughout the day as indicated in Fig. 2.

The sum of the numbers used to measure the amount by which the service varies from uniformity or the index of concentration is 410. A company with a less pronounced peak load would show a smaller figure and one with a peak greater than normal a larger figure than this as a measure of its deviation from uniformity. Fig. 1 shows the results of a series of computations along this line.

The application, to a particular case, of the data from which Fig. 1 was drawn is shown in Fig. 2. The line *A-A* represents passengers and the line *B-B* cars in service at each hour. It will be observed that the line *B-B* follows proportionately the variations in the line *A-A*, keeping constant the relation between service and traffic. Table II, based on the data from which the line *B-B* was drawn, shows the deviation from uniformity to be 410. Assuming that 6000 car-hours distributed as indicated by the line *B-B* exhaust the financial ability of the company to provide service, it will be found by reference to Fig. 1 that if service can be so distributed as to reduce the deviation from uniformity from 410 to 325, the cost per car-hour will be but 92 per cent as great and consequently the number of car-hours which the company is financially able to supply will be 6000 divided by 0.92, or 6540. Service on this basis is shown by the line *C-C*.

It is of interest to note that the 160 car-hours in the morning and the 190 car-hours in the evening, 350 in all, have been replaced with 890, leaving a net gain of 540 car-hours. The distribution of car-hours indicated by the line *C-C* is the more common, but it is immaterial to the company whether, under the conditions stated, 6000 or 6540 car-hours are provided each day. Such redistributions of car-hours as are frequently

TABLE II—SHOWING PERCENTAGE RELATION BETWEEN TIME AND CAR HOURS

Per Cent of Time	Per Cent of Car-hours	Difference	Per Cent of Time	Per Cent of Car-hours	Difference
4 1/6	1	3 1/6	54 1/6	30 1/3	23 5/6
8 1/3	2	6 1/3	58 1/3	34 2/3	23 2/3
12 1/2	3	9 1/2	62 1/2	39	23 1/2
16 2/3	4 1/3	12 1/3	66 2/3	43 1/3	23 1/2
20 5/6	6	14 5/6	70 5/6	48	22 5/6
25	7 2/3	17 1/3	75	52 2/3	22 1/3
29 1/6	10	19 1/6	79 1/6	58	21 1/6
33 1/3	12 1/3	21	83 1/3	64	19 1/3
37 1/2	15	22 1/2	87 1/2	72	15 1/2
41 2/3	18 2/3	23	91 2/3	80	11 2/3
45 5/6	22 1/2	23 1/2	95 5/6	89 1/3	6 1/2
50	26 1/3	23 2/3	100	100	0
Total difference or index of concentration...........					410

TABLE III—SHOWING RELATIVE SERVICE FURNISHED UNDER PLANS INDICATED BY LINES C-C AND B-B IN FIG. 2

		Line C-C in Fig. II Index of Concentration, 324.7 Cost Factor, 92		Line B-B in Fig. II Index of Concentration, 410 Cost Factor, 100	
Hour	Number of Passengers	Number of Cars	Number of Seated Passengers	Number of Cars	Number of Seated Passengers
12— 1 a. m....	5,000	118	4,820	100	4,100
1— 2 a. m....	4,000	100	4,000	80	3,270
2— 3 a. m....	3,000	80	3,000	60	2,450
3— 4 a. m....	3,000	80	3,000	60	2,450
4— 5 a. m....	3,000	80	3,000	60	2,450
5— 6 a. m....	8,000	200	8,000	160	6,550
6— 7 a. m....	24,000	400	16,350	480	19,630
7— 8 a. m....	24,000	400	16,350	480	19,630
8— 9 a. m....	13,000	313	12,800	260	10,630
9—10 a. m....	12,000	313	12,000	240	9,825
10--11 a. m....	11,000	313	11,000	220	9,000
11—12 a. m....	12,000	313	12,000	240	9,825
12— 1 a. m....	14,000	313	12,800	280	11,450
1— 2 a. m....	13,000	313	12,800	260	10,630
2— 3 a. m....	13,000	313	12,800	260	10,630
3— 4 a. m....	14,000	313	12,800	280	11,450
4— 5 a. m....	18,000	440	18,000	360	14,720
5— 6 a. m....	32,000	505	20,650	640	26,170
6— 7 a. m....	28,000	505	20,650	560	22,900
7— 8 a. m....	16,000	400	16,000	320	13,100
8— 9 a. m....	11,000	270	11,000	220	9,000
9—10 a. m....	7,000	170	6,950	140	5,720
10—11 a. m....	7,000	170	6,950	140	5,720
11—12 a. m....	5,000	118	4,820	100	4,100
Total	300,000	6,540	262,540 or 87.5% of total	6,000	245,400 or 81.8% of total

desired by patrons should be considered, however, as depending upon the ability and willingness of the patrons to pay for them, and when there is no other determining factor on the basis of the greatest good to the greatest number.

On the assumption that the line *C-C* represents service sufficient to provide a seat per passenger from 8 a. m. to 4 p. m., it will be of interest to note the relative service furnished under the two plans indicated by the lines *C-C* and *B-B*, as measured by the percentage of passengers seated at the point of maximum loading. Under the method of procedure previously outlined, Table III has been computed and it is found that the advantage of lower off-peak costs has been utilized to seat about 17,000 additional passengers out of 300,000, or 5.6 per cent.

In all the above computations, it is assumed that the average length of ride is the same throughout the day, and that the same routing is employed under both schedules. This permits the quality of service to be measured by the number of passengers standing at the point of heaviest loading. A more critical analysis would consider in addition the miles ridden by standing passengers.

The foregoing is set forth in some detail as furnishing a mental background which is very necessary if the maker of time-tables is not to be drawn into unwise and expensive deviations from what his company can do in the way of providing car-hours without being neglectful of the interests of the capital which makes the transportation industry possible.

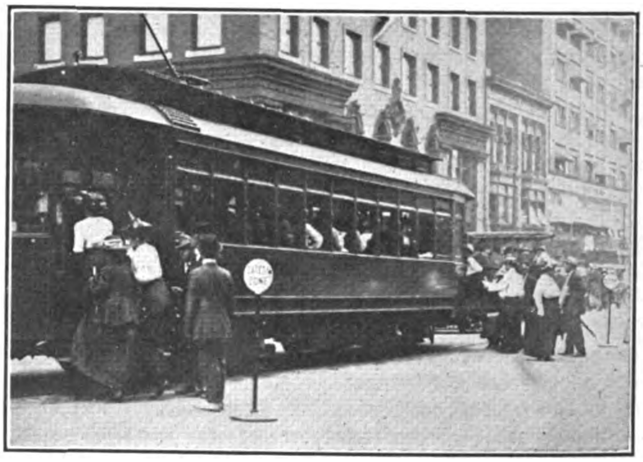
Railway Co-operating to Beautify Towns

Along the Louisville & Eastern division of the Louisville & Interurban Railway there are several suburban towns in which the "community beautiful" movement has been receiving attention. The town of Anchorage, for instance, engaged a landscape architect to make plans for it, while the people harbor a desire to see the railway replace its present station with something more to their liking. O'Bannon's, Pewee Valley and Crestwood, also have their own particular movements. In so far as it is possible the railway is co-operating. R. H. Wyatt, freight and passenger agent of the company, described what the company had done at O'Bannon's to satisfy the people. The station there was located for purely utilitarian purposes. When the landscape gardening fever struck the community Mr. Wyatt was visited by a delegation of citizens who suggested that the station be faced differently. It was agreed that the commuters were right, and a gang of men with jackscrews and rollers relocated the station in a way that met the idea of the landscape artists. Planting around the station grounds and grading of unequal places, etc., is making progress. It is felt that co-operation with the local residents wherever possible is good business for the traction company.

The Fort Wayne & North Indiana Traction Company, Fort Wayne, Ind., is holding safety-first meetings for employees in which recreation, entertainment and instruction are provided. The day employees were taken to Robinson Park recently for an evening outing. James M. Barrett, president of the company, was the principal speaker at this meeting. A meeting was held in the Holman Street carhouse at 12.30 o'clock midnight for the night employees, at which S. W. Greenland, general manager of the company, made an address. Similar meetings will be held by the company at Lafayette, Ind., and Logansport, Ind.

Operation of Safety Zones in Kansas City

"Safety zone" standards were recently set up on several of the downtown crossings of Kansas City, Mo. Their use is being tested, as well as the methods of placing them. Temporarily, they are placed 7 ft. from the nearest rail, and about 50 ft. apart, in pairs, defining a zone within which persons boarding or leaving cars may be safe from vehicle traffic, as shown in the accompanying illustration. It is likely that lines may be painted on the pavement defining the safety zones, and extending to the sidewalks so as to indicate more clearly to pedestrians crossing the road the exact straight course they should take. There is still some confusion among motor car drivers, because of the ordinance prohibiting automobiles from passing a car taking on or discharging passengers, and requiring the automobiles to stop 10 ft. from such a car. The new rules will allow automobiles to pass standing cars, but probably at slow speed. Some streets are so narrow that automobiles cannot safely pass the cars, and in these streets they are being allowed to follow the cars through the zones on the tracks. There was opposition from the police to the installing of the standards, because of the problem of their care at night. However, the police are temporarily caring for the standards, removing them to the sidewalks at night, and replacing them at 8 a. m. It is possible that the standards may be discarded when the lines showing the zones are painted. The present standards are about 5 ft. high, on bases about 16 in. in diameter, with circular white-painted signs on top, bearing the following wording: "Safety Zone," "Load," "Stop." The face "Stop" stands at the point where the motorman stops the front end of the car. The face "Load" is at the rear end. The reverse of each standard bears the words "Safety Zone."


KANSAS CITY SAFETY ZONES IN OPERATION

The crossings at which the safety zones can be established, the width of the zones, and the regulations as to motor car and vehicular traffic are now the subject of study by the experts of the board of control. So far the public has shown timidity about standing in the zones, and an almost unconquerable inclination to wait until the last minute, as under previous conditions, before approaching the car. It is believed, however, that when patrons learn to reach the safety zones by way of the street crossings, and that it will be reasonably safe there while they wait for the car, traffic will be very greatly expedited. The recent growing tendency to disembark by the front doors is an important factor in promoting the utility of the zones, since passengers can immediately mingle with the pedestrian stream at the crossings.

Traffic Investigation in Denver

Counts of All Vehicles and Pedestrians Passing Into and Out of the Business District Showed a Marked Increase of Automobile and Bicycle Traffic Notwithstanding an Actual Decrease in the Total Traffic Compared with That of Last Year

BY ROGER W. TOLL, CHIEF ENGINEER DENVER TRAMWAY COMPANY

In order to obtain information as to the relative importance of the various methods of city transportation in Denver, a traffic investigation was conducted in May, 1915, under the direction of John A. Beeler, vice-president Denver Tramway Company, as a supplement to the investigation of the year before which was reported in the ELECTRIC RAILWAY JOURNAL for Aug. 29, 1914, page 380. As it was desired to investigate traffic conditions on Sunday as well as on a weekday, the recent investigation covered two days, namely, Sunday, May 9, and Tuesday, May 11. The weather was good on both of these days, and the results obtained represent typical traffic conditions.

The basis of the investigation was a count of all persons and vehicles entering and leaving the business district of the city upon the dates selected, the assumed boundaries including the greater part of the retail and wholesale districts of the city as well as a portion of the railroad terminal yards. Observations were taken under the direction of J. D. Rich of the engineering department, and the data collected were also compiled by him. Through the valued co-operation of W. M. Casey, W. H. Seip and J. L. Adams of the transportation department, trainmen were secured as observers, and because of their interest in the work and conscientious attention to duty, the results obtained are accurate and reliable.

It was desired to make a complete count of all traffic entering and leaving the entire district in a single day, and as the number of available observers was limited, it was necessary to use a long shift. Thirty-nine men were on duty for a continuous eighteen-hour period from 6 a. m. until midnight. In order to provide for meals and short rests, a relief, consisting of four men, was maintained from 9 a. m. until midnight. Each relief man was assigned to a certain number of the observers, each of whom he relieved three times during the eighteen hours for a period of one-half hour.

Thirty-eight thoroughfares cross the assumed boundaries of the business district. In the case of a few streets with very light traffic, one observer could record the traffic on two streets, but as a rule a man was stationed at each street entering the district, and, owing to particularly heavy traffic, two simultaneous observers were placed at each of the four busiest locations, and by dividing the work reliable results were secured. Observations were recorded in half-hour periods throughout the eighteen-hour day. To make the data comparable to the data on street car passengers, children under six years old were not counted.

NUMBER OF PERSONS INBOUND AND OUTBOUND

Table I shows the number of persons entering and leaving the business district by each method of transportation, exclusive of street cars, on Sunday, May 9, and Tuesday, May 11, respectively. The excess of inbound pedestrians over outbound pedestrians was 5261, which agrees closely with last year's results and indicates that more people walk to business than walk home.

Table II shows a comparison of the Sunday and Tuesday traffic as to the total number of persons entering and leaving the business district, exclusive of street car traffic. This table shows the large increase of passenger automobile traffic on Sunday, amounting to 41.6 per cent, and also the decrease of freight traffic, both automobile and horse-drawn, amounting respectively to 77.7 per cent and 83.8 per cent. The great decrease in bicycle traffic, amounting to 59.3 per cent, shows that most of the bicycles are not used for pleasure, but primarily either for transportation to and from work or for business purposes. A large part of the bicycles are used by messenger boys and delivery boys.

Table III shows a comparison of the records obtained last year and this year, relative to the total number of persons counted. An increase of 6.8 per cent is shown in the total number of persons entering and leaving the business district, exclusive of street car traffic. A considerable variation is to be expected from one day to another, in the same month, due to weather and other conditions, and therefore too great weight should not be given to this increase in any general conclusion regarding the two years. However, a comparison of the results of the two days is very valuable. The total number of persons in passenger automobiles shows an increase of 53 per cent and the number of persons in freight automobiles increased 46 per cent. Much smaller gains are shown in the motorcycle traffic and bicycle traffic, while the horse-drawn traffic, both passenger and freight, and the pedestrians count have each decreased by a small percentage. The comparison, as a whole, shows a decided increase in automobile transportation.

TABLE I—INBOUND AND OUTBOUND STREET TRAFFIC—PERSONS

Means for Transportation	Sunday, 5/9/15		Tuesday, 5/11/15	
	Inbound	Outbound	Inbound	Outbound
Passenger autos	32,798	33,104	23,408	23,117
Freight autos	569	650	2,658	2,795
Motorcycles	2,227	2,248	2,072	2,115
Bicycles	4,221	4,323	10,393	10,558
Passenger horse-drawn vehicles	2,333	2,344	2,350	2,118
Freight horse-drawn vehicles	1,874	1,878	11,529	11,593
Pedestrians	53,155	48,331	54,081	48,820

TABLE II—SUNDAY AND WEEKDAY TRAVEL—PERSONS—1915

Means for Transportation	Sunday, 5/9/15		Tuesday, 5/11/15		Increase		Decrease	
	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent
Passenger autos	65,902	34.7	46,525	22.4	19,377	41.6	......	....
Freight autos	1,219	0.6	5,453	2.9	......	....	4,234	77.7
Motorcycles	4,475	2.4	4,187	2.2	288	6.9	......	....
Bicycles	8,544	4.5	20,951	10.1	......	....	12,407	59.3
Passenger horse-drawn vehicles	4,677	2.5	4,468	2.2	209	4.7	......	....
Freight horse-drawn vehicles	3,752	1.9	23,122	11.1	......	....	19,370	83.8
Pedestrians	101,486	53.4	102,901	49.6	......	....	1,415	1.2
Total	190,055	100.	207,607	100.	......	....	17,552	8.5

TABLE III—COMPARISON OF WEEKDAY TRAVEL—PERSONS—1914-1915

Means for Transportation	Tuesday, 5/5/14		Tuesday, 5/11/15		Increase		Decrease	
	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent
Passenger autos	30,804	15.9	46,525	22.4	15,721	51.0	......	....
Freight autos	3,735	1.9	5,453	2.9	1,718	46.0	......	....
Motorcycles	3,923	2.0	4,187	2.2	264	6.7	......	....
Bicycles	18,950	9.3	20,951	10.1	2,001	10.5	......	....
Passenger horse-drawn vehicles	4,710	2.4	4,468	2.2	......	....	242	5.1
Freight horse-drawn vehicles	25,344	13.5	23,122	11.1	......	....	2,222	8.8
Pedestrians	106,990	55.0	102,901	49.6	......	....	4,089	3.8
Total	194,456	100.	207,607	100.	13,151	6.8	......	....

The number of vehicles entering and leaving the business district was recorded, as well as the number of persons in the vehicles. Table IV shows the vehicular count on May 9 and May 11, and Table V shows a comparison of the totals of the vehicle count on these two days, together with the average number of persons carried by each class of vehicle. The marked decrease in the use of freight vehicles, both motor and horse-drawn, is to be expected on Sunday. The large decrease in the use of bicycles, above referred to, may also be noted. The use of passenger horse-drawn vehicles also decreased on Sunday, showing that this class of transportation is used more for business purposes than pleasure.

The number of passenger automobile trips and motorcycle trips remained about the same, numerically, on Sunday as on the weekday count, but it was very evident that their use on Sunday was largely for pleasure trips. This is also indicated by the increased number of passengers per vehicle on Sunday for both autos and motorcycles. Incidentally, the number of vehicles of each class entering and leaving the business district in any one day should balance almost exactly, and Table IV furnishes a good indication of the degree of accuracy obtained in the traffic count.

Table VI gives a comparison between the vehicle counts obtained last year and this year. The total trips on Tuesday, May 11, this year show an increase of 12.7 per cent over the total trips of last year. The number of passenger automobile trips shows 38.6 per cent increase, and the number of freight automobile trips shows an even greater percentage of increase. Motorcycles and bicycles show small increases, but horse-drawn vehicles, both passenger and freight, show a decrease. These comparisons are closely analogous to the comparisons, for the two years, of the total number of persons, as shown in Table III. In each case, the number of passengers per vehicle is nearly the same for both years.

The passenger automobile is shown as the most numerous class of vehicle, with the bicycle in second place and the horse-drawn freight vehicle in third place. Last year the horse-drawn freight vehicle had first place, the bicycle second place and the passenger automobile third place.

The ratio of the motorcycle trips to the bicycle trips is 1 to 5.6 as compared with the ratio last year of 1 to 5.4. This indicates that the bicycle is holding its own as compared with the motorcycle. The ratio of the freight auto trips to the passenger auto trips is 1 to 6.1, as compared with the ratio of last year, which was 1 to 6.5. Of the horse-drawn vehicle trips, 86 per cent were for freight purposes, which is the same percentage as that of last year. Of the total vehicle trips, 31 per cent were for freight purposes, as against 35 per cent for last year. Contrary to last year's records, the automobile trips are in excess of the horse-drawn vehicle trips, being 37 per cent of the total number of vehicles, as compared with 30 per cent for the horse-drawn vehicles. Last year, these percentages were exactly reversed.

The accompanying chart shows graphically the number of persons entering and leaving the business district during each half hour of the day for each method of transportation on Sunday, May 9, 1915. This indicates that the Sunday peak for automobiles occurred at about 5 p. m., but that the peak for pedestrians was not reached until nearly three hours later.

TABLE IV—INBOUND AND OUTBOUND STREET TRAFFIC—VEHICLES

Class of Vehicle	Sunday, 5/9/15		Tuesday, 5/11/15	
	Inbound	Outbound	Inbound	Outbound
Passenger autos	11,848	11,938	11,980	11,904
Freight autos	350	396	1,874	2,013
Motorcycles	1,653	1,665	1,786	1,830
Bicycles	3,898	4,245	10,388	10,503
Passenger horse-drawn vehicles	1,218	1,211	1,684	1,533
Freight horse-drawn vehicles	1,375	1,412	9,455	9,636

TABLE V—SUNDAY AND WEEKDAY TRAVEL—VEHICLES—1915

Class of Vehicle	Sunday, 5/9/15		Tuesday, 5/11/15		Increase		Decrease		Average Number of Persons per Vehicle	
	Vehicles	Per cent	Vehicles	Per cent	Vehicles	Per cent	Vehicles	Per cent	5/9/15	5/11/15
Passenger autos	23,786	57.7	23,884	32.0	..	..	98	0.4	2.77	1.95
Freight autos	746	1.8	3,887	5.2	..	..	3,141	80.8	1.63	1.40
Motorcycles	3,318	8.0	3,616	4.9	..	..	298	8.2	1.35	1.16
Bicycles	8,143	19.8	20,891	28.0	..	..	12,748	61.1	1.05	1.00
Passenger horse-drawn vehicles	2,429	5.9	3,217	4.3	..	..	788	24.5	1.93	1.39
Freight horse-drawn vehicles	2,787	6.8	19,091	25.6	..	..	16,304	84.5	1.35	1.21
Total	41,209	100.	74,591	100.	..	..	33,382	44.8	2.15	1.40

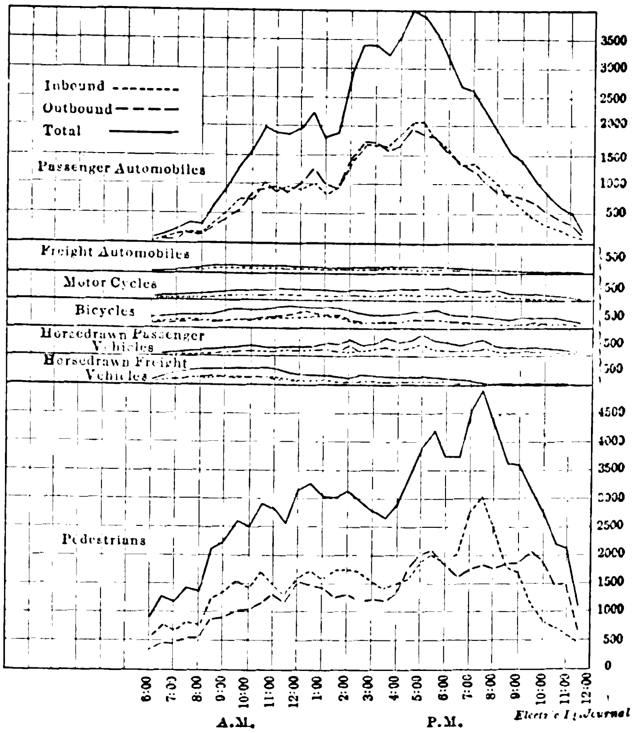
TABLE VI—COMPARISON OF WEEKDAY TRAVEL—VEHICLES—1914-1915

Class of Vehicle	Tuesday, 5/5/14		Tuesday, 5/11/15		Increase		Decrease		Average Number of Persons per Vehicle	
	Vehicles	Per cent	Vehicles	Per cent	Vehicles	Per cent	Vehicles	Per cent	5/5/14	5/11/15
Passenger autos	17,212	26.0	23,884	32.0	6,672	38.8	....	...	1.79	1.95
Freight autos	2,630	4.0	3,887	5.2	1,257	47.8	....	...	1.42	1.40
Motorcycles	3,452	5.2	3,616	4.9	164	4.8	....	...	1.14	1.16
Bicycles	18,667	28.2	20,891	28.0	2,224	11.9	....	...	1.01	1.00
Passenger horse-drawn vehicles	3,459	5.2	3,217	4.3	.....	....	242	7.0	1.36	1.39
Freight horse-drawn vehicles	20,747	31.4	19,091	25.6	.....	....	1656	8.0	1.22	1.21
Total	66,167	100.	74,591	100.	8,424	12.7	....	...	1.47	1.40

CAR TRAFFIC

The best statistics that are available for comparison with street traffic are the figures of total passengers carried in the city, regardless of the business district. This comparison, while it is the best available, is on a somewhat different basis, since a certain proportion of the passengers carried on cars do not enter the business district. The car data, therefore, included all of that class of traffic in the entire city, while the street traffic data are confined to that crossing the boundaries of the business district.

The total passengers carried by the city cars on May 9 and 11 of this year were as follows: Sunday, May 9,



DENVER TRAFFIC—CHART SHOWING NUMBER OF PERSONS ENTERING AND LEAVING BUSINESS DISTRICT DURING SUNDAY

TABLE VII—COMPARISON OF RAILWAY AND STREET TRAFFIC—SUNDAY AND WEEKDAY
Totals of Persons on Sunday, May 9, 1915, and Tuesday, May 11, 1915

Method of Transportation	Sunday, 5/9/15		Tuesday, 5/11/15		Increase		Decrease	
	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent
Street cars	201,005	51.4	183,888	46.9	17,117	9.3	......	....
Passenger autos	65,902	16.8	46,525	11.9	19,377	41.6	......	....
Freight autos	1,219	0.3	5,453	1.4	......	....	4,234	77.7
Motorcycles	4,475	1.1	4,187	1.1	288	6.9	......	....
Bicycles	8,544	2.2	20,951	5.4	......	....	12,407	59.3
Passenger horse-drawn vehicles	4,677	1.2	4,468	1.1	209	4.7	......	....
Freight horse-drawn vehicles	3,752	1.0	23,122	5.9	......	....	19,370	83.8
Pedestrians	101,486	26.0	102,901	26.3	......	....	1,415	1.2
Total	391,060	100.	391,495	100.	......	....	435	0.1

TABLE VIII—COMPARISON OF RAILWAY AND STREET TRAFFIC—1914-1915
Totals of Persons on Tuesday, 5/5/14, and Tuesday, 5/11/15

Method of Transportation	Tuesday, 5/5/14		Tuesday, 5/11/15		Increase		Decrease	
	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent
Street cars	201,794	50.9	183,888	46.9	......	....	17,906	8.9
Passenger autos	30,804	7.8	46,525	11.9	15,721	51.0	......	....
Freight autos	3,735	0.9	5,453	1.4	1,718	46.0	......	....
Motorcycles	3,923	1.0	4,187	1.1	264	6.7	......	....
Bicycles	18,950	4.8	20,951	5.4	2,001	10.5	......	....
Passenger horse-drawn vehicles	4,710	1.2	4,468	1.1	......	....	242	5.1
Freight horse-drawn vehicles	25,344	6.4	23,122	5.9	......	....	2,222	8.8
Pedestrians	106,990	27.0	102,901	26.3	......	....	4,089	3.8
Total	396,250	100.	391,495	100.	......	....	4,755	1.2

1915, 201,005 passengers; Tuesday, May 11, 1915, 183,888 passengers.

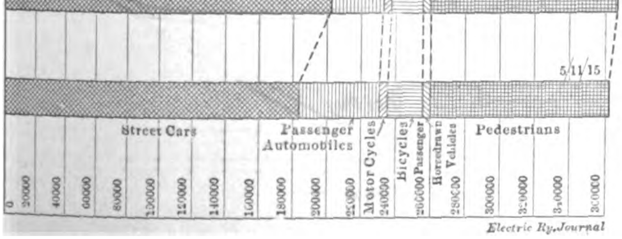
As noted above, no observations were taken of the street traffic between the hours of midnight and 6 a. m. It is estimated that only 1 per cent of the total traffic for the twenty-four hours passes in and out of the business district during this six-hour period, so that the figures obtained for the street traffic represent 99 per cent of the total for the twenty-four-hour day.

Regarding the effect of weather conditions upon street traffic and car passengers, some observations were taken on two successive Sundays in May, the first being cold and windy and the second warm and mild. On the pleasant Sunday there was an increase of 11.1 per cent in the number of passengers carried on the street cars, and an increase of 32.8 per cent in the number of persons traveling by other methods.

It therefore seems that while the weather has a decided effect upon Sunday street car travel, its effect upon other methods of travel is still more pronounced.

Table VII shows a comparison of the total traffic on Sunday, May 9, and Tuesday, May 11, of this year. The number of passengers carried by the cars in the entire city is combined with the total street traffic in and out of the business district. An interesting coincidence is seen in the fact that the total number of persons traveling on these two days is almost identical. With the population of Denver in the neighborhood of 200,000, the above total represents an average of one trip in and out of the business district per person per day.

Table VIII shows a similar combination and comparison for Tuesday, May 5, of last year and Tuesday, May 11, of this year. As will be noted in this table, the total travel is 1.2 per cent less for 1915 as compared with 1914, the car travel on these two days showing a decrease of 8.9 per cent for 1915, and the total street traffic showing an increase of 6.8 per cent over the previous year.



DENVER TRAFFIC—GRAPHIC COMPARISON OF WEEKDAY TRAVEL, EXCLUSIVE OF THAT IN FREIGHT VEHICLES

On Tuesday, May 5, 1914, the total number of persons carried on the street cars and in passenger automobiles was 232,598. Passenger automobiles carried 13.2 per cent and the street cars 86.8 per cent of this number. On Tuesday, May 11, 1915, the total number of persons carried by these two methods of transportation was 230,413, passenger automobiles carrying 20.2 per cent and street cars 79.8 per cent. On Sunday, May 9, 1915, the total number of persons carried by these two methods was 266,907, passenger automobiles carrying 24.8 per cent and street cars 75.2 per cent.

The number of persons carried by the street cars, expressed as a multiple of the number of persons carried by passenger automobiles, is as follows: Tuesday, May 5, 1914, 6.6; Tuesday, May 11, 1915, 3.9; Sunday, May 9, 1915, 3.1.

AUTOMOBILE TRAFFIC

It may be assumed that the number of automobiles in use in Denver at the time of the traffic count was the same as the number registered by owners at that time, namely, 6000. This is an increase of 1372 over the corresponding figures of 4630 for the previous year, the number of motorcycle licenses being 927 in 1914 and 944 in 1915.* The vehicle count on Tuesday, May 11, showed the total number of automobile trips in and out of the city as 27,771. The percentage of trips made by freight automobiles was 14 per cent of the total automobile trips. Freight autos make more trips per day, in and out of the business district, than passenger automobiles do, and it is assumed that 7 per cent of the total autos are freight vehicles. This is consistent with the figures of the United States Census Bureau, that from 4 per cent to 7 per cent of the automobiles produced are for freight purposes. Therefore, the number of passenger automobiles in use in Denver is 93 per cent of 6000, or 5580. Roughly speaking, the average passenger automobile makes two round trips, or four single trips, per day in and out of the business district, and carries two people per trip, making a total of eight passenger trips per day. The exact figures for Tuesday, May 11, establish the average number of single trips per day at 4.27, the average number of passengers per trip at 1.95, and the average number of passengers per day at 8.35, as compared with 7.1 for last year. Both the number of trips per auto per day and the number of passengers carried have increased.

If this average rate of 8.35 passengers per day is maintained through the year, an auto would carry 3000 passengers per year.

Assuming the population of Denver at 200,000 and the number of passenger automobiles in use at 5580, there is an average of one auto to every thirty-six persons, or one to every eight families.

A "Denver Automobile Directory" has been published, containing the registration number, name and address of owner, and make of automobile, for all 1915 registrations up to March 13. This directory contains 5340 registrations, and it shows that the business district has the most dense ownership owing to the many machines owned by firms for business purposes, in either freight or passenger service. Of the 5340 autos, 1317, or 25 per cent, are Fords, the figures for the entire United States showing that 33 per cent of the cars in use are Fords. Comparison of a map showing distribution of population with one showing location of automobiles indicates that the distribution of automobiles is in general similar to the distribution of the population.

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*There are no jitneys in Denver. [EDS.]

Mesaba Railway's New Repair Shops and Office Building

These New Buildings Replace Those Which Were Destroyed by Fire in November, 1913, and Contain a Number of Interesting Features—Details of Construction and Description of the Various Shops Are Given

BY GOTHARD SARGL, SUPERINTENDENT OF CONSTRUCTION CLEVELAND (OHIO) CONSTRUCTION COMPANY

After a year in temporary quarters following the disastrous fire which destroyed the shops and office building, the Mesaba Railway office and repair force is now housed in new quarters. Situated on the frontier of Minnesota, 80 miles north of Duluth, the nearest city of any size, the Mesaba Railway, a 35-mile interurban road, connects a number of villages and mine locations in the Mesaba Iron Range. The construction features of this road were described in the Jan. 10, 1914, issue of the ELECTRIC RAILWAY JOURNAL on page 68.

REPAIR SHOP CONSTRUCTION DETAILS

Essentially the new layout conformed to the original plan in that the foundations of the original repair shop were used and a separate office and dispatcher's building constructed. In addition, a paint shop, also in a separate building and more than 60 ft. away from the repair shop, was also provided.

The new repair shop is a brick, steel and concrete structure, 86 ft. x 122 ft. in plan. This area is divided into a car-storage bay and repair and machine-shop bay a portion of which is given over for a storeroom and a heating plant. A 13-in. fire wall extending 3 ft. above the roof separates the car-storage bay from the repair-shop bay. Trackage in each of these sections provides for the storage of four cars, and all of the car-storage space in the repair-shop bay is constructed over repair pits.

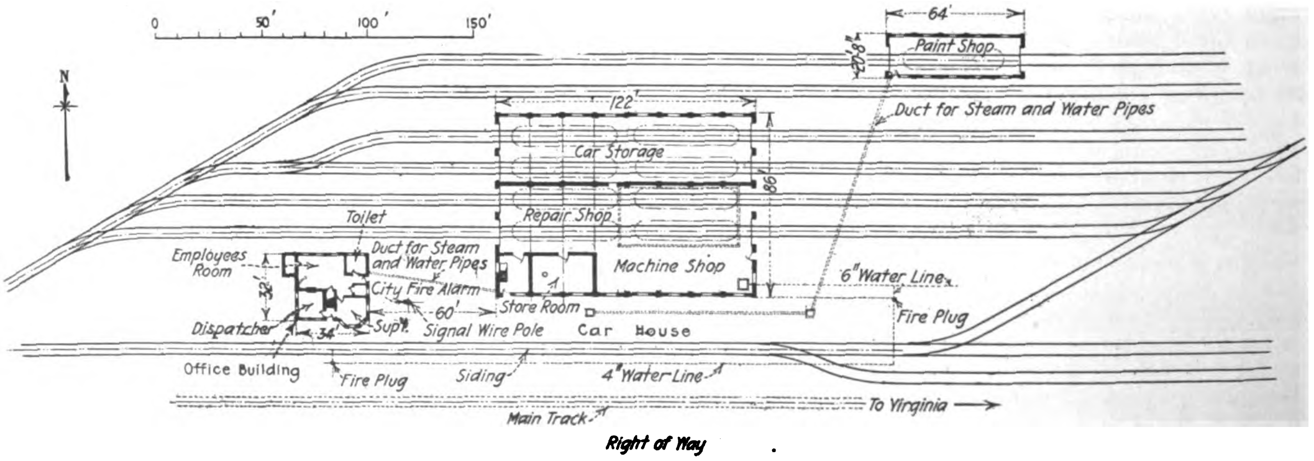
Following the fire the original pits were restored with timber which was permitted to remain in the new structure. These pits were extended, however, so that storage space was provided for four cars. The pits in this extension are of concrete construction, and it is contemplated that later the old wooden pits will be replaced with others built of concrete. Experience during the first winter in this extremely cold climate demonstrated that additional pit area was necessary to thaw out the cars. To minimize the time required to thaw out the frozen car equipment, however, radiation considerably in excess of that ordinarily required was installed on the pit walls.

Steel trusses supported on the brick walls span each bay, and in the intervals between these are concrete roof slabs reinforced with Ferroinclave and carried on steel purlins. These slabs are 1⅜ in. thick, formed of 1 in. of concrete on the upper side of the reinforcement, ⅜ in. on the under side and covered with a five-ply tar and gravel roofing. Eight flat wire-glass skylight openings were provided in the roof along the fire wall to provide a uniform natural illumination in all parts of the building. A liberal spacing of windows in the side and end walls of the repair shop section insures ample natural illumination in all parts of the machine shop. The four car door openings at each end of the building are 12 ft. wide by 16 ft. 6 in. high and are equipped with Kinnear rolling steel doors. The openings in the fire wall between the two bays and those leading to the storeroom and boiler room are fitted with standard Underwriter's fire doors.

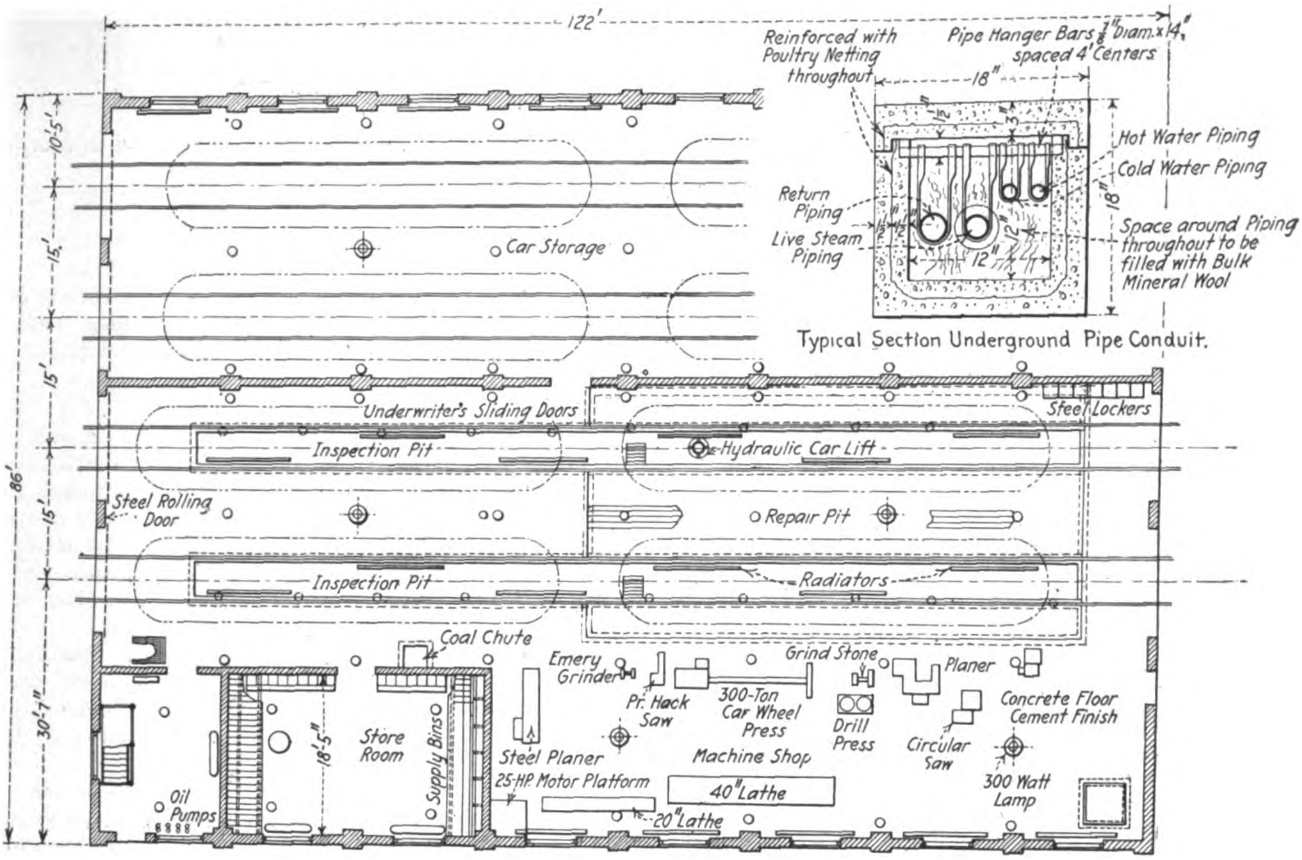
Three 2-in. hose connections with hose and racks were installed in the repair shop building, and two standard fire hydrants were provided in the storage yard adjoining the building. In addition to these a Gamewell fire-alarm box connected to the Virginia city fire alarm system was installed near the office building so that the city fire department may be called. Water is supplied to the fire-protection system through a 6-in. water main which connects to the city water system.

ARRANGEMENTS OF SHOPS AND EQUIPMENT

Conveniently located in the repair-shop bay beside the repair pits in a space 25 ft. wide by 75 ft. long is the machine shop. This contains the usual machine tool equipment necessary to handle all repair work, all driven from an overhead line shaft which is belted to a 25-hp. three-phase, 600-volt induction motor. Energy is supplied to this motor through a three-phase line from the company's power house. The hoists in the repair shop include a hydraulic lift for handling armatures, motors and truck parts, and two 8-ton Yale & Towne chain blocks suspended from one of the roof trusses and used for lifting car bodies.



MESABA REPAIR SHOPS—GENERAL PLAN OF PROPERTY


122'
Reinforced with Poultry Netting throughout
Pipe Hanger Bars 1/2" Diam. x 14", spaced 4' Centers
18"
Hot Water Piping
Cold Water Piping
Return Piping
Live Steam Piping
Space around Piping throughout to be filled with Bulk Mineral Wool
12"
18"
Typical Section Underground Pipe Conduit.
10'-5"
15'
15'
15'
86'
30'-7"
Car Storage
Underwriter's Sliding Doors
Steel Lockers
Inspection Pit
Hydraulic Car Lift
Steel Rolling Door
Repair Pit
Radiators
Inspection Pit
Coal Chute
Emery Grinder
Grind Stone
Planer
Pr. Hack Saw
300-Ton Car Wheel Press
Drill Press
Concrete Floor Cement Finish
Store Room
18'-5"
Supply Bins
Steel Planer
25 HP Motor Platform
Machine Shop
Circular Saw
300 Watt Lamp
40" Lathe
20" Lathe
Oil Pumps

MESABA REPAIR SHOPS—PLAN OF SHOPS AND SECTION THROUGH PIPE CONDUIT

Energy for lighting is obtained from the 600-volt, single-phase motor service which is stepped down to 110 volts through a 7½-kva. transformer. All wiring in the carhouse is installed in conduit, and tungsten lamps on brewery cord drops furnish individual illumination. In addition to these six 300-watt nitrogen-filled lamps with Abolite shades were installed in the repair shop and car-storage bay for general illumination. All the lighting circuits are controlled from a cabinet situated in the passageway beside the storeroom.

Installed in the basement below the storeroom is a low-pressure heating plant of sufficient capacity to heat the repair shop, paint shop and office building, as well as the manager's residence, which is situated about 600 ft. from the carhouse. All radiation is of the wall type, except that in the storeroom and passageway, and is so installed on the walls and between the columns that the radiators occupy very little floor space. The radiation in the pits is fastened to the concrete walls and to the supporting timbers of the wooden constructed section. A hot water tank in the boiler room supplies the office and paint shop. In one corner of the boiler room four Bowser oil tanks containing lubricating and signal oils have been installed. These tanks are equipped with measuring pumps located on the main floor.

Situated about 60 ft. from the repair shop building is a brick and concrete paint shop, 20 ft. 8 in. x 64 ft. in size. The walls of this building are 9 in. thick with 4-in. x 26-in. pilasters, and the roof is a 3-in. reinforced-concrete slab supported on ten 9-in. I-beams and covered with a five-ply tar and gravel roof. Suitable ventilation is supplied by three Ohio Blower Company's 16-in., Swartwout, rotary ball-bearing ventilators. The size of this building is just sufficient to accommodate one car, one track of the yard lay-out passing through the building. The track entrances to this building are fitted with Kinnear steel rolling doors, and the window openings are equipped with Fenestra steel sashes glazed with ⅛-in. ribbed glass. Other construction details include concrete floors, wooden trolley trough and ten drop lights wired in conduit. Three attachment plug outlets on the side walls were supplied for extension cord connections.

OTHER FEATURES

The new office building is a two-story frame and brick structure situated 60 ft. from the car repair shop building. An unusual feature in the construction of this building was the provision of an entirely fireproof room to contain the dispatcher's equipment. This room is surrounded with 9-in. brick partition walls and has a reinforced-concrete ceiling and sub-floor. Openings from this room to the interior building are protected with Kinnear steel rolling fire doors. Added importance is given the protection of the dispatcher because his outfit includes a Simmen automatic railway signal dispatcher's board.

To protect the records of the road a 5-ft. 9-in. x 8-ft. 8-in. reinforced-concrete vault occupies one corner of the office building and extends the full height of the two floors. In connection with this vault it is interesting to note that the one now serving the first floor was formerly on the second floor of the original office building. At that time this vault was supported on steel columns and during the fire it fell from the second story to the ground. This caused no apparent injury and all the records in the vault were fully protected.

An interesting feature in connection with the electric wiring of the office building, as well as the manager's residence, is that the wiring provides for electrical heating. Separate circuits in conduit run from the lighting cabinet to baseboard receptacles in each office room. To these ordinary car bank-heaters are connected during the cold spring and autumn days when steam heat is unnecessary but some heat is required in the office and residence.

Digest of Jitney Ordinances*

Fundamental Provisions and Important Details of Ordinances for the Regulation of Jitney Traffic in American Cities Are Abstracted and Compared

BY CLYDE LYNDON KING, PH.D.

This digest was made from ordinances sent to The Utilities Bureau in response to a request made to the mayor of every city and town of considerable size in the United States. The ordinances used have all been received since June 15. The text gives as succinctly as possible the provisions found in the ordinances of the various cities, the names of which are, for each provision, given in the foot-notes.

A typical definition of the jitney or the motor bus, as regulated by these ordinances, is found in the jitney ordinance of Dallas, Tex. This ordinance makes subject to its provisions and the rulings of the authorities made thereunder "any automobile, auto truck or trackless motor vehicle engaged in the business of carrying passengers for hire within the city limits of Dallas, which is held out or announced by sign, voice, writing, device or advertisement, to operate or run, or which is intended to be operated or run, over a particular street or route, or to any particular or designated point or between particular points, or to or within any designated territory, district or zone." Many of the ordinances, as does that of Spokane, Wash., specifically exclude cabs, taxicabs, automobiles for hire, stages running on regular schedules and used exclusively for transporting passengers from points outside of the city, sight-seeing buses, hotel buses, hearses, ambulances, pall-bearers' vehicles, and railway or street cars.

The usual method by which regulation is assured is that of requiring the owner or operator of each such vehicle to secure a permit or license[1] as a prerequisite to the privilege of using the streets and other public places as a common carrier. As pay for this supervision, or as a source of revenue to the city, or both, license fees are required, though these are so evidently exorbitant in some instances as to raise the presumption that they are more a means for abolishing the jitney than regulating it.

LICENSE FEES AND OTHER CHARGES

License fees are occasionally designated as definite sums to be paid annually, regardless of the seating capacity of the vehicle. In the larger majority of the ordinances, however, the amounts of the license fees are very properly based on seating capacity, as the relation between seating capacity and wear and tear on streets, as well as earning power, is quite direct. Where the ordinances require flat-rate license fees, the sums specified include: $5,[2] $10,[3] $25,[4] $30,[5] $50,[6] $60[7] and $75.[8] In general, when based on seating capacity, the license fees range from $25 for a car carrying five or less to $200 for cars carrying more than sixteen.[9]

In addition to the annual license fees certain other charges incidental thereto are sometimes required. These charges are 50 cents,[10] $1,[11] $2[12] and $2.50.[13]

BONDS OR INSURANCE POLICIES

Bonds or insurance policies are often required as a protection against injury of persons or destruction of property. These bonds are usually conditioned, as in Utica, N. Y., that "licensees will indemnify and save harmless the city of Utica, N. Y., and its officers or agents, from any and all causes and actions, and the costs and expenses of defending same, growing out of the operation of motor-propelled vehicles . . . " and "satisfy any and all judgments by any person, firm or corporation for personal injury or property damage caused by the operation of said licensed vehicle, upon, in and over the streets and public places of Utica, N. Y.'"[14]

Not all the cities by any means require bonds or insurance policies.[15] The amounts of the bonds or insurance policies in the ordinances of two cities[16] are stated to be such as are "reasonable." The amounts designated in other cities include: $1,000,[17] $2,000,[18] $2,500,[19] $5,000[20]

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*Reprinted from *The Utilities Magazine*, July, 1915, by permission of The Utilities Bureau, Philadelphia, Pa.

[1] In Denver, Col., a franchise is required.

[2] Orange, N. J.; Battle Creek, Mich.; Staunton, Va. (the fee is $6); Little Rock, Ark.

[3] Lansing, Mich. ($5 for the second and $2 for each additional vehicle); Warren, Pa. (hacks only—no jitneys).

[4] Ashtabula, Ohio; Ocean City, Passaic, N. J. ($5.50 per year for automobile hacks); Fulton, N. Y.

[5] Norfolk, Va.

[6] Pueblo, Col.; El Paso, Tex.

[7] Oakland, Cal.

[8] Dallas, Tex.

[9] The license fees based on carrying capacity are as follows for various cities: Davenport, Ia., seven or less, $25; seven, $35; seven or more, $50; Utica, N. Y., five or less, $75; five to eight, $100; eight to sixteen, $150; sixteen or more, $200; Augusta, Ga., five or less, $25; five to seven, $35; seven or more, $50; Austin, Tex., five or less, $50; seven or less, $75; eight or more, $100; Joplin, Mo., five or less, $10; five to eight, $15; seven to thirteen, $20; twelve to seventeen, $25; sixteen to twenty-six, $35; more than twenty-five, $40; Oklahoma City, Okla., eight or less, $50; eight to twelve, $75; twelve or more, $150; Syracuse, N. Y., five or less, $75; five to ten, $100; ten to fifteen, $125; more than fifteen, $150; Huntington, W. Va., four or less, $50; five or more, $75; Tulsa, Okla., $5 for each passenger seat with a minimum of $20; Schenectady, N. Y., as many times $5 as number of passengers, with a minimum of $25; Galveston, Tex., five, including driver, $30; five to seven, including driver, $35; more than seven, including driver, $45; Grand Rapids, Mich., $3.50 for each passenger, maximum fee, $50, payable in advance; Louisville, Ky., eight or less, $10; nine to fifteen, $20; more than fifteen, $25; Pasadena, Cal., five or less, including driver, $30; more than five, less than eight, $35; more than seven, less than sixteen, $45; more than fifteen, less than thirty, $55; thirty persons or more, $75; Providence, R. I., $5 per seat exclusive of driver's seat, maximum fee, $50; if route extends into another town requiring license, fee of $3 per seat; Little Rock, Ark., per month, five to seven, including chauffeur, $3; eight to twelve, $6; twelve or more, $8; San Antonio, Tex., seven seats or less, $25; each seat more than seven, $3.50; Fresno, Cal., five or less, including driver, $40; five or more, $50; more than seven less than sixteen $60; more than fifteen, less than thirty, $75; thirty or more, $100; Portland, Ore., per month, seven or less, $2; more than seven, $2, and 25 cents for each seat in excess of seven; Long Beach, Cal., six or less, including driver, $25; more than six and less than ten, $30; more than nine and less than sixteen, $35; more than sixteen and less than thirty, $75; Fort Smith, Ark., $20 per year, $12.50 for six months, payable in advance; Tacoma, Wash., per month, five persons or less, $1; more than five, 25 cents in addition to $1 for each additional seat; driver's license, $1; renewal of driver's license, $1; transfer of license, 50 cents; Ogden City, Utah, not exceeding five, $75; five to ten, $100; ten to twenty, $150, payable in advance; if route extends beyond limits of city license fee shall be $25 per annum; driver must pay $1 for permit and badge; Fort Worth, Tex., change of license, 50 cents; five or less, including driver, $10; seven or less, more than five, $20; more than seven, $30.

[10] Pueblo, Col.; Tacoma, Wash. (for transfer of license); Fort Worth, Tex. (for changing license); Grand Rapids, Mich.; Oakland, Cal.

[11] Schenectady, N. Y. (driver's license); Providence, R. I.; Augusta, Ga. (for badge); Los Angeles, Cal.; Dallas, Tex. (for substituting one car for another, altering cars or losing license plate); Ogden City, Utah ($1 for permit or badge).

[12] Birmingham, Ala.; Tacoma, Wash.

[13] Seattle, Wash., and Spokane, Wash. (renewal, $1; reissue, $1.50); El Paso, Tex. (for changing route or termini, $2.50, and for examination, $2.50).

[14] The ordinance of Louisville, Ky., requires that the bond be conditioned that the person injured or having his property damaged through defect or negligence in operation has a right to action; that the applicant pay all sums due the city, such as licenses, taxes, fines and forfeitures, and indemnify the city against any loss and damages for accidents.

[15] Salem, Mass.; Dallas, Tex., and Portland, Ore., do not, among others.

[16] Pine Bluff, Ark., and Fitchburg, Mass. (determined by Mayor or Board of Aldermen).

[17] Lansing, Mich. (conditioned on observing provisions of charter and ordinance and duties of common carrier).

[18] Little Rock, Ark., and Fort Smith, Ark.

[19] Fort Worth, Tex.; Austin, Tex. ($2,500 to any one person, and $5,000 for all damages on account of death or injuries of all persons occurring in one accident).

[20] Huntington, W. Va.; Louisville, Ky.; San Antonio, Tex.

and $10,000.[21] Other cities base the amount of the bond or insurance policy on the carrying capacity of the respective cars.[22]

QUALIFICATIONS OF DRIVERS

Proper qualifications for drivers are assured in the great majority of ordinances by requiring at least that the application for the license or permit shall indicate for all chauffeurs the name, age, residence, address, previous addresses, length of residence in each, whether previously engaged in transporting passengers for hire, nationality, married or single, and experience in driving.[23] In addition to this a few cities definitely require testimony of two citizens, or other similar evidence, as to the moral character of the driver.[24] With one exception,[25] the age limits, if stated in the ordinances, are either eighteen years of age or more,[26] or twenty-one or more.[27] Occasionally the chauffeur is required to carry with him at all times an identification card, including his photograph,[28] while a number of ordinances particularly require that the chauffeur shall give evidence as to sober habits, or that he is not addicted to the use of liquors or drugs.[29] Occasionally there is a specific requirement that the chauffeur shall be able to speak the English language.[30] Written or oral examination is sometimes specifically required as to the driver's knowledge of the ordinances and traffic regulations of the city and state.[31] Very frequently the chauffeur must give evidence as to his ability to drive a car, and also evidence that he has no physical disabilities, such as being deaf, or partially deaf, near-sighted, etc.,[32] and occasionally must take a medical examination to show that he is not subject to epilepsy, vertigo, heart trouble, color-blindness, or any other infirmity of body or mind which would disqualify him from serving as a driver of a public vehicle.

ROUTES AND TERMINI

It is a usual provision of the jitney bus ordinance to require that the operator shall set forth in his application or in his permit the route over which it is proposed to operate such motor bus and the terminal points of such routes, and to require, though less often, a map of the route or the designation of the particular street or streets over which the vehicle is to run.[34] In a few ordinances the routes and termini are to be indicated by signs only, the authorities not assuming any other control thereover.[35] Many of the ordinances requiring routes to be designated also require that the vehicles shall not depart from this route, and must go to the end of the route on each trip.[36] When routes must be specified before the permit or license to operate the bus is granted, authority is usually either reserved by the Council or delegated to specified city officials to change or modify the route at any time.[37] A few ordinances specifically make it unlawful to deviate from the route established, or, if deviation is necessary, the vehicle must return to the point of deviation as soon as possible and proceed in the direction the motor was headed before deviation.[38] In order to retain for the city one of the chief advantages of motor transit, mobility, certain ordinances particularly provide that buses may deviate from their designated routes for stated purposes.[39] Legible signs which can be read at a distance of 100 ft. or more are particularly required, setting forth the fare, the termini and the routes.[40]

How long the route shall be is not readily discernible on examination of an ordinance, as the length is usually expressed by names of streets. Austin, Tex., requires that they must average at least thirty blocks, and Davenport, Iowa, requires that when the route of a motor bus parallels a street-car line, its termini shall be that of the car line or beyond, unless the Council otherwise decides. In the cities where the routes over which the vehicle is to run must be specified in the application the proper authority would have the power to lengthen or shorten the route. Certain ordinances definitely provide that the route may be changed at any time by the Council, the Board of Police Commissioners, or other

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($5,000 the maximum for one person, and $10,000 for one accident); Memphis, Tenn. (for each car for one accident); Taunton, Mass. ($5,000 for one vehicle and $1,000 for each additional vehicle); Pasadena, Cal. ($5,000 for any one person injured, and $10,000 for all persons injured in any one accident); same in Long Beach, Cal., and Tulsa, Okla.; Duluth, Minn.; Syracuse, N. Y. (limited to $15,000 for one accident); Oakland, Cal. ($5,000 for any one person injured; $10,000 for any one accident resulting in injuries to or death of more than one person); San Antonio, Tex. (a total of $50,000 for five vehicles or less, or a total of $100,000 for any number of vehicles in excess of five); Melrose, Mass.

[21] Pueblo, Col.; Oklahoma City, Okla.; Ogden City, Utah (if more than one car, $20,000); Fresno, Cal.; El Paso, Tex. ($10,000 for each car up to ten cars, and $500 for each additional car).

[22] Grand Rapids, Mich., seven persons or less, $10,000 for damages or accidents; $2,000 for each passenger more than seven; up to $10,000. Schenectady, N. Y., as many times $1,000 as carrying capacity of car, but at least $5,000. Ashtabula, Ohio, in lieu of liability insurance policy, a bond of $3,000 for buses carrying nine persons or less, and $5,000 for more than nine persons. Utica, N. Y., eight passengers or less, $10,000; eight to sixteen passengers, $15,000; sixteen or more, $20,000.

[23] Ogden City, Utah; Dallas, Tex.; Lansing, Mich.; Davenport, Iowa; Spokane, Wash.; Austin, Tex.; Joplin, Mo.; Oklahoma City, Okla.; Birmingham, Ala.; Seattle, Wash.; Providence, R. I.; Fitchburg, Mass.; Grand Rapids, Mich.; Long Beach., Cal.; Louisville, Ky.; Los Angeles, Cal.; Duluth, Minn.; Oakland, Cal.; Pasadena, Cal.; Tacoma, Wash.; Schenectady, N. Y.; Fort Worth, Tex.; San Antonio, Tex.

[24] Davenport, Iowa; Spokane, Wash.; Joplin, Mo.; Seattle, Wash.; Galveston, Tex.; Grand Rapids, Mich.; Little Rock, Ark.; Oakland, Cal. ("worthy"); Schenectady, N. Y.

[25] Long Beach, Cal.

[26] Birmingham, Ala.; Austin, Tex.; Fresno, Cal. (and under fifty); Providence, R. I. (over twenty); Fitchburg, Mass.; Syracuse, N. Y.; Grand Rapids, Mich.; Little Rock, Ark.; Tacoma, Wash.; Portland, Ore.; El Paso, Tex. (and shall have lived in El Paso for six months).

[27] Davenport, Iowa; Ashtabula, Ohio; Spokane, Wash.; Pueblo, Col.; Seattle, Wash.; Augusta, Ga.; Schenectady, N. Y.; Melrose, Mass.

[28] Providence, R. I.; Grand Rapids, Mich.; Oakland, Cal.; Los Angeles, Cal.; Schenectady, N. Y.; Spokane, Wash.; Seattle, Wash.

[29] Dallas, Tex.; Spokane, Wash.; Austin, Tex.; Joplin, Mo.; Birmingham, Ala.; Seattle, Wash.; Galveston, Tex.; Schenectady, N. Y.; Fort Worth, Tex.

[30] Atlantic City, N. J. (read, also); Spokane, Wash.; Joplin Mo. ("properly understand the traffic rules and ordinances of the city"); Seattle, Wash.; Schenectady, N. Y. (read and speak).

[31] Los Angeles, Cal.; Hartford, Conn. (any "suitable" person with proper experience and character"); Harrisburg, Pa.; Atlantic City, N. J. (familiar with territorial limits and principal places); Spokane, Wash.; Birmingham, Ala.; Seattle, Wash.; Ogden City, Utah; Galveston, Tex. (thoroughly acquainted with all the streets and locations); Grand Rapids, Mich.; Portland, Ore.; Little Rock, Ark.; El Paso, Tex.

[32] Los Angeles, Cal.; Seattle, Wash.; Providence, R. I.; Dallas, Tex.; Davenport, Ia.; Austin, Tex.; Pueblo, Col. (requires one year's experience); Birmingham, Ala. (must be "experienced"); Fresno, Cal.; Grand Rapids, Mich.; Portland, Ore.; Little Rock, Ark. (requires six months' experience).

[33] Spokane, Wash.; Seattle, Wash.; Schenectady, N. Y.

[34] Los Angeles, Cal.; Dallas, Tex.; Utica, N. Y.; Orange, N. J. (routes designated by Mayor—only two lines are operating, each making three trips daily); Davenport, Iowa; Spokane, Wash.; Austin, Tex. (must operate at least thirty blocks); Oklahoma City, Okla.; Pueblo, Col.; Fresno, Cal.; Ogden City, Utah; Fitchburg, Mass.; Syracuse, N. Y.; Tulsa, Okla.; Galveston, Tex.; Augusta, Ga.; Grand Rapids, Mich.; Portland, Ore.; Louisville, Ky.; San Antonio, Tex.; Oakland, Cal.; Pasadena, Cal.; Tacoma, Wash.; Schenectady, N. Y.; Fort Worth, Tex.; Huntington, W. Va.

[35] New Orleans, La.; Hartford, Conn.; Joplin, Mo.; Providence, R. I. (license granted subject to prescribing of route).

[36] New Orleans (as announced on sign and "provided there is a passenger on said vehicle"); Los Angeles, Cal.; Dallas, Tex.; Davenport, Iowa; Spokane, Wash.; Austin, Tex.; Fresno, Cal.; Ogden City, Utah; Tulsa, Okla.; Galveston, Tex.; Portland, Ore. ("between the hours of 6 and 8 p. m. all motor buses shall be operated to outer terminus of their routes, but may turn back upon discharging the last inbound passenger, and between the hours of 4.30 and 7 p. m. all auto buses shall be operated to the inner terminus, but may turn back on discharging the last outbound passenger." During all other hours must complete the trip); Oakland, Cal.; Spokane, Wash.; El Paso, Tex.

[37] Los Angeles, Cal.; Davenport, Iowa; Fresno, Cal.; Ogden City, Utah; Syracuse, N. Y.; Galveston, Tex.; Grand Rapids, Mich. (temporary change with application of superintendent of police); Portland, Ore.; San Antonio, Tex.; Pasadena, Cal.; Augusta, Ga. (licensee may change route by notifying treasurer of city); Fort Worth, Tex. (may be changed upon application by licensee).

[38] Los Angeles, Cal. (for more than three blocks); Spokane, Wash.; Fresno, Cal.; Tulsa, Okla.; Galveston, Tex.; Portland, Ore.; Oakland and Pasadena, Cal.

[39] Thus in Los Angeles they may deviate to transport passenger to and from any public demonstration or attraction, church or public school, or to designated points in the business district. In Grand Rapids they may go to the railroad station if route is within three blocks of any such station.

[40] New Orleans, La.; Hartford, Conn.; Providence, R. I.; Augusta, Ga.; Louisville, Ky. (routes only); Joplin, Mo. (fare only).

stated officer or officers. As one means of exterminating the jitney under the guise of regulating it, the routes required are sometimes so long as to be unprofitable. Transfer systems[41] may be or are compulsory.

The ordinances often require that applications for licenses shall show the number of hours per day which the vehicle will be operated and the schedule for such operations,[42] or require operation continuously between the hours designated in the license certificate.[43] Occasionally, however, eight hours of continuous service are required,[44] and rarely twelve,[45] or even sixteen[46] or more.[47]

SAFETY PRECAUTIONS

The safety precautions included in the ordinances either require the passengers to ride on the seats only,[48] or particularly prohibit riding on doors, dashers, fenders or running boards, or the protrusion of the body outside of the car.[49] It is occasionally provided specifically that the car must be brought to a full stop before crossing steam railway tracks.[50] These provisions, of course, are all in addition to the traffic and ordinance provisions as to speed limits, speed at intersections and cutting corners.

Other safety requirements are set forth in the various ordinances. Thus tire chains are required, especially in winter and wet weather.[51] It is likewise required in some cities, that the cars be equipped with non-skid tires.[52] When cars are to be run between sunset and sunrise, the cars must be provided with lights.[53] Various kinds of signs are required, such as giving the route,[54] termini,[55] fare,[56] license number,[57] name of operator[58] and carrying capacity of car.[59]

The provisions of these ordinances to assure a safe vehicle run all the way from the prohibition of the use of dangerous cars[60] to requirement of inspection before use and during use, to see if running gear, brakes, chassis, wheels, etc., are safe.[61] Some ordinances specify the intervals at which such inspection shall be made.[62] General requirements are that cars shall be sanitary,[63] while Portland, Ore., requires that they be cleaned and fumigated at stated intervals.

RECEIVING AND DISCHARGING PASSENGERS

A number of ordinances specifically state that the motor vehicle must, in receiving and discharging passengers, draw up at the right-hand curb.[64] Requirements are also included that these vehicles must stop for this purpose at least 25 ft.,[65] 50 ft.,[66] 60 ft.[67] and 75 ft.[68] respectively from the near side of the intersecting street. Other cities specify distances of 10 ft.[69] and 20 ft.[70]

It is further specified, though rarely, that the vehicle must come as near to the curb as possible,[71] or come within 2 ft. of the curb.[72] One city, Pueblo, Col., requires that the bus stop in the middle of the block.

RESTRICTIONS AS TO OVERCROWDING

The ordinances of some cities restrict the number of passengers that can be carried to two, including the driver, in excess of the manufacturer's rating as to the capacity of the car.[73] In most of these cases children under seven years of age are excepted. One city, Oakland, Cal., allows one passenger in excess of the seating capacity. In many other ordinances the number of passengers that the car may hold is restricted to the number stipulated in the manufacturer's statement as to the car's capacity.[74] In these cases children under the age of five years are excepted. In the majority of cities where jitney ordinances are in operation it is specifically stated that but one person may ride with the chauffeur.[75]

OTHER POLICE REGULATIONS

A sign stating that the car is filled, visible at a distance of 100 ft., is required in Fresno, Cal. The number plate is to be displayed conspicuously in Utica,

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[41] Syracuse, N. Y.

[42] Austin, Tex.; Oklahoma City, Okla.; Pueblo, Col.; Fitchburg, Mass.; Syracuse, N. Y.; Galveston, Tex.; Pasadena, Cal.; Tacoma, Wash.; Utica, N. Y.; San Antonio, Tex.

[43] Dallas, Tex. (except Sundays and in case of illness, accidents, etc.).

[44] Spokane, Wash. (each day of the year); Grand Rapids, Mich. (6 to 10 a. m.; 12 noon to 2 p. m.; and 5 to 8 p. m., with but one-half of buses on any route on Sunday); El Paso, Tex.

[45] Austin, Tex. (twelve hours consecutively, Sundays excepted, with reasonable time for meals and due allowance for delays and interruptions); Portland, Ore. (6 to 10 a. m. and 3 to 11 p. m., except in case of unavoidable accidents; 7.30 a. m. on Sundays); Fort Worth, Tex. (for twelve consecutive hours except Sunday).

[46] Davenport, Iowa; Fresno, Cal. (from 6 a. m. to 10 p. m.); Tulsa, Okla.; Schenectady, N. Y. (for six days per week).

[47] Ogden City, Utah (6.30 a. m. until midnight on a "regular schedule").

[48] Atlantic City, N. J.; Davenport, Iowa; Augusta, Ga.; Duluth, Minn.

[49] Ashtabula, Ohio; Dallas, Tex.; Utica, N. Y.; Harrisburg, Pa. (no ordinance); Hartford, Conn.; New Orleans, La.; Austin, Tex.; Oklahoma City, Okla.; Syracuse, N. Y.; Birmingham, Ala.; Portland, Ore.; San Antonio, Tex.; Tulsa, Okla.; Galveston, Tex.; Spokane, Wash.; Louisville, Ky.; Grand Rapids, Mich.; Providence, R. I.; Fresno, Cal.; Tacoma, Wash.; Pasadena, Cal.; Oakland, Cal.; Fort Worth, Tex.; Reading, Pa.; El Paso, Tex.

Policemen and firemen are excepted from the operation of these provisions by a number of these cities.

[50] Duluth, Minn. (stop at least 30 ft. from track); Joplin, Mo.; Grand Rapids, Mich.; Ogden City, Utah (electric cars or otherwise); Portland, Ore. (applies only to vehicles with capacity of more than fourteen passengers); Oakland, Cal. (except that orders of flagmen must be obeyed).

[51] Los Angeles, Cal.; Joplin, Mo.; Pueblo, Col.; Ogden City, Utah; Providence, R. I.; Oakland, Cal.

[52] Los Angeles, Cal.; Dallas, Tex.; Ogden City, Utah.

[53] Davenport, Iowa; Utica, N. Y.; New Orleans, La.; Joplin, Mo.; Oklahoma City, Okla.; Syracuse, N. Y.; Portland, Ore.; San Antonio, Tex.; Tulsa, Okla.; Dallas, Tex.; Galveston, Tex.; Spokane, Wash.; Grand Rapids, Mich.; Fitchburg, Mass.; Ogden City, Utah; Tacoma, Wash.; Pasadena, Cal.; Fort Worth, Tex.

[54] Utica, N. Y.; Los Angeles, Cal.; Augusta, Ga.; Oklahoma City, Okla.; Syracuse, N. Y.; Portland, Ore.; Dallas, Tex.; San Antonio, Tex.; Davenport, Iowa; Tulsa, Okla.; Galveston, Tex.; Spokane, Wash. (signs to be hung on both sides of car); Louisville, Ky.; Grand Rapids, Mich.; Ogden City, Utah; Providence, R. I.; Shreveport, La.; Tacoma, Wash.; Oakland, Cal.; El Paso, Tex.

[55] Los Angeles, Cal.; Augusta, Ga.; Joplin, Mo.; Austin, Tex.; Oklahoma City, Okla.; Dallas, Tex.; San Antonio, Tex.; Tulsa, Okla.; Galveston, Tex.; Louisville, Ky.; Grand Rapids, Mich.; Ogden City, Utah; Oakland, Cal.; Little Rock, Ark.; El Paso, Tex.

[56] Los Angeles, Cal.; Augusta, Ga.; Joplin, Mo.; San Antonio, Tex.; Grand Rapids, Mich.; Ogden City, Utah; Providence, R. I.; Shreveport, La.; Tacoma, Wash.; Oakland, Cal.; Little Rock, Ark.

[57] Hartford, Conn.; Los Angeles, Cal.; Austin, Tex.; Portland, Ore.; Atlantic City, N. J.; San Antonio, Tex. (copy of license to be displayed); Tulsa, Okla.; Galveston, Tex.; Spokane, Wash. (both sides of car); Pueblo, Col.; Louisville, Ky.; Grand Rapids, Mich.; Fitchburg, Mass.; Ogden City, Utah; Providence, R. I.; Fresno, Cal.; Shreveport, La.; Long Beach, Cal. (permit number also); Tacoma, Wash.; Pasadena, Cal.; Schenectady, N. Y.; Little Rock, Ark.; Davenport, Iowa.

[58] Austin, Tex.; Oklahoma City, Okla.; Tulsa, Okla.; Louisville, Ky.

[59] Grand Rapids, Mich. (sign front and rear—to be illuminated after dark).

[60] New Orleans ("no vehicle which is dilapidated, worn, or in other ways dangerous to passengers may be used").

[61] Atlantic City, N. J.; Seattle, Wash.; Little Rock, Ark.; Augusta, Ga.

[62] In Portland, Ore., and Providence, R. I., cars must be inspected at least once in thirty days, and in Dallas, Tex., once each week; El Paso, Tex., every two weeks.

[63] Augusta, Ga.; Joplin, Mo.; Little Rock, Ark.

[64] Harrisburg, Pa.; Hartford, Conn.; New Orleans, La.; Los Angeles, Cal.; Joplin, Mo.; Austin, Tex.; Grand Rapids, Mich.; Tacoma, Wash.; Utica, N. Y. (on streets with car service); El Paso, Tex.

[65] Birmingham, Ala.; Atlantic City, N. J.; Fitchburg, Mass.

[66] Hartford, Conn.; New Orleans, La.; Los Angeles, Cal. (75 ft. of a street railway on the street); Dallas, Tex. (not nearer than 50 ft. or farther than 100 ft. from intersection); San Antonio, Tex.; Duluth, Minn.; Providence, R. I. (not within 25 ft. of place designated by white post or in manner prescribed for receiving and discharging street railway passengers).

[67] Spokane, Wash.

[68] Harrisburg, Pa.; Tacoma, Wash.; Reading, Pa.

[69] Fitchburg, Mass. (not within 10 ft. of white pole designated for a street-car stopping place or 25 ft. of intersection of streets).

[70] Ogden City, Utah (not within 20 ft. of crossing).

[71] Oakland, Cal.; Ashtabula, Ohio.

[72] Fresno, Cal.; Shreveport, La.

[73] Ashtabula, Ohio (applies to standard touring cars or limousines); Spokane, Wash.; Hartford, Conn.; Fort Smith, Ark.; Fitchburg, Mass.; Fresno, Cal.; Long Beach, Cal.

[74] Ashtabula, Ohio (applies to all cars except standard touring cars and limousines); Duluth, Minn.; Davenport, Iowa; New Orleans, La.; Portland, Ore.; Atlantic City, N. J.; Dallas, Tex.; Grand Rapids, Mich.; Providence, R. I. (except children under seven years of age); Taunton, Mass.; Tacoma, Wash.; Schenectady, N. Y.; Little Rock, Ark.; El Paso, Tex.; Melrose, Mass.

[75] Duluth, Minn.; Davenport, Ia.; Reading, Pa.; Harrisburg, Pa.; Hartford, Conn.; Los Angeles, Cal.; Joplin, Mo. (no person ahead of front seat); Austin, Tex. (unless seat is designed to accommodate more than one passenger); Portland, Ore.; Dallas, Tex.; San Antonio, Tex. (with child in arms); Pueblo, Col., and Fitchburg, Mass. (same as San Antonio); Ogden City, Utah; Providence, R. I. (no passenger with child in arms); Shreveport, La.

N. Y. The words "jitney bus"[76] or "motor bus"[77] must be attached or painted on the car in some cities. Dallas, Tex., requires that a safety certificate be hung in the car. New Orleans, La., requires that the name of the corporation owning or operating the car be displayed in the car.

Some ordinances make stipulations as to where cars shall stand and as to the length of time they shall stand.[78] Special provisions are made in some cities as to cars running on streets on which street railways are in operation.[79] Salem, Mass., requires that two means of exit must be provided for cars with a carrying capacity of more than eight persons. Some ordinances specifically state that no advertising shall be allowed.[80] San Antonio, Tex., requires that no umbrella shall be raised by any person occupying the front seat.

PENALTIES

The penalties for violation of the ordinances are usually expressed in terms of fine or imprisonment or both, the maximum period of imprisonment ranging from thirty to ninety days.[81] The fines are limited as follows: to not more than $25,[82] $50,[83] $100,[84] $200,[85] $300[86] and $500.[87] It is usually provided that licenses may be revoked upon conviction or violation thereof or of the ordinance on traffic regulations. Dallas, Tex., provides that when so revoked a license may not be reissued within six months. Galveston, Tex., and Ashtabula, Ohio, automatically revoke licenses on the second and third convictions respectively.

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[76] Atlantic City, N. J. (words must be on rear part of car, not less than 8 in. in length and 24 in. wide).

[77] Dallas, Tex. (words to be painted on rear of car in letters not less than 6 in. high).

[78] Utica, N. Y.; Providence, R. I.; Little Rock, Ark.

[79] In Oklahoma City, Okla., cars are not allowed to run longitudinally on streets on which street railways are in operation, except within fire limits of city. They may operate for more than two blocks in one direction where necessary in crossing fire limits. Tulsa, Okla., requires that cars shall not run longitudinally on streets having street railways.

[80] Augusta, Ga.; Grand Rapids, Mich.; Providence, R. I.; Shreveport, La.

[81] Los Angeles, Cal., however, provides a maximum imprisonment of six months.

[82] New Orleans, La. (not less than $10 or more than $25); Ocean City, N. J. (or thirty days' imprisonment in default of fine); Fort Smith, Ark. (not less than $5 or more than $15); Little Rock, Ark. (not less than $5).

[83] Huntington, W. Va. (not less than $10 or more than $50); Atlantic City, N. J. (or not to exceed ten days in jail); Ashtabula, Ohio; Providence, R. I.; Fitchburg, Mass. ($20); Louisville, Ky., (not less than $10).

[84] Hartford, Conn. (fine only); Lansing, Mich. (or imprisonment until fine is paid, not in excess of thirty days); Utica, N. Y., Davenport, Iowa (or thirty days in jail); Duluth, Minn. (or sixty days in jail); Spokane, Wash.; Oklahoma City, Okla.; Seattle, Wash.; Syracuse, N. Y.; Tulsa, Okla.; Galveston, Tex.; Grand Rapids, Mich.; Shreveport, La. (not less than $5); Long Beach, Cal.; Portland, Ore.; Salem, Mass.; Oakland, Cal.; Pasadena, Cal.; Tacoma, Wash.; Memphis, Tenn. (not less than $50—a state law).

[85] Schenectady, N. Y. (not more than $150); Austin, Tex.; San Antonio, Tex.; Fort Worth, Tex.; El Paso, Tex.

[86] Denver, Col. (not less than $100 or imprisonment of ninety days or both); Joplin, Mo.; Fresno, Cal.; Pueblo, Col.

[87] Los Angeles, Cal.; Dallas, Tex. (not less than $5).

Traffic Notes from Hampton, Va.

Following the Consolidation of Five Companies the Combined Properties Were Rehabilitated—Schedule, Publicity and Fare Systems

On Jan. 12, 1912, Allen & Peck, Inc., took over the following five companies: Newport News & Old Point Railway & Electric Company, Citizens Railway, Light & Power Company, Newport News Gas Company, Hampton Roads Traction Company, Hampton, Phoebus & Fort Monroe Gas Corporation. On Jan. 1, 1914, these utilities were merged as the Newport News & Hampton Railway, Gas & Electric Company. In addition to the activities named in the title of the company, it conducts ice manufacture with retail distribution. Since the present operating company took charge of these properties, with J. N. Shannahan as general manager, it has spent about $600,000 for rehabilitation.

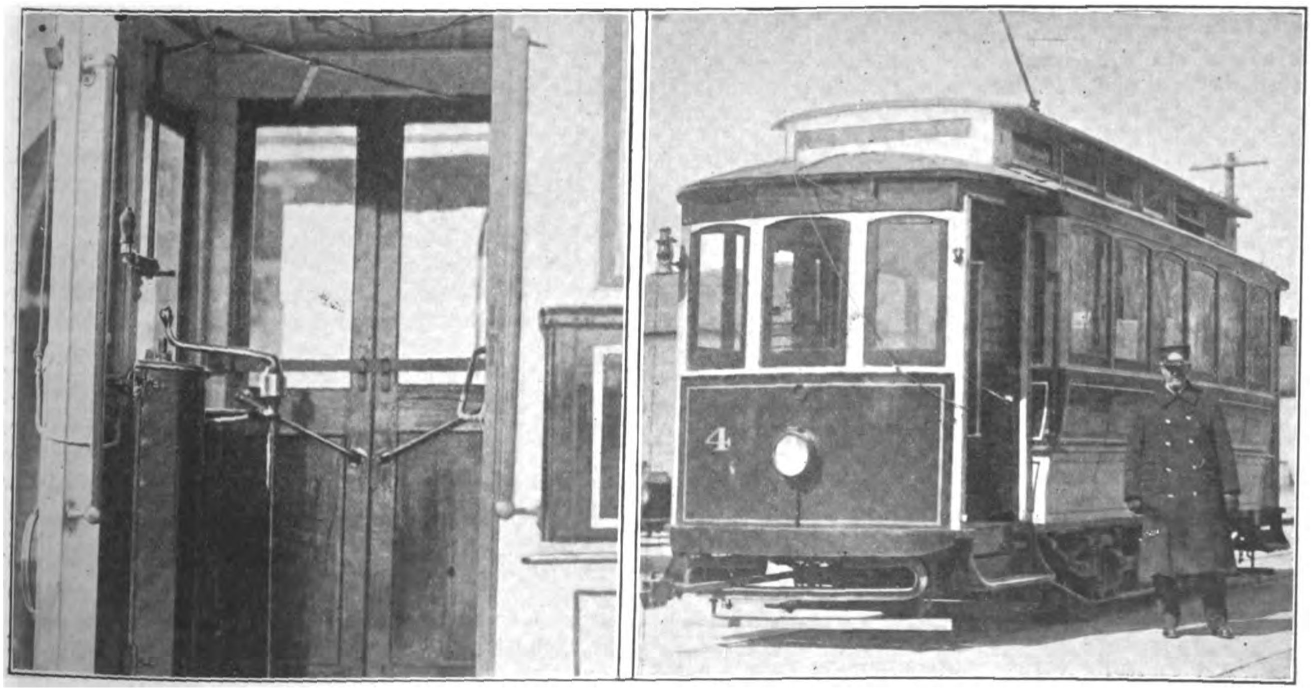
Briefly stated the main improvements comprised the following:

Re-equipment of the power house, except for the boilers and one vertical turbine (the latter now used only for peak loads), without serious interruption of the traction and lighting service, although no other source of energy supply was available.

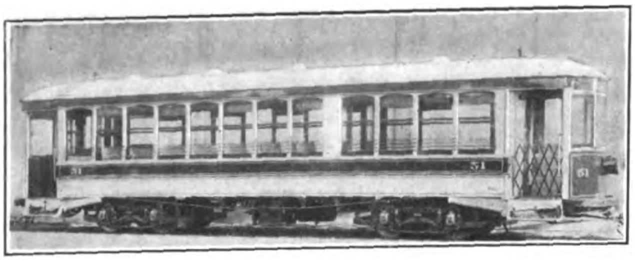
Reconstruction of the pole lines for 11,000-volt transmission and 3450-volt lighting.

Modernization of the lighting system by the installation of luminous arcs, nitrogen-filled lamps and tungsten lamps.

Construction of a gas holder at Newport News and installation of a high-pressure main from the Newport News plant to Hampton, the Hampton low-pressure plant being discontinued.



HAMPTON TRAFFIC NOTES—CAR REBUILT FOR POSSIBLE ONE-MAN OPERATION



HAMPTON TRAFFIC NOTES—STANDARD DOUBLE-TRUCK CAR WITH SMOKING COMPARTMENT

Replacement of worn special work.

Rehabilitation of all rolling stock, part being rebuilt from the sills up. In repainting the cars, their color was changed from dark yellow to Sherwin-Williams light body color traction green, partly because this color was considered an improvement and partly to make the public realize the betterments which the company was effecting in the service as a whole.

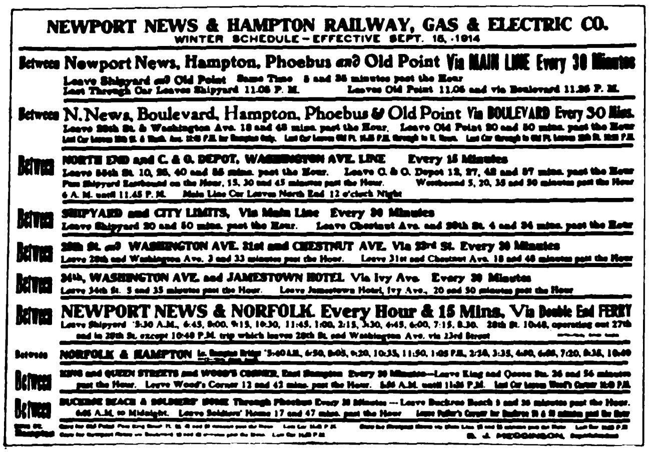
Purchase of four Brill arch-roof semi-convertible cars fitted with smoking compartment and carrying four 203-H tap-field motors with K-49-A controllers. Further purchase of eight single-truck second-hand cars each equipped with two GE-1000 motors.

Lately the management has looked into the possibility of one-man cars for certain feeder lines. One of its eight single-truck cars has already been rebuilt for longer platforms (from 3½ ft. to 4½ ft.). A locking arrangement also has been provided for the rear folding doors on the right-hand side of each vestibule. The convenient control handle for these doors and the simple leverage for the same are shown in the accompanying illustration of the rebuilt vestibule.

The following paragraphs will give some details of the railway service which is now being conducted by this company.

SERVICE AND PUBLICITY FOR IT

On a system of this character where shorter headways than fifteen to thirty minutes are uneconomical, the maximum traffic can be obtained only by keeping resident and visitor alike fully acquainted with the schedules. This end is achieved in several ways. One way is to print the schedule of all lines on a card which is then distributed for display in all hotels, important stores and waiting rooms. A second way is to paint on a bulletin board a schedule of cars passing a certain prominent corner, such as the sign reproduced which is installed at the northeast corner of King and Queen Streets, Hampton. A third and still simpler way is to erect a signboard at outlying stops to show at what minutes past the hour the cars for given directions are to be expected. The company also issues a pocket booklet with detailed time-tables of all lines, including ferry connections to Norfolk. The cost of this booklet is defrayed by advertising revenue from local merchants and banks.



NEWPORT NEWS & HAMPTON RAILWAY, GAS & ELECTRIC CO.
WINTER SCHEDULE—EFFECTIVE SEPT. 16, 1914

Between Newport News, Hampton, Phoebus and Old Point Via MAIN LINE Every 30 Minutes
Leave Shipyard and Old Point Same Time 5 and 35 minutes past the Hour
Last Through Car Leaves Shipyard 11.05 P. M. Leaves Old Point 11.05 and via Boulevard 11.25 P. M.

Between N. News, Boulevard, Hampton, Phoebus & Old Point Via BOULEVARD Every 30 Mins.
Leave 28th St. & Washington Ave. 18 and 48 mins. past the Hour. Leave Old Point 20 and 50 mins. past the Hour
Last Car leaves [illegible] for Hampton Only. Last Car leaves Old Pt. [illegible] through to N. News. Last Car through to Old Pt. leaves [illegible]

Between NORTH END and C. & O. DEPOT, WASHINGTON AVE. LINE Every 15 Minutes
Leave 56th St. 10, 25, 40 and 55 mins. past the Hour. Leave C. & O. Depot 12, 27, 42 and 57 mins. past the Hour
Pass Shipyard Eastbound on the Hour, 15, 30 and 45 minutes past the Hour. Westbound 5, 20, 35 and 50 minutes past the Hour
6 A. M. until 11.45 P. M. Main Line Car Leaves North End 12 o'clock Night

Between SHIPYARD and CITY LIMITS, Via Main Line Every 30 Minutes
Leave Shipyard 20 and 50 mins. past the Hour. Leave Chestnut Ave. and 30th St. 4 and 34 mins. past the Hour

Between 28th St. and WASHINGTON AVE. 31st and CHESTNUT AVE. Via 23rd St. Every 30 Minutes
Leave 28th and Washington Ave. 3 and 33 minutes past the Hour. Leave 31st and Chestnut Ave. 18 and 48 minutes past the Hour

Between 34th, WASHINGTON AVE. and JAMESTOWN HOTEL Via Ivy Ave. Every 30 Minutes
Leave 34th St. 5 and 35 minutes past the Hour. Leave Jamestown Hotel, Ivy Ave., 20 and 50 minutes past the Hour

Between NEWPORT NEWS & NORFOLK Every Hour & 15 Mins. Via Double End FERRY
Leave Shipyard *5:30 A.M., 6:45, 8:00, 9:15, 10:30, 11:45, 1:00, 2:15, 3:30, 4:45, 6:00, 7:15, 8.30. 28th St. 10:48, operating out 27th and in 28th St. except 10:40 P.M. trip which leaves 28th St. and Washington Ave. via 23rd Street

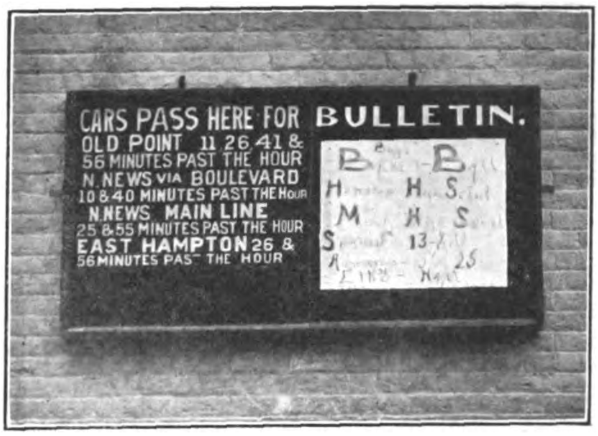
Between NORFOLK & HAMPTON Lv. Hampton Bridge *5:40 A.M., 6:50, 8:05, 9:20, 10:35, 11:50, 1:05 P.M., 2:20, 3:35, 4:50, 6:05, 7:20, 8:35, 10:40

Between KING and QUEEN STREETS and WOOD'S CORNER, East Hampton Every 30 Minutes—Leave King and Queen Sts. 26 and 56 minutes past the Hour. Leave Wood's Corner 12 and 42 mins. past the Hour. 5:56 A.M. until 11:26 P.M. Last Car leaves Wood's Corner [illegible] P.M.

Between BUCKROE BEACH & SOLDIERS' HOME Through Phoebus Every 30 Minutes — Leave Buckroe Beach 5 and 35 minutes past the Hour. 6:05 A.M. to Midnight. Leave Soldiers' Home 17 and 47 mins. past the Hour Leave [illegible] Corner for Buckroe [illegible] minutes past the Hour

[illegible]

HAMPTON TRAFFIC NOTES—CAR SCHEDULE CARRIED IN STORES AND HOTELS


BULLETIN.
CARS PASS HERE FOR
OLD POINT 11 26 41 & 56 MINUTES PAST THE HOUR
N. NEWS VIA BOULEVARD 10 & 40 MINUTES PAST THE HOUR
N. NEWS MAIN LINE 25 & 55 MINUTES PAST THE HOUR
EAST HAMPTON 26 & 56 MINUTES PAST THE HOUR

HAMPTON TRAFFIC NOTES—BULLETIN BOARD ON A STREET CORNER IN HAMPTON

The popularity of Old Point Comfort and vicinity as a pleasure resort the year round is a matter of national knowledge. For its transient patrons the company issues a finely-illustrated folder with map, the descriptions in the folder being placed in the order in which a rider starting from Old Point would see the places described. To aid the passenger still further, the same number which distinguishes each place in the text is repeated on the map. The summer schedule calls for such short headways that this folder is printed without a time-table.

The 10-mile run between Old Point Comfort, Phoebus, Hampton and Newport News is made in 45 minutes. In the towns the speed may be as low as 6 m.p.h. because of ordinances, while it is as high as 30 m.p.h. on the intermediate right-of-way. Cars are despatched by telephone. U. S. block signals are standard.

FARES

The distance between Old Point Comfort and Newport News is 10 miles. This run is divided into three zones at 5 cents each. Under a franchise provision, workmen's tickets good between the hours of 5 and 7, both morning and evening, are sold in books at half price. Half fare is also granted to children going to and from school.

Aside from these half-rate fares the company is also obligated to sell six tickets for 25 cents for use in Newport News only. In summer a voluntary reduction is made in the form of a 20-cent round trip between Newport News and Buckroe Beach, valid between midday and midnight. The going ticket is sold on the car by the conductor, and includes a stub which is exchanged within the Beach limits for a return coupon. The ordinary fare for this trip is 30 cents. Owing to the varieties of fares and the use of zones, the Ohmer register is employed.

Aside from individual excursion tickets, the company handles entire groups for pleasure trips in chartered cars or for tickets sold at 20 cents per person and valid all day. In such cases, the organization which conducts the excursion receives 10 per cent of the fares collected. Sometimes these trips take the form of night trolley rides, with music, to Buckroe Beach.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 to 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

The Nominating Committee of the Engineering Association Reports Names of Candidates for Office—Convention Committees of the Manufacturers' Association—"White Special" Folder Issued—Accountants' Association Educational Courses

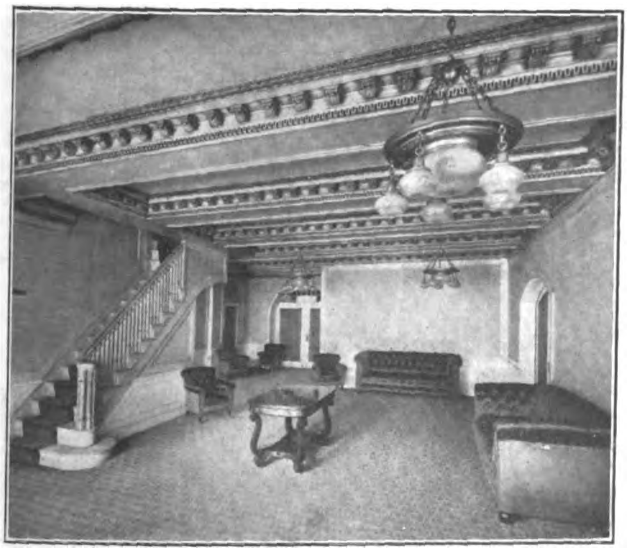
ENGINEERING ASSOCIATION NOMINATIONS

The committee on nominations has reported the following list of names of its candidates for offices and membership in the executive committee: President, John Lindall, Boston Elevated Railway; first vice-president, F. R. Phillips, Pittsburgh Railways; second vice-president, G. W. Palmer, Jr., Bay State Street Railway; third vice-president, W. G. Gove, Brooklyn Rapid Transit System, and secretary-treasurer, E. B. Burritt, New York, N. Y.

Executive committee (in addition to the above): E. R. Hill, Pennsylvania Railroad; C. S. Kimball, Washington Railway & Electric Company; C. L. Cadle, New York State Railways, and C. F. Bedwell, Public Service Railway.

MANUFACTURERS' ASSOCIATION COMMITTEE APPOINTMENTS

Vice-President F. A. Elmquist of the Manufacturers' Association, in charge of finance, has announced the appointment of C. P. Billings, Westinghouse Traction Brake Company, Pittsburgh, Pa., as chairman of the finance committee for the San Francisco convention.



LOBBY WHERE SECRETARY'S OFFICE AND REGISTRATION DESKS WILL BE LOCATED, IN HALL OF THE NATIVE SONS OF THE GOLDEN WEST

The appointment of the following committees has also just been announced:

Local Transportation Committee—A. G. Jones, General Electric Company, chairman; G. H. Barker, Standard Motor Truck Company; W. P. Bell, Standard Underground Cable Company; S. M. Gilman, John A. Roebling's Sons Company; G. R. Murphy, Electric Storage Battery Company, and F. W. Webster, Allis-Chalmers Manufacturing Company.

Entertainment—(Under the direction of Thomas Finigan, vice-president, vice-president Pierson, Roeding & Company, San Francisco, Cal.); A. V. Thompson, General Electric Company, San Francisco, Cal., chairman; W. E. Amann, Galena-Signal Oil Company; C. F. Bulotti, Eccles & Smith Company; Richard R. Carr, The Lorain Steel Company; H. S. Clark, Westinghouse Traction Brake Company; H. B. Green, Pennsylvania Steel Company; R. A. Holabird, Ohio Brass Company; F. L. Jones, General Railway Signal Company; H. R. Noack, Pierson, Roeding & Company; J. H. Steiger, American Brake Shoe & Foundry Company, and J. B. Struble, Union Switch & Signal Company.

Press and Publicity Bureau—N. A. Bowers, ELECTRIC RAILWAY JOURNAL, chairman; A. H. Halloran, *Journal of Electricity, Power & Gas.*

Hotel and Registration—C. E. Heise, Westinghouse Electric & Manufacturing Company, chairman; R. F. Behan, Westinghouse Electric & Manufacturing Company; H. A. Beuter, Baldwin Locomotive Works; E. F. Bodler, Tool Steel Gear & Pinion Company; E. C. Myers, General Electric Company; F. A. Richards, The J. G. Brill Company; S. P. Russell, H. W. Johns-Manville Company, and E. Sullivan, Pantasote Company.

Information Bureau—W. P. L'Hommedieu, Westinghouse Electric & Manufacturing Company, chairman; Stuart Hazelwood, Midvale Steel Company; G. Koch, St. Louis Car Company; S. H. Lanyon, Federal Signal Company; F. H. Leggett, Western Electric Company; W. P. Millner, Dearborn Chemical Company; C. H. Pennoyer, National Conduit & Cable Company, and O. W. Wollcott, Sherwin-Williams Company.

THE "WHITE SPECIAL"

Complete information concerning the transportation arrangements made by the Chicago transportation committee for the "White Special" train from Chicago to San Francisco is given in a folder, appropriately inclosed in attractive white covers, distributed this week from the office of H. G. McConnaughy, director of transportation. This train is in charge of L. E. Gould, ELECTRIC RAILWAY JOURNAL, Old Colony Building, Chicago, Ill., who will furnish additional information, and reserve space and tickets.

The train will leave the Grand Central Depot, Harrison Street and Fifth Avenue, Chicago, via the Chicago Great Western Railroad, at 6.30 p. m., Friday, Oct. 1. At Omaha passengers from St. Louis, Kansas City, St. Paul and Minneapolis will join the train, which will leave at 8.30 a. m. on Saturday. Cheyenne, Wyo., will be reached at 8.30 p. m. on the same day. The train will arrive at San Francisco at 10.25 o'clock on Monday morning. The train will be a counterpart of the "Overland Limited." Tourists on the "White Special" can return on the "Blue Special" or "Red Special," or individually.

ACCOUNTANTS' ASSOCIATION EDUCATIONAL COURSES

As an outgrowth of the course administered last season by Prof. John R. Wildman under the auspices of the educational committee of the Accountants' Association, three courses have been planned for the coming year. These are as follows: Elementary course, course in general theory and practice of accounts, and course in advanced accounting. The third course will be taken by the students who followed the course begun in 1914.

The subjects to be taken up in the elementary course are: Qualities essential to efficient office work; business English; mathematics of business; office practice—care of correspondence, filing, forms, functions, method of preparing and handling invoices, checks, vouchers, notes, etc.; principles of double-entry bookkeeping, with illustrations from the street railway field; practice in double-entry bookkeeping, with material from the street railway field; major and minor reports of the accounting department—why and how made up, and the use to which they are put; brief history of Interstate Commerce Commission, its relation (as well as the relations of various State commissions) to the street railway companies, the scheme of the classification, explanation of accounts, etc.

The topics to be followed in the course on general theory and practice of accounts are as follows: The purpose and scope of accounting; the relation of accounting to allied subjects, such as economics, law, finance and organization; the methods of keeping books and the media for recording financial transactions; accounts—their philosophy, construction and classification; discussion of balance sheet accounts; discussion of revenue and expense accounts; preparation, interpretation and use of balance sheets, income statements, etc.; graphs, charts and statistics as aids to operation and management.

In advanced accounting the following subjects will be covered: Organization and development; operation; merger; consolidation; holding companies; receivership; reorganization; dissolution.

In a pamphlet just issued by the committee, a number of testimonials expressing satisfaction with the first-year course are printed.

COMMUNICATION

Girder and High T-Rail Renewals

United Railroads of San Francisco
San Francisco, Cal., Aug. 11, 1915.

To the Editors:

I have read the article in the Electric Railway Journal of July 31 regarding rail renewals, and I want to make the following comments:

Flange Bearing.—In proper rail sections it is not necessary to renew as soon as the wheel flange rides or touches the floor of the groove or tram. We have rail in service where the groove has been cut through. It had to be removed from the street two years ago, although still good for a year or more. This condition applies only in asphalt and concrete paved streets, otherwise the head of the rail would bend over and break off.

Corrosion.—The statement made that corrosion advances more rapidly where the track drainage is good, as on steep grades, is rather novel. This, if true, would seem to indicate that poor drainage is an advantage and, therefore, draining track is a useless expenditure. Personally, I believe that the drier the track can be kept the longer the rail will last, so far as corrosion is concerned. Wherever we have had bad cases of corrosion of the web and base of the rail, the track was located in poorly-drained flat-grade streets. Electrolytic action takes place more readily, also, where the drainage is poor, and where the rail, therefore, is constantly in damp, moist ground.

Corrugation.—Our experience does not lead us to believe that titanium prevents or delays corrugation, but it might lengthen the life of the rail because the metal is practically free from impurities. This has not yet been demonstrated on our property as we have only used titanium for four years. A comparison of titanium-treated rail and untreated is shown in the following table:

Report on Corrugated Rails in Standard Track Construction

Lorain steel 106-422 rail on ties spaced 2-ft. centers with 9 in. of rock ballast and asphalt or basalt block paving. All rails open-hearth steel with or without titanium. All corrugations where noted are just starting or have developed sufficiently to be quite noticeable, but are not yet bad.

Track Laid in	Kind of Paving	Kind of Rail	Condition
1909	Asphalt	Open hearth	No corrugation
1910	Macadam	Open hearth	No corrugation
1910	Asphalt	Open hearth	Corrugated
1910	Asphalt	Open hearth	Corrugated
1910	Asphalt	Open hearth	Corrugated
1910	Asphalt	Open hearth	Corrugated
1910	Asphalt	Open hearth	Corrugated
1910 1911 1912	Asphalt	Open hearth	Corrugated
1911 1912	Asphalt	Soft titanium	Corrugated
1911	Block	Soft titanium	Corrugated
1911 1912	Asphalt	Soft titanium	No corrugation
1911	Asphalt	Soft titanium	No corrugation
1911	Asphalt	Soft titanium	Corrugated
1911 1912	Macadam	Soft titanium	Corrugated
1912 1913	Asphalt and block	Hard titanium	No corrugation
1913	Asphalt	Hard titanium	Corrugated
1912 1913	Asphalt	Hard titanium	Corrugated
1912	Asphalt	Hard titanium	Corrugated
1912	Asphalt and block	Hard titanium	No corrugation
1913	Asphalt	Hard titanium	No corrugation
1913	Asphalt	Hard titanium	Corrugated
1913	Asphalt	Hard titanium	No corrugation
1913	Asphalt	Hard titanium	Corrugated
1913	Asphalt	Hard titanium	Corrugated
1913	Asphalt	Hard titanium	Corrugated
1913	Asphalt	Hard titanium	No corrugation
1913 1914	Asphalt	Hard titanium	Corrugated
1912	Asphalt	Hard titanium	Corrugated

Welded and Riveted Joints.—I do not agree that welded and riveted joints have had a tendency to reduce joint difficulties. I think this statement is too optimistic. For a certain time after installation it would appear that such was the case. After a few years, however, when the steel adjacent to the joint begins to break on account of the great heat applied when the joints were installed, the trouble and expense of keeping these in good condition is far more than that of the standard plate joint. Riveted joints cannot be made perfectly tight on account of the shrinkage of the rivets when cold. Furthermore, after they loosen they cannot be tightened without cutting them off and reriveting.

B. P. Legare,
Engineer Maintenance of Way and Construction.

Train Resistance of Electric Cars

On page 239 of the issue of the Electric Railway Journal for Aug. 7 a pair of resistance curves, Fig. 3, was inadvertently included with two energy consumption curves plotted from Third Avenue (New York) Railway tests. They were also referred to editorially as from Third Avenue Railway tests in the issue for Aug. 14. These curves were intended to represent heavy railroad conditions and had no relation to the Third Avenue Railway tests.

A bit of freight business of which the Louisville & Interurban Railway is sure, is represented by water from two locally famous springs near LaGrange, Ky., which is bottled by two concerns in Louisville. Shipments have been made daily from each of the springs in galvanized drums and taken from the interurban depot by the wagons of the bottling company. The Merchants' Ice & Refrigerating Company, which recently acquired the bottling rights of one of the springs, is planning to haul the water in carload lots, storing it until it is bottled. The water is used for carbonating, as well as for other purposes, and the volume of this business is increasing. In carload lots the water might be delivered to the merchants' plant.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Los Angeles Commutator Slotter

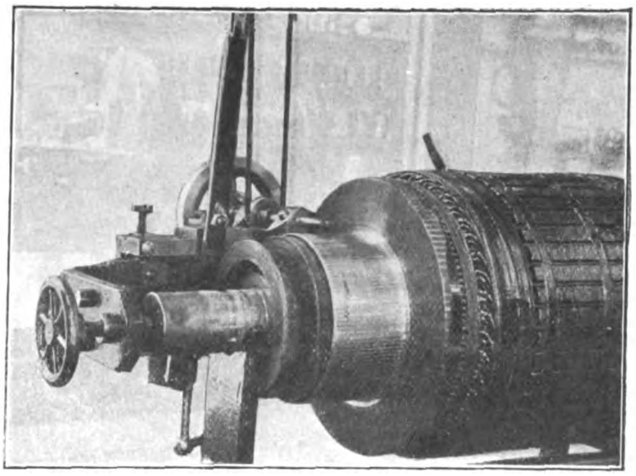
BY E. L. STEPHENS, MASTER MECHANIC LOS ANGELES (CAL.) RAILWAY

The advantage of slotting commutators has been so fully recognized that the practice has almost become universal, as nearly every company has in some way or other endeavored to develop some means whereby this slotting can be done in the most satisfactory and economical manner. Our idea was to develop something simple and efficient for a small outlay and we have finally developed a slotter which combines accessibility and ease of operation for a wide range of motors.

Fig. 1 shows an end view of the machine with the saw swung clear of the centers. In this position it receives the armature which is conveyed by chain block from a truck to the centers. The wrought-iron yoke which carries the centers for the armature shaft and machine proper is now swung into position, bringing the saw in line with the center of the commutator. The centers are then tightened on the end of the armature shaft, making the whole rigid.

Fig. 2 is a three-quarter view of the slotter with the armature in place and the machine in operation.

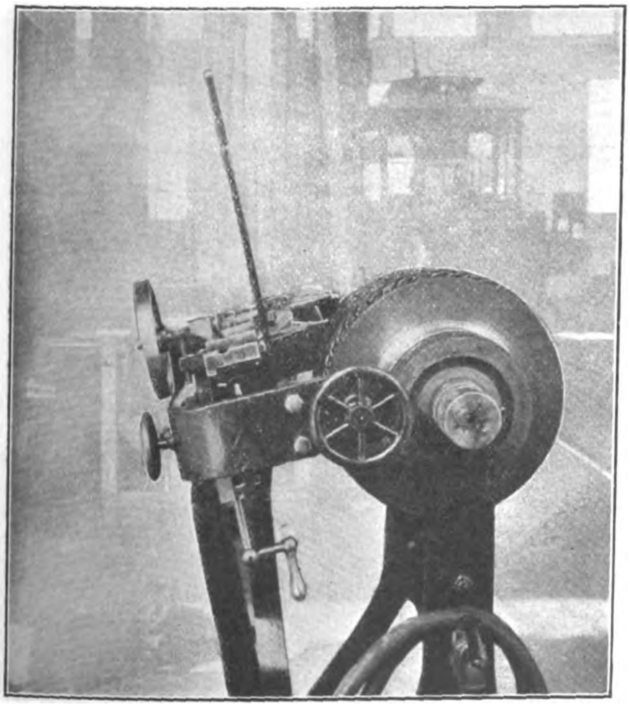
Fig. 3 is a general view of the machine, of the stand and of the air hose, which is used to keep the commutator clean and free from mica dust. The working parts, in this instance, were constructed mostly of wrought iron with brass bushings for the saw spindle. This is driven by a ¼-in. round belt on a grooved pulley at about 1500 r.p.m. We use a ¾-in. diameter circular metal saw, held in place by a nut as shown at the end of the shaft. Hence the saw when worn may be easily removed and replaced by a new one.



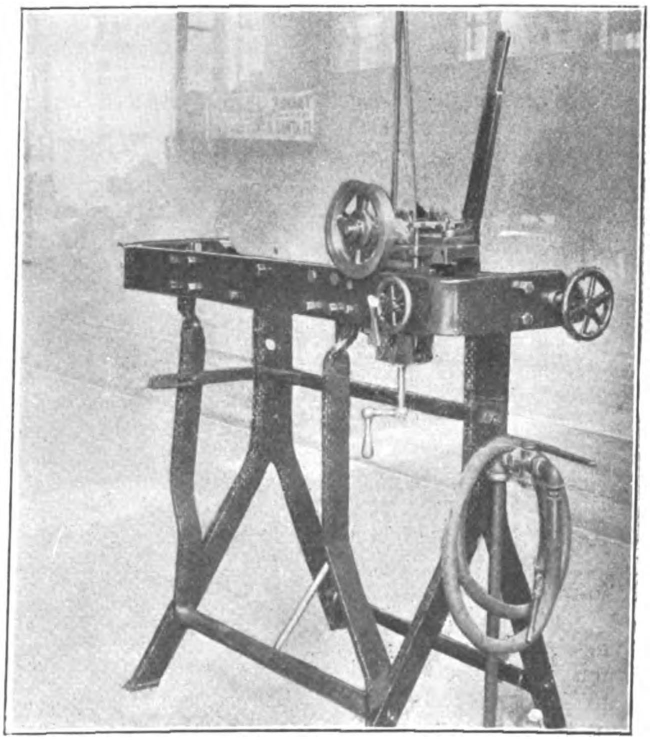
COMMUTATOR SLOTTER—FIG. 2—SLOTTER AT WORK

This machine is easily adjusted to a commutator of any diameter, by using a hand screw, as shown below the centering frame, which raises or lowers the saw shaft to the proper position and depth of cut, as checked by a thumb screw.

The hand wheel at the side is for adjusting the saw when segments of the commutator are not in line with its shaft center. After this adjustment has been made the workman slots the commutator by pushing the lever



COMMUTATOR SLOTTER—FIG. 1—VIEW BEFORE FRAME IS SWUNG INTO PLACE



COMMUTATOR SLOTTER—FIG. 3—THREE-QUARTER VIEW OF MACHINE WITHOUT ARMATURE toward the armature, moving the sliding carriage which supports the saw spindle. The saw runs clockwise, facing the front of the machine (as in Fig. 3) and is driven from a countershaft overhead. With this device a Westinghouse 38-B commutator of 135 segments can be cut 3/32 in. deep, in a minimum time of ten minutes and a maximum of twenty-five minutes, according to the hardness of the mica.

The standard or armature support is constructed of two ¾-in. wrought-iron forgings held together by ½-in. rods running through ¾-in. gas pipes, which makes it strong and rigid, yet light. This machine has been in use for several years, and has given perfect satisfaction, not only in reduction of time saved but in permitting better work at reduced cost.

An Unusual Feed-In Clamp

BY S. L. FOSTER, CHIEF ENGINEER UNITED RAILROADS OF SAN FRANCISCO

For the important matter of connecting the main feeder cable with the trolley wire at the span-wire support several methods, involving different devices and giving different degrees of satisfaction, have been used.

In one type the feed-in conductor is independent of the span wire and is connected to the brass trolley ear by a small iron set screw or else is attached to a separate ear by set screws.

Experience has shown that the cost of the labor and material of this method of providing the feed-in connection by a separate conductor is the highest of all. The current-carrying capacity of the copper supplementary feed-in cable fastened with set screws is uncertain originally and is not permanent, and the feed-in cable is difficult to move because the iron set screws rust in place and break off when attempts are made to loosen or tighten them.

In a second type the contact surface for transferring the current from the feed-in cable to the trolley wire is furnished by using the feed-in cable as the span wire and relying on the pressure of this feed-in span wire, bared, against an uninsulated metal feed-in-yoke, straight-line suspension body or round-top suspension body.

This type of feed-in costs less to install than the first and its parts last practically forever. The area of contact for current-carrying purposes is not great, however. Again, the contact pressure between the bare copper feed-in cable and the metal body varies with the span-wire tension and is uncertain and the conducting surfaces are liable rapidly to become tarnished and corroded by their exposure to the weather so that their conductivity is reduced.

In a third type the feed-in cable, used as the span wire, is held by a clamping or clinching arrangement and soldered in place. This soldering-in process makes a solid piece of the stranded cable, and in the alternate up-and-down motions of the span wire imparted by the passing trolley wheels the copper strands are liable to break off one after the other until the whole conductor fails. This soldering-in also proves expensive if the track centers are changed and the trolley wire has to be moved.

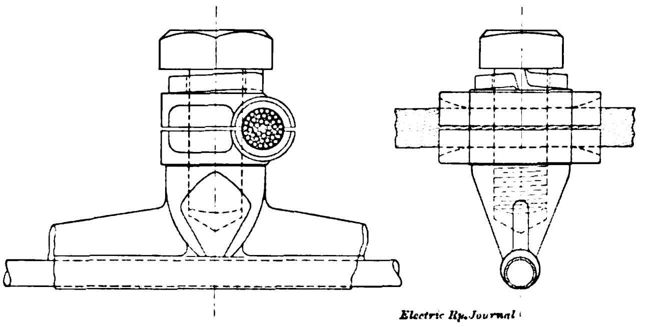
The cap screw in this type of feed-in yoke, located as it is under the feed-in cable and span-wire combined, is very inaccessible for rapid manipulation with a wrench in re-earing work. The current-carrying capacity of this type of soldered-in yoke is, of course, the best possible, but the failure of the feed-in cable at the sharp edges of the yoke, the inaccessibility of the cap screw and the usual spoiling of the device when removed are points against its popularity.

In San Francisco years ago a feed-in device was designed after unfortunate experiences with those then on the market. The working drawings and sketches make plain its construction and method of use. It consists of two special grooved brass washers that inclose the feed-in cable, one above and one below, the whole affair being bolted rigidly to the common trolley ear with the usual ¾-in. square-head tap bolt and spring lock washer. It has proved to have all the good features of all the other devices and some additional ones, with none of the defects of the others.

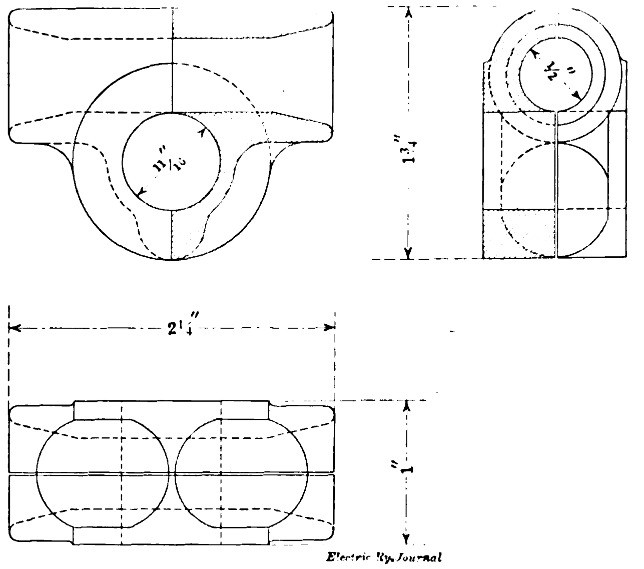
It is light in weight, cheap in price, quickly installed, inconspicuous, foolproof and everlasting. It has ample current-carrying and contact-pressure capacity. It requires no soldering, clinch tips or set screws and, as it has no sharp edges, it safeguards the stranded soft-copper feed-in cable from breakage.

It is readily and rapidly taken off for moving or for re-earing and can be used over and over again indefinitely. It has proved entirely satisfactory in more than ten years of continuous use and is standard for this company. It is so installed that an approaching wild trolley pole will drive the feed-in cable against the steel cap screw and not against the lips of the brass washer. These brass washer feed-in devices cost 15 cents each, exclusive of the short 2-in. sherardized tap bolt and sherardized spring washer, and weigh but 7 ounces. This light weight is an important point in minimizing the hammer blow of the passing trolley wheel.

Of course, by drilling one or more holes through the top washer the inclosed cable can be soldered into this feed-in device, if this is considered desirable.



SIDE AND END VIEWS OF FEED-IN CLAMP



CONSTRUCTION DETAILS OF FEED-IN CLAMP

Vacuum Cleaning Cars

BY E. J. HAINES, ASSISTANT TO SUPERINTENDENT OF EQUIPMENT, BAY STATE STREET RAILWAY, BOSTON, MASS.

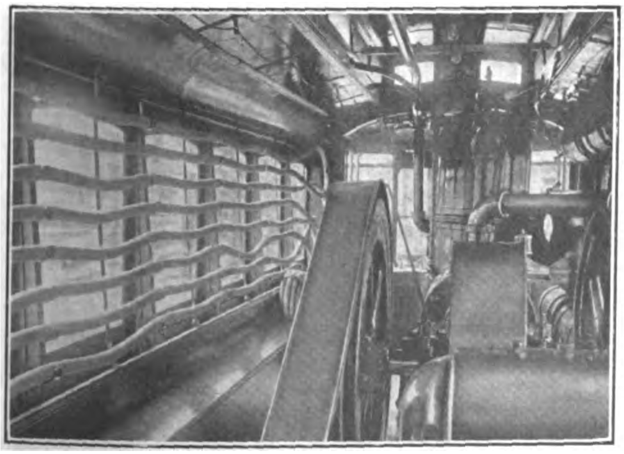
On a system where there are more than two or three carhouses the number of cars at each station might not warrant the installation of a vacuum cleaning plant at each one of these stations. In order to overcome this difficulty on the Bay State Street Railway, where there are thirty-seven operating carhouses scattered over a large territory, the vacuum cleaning plants are installed on cars, four of which are in service, one for each general division. This arrangement admits of the use of apparatus of larger capacity and greater efficiency for the same investment than would be possible with a plant at each station.

The vacuum cleaning cars were formerly single-truck box cars used in passenger service, having 20-ft. car bodies and longitudinal seats. All seats and seat backs were removed, cables were placed in troughs and the insides of the cars were sheathed up to the windows. The 4-in. axles of the Peckham single trucks under the cars were replaced with others 4¾ in. in diameter, and new journal boxes and heavier springs were installed.

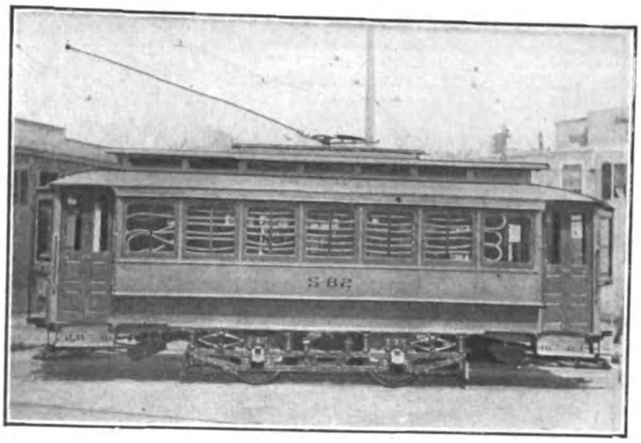
The vacuum cleaning apparatus was then installed, great care being taken to properly distribute the weight. In addition to the vacuum cleaner a 50-cu. ft. air compressor was installed in each car for the compressed-air supply in carhouses not having compressors.

Two different types of vacuum cleaners are used. The first consists of a four-sweeper, horizontal motor-driven, vacuum pump, with a cylinder of 14 in. diameter and 10 in. stroke, operating at approximately 150 r.p.m. The motor is of 20-hp. capacity, 550-volt, type CQ, compound wound, and drives the pump by means of a beveled steel chain, covered with a continuous strip of rawhide. There are two separators, each 24 in. in diameter by 48 in. long, one wet and one dry, which deposit the dirt at points for convenient handling in the most efficient manner. The tools used are four cushion renovators, four special cushion-edge renovators, four long bristle brushes for cleaning flat woodwork and ceilings of cars, four special renovators for cleaning grooves in molding, etc., four special renovators for cleaning heaters and four extension handles. There are 200 ft. of 1-in. or 1½-in. special wire reinforced vacuum hose in four 50-ft. lengths. This hose is supported on hangers bracketed on the body posts when not in use.

Boxes with hinged covers are installed under the windows for the storing of tools and a large closet is built at one end of each car, the air compressor and switchboard being located at the other end.



VIEW OF HORIZONTAL TYPE VACUUM CLEANER AND HOSE



EXTERIOR OF VACUUM CLEANING CAR

The other vacuum cleaner is of the turbine type, four-sweeper, direct-connected to a vertical shunt-wound motor of 10 hp. capacity. There is a primary separating tank of 30 in. diameter and a secondary separator of 36 in. diameter with 14-in. bags for separating the fine dust. These dirt bags are so arranged that they can be taken out and emptied after each day's run. Two hundred feet of hose and renovators similar to those in the other equipment are used.

Each one of these vacuum cleaners has some advantages and some disadvantages, so that the selection of either would depend a great deal on the service demanded. The turbine cleaner has the advantage of being lighter and the current consumed is in proportion to the work done, while with the horizontal type the greatest efficiency is obtained with all sweepers in operation. Both 1-in. and 1½-in. hose has been used. The smaller is easier to handle but it clogs up more easily, and as there is a great deal of rubbish, such as peanut shells, etc., to be cleaned up at times, it is a distinct advantage to have the larger hose.

One man is assigned to stay with each car in charge of the apparatus. He is assisted at the various carhouses by one or more car cleaners. Two men can in a day thoroughly clean fourteen box cars with longitudinal seats and plush cushions, and more of the semi-convertible cars with cane seats.

Hydraulic Wheel and Armature Presses

BY "VULCAN," A.M.I.C.E., A.M.I.E.E., ENGLAND

To give very heavy pressure the ram of a hydraulic wheel press must of necessity move very slowly. With the ordinary type of machine having only one belt-driven, constant-speed pump plunger the traveling speed of the ram is practically the same whether the latter is exerting a light or a heavy pressure.

In forcing axles into or out of car wheels the hydraulic ram often has a considerable amount of idle travel before reaching the object to be forced; in fact, on many jobs this idle travel almost equals, and on certain work considerably exceeds, the load travel, i.e., the distance moved under appreciable pressure. The time wasted on the idle movement is proportionately very high, and various arrangements have therefore been devised with the object of increasing the ram speed at this period.

With this object in view some makers provide the hydraulic press with two pump plungers of different diameters, power-driven from the same crankshaft, the larger one or both together being for use on the idle movement of the ram and the smaller one for providing the greater ram pressures required when the work is reached.

Others have used a single pump plunger driven from a two-speed countershaft, and in this case the high speed is employed for small ram pressures, and the low speed when the loading is great.

Such methods have been more or less successful, but the following device, which has been adopted by the writer on presses having only one pump plunger, meets all requirements in the simplest possible manner, and obviates the mechanical disadvantages of the double type.

It consists of a tank fitted on the wall of the building as high as possible above the press cylinder, and connected to the latter through a 1-in. pipe and a ⅝-in. hydraulic valve on the press. The tank is connected to the local water mains through a ball float valve.

Thus, supposing the tank is 20 ft. above the press, this arrangement, with valve open, is capable of imposing on a 10-in. ram a total pressure of about 680 lb., which is more than sufficient to move the ram forward up to the object to be forced.

By coupling the press to the tank on the idle forward travel, a ram speed many times greater than that produced by the operation of the pump may, therefore, be obtained. When the normal forcing pressure is required the tank supply valve is, of course, closed.

This addition to an ordinary hydraulic press will be found to increase the output capacity very considerably and costs very little to install.

Electric Welding with Dynamotor Sets

BY DANIEL DURIE, MASTER MECHANIC WEST PENN RAILWAYS

In order to save the great waste of current (7 to 1) when using resistance to obtain power direct from the trolley line for electric welding on motor repairs and on track work, this company has had constructed some dynamotor sets. These consist of 15-kw. machines with double commutators and armatures having double windings, one side wound for 650 volts and the other side for 80 volts, running at 2200 r.p.m. The 650-volt commutator is in series with the series winding on the field and the shunt field receives its current from the 80-volt commutator, so the wire is comparatively rugged. This makes the machine self-starting by simply hooking a fish-pole connection over the trolley line. At the same time it has sufficient shunt field strength to prevent its running away. This makes a very compact, light-weight, efficient and economical machine.

One point especially important in connection with welding with a machine of this class is having sufficient inductance in the welding circuit. Welding with the arc electrode was very difficult and with metal electrodes was practically impossible until after the welding current was stabilized by inserting an inductance coil. An inductance coil was finally made out of the core of an obsolete type of 4-kw. transformer wound with No. 4 Deltabeston wire. This inductance coil was used dry without a case. After its introduction the welding arc became very stable, and more suitable than when welding from 650 volts. Moreover, practically no resistance was required, as the strength of the welding current could be regulated by the length of the arc.

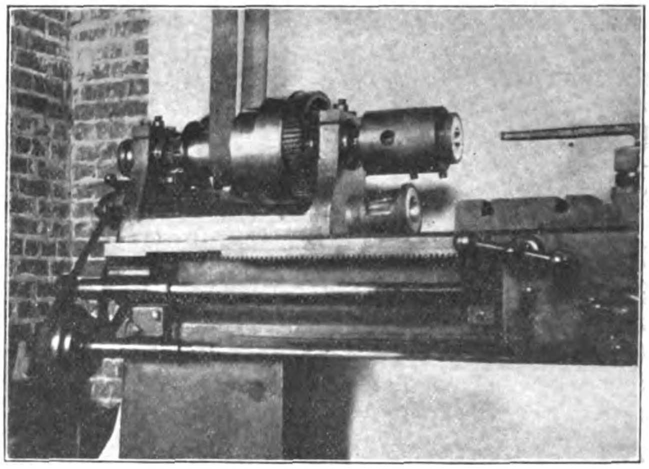
The provision of ample inductance in the welding circuit is absolutely vital to the success of the low-voltage welding apparatus. It also enables the machine to do far better work than when using 650 volts.

Our welding machines are hung underneath ordinary push carts with the axles arched up sufficiently to make room. The bodies of the push carts are used as lockers for helmets, cables, electrode holders and supplies. It is easy for one man to handle the apparatus around the shop or on the track.

Armature Bearing Jig

BY W. E. NEES, SUPERINTENDENT SELMA STREET & SUBURBAN RAILWAY

The advantage of using a jig for boring motor armature bearings has been generally evidenced by the large number of devices of this character that have been developed, and a simple device of this type is used by the Selma Street & Suburban Railway in its shops, the details being shown in the accompanying illustration. This jig is made large enough to take the largest diameters of bearing, and bushings are inserted for the bearings of smaller size. By adjusting four set screws, of which two are shown in the illustration, it is possible to arrange the jig so that the bearing is bored off-center, and the life of the bearing is thus increased about 50 per cent. It has been found that through the use of the jig, an apprentice boy can learn within a short time to bore out bearings as quickly as an experienced machinist.

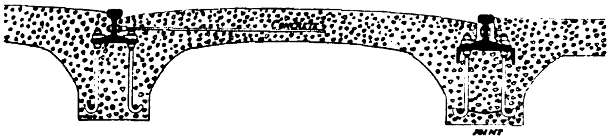

JIG FOR BORING ARMATURE BEARINGS

As shown in the illustration, the jig consists of two parts, one of which is screwed on to the spindle of the lathe. This is bored out to a taper, and in the recess is inserted a bushing, the latter being bored out to fit any particular size of armature bearing. By screwing in the set screws that are located on one side of the jig, the bushing is moved off the center line and the bearing held in it is thus bored eccentric to any desired degree.

Standard Paved Track Construction of the Southern Public Utilities

In a recent issue of the *Southern Public Utilities Company's Magazine*, E. R. Horton, Jr., of the engineering department, described the new form of construction which is being installed in Anderson, S. C., during the present summer. A cross-section of this is shown in the accompanying illustration. The rail support is a concrete beam reinforced with corrugated steel bars in accordance with modern concrete practice. The rail is mounted on the beam on wide bearing plates distributing the weight over 8 in. of width. Long hook bolts, placed at 2-ft. intervals, are used to anchor the rail, the hooks being turned under the reinforcing bars in the concrete beam. To insure permanent contact of the rail with its supports, wooden washers are placed under the base plates and strong lock washers are used on the upper ends of the anchor bolts. This design provides for the forcing of the rail down by the weight of the cars if there is much shrinkage.

At the joints extra support is given by the base plates which run unbroken past them, and the plates are heavily reinforced underneath by means of steel channel.



CROSS-SECTION NEW STANDARD TRACK CONSTRUCTION SOUTHERN PUBLIC UTILITIES COMPANY

The hook bolts anchor all parts of the joints together. In addition the splice bars are bolted up with Mayari chrome-steel bolts. To avoid pounding of the joints the heads are carefully ground and the rail ends are butted close together.

A monolithic track foundation and pavement are provided in this construction, the concrete paving being favored because it is believed that if properly constructed it is entirely satisfactory, while at the same time it is cheap. Mr. Horton states that in a few places concrete pavements have not been satisfactory on account of the use of inferior mixtures and poor workmanship and of ignorance of the proper method of making expansion joints. The method for making such joints which has been found satisfactory by the Southern Public Utilities Company is as follows: A smooth piece of weather boarding, greased, is placed in the track and the concrete is carefully edged on both sides, the edge being slightly rounded and compacted thoroughly so as to be very hard when the concrete sets. The surface of the street is laid off into large blocks similar in appearance to large bricks, the surface being scored by means of a large scoring board which lays off four rows of block at once. The scoring board is made of heavy timber sawed out to the proper crown and having on its face V-shaped oak strips suitably placed.

There is no groove next to the rail in this construction as the residents of the towns served by the company prefer this crown construction to the groove construction. There is no jolt when vehicles cross the track and there is nothing to catch the wheels of vehicles.

New Track and Conduit Construction at Worcester, Mass.

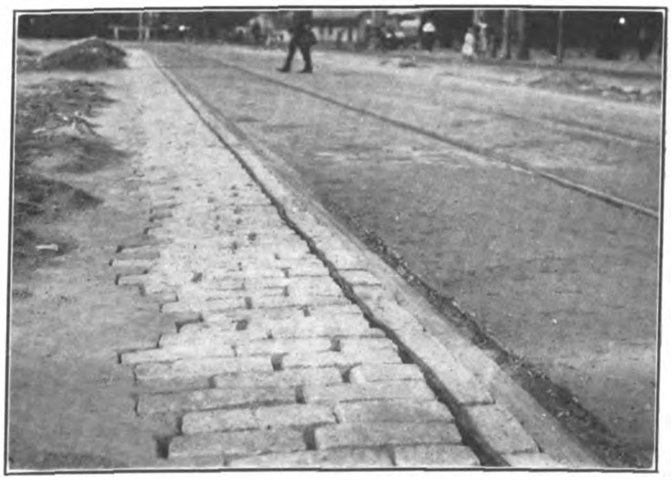
The Worcester Consolidated Street Railway is engaged in reconstructing double track on Main Street between Lincoln Square and Chandler Street and is placing the feed wires underground. The grouted granite-block paving, laid in 1901 at a cost of $3.50 per square yard, is the oldest of its type on any business street in the country. The track laid in 1901 consisted of Pennsylvania Steel Company's Sec. 222, 95-lb. girder rails, 8 25/32 in. high, laid on 7-ft. ties. The small amount of wear shown by the pavement upon the removal of the grouted blocks from between the rails and from a strip 2 ft. wide outside each track is indicated by the accompanying halftones.

The new track consists of Pennsylvania Steel Company's Sec. 273, 9-in. 125-lb. girder rail in 50-ft. lengths. The rails are of Mayari steel and the track bolts are of the same material. The rails are laid on 6-in. treated chestnut ties, 8 ft. long, with a minimum face of 7 in., the ties being spaced 2 ft. apart on centers. Rail braces are provided on alternate ties and the joints are of the suspended type, with twelve-hole plates. The track bolts, 1 in. in diameter, have 1/16-in. raised threads and Harvey grips, the guaranteed tensile strength of the material being 100,000 lb. per square inch. Each joint is provided with the American Steel & Wire Company's compressed-terminal copper bonds, one 3 in. and the other 10 in. long, giving full rail-section conductivity. A 500,000-circ.-mil cable is bonded around all special work, and cross-bonding is done every 500 ft.

WORCESTER CONSOLIDATED STREET RAILWAY—RELAYING BLOCKS BETWEEN RAIL AND OLD PAVEMENT

In laying the new track no ballast was required, an excellent gravel foundation being available. The ties were laid upon a bed of gravel, leveled to within 3 in. of their tops. Concrete of one part cement, three parts sand and six parts crushed stone was poured around the ties to a total depth of 5 in., thus surrounding the base of the rail. On top of the concrete a 1-in. cushion of sand was placed, the paving blocks being bedded upon this by the city. The blocks were laid about ¼ in. apart and grouted with a mixture of one part cement and two parts sand to a point near the top of the blocks and above this a 1.25 : 1.5 mixture was used. A dressing of pea stone was then broomed upon the granite.

Between Lincoln Square and School Street a strip of felt 6 in. wide and ½ in. thick has been placed vertically between a row of blocks laid parallel to the outer rail of each track and the heads of the other paving blocks laid on the street, the axes of the latter being at right angles to the rail. These strips are designed to reduce the noise of the cars by the insertion of a break between the track and the solid structure formed by the paving blocks and the grouting. Pending a test as to the water-tightness of this construction, which was introduced largely as an experiment, it has been decided to omit it in the remainder of the job. The opinion is held in some quarters that with the felt strip in service it may be difficult to prevent water from getting between the block and the rail and ultimately reaching the ties. The space required by the rail braces prevents the application of a continuous strip of felt between the rail and the first row of blocks.



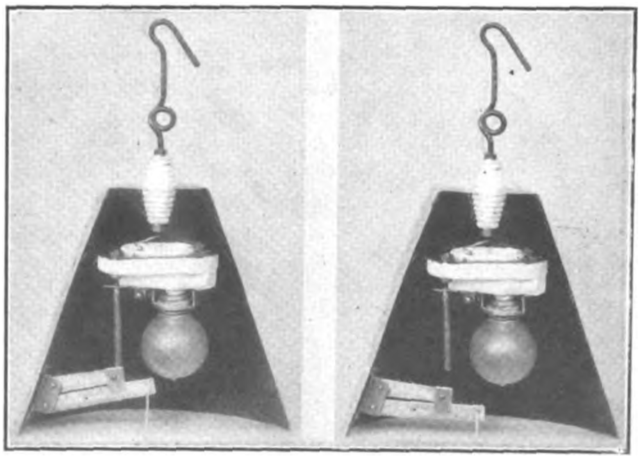
WORCESTER CONSOLIDATED STREET RAILWAY—RELAID PAVEMENT WITH EXPERIMENTAL EXPANSION JOINT

The feeder conduit consists of thirty or thirty-six 3½-in. Orangeburg fiber ducts laid in a trench 5 ft. deep and 30 in. wide at the bottom. This will contain both positive and negative feeders, and rental space has also been provided. Special manholes were designed for this work by Howard R. Whitney, engineer maintenance of way Worcester Consolidated Street Railway. These are of an offset type, with entrances 30 in. in diameter located at one side of the track. The working chamber, brick-lined at the sides, with an 8-in. concrete base and concrete, brick and steel roof, is 8 ft. long and 5 ft. wide, the height being 7 ft. 6 in. At one side is a step 3 ft. high and 2 ft. 9 in. wide, below the entrance, which was required by the city to facilitate the location of future underground structures. The negative feeders are carried from duct to duct along the roof, the other cables being racked on the wall in the usual way. A sump at one end of the floor provides for drainage into the surrounding gravel soil. The roof is composed of old rails laid parallel to the track, the rails being spaced just far enough apart to allow a course of bricks to be threaded into place between the webs. The bricks are used in place of wooden forms and a 3-in. layer of concrete is poured upon the bricks, forming the roof slab. Thirteen bull rings attached to walls and floor provide means for the handling of cable from the street into ducts by snatch-blocks and pulleys.

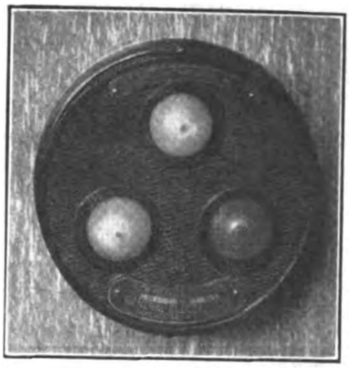
Electrostatic Potential and Synchronism Indicators

The General Electric Company has developed several devices employing the electrostatic glower for use on high-tension lines. This glower consists of a spherical lamp bulb with the usual base but without a filament, in fact with no terminal inside the vacuum space. One terminal consists of a brass cap on a glass tube pushed up inside the stem to the point near the center of the bulb. It is connected by a copper wire to another cap mounted on the opposite end of the tube. The base forms the second terminal. When the two terminals are subjected to a sufficient difference of potential a glow is produced in the bulb.

In using the glower for indicating potential on a transmission line, it is mounted on a porcelain base in an inverted position in a metallic condenser hood as shown in two of the accompanying illustrations. The inside terminal is connected direct to the hood while the screw-base terminal is connected in series with an air gap formed by two plates mounted on the under side of the porcelain base. An adjusting screw, seen in the illustration, permits variation in the length of the air gap. The other side of the air gap goes to a hook by means of which the device can be hung from a line wire. This hook is suitably insulated from the condenser hood. A loop is provided in the suspension hook to permit the indicator to be hung over the line by means of the ordinary switch hook used for operating disconnecting lever switches.



CROSS-SECTIONS OF VACUUM-LAMP-TYPE ELECTROSTATIC POTENTIAL INDICATOR, SUSPENSION DESIGN



GLOW POTENTIAL INDICATOR FOR USE AS A SYNCHROSCOPE

Mounted inside the hood is a switch for cutting the glower in and out of circuit, this switch being connected between the hood and the line hook. When the switch is opened the glower is connected between the line and the hood through the spark gap and will light up if there is potential on the line at least equal to the tension between the line and ground on a three-phase system carrying 15,000 volts. When the switch is closed there is a low resistance path between line and hood, and the glower is cut out of circuit.

The short-circuiting switch can be opened and closed by pulls on the cord by means of this construction: The switch consists of two blades, the upper of which rides on the lower, the latter being raised by a spring not shown. On the upper edge of the lower blade is a notch with which the end of the upper blade engages when the lower blade is pulled down a certain distance. To open the switch the string is pulled downward, bringing the lower blade downward also and the upper blade follows by gravity, its end sliding along the upper surface of the lower blade. After the end of the upper blade has passed the notch on the lower, the pull on the string is stopped and the lower blade starts upward under the action of the spring until the two blades are locked by the engagement of the notch and the end of the upper blade. To close the switch the lower blade is pulled down some distance, say 3 in., and released suddenly, causing the end of the upper blade to jump over the notch, both blades rising under the action of the spring.

A portable form of the indicator is also made in which the switch is omitted and the hood is attached to a long wood rod. In both forms there is provision for protecting the user by means of suitable grounding devices.

Another use for the electrostatic glower is in synchronizing, especially on circuits where transformers are not used for indicating or measuring purposes. The electrostatic synchronizer operates from the line charging current. The glowers are arranged in a case, as shown in one of the illustrations, and are connected to the line through condensers consisting of suspension insulators. The terminals of one glower are connected through the insulators to the leads of the same phase of running and incoming lines. The others are each connected across dissimilar phases of the remaining leads. When the lines are not in synchronism the glowers indicate the relative frequency of the lines in the usual manner. When they are in synchronism the rotating effect disappears, the glower connected to the corresponding lines being darkened and the other two showing about one-half brilliancy. The minimum voltage for operation is 13,200, and the maximum depends only upon the use of the proper number of insulators.

The synchronism indicator can also be used as a ground detector by connecting one terminal of each glower to the ground and the other terminal to the line.

News of Electric Railways

WASHINGTON BUS COMPANY SUSPENDS

Herdic Line, in Hands of Receiver, Returns Coaches to Manufacturer

The Metropolitan Coach Company, Washington, D. C., has suspended operations, and the route along Sixteenth Street through which it has been running is now being served by two different jitney lines under permits from the Commissioners of the District of Columbia. The coach company has surrendered to the Internatonal Motor Company, New York, the electric coaches it has been using in this service and they have been shipped back to New York in connection with a claim for an unpaid balance on the vehicles.

The suspension of service followed negotiations with the Public Utilities Commission of the District of Columbia, during which the Metropolitan Coach Company was refused permission to issue $150,000 of bonds. Permission was granted to issue $118,000 of bonds, however, but was not availed of, by reason of a number of circumstances, chief among which was, according to statements made at the office of the Public Utilities Commission, that the coach company refused to furnish information, except such as could be obtained from annual reports, as to the use to which the money desired from the bonds was to be put. In this connection an officer of the commission stated to a representative of the ELECTRIC RAILWAY JOURNAL:

"The commission was never able to obtain enough data from the company until toward the end of the service to afford any authority for the issue of bonds. The commission might have authorized bonds and complaints might have been made by the public afterward who purchased them that there were not enough assets behind the bonds. The company could not show property enough. The company also applied for an increase of fare from six tickets for a quarter to a straight 5-cent fare and the commission stated that while such an increase might be justified if better service were furnished, the service before the suspension would not warrant an increase in fare.

"About a year ago the commission received numerous complaints as to the condition of the equipment of the coach company and the service afforded. The commission notified the company again and again to repair the coaches. The company urged the condition of coaches and the necessity for providing new coaches as a reason for the bond issue, and desired to erect a $30,000 garage and pay off outstanding indebtedness.

"The commission desired to know what had been done with previous funds raised by the company, but no satisfactory information was obtained on this point. The commission also required as a condition for the issue of bonds that the old stock outstanding of the company should be withdrawn, but nothing was done about that. There was an agreement as to the exchange of transfers between the Washington Railway & Electric Company and the Capital Traction Company, which was automatically done away with by the suspension of the company. It could not be expected that either of the street railways would honor tickets or transfers of the coach company when it had suspended service."

The coach company went into the hands of a receiver shortly before its suspension. The Public Utilities Commission of the District of Columbia is of the opinion that the present traffic along the route served by the coach company will be suitably taken care of for the present by the two jitney lines which have been authorized to conduct business.

The Metropolitan Coach Company owned no land and such expenditures as it made for garage and plant facilities were made for leased land. The company owned six coaches, the cost price of which was $3,749 each, making a total of $22,494. According to statements made by the commission there is a balance still due thereon of $2,894. The commission estimated the value of the property of the company just before the suspension at $11,000. In one of its orders in connection with the case, the commission said:

"Since the company, during a large part of the year 1914, was operating over a longer route than at present, and was operating four large buses which have since been disposed of, the operating conditions of the company for the year 1913 approximate more closely to the present conditions than do those for the year 1914, and therefore the report of the company for the year 1913 is selected for the purpose of comparison. The net operating revenue for that year was $1,080.12. Assuming that the revenue passengers will number the same as in 1913, the annual revenue will be increased by $4,172.14 over that year by an increase in fare to 5 cents, and assuming that the operating expense will remain the same as in 1913 the annual net operating revenue will be $5,252.26. Assuming the life of the coaches to be six years, the company should be setting aside annually for depreciation $3,750, and assuming yearly taxes at 1½ per cent on a valuation of $11,000, the company should provide $165 annually for taxes. This total annual charge of $3,915, with a net operating revenue of $1,080 when operating under the conditions for the year 1913, would leave a deficit of $2,834, but with a net operating revenue of $5,252.26 when operating under the same conditions except for an increase of fare to 5 cents it would leave a gross income less operating expenses and taxes of $1,337.26."

RAPID TRANSIT PROGRESS IN PHILADELPHIA

Bids Received for the Construction of the Broad Street Subway and the Foundations for the Frankford Elevated

The Public Service Commission of Pennsylvania on Aug. 14 gave A. Merritt Taylor, director of city transit of Philadelphia, a certificate of public convenience, granting the application made for authority for the construction of a portion of the subway from a point in Broad Street, at the north side of the existing subway structure north of City Hall, to a point in Broad Street at the south side of the existing subway structure, including station platforms and entrances, and also granted a certificate for the construction of the elevated from Front and Arch Streets to Rhawn Street, Frankford, by way of Front Street, Kensington Avenue and Frankford Avenue.

On Aug. 16 the bids for the construction of the west City Hall section of the Broad Street subway and the foundation for the Frankford elevated line were opened by Director Taylor, in the City Transit Department's offices. Seventeen proposals were placed before Director Taylor. For the subway section, the larger operation, there were six estimates, four of which were made by New York firms. Of the eleven bids for the "L" foundation work, three were from New York concerns, and the rest from Philadelphia. One of the Philadelphia bids, that of James Connor, however, was thrown out, since he had failed to file a bond with the City Solicitor. His offer was $194,875. The names of the bidders and the prices quoted by them follow:

Broad Street subway:

Biddder	Lump Sum Bid for Item No. 1	Aggregate of Bids
Keystone State Construction Company, Philadelphia	$1,700,000	$1,737,320
The Foundation Company, New York	1,720,815	1,763,870
Arthur McMullen Company, New York	2,250,000	2,286,060
Frederick L. Cranford, Inc., and Smith, Hauser & MacIsaac, Inc., New York	2,350,000	2,404,770
New York and New Jersey Construction Company, New York	2,449,000	2,486,980
The Snare & Triest Company, Philadelphia	2,758,000	2,787,240

Frankford Elevated Line:

Biddder	Lump Sum Bid for Item No. 1	Aggregate of Bids
Edward Fay & Son, Philadelphia	$179,400	$188,278
Robert Lombardi, Philadelphia	149,000	155,150
Keystone State Construction Company, Philadelphia	179,000	185,970
Peoples & Rach, Philadelphia	227,000	235,240
American Paving & Construction Company, Philadelphia	307,000	315,640
Oscar Daniels Company, New York	217,000	225,815
Millard & Lupton Company, Philadelphia	260,000	273,150
James D. Dorney, Philadelphia	142,590	149,235
New York & New Jersey Construction Company, New York	282,200	290,450
A. L. Guidone & Son, Inc., New York	190,000	202,334

DETROIT COUNCIL ACCEPTS M. O. PLAN

Accompanying the plan of purchase and a statement of the prospective profits of the Detroit United Railway city lines under the proposed municipal ownership and operation, the Street Railway Commission of Detroit, Mich., sent an explanatory communication to the Common Council on the evening of Aug. 17. The Council accepted the financial statement, the plan of acquiring the lines and the explanatory communication. All were laid on the table until Aug. 23, when the Council will meet as a committee of the whole to discuss them and possibly set a date for a special election at which to submit the proposition to the electors.

In its statement to the Council, the commission bases its estimate of profits on the 1914 earnings of the company. Its accountants, the commission says, have separated the earnings of the so-called one-fare zone from the earnings of the interurban lines included in the Detroit United Railway.

The commission places the earnings of the one-fare zone in 1914 at $7,889,570. This, added to the earnings from chartered, express and freight cars, and sundry earnings, makes a total of $8,096,011. From the grand income total the commission subtracts $6,191,304 for operating expense, maintenance, depreciation and reserve, leaving a net income of $1,904,707. This amount, of course, does not include interest and taxes.

In a statement to the public, the commission says it has figured that the earnings of the lines will pay for the lines within thirty years and allow $10,000,000 for betterments. This, naturally, is a speculation, because until the price of the property has been fixed by the circuit court the commission cannot estimate what the interest charges on the debt assumed will be.

INDUSTRIAL RELATIONS COMMITTEE COMPLETES WORK

The United States Commission on Industrial Relations, which for two years has been investigating industrial unrest and its causes, concluded its session in Chicago, Ill., on Aug. 14 and adjourned.

The life of the commission expires on Aug. 23. On Aug. 17 it was announced that two reports had been prepared—a majority report signed by the three representatives of capital and by Prof. John R. Commons and Mrs. J. Borden Harriman, and a minority report signed by Chairman Frank P. Walsh and the three representatives of labor. In a statement Harris Weinstock, an employed member of the commission, said the members found themselves to be unalterably divided on social questions and that the presentation of two reports was the only solution of the deadlock. One of the points on which the commission split was a recommendation in the report drafted by Chief of Staff Basil M. Manley, and fostered by Chairman Walsh, that Congress enact laws confiscating, upon inheritance, all fortunes in excess of $1,000,000. Another ground of difference was that after the whole commission had agreed to recommend the establishment of a permanent bureau of industrial relations, the Walsh wing of the commission wanted to put the bureau under the Federal Department of Labor. The majority took the stand that this would destroy the very purpose of the bureau because capital would have no confidence in arbiters controlled by labor.

MANDAMUS PROCEEDINGS HOLD UP RAPID TRANSIT CONTRACTS

The Board of Estimate and Apportionment of the city of New York has had before it recently a number of rapid transit contracts awarded by the Public Service Commission for the First District. Under the provisions of the rapid transit act the following procedure is necessary before a rapid transit contract can legally be entered into: Public hearing must be held after due advertisement upon the draft form of contracts, it must then be advertised for bids, and then receive approval as to form by the corporation counsel and receive the consent of the Board of Estimate, which, at the same time, must prescribe a limit of bonds available for such contracts.

All the rapid transit construction contracts prepared by the commission since September, 1910, have been unit price contracts. All the unit price contracts of the commission since the change from lump sum to unit prices have contained a provision, known as Article XII, providing that if any work was not susceptible of classification that it should be done and paid for at cost plus 10 per cent. In view of the great number of unit prices and the fact that the great bulk of the work is comprised in the units of excavation, steel and concrete, Article XII is practically restricted to a very small amount of incidental work.

With two years' experience under the unit price contracts it was found that the practical workings of Article XII could be greatly improved if an alternative method was allowed, whereby the chief engineer, with the approval of the commission, could fix unit or lump sum prices for incidental work as it arose in lieu of the percentage plan. One of the advantages resulted from eliminating the considerable expense of supervision and cost accounting under the percentage provision. Accordingly, early in 1913 the commission submitted to the corporation counsel such an alternative provision. This was approved by the corporation counsel, and has been in every construction contract since that time.

The contracts incorporating this alternative provision amount in value to more than $73,000,000, and during the past two years have been consented to by the Board of Estimate without question. On the work to date under those contracts the orders under Article XII, including orders under both the percentage and unit price provisions, amount in gross to about eight-tenths of 1 per cent of the work done to date. Many of those orders, however, are in substitution for work which would otherwise have to be done so that the net increased cost due to orders under Article XII would be probably less than half of eight-tenths of 1 per cent. When several large contracts came before the Board of Estimate after being advertised and awarded by the commission that board suddenly insisted on the elimination of Article XII. This raised the questions, first of the legality of the action of the Board of Estimate in giving a consent upon condition, which, the corporation counsel holds, is equivalent to a refusal; and, secondly, whether the commission itself could change a form of contract after its being advertised and bids being received upon it. These questions are now brought before the courts in mandamus proceedings, instituted by the Holbrook, Cabot & Rollins Corporation, one of the contractors concerned, and action will have to be withheld pending the determination of the legal questions.

PROVIDENCE ARBITRATION HEARINGS

Hearings in the Rhode Island Company's wages arbitration case at Providence were resumed last week, with little prospect of their termination before Labor Day. The time has been chiefly occupied by the evidence of motormen and conductors as to the difficulties of their work. At a recent session Mayor Gainer, chairman of the board, ruled that some weight would be given to comparative wage tables. Efforts were made by the men to show that the work of platform men in Providence is more difficult than in Boston, but without much success. The company has not yet begun its rebuttal. Owing to the indisposition of counsel no sessions were held on Aug. 17 and 18, the hearings being continued until Aug. 19.

HOLYOKE STRIKE ENDED

After a complete suspension of service lasting eight and one-half days, the operation of cars on the Holyoke (Mass.) Street Railway was resumed at noon on Sunday, Aug. 15, by the striking employees of the company. The issues between the men and the company, relating chiefly to wages and methods of their payment as affected by figuring platform time or time by the day, are to be arbitrated by a board of three members. One member of this board will be chosen by the company, one by the union and the third by Governor David I. Walsh of Massachusetts. Each party to the agreement is to name his arbitrator by noon on Aug. 21. A conference relative to the third arbitrator was scheduled at Boston early in the week between Governor Walsh and Mayor Woods of Holyoke. The interruption of traffic affected more than 65,000 persons in Holyoke and Amherst, and seriously cut into the traffic on the Springfield-Holyoke route of the Springfield Street Railway. The local service of the Boston & Maine Railroad between Springfield, Holyoke and Northampton was heavily patronized during the strike and a large jitney bus traffic developed in Holyoke.. The latter fell off to insignificant proportions soon after the resumption of street railway traffic. The arbitration agreement was ratified by the members of the union at a meeting in Silverman's Hall on Sunday morning. Cars were placed in operation immediately after the meeting, but normal service was not restored until the evening.

New Electric Line Opened in Utah.—The Ogden, Logan & Idaho Railway, recently completed between Ogden and Huntsville, Utah, has been formally opened to traffic.

Louisiana Line Converted to Electricity.—The line of the St. Tammany & New Orleans Railway & Ferry Company, Mandeville, La., is now being operated by electricity between Mandeville, Abita and Covington. The road has been operated with motor cars. The cost of conversion for electric operation is said to have been $80,000.

Proposal for Operating Harbor Lines at Los Angeles.—The Harbor Commission of Los Angeles, Cal., has under consideration a proposition made by the Pacific Electric Railway and recommended by Clarence H. Matson, secretary and traffic manager of the commission, for the operation of the city's harbor belt line tracks by the Pacific Electric Railway. Mr. Matson points out that the proposed plan will offer the city practically all the advantages of the terminal agreement that failed to be consummated.

Thirty-three Mile Michigan Line Planned.—The Michigan Traction Company, Jackson, Mich., announces that an appropriation has been made for the construction and equipment of a 33-mile connecting link between existing divisions of its property now having terminals at Owosso and Saginaw. Construction surveys have about been completed, but the final route has not been chosen. This new line will make possible high-speed service between Bay City, Saginaw, Lansing, Jackson, Detroit, and Kalamazoo.

Back Franchise Fees an Issue in Los Angeles.—The Los Angeles Public Utilities Board, in a recent communication to the City Council, declares that the Los Angeles Railway owes the city between $18,000 and $20,000 for back franchise fees. The board's claim is based on the contention that franchise privileges originally granted to the company by the county no longer hold, since certain territorial annexations have brought into the city limits and under city jurisdiction certain of the railway's lines.

Mayor Resurrects Chicago Subway Plan.—Mayor Thompson of Chicago, Ill., has in the process of preparation his annual message to the City Council. He has announced that he will resurrect the plans for a subway system for Chicago and make a strenuous effort to get actual work started at an early date. The city's traction fund now totals approximately $16,000,000, an amount which the Mayor deems sufficient to begin construction at once. He will advocate the initial or downtown subway plan for immediate relief of congestion in the loop, after which a comprehensive system may be undertaken.

New Haven Men Ask More Particulars.—Further particulars were asked on Aug. 16 by the directors, officers and counsel of the New York, New Haven & Hartford Railroad who were indicted some time ago by the Federal Grand Jury for alleged conspiracy to violate the Sherman law. On Aug. 2, in reply to orders of the Federal Court, Assistant United States Attorneys Swacker and Batts filed a bill of particulars containing sixty-three printed pages and 189 paragraphs. Counsel for the defendants, however, have asked Federal Judge Hunt to direct the Government to furnish further and more sufficient specifications. Decision has been reserved.

I. C. C. on Directors' Responsibility.—The Interstate Commerce Commission on Aug. 17 handed down a report on the financial transactions and the operation of the Rock Island Railroad under the Reid-Moore syndicate and the history of the management which finally placed the road in bankruptcy. An aggregate of losses amounting to more than $20,000,000 is charged to have been caused by the syndicate. In its conclusions the commission has the following to say in regard to the responsibility of directors: "This record emphasized the need of railway directors who actually direct. There are too many directors who acquiesce in what is being done without knowledge and without investigation. A director of a railroad is a quasi-public official, who occupies a position of trust. A director who submits blindly to the exploitation of his company is a party to its undoing, and he should be held responsible to the same extent as if he had been a principal instead of an accessory before the fact. The greater his prominence, the greater his responsibility and the greater his dereliction. Obviously a man of large affairs could not attend to all the details in intricate transactions, but it is inconceivable that a director of ordinary business prudence and sagacity would sanction large expenditures without an inquiry as to the purposes of such disbursements. So long as this situation exists, however, it suggests the need of a law to charge such directors with individual responsibility for the dissipation of corporate funds."

PROGRAM OF ASSOCIATION MEETING

International Engineering Congress

The International Engineering Congress will be held in San Francisco, Cal., from Sept. 20 to 25. All sessions are to be held in the Auditorium Building, Civic Center, Hayes and Larkin Streets, at Market Street. At the general and sectional sessions a very large number of papers will be presented by eminent specialists. There will be an opening general session on Monday morning, Sept. 20, at which addresses will be presented by the Mayor of San Francisco, Gen. G. W. Goethals, honorary president of the Congress, and by distinguished delegates. The John Fritz medal will be presented to Dr. James Douglas. A general closing session will be held on Saturday morning. The balance of the week will be occupied with sectional meetings. Among the many papers of interest to electric railway men the following may be mentioned:

"Status of the Railways of North and South America," by F. Lavis, New York, N. Y.

"Italian Railways," by Prof. Luigi Luiggi, Rome, Italy.

"The Status of Railways and Tramways in the Netherland East-Indies," by E. P. Wellenstein, The Hague, Holland.

"Economic Considerations Controlling and Governing the Building of New Lines," by John F. Stevens, New York, N. Y.

"City Planning," by Nelson P. Lewis, New York, N. Y.

"London Traffic in 1913," by Sir Albert Stanley, London, England.

"Transit Problem in American Cities," by W. F. Reeves, New York, N. Y.

"Machine Shop Equipment, Methods and Processes," by E. R. Norris, East Pittsburgh, Pa.

"Machine Shop Equipment, Methods and Processes," by H. F. L. Orcutt, Rowington, England.

"High Temperature Flames in Metal Working," by H. R. Swartley, Jr., Jersey City, N. J.

"The Internal Combustion Engine," by Prof. C. E. Lucke, New York, N. Y.

"The 1915 Steam Turbine," by E. A. Forsberg, Stockholm, Sweden.

"The Diesel Engine in America," by Max Rotter, St. Louis, Mo.

"Streets," by George W. Tillson, New York, N. Y.

"Economics of Electric Power Station Design," by H. F. Parshall, London, England.

"Track and Roadbed," by George H. Pegram, New York, N. Y.

"Electric Welding," by C. B. Auel, East Pittsburgh, Pa.

"Effects of Electrolysis upon Engineering Structures," by Prof. A. F. Ganz, Hoboken, N. J.

"The Mechanical Problem of the Electric Locomotive," by G. M. Eaton, East Pittsburgh, Pa.

"Utilities," by President A. C. Humphreys, Hoboken, N. J.

"Public Utilities," by Edward Willis, Chiswick, England.

"Electric Motive Power in the Operation of Railroads," by William Hood, San Francisco, Cal.

"Electric Motive Power in the Operation of Railroads," by E. H. McHenry, New Haven, Conn.

"Signals and Interlocking," by Charles Hansel, New York, N. Y.

"Safety Engineering," by F. R. Hutton, New York, N. Y.

"Motor Vehicles," by Ethelbert Favary, New York, N. Y.

"The Boiler of 1915," by Arthur D. Pratt, New York, N. Y.

Financial and Corporate

KANSAS CITY PLAN FILED

Judge Hook's Arrangement Accepted by City and Reorganization Managers—Railway and Lighting Properties to Be Segregated

Another important step toward the reorganization of the Metropolitan Street Railway, Kansas City, Mo., was made on Aug. 16, when Judge Hook's plan was accepted by the managers who will supervise the refinancing of the street railway and electric light systems of the city, and a certified copy of the plan was filed with the clerk of the Federal court. The agreement, which embodies as its main features the almost complete exchange of old securities and the separation of the railway and the lighting properties, was described briefly as to its principal provisions in the ELECTRIC RAILWAY JOURNAL of Aug. 7. City Counselor Evans, who has approved the plan on behalf of the city, says:

"The way is now clear for the refinancing of the company and for putting it on a strong and permanent financial basis by which it can meet all of its obligations under the franchise extension and give Kansas City a better street car service than ever."

The three banking houses, Kuhn, Loeb & Company, Lee, Higginson & Company and Blair & Company, which have had much to do in the past with the securities of the old companies, have by their acceptance of the plan become reorganization managers for carrying out its provisions. H. L. Stuart, of N. W. Halsey & Company, Chicago, Ill., is designated as the personal representative of Judge Hook to co-operate with the foregoing. These managers are to take such steps as may be required to vest the necessary titles in the proper parties, and by foreclosure at Kansas City, exchange, purchase or otherwise acquire for the new street railway company, the Kansas City Railways, and the Kansas City Electric Light Company or its successor all the street railway and electric light properties, so as to clear the same of all existing mortgages, pledges and liens, except as to the Kansas City Elevated Railway and Kansas City & Westport Belt Railway mortgages, for which special provisions are made. Details in conformity with the plan may be adopted by the managers.

TABLE — SHOWING NEW SECURITIES AND BASIS OF EXCHANGE

Existing Securities		New Company Three-Year 5½ Per Cent Notes		New Company First and Refunding 5 Per Cent Bonds†		New Company Second Mortgage Bonds††			Light First Mortgage 5 Per Cent Bonds†		Light Second Mortgage 6 Per Cent Bonds‡	
Class	Amount	Per Cent	Amount	Per Cent	Amount	Per Cent	Series	Amount	Per Cent	Amount	Per Cent	Amount
Metropolitan Street Railway consols	$7,242,000	100	$7,242,000	.....	....	......	..	....	..	....	..	....
Corrigan Consolidated Street Railway	55,000	100	55,000	.....	....	......	..	....	..	....	..	....
East Side Electric Street Railway	250,000	100	250,000	.....	....	......	..	....	..	....	..	....
Kansas City Banks	375,000	100	375,000	.....	....	......	..	....	..	....	..	....
Kansas City & Westport Belt Railway	500,000	...	....	100	$500,000	......	..	....	..	....	..	....
Kansas City Railway & Light Company 5's	10,200,000	...	....	70	7,140,000	......	..	....	30	$3,060,000	..	....
Kansas City Railway & Light Company 6's	5,478,000	...	....	.....	....	65	A	$3,560,700	..	....	35	$1,917,300
Central Electric Railway	2,000,000	...	....	50	1,000,000	50	B	1,000,000	..	....	..	....
Kansas City Elevated Rail'y 6's	600,000	...	....	110	*660,000	......	..	....	..	....	..	....
Kansas City Elevated Rail'y 4's	2,000,000	...	....	42.51	*850,200	36.515	A	*730,300	..	....	..	....
Total	$28,700,000	...	$7,922,000	.....	$10,150,200	......	..	$5,291,000	..	$3,060,000	..	$1,917,300

NOTE—Interest will be adjusted as of July 1, 1915, and holders of the bonds will, in addition to the new securities, receive in cash the interest accrued and unpaid on the existing bonds to said date, as well as additional interest as stated in the plan.

*Approximate.

†Additional bonds of same lien not presently issued to bear interest not exceeding 6 per cent, as determined by directors.

††Series A, 6 per cent; Series B, 5 per cent. Sinking fund, $105,820 per annum.

‡Sinking fund, $38,346 per annum.

When such acquisitions and the releases in addition justify, the managers may declare the plan operative and cause new securities to be issued, in the meantime issuing interim certificates if necessary. Protective committees representing Metropolitan Street Railway consolidated 5's, Kansas City Railway & Light Company collateral note 6's and refunding 5's and Central Electric Railway 5's have already approved the agreement and in addition as of Aug. 19 the terms of participation therein. Any person interested may become a party to the plan on or before Oct. 1. The pending franchise required the Kansas City Railways to acquire within six months, or such extended time as the city might give, the portion of the street railway system in Missouri. This time was extended to July 7, 1915, and again to Nov. 7, 1915, upon the express condition that the reorganization follow Judge Hook's plan now published.

Judge Hook's plan provides that the lighting and street railway properties be separated in ownership and control so that they may be financed and operated by companies wholly independent of each other. It is now generally admitted that there should be no holding company owning the stocks of both, nor should the stocks or properties of both be mortgaged or pledged to secure the same obligations. With minor exceptions, the present holding company, the Kansas City Railway & Light Company, now holds or controls, subject to pledges, the stocks of the lighting company and the street railways, and has outstanding $15,678,000 of its own funded obligations. In Judge Hook's opinion, the separation presents little difficulty if a just proportion of that indebtedness be unconditionally set off against the lighting company to the relief to that extent of the street railways. Previous plans suggested that an amount in excess of $5,000,000 be so set off, but the amount now fixed as the conservative proportion is $4,977,300. This would leave $23,722,700 of the old funded debt to be cared for by the new Kansas City Railways. The new company and the lighting company should each take care of its own part of the debt by its own obligations, and the equity then left for the stockholders of the Kansas City Railway & Light Company should be distributed among them as they may determine, without supervision or approval by Judge Hook, provided no common corporate control of the electric and street railway properties is maintained or created.

It is stated that the stockholders of the Kansas City Railway & Light Company who own the equity in the lighting and street railway properties should not be assessed further than as provided in this plan for, since the receivers were appointed and up to May 31, 1915, the stockholders have received no dividends. In addition to interest paid on the bonds, $4,486,755 has been expended on the properties —$1,664,142 upon the lighting company and $2,822,613 by the receivers upon the street railways. Furthermore, the defaulted franchise obligations of the old street railways, claimed by the city to be about $7.000,000 and to be superior to the rights of existing bondholders, are cared for in the new franchise in a modified and extended form and assumed by the new company, and that much of the burden will fall on the stockholders without corresponding increase of income. Moreover, the franchise provides that $6,300,000 of the surplus earnings of the new company shall be used for "extensions and additions to the property" without increase of capital value on which returns are available for dividends to stockholders. It is proposed, however, that the stockholders shall take or cause to be taken at par sufficient of first and refunding bonds to pay the reorganization expenses chargeable to the street railways and not paid from current funds, the liabilities, claims and charges judicially determined to be prior and paramount to the bonds to be refunded, and to supply the new company with $1,000,000 in cash for new capital expenditures. Pending reorganization all necessary steps will be taken to provide for advancements of capital value required by the franchise by the issuance of receivers' certificates.

The holders of the bonds of the old companies who become parties to the reorganization are to receive interest at the rates last paid, respectively, to July 1, 1915, the date of the bonds of the new company, except that the holders of the Kansas City Railway & Light Company 5's shall receive an additional 1 per cent per annum from May 15, 1913, to the date above mentioned, and the holders of Metropolitan Street Railway consols shall receive additional interest at the rate of 1 per cent per annum for the period from May 1, 1913, to Nov. 1, 1913.

The bonds of the new company are to run for the life of the franchise. The manner in which it is intended that the new securities shall be distributed is shown in the table on page 330.

Judge Hook states that a reorganization of the Metropolitan Street Railway system and the acceptance of the new thirty-year franchise, which has been conditionally tendered, are imperative if even the bondholders are to save their investments intact. The funded debt amounts to $28,700,000 (part electric lighting debt), of which more than $25,000,000 is past due. There is also a large amount of other liabilities, part of which is claimed to be superior to the bonds. In commenting on the plan Judge Hook says:

"This plan is not framed to make a profit or to give an advantage to any security holder. It is not intended to make the old bonds worth par in the present market except as the assurance of safety and intrinsic worth of the bonds of the new company for which the old ones can be exchanged at par may so result. So far as practicable and just the old status has been carried forward and the relative rights of each class of creditors, preferred, secured and unsecured, have been preserved. The franchise tendered by the city offers a way out of much difficulty and loss. It is not likely another will be granted, certainly not without extreme sacrifice. This plan is recommended to every person having an interest in the property."

OHIO TAX VALUES $160,887,220

The value of the street, interurban and suburban railways of Ohio, according to the figures of the State Tax Commission, is $160,887,220. This is a net increase of $8,450,700 over the valuation fixed for taxation purposes in 1914. Approximately one-fifth of the total increase was assigned to the Cleveland Railway, thus placing its valuation far above the figures on which the company has several times refused to pay taxes in the past. The increase on this property over 1914 is $1,717,320, making the total for the year $24,470,050. The Cincinnati Traction Company with a valuation of $19,232,270, an increase of $471,870 over 1914, is second to the Cleveland Railway.

The valuations of other large properties follow:

	Value	Increase
Ashtabula Rapid Transit Company	241,330	6,950
Cleveland, Alliance & Mahoning Valley Railroad	707,540	347,750
Cleveland, Painesville & Eastern Railroad	1,825,260	66,850
Cleveland, Painesville & Ashtabula Railroad	489,390	11,890
Cleveland & Eastern Traction Company	718,090	......
Cleveland, Southwestern & Columbus Railway	4,574,770	150,930
Cleveland & Erie Railway	22,970	250
Cleveland, Youngstown & Eastern Railway	415,750	440
Lake Shore Electric Railway	$4,965,240	$221,390
Lorain Street Railway	852,900	26,800
Mahoning Valley Railway	3,453,700	137,500
Mansfield Railway, Light & Power Company	833,630	13,990
Mt. Vernon Railway	20,000	*7,920
Northern Ohio Traction & Light Company	14,410,540	379,690
Pennsylvania & Ohio Railway	499,220	*102,370
Plymouth & Shelby Traction Company	100,000	......
Sandusky, Norwalk & Mansfield Electric Railway	263,530	*36,470
Sandusky, Fremont & Southern Railway	270,820	......
Stark Electric Railroad	1,337,680	85,060
Youngstown Park & Falls Railway	764,070	124,190
Youngstown & Sharon Street Railway	4,832,210	260,640
Youngstown & Southern Railway	646,080	*44,040
Youngstown & Ohio River Railroad and Salem Street Railway	1,059,320	97,090

*Decrease.

ANNUAL REPORT

Illinois Traction System

The comparative statement of income, profit and loss of the Illinois Traction System, Peoria, Ill., for the calendar years 1913 and 1914 follows:

	1914	1913
Earnings:		
Interurban lines	$3,626,636	$3,604,265
City lines	3,021,859	3,072,236
Gas	877,982	816,911
Electric	3,002,378	2,636,714
Heat	314,640	274,672
Water	14,386	13,539
Miscellaneous	254,973	102,761
Total gross earnings	$11,112,854	$10,521,098
Total operating expenses, including taxes	6,587,462	6,198,873
Net from operation	$4,525,392	$4,322,225
Interest on bonds, etc	3,290,787	2,883,239
Available for depreciation, etc	$1,234,605	$1,438,986
Less depreciation	309,580	
	$925,025	
Less bond discount for 1914	47,956	
Surplus, 1914	$877,069	

In 1914 the arrangement which had been under consideration for several months, covering the consolidation of the Western Railways & Light Company with the Illinois Traction Company, was consummated on a basis acceptable to the directors of each company. The operating properties of the Western Railways & Light Company included the Atchison Railway, Light & Power Company, the Cairo Electric & Traction Company, the Cairo & St. Louis Railway, the Chicago, Ottawa & Peoria Railway, the Galesburg Railway, Lighting & Power Company, the Northern Illinois Light & Traction Company, the Quincy Railway and the Wichita Railroad & Light Company. The above financial statement for 1914 includes the reports of the newly acquired companies, so that the results of the two years are not strictly comparable.

The interurban and street railway receipts for the year, however, were affected by the general business depression, which caused the closing of many manufactories in whole or in part, and also by the increased use of the automobile, both in town and country. The general result was a slight decrease in the earnings of these properties. Satisfactory increases in the electric and gas departments were obtained by judicious advertising and strenuous campaigns for the introduction of improved appliances. There was a gratifying decrease in the operating costs at generating stations, but this was partly offset by the increase in taxes and the increases in the wages of trainmen. Taxes for the year were $61,484, or approximately 16.6 per cent above the amount expended during the preceding year. New wage schedules decided by arbitration increased this item of expense $31,617.

Between Springfield and Carlinville and between Staunton and Edwardsville the installation of electric automatic block signals was completed, and now all the interurban trackage contemplated when the installation was decided upon is protected by this type of signal. During the year the demand on the freight equipment was such as to justify the purchase of additional cars, and an order was placed for fifty standard hopper-bottom coal cars of 50-ton capacity.

Alton & Jacksonville Railway, Alton, Ill.—In an appeal from the decision of the Illinois Public Utilities Commission the Alton & Jacksonville Railway, the successor to the Alton, Jacksonville & Peoria Railway, has filed a suit in the Sangamon County Circuit Court in an effort to reorganize with a capital stock of $750,000 and a bond issue of $500,000. When the company decided to extend its lines from Jacksonville to Peoria, application was made to the commission for permission to reorganize with the above-stated capitalization, but its ruling cut the capital stock down to $192,000 and the bonds to $450,000. Although this order has not been accepted, the old company has been taken out of receiver's hands and the new company is operating the electric railway from Alton to Jacksonville.

Argenta (Ark.) Railway.—The Argenta Railway was sold on July 28 to the Intercity Terminal Railway Company for a nominal consideration. The latter company was incorporated a few weeks ago and held a franchise for the operation of street cars or motor cars from Markham and Main Streets, Little Rock, to the center of the free bridge. The Argenta Railway held a franchise for the operation of cars from Argenta to the center of the free bridge, in addition to the street railway system in Argenta. With the consolidation of the two companies and the installation of bridge car service, transfers will be issued to passengers from the Argenta lines to the bridge cars or vice versa. It is said that arrangements will also be made for the transfer of passengers from the bridge cars to the Little Rock street cars. It is reported that three large motor buses with seating capacity for twenty passengers are now being constructed on the order of the Intercity Terminal Railway and will be placed in service on the bridge. The officers of the Intercity Terminal Railway are: C. C. Kavanaugh, president; E. W. Jackson, vice-president, and F. J. Schmutz, secretary and treasurer.

Boise (Idaho) Railroad.—As stated in a preliminary announcement in the ELECTRIC RAILWAY JOURNAL of Aug. 7, the lines of the Boise Railroad and the Idaho Traction Company have been separated. The Boise Railroad has refused to honor the transfers given by the Idaho Traction Company and it is understood the matter is to be taken before the Public Utilities Commission for a hearing. The Boise Railroad has reorganized, with W. E. Pierce, president; H. E. Dalton, general manager; R. G. Jennings, vice-president; J. M. Haines, secretary, and L. H. Cox, treasurer.

Fort Madison (Iowa) Street Railway.—The election that was to have been held on July 17 for the approval of the Mississippi Valley Electric Company franchise in Fort Madison has been postponed until Sept. 9. This company recently took over the property of the Fort Madison Street Railway on the condition that the new franchise for the latter company, recently passed by the City Council, be approved by the voters.

Grand Valley Railway, Brantford, Ont.—The negotiations between the Lake Erie & Northern Railway and the city of Brantford, with reference to a portion of the Grand Valley Railway section of the lines operated as the Brantford Municipal Railway, have been concluded. As a result, the Lake Erie & Northern Railway has acquired for $30,000 the portion of the Grand Valley Railway from Paris to Galt, a distance of about 13 miles. The Brantford Municipal Railway will in the future consist of the old Brantford Street Railway and the Brantford-Paris section of the old Grand Valley Railway, the latter being about 8 miles long. The feature of rearrangement is the electrification of the entire Lake Erie & Northern Railway line from Fort Dover to Galt, as described elsewhere. Until this electrification is completed, the purchased section of the Grand Valley Railway will be operated by the Brantford Municipal Railway Commission.

Idaho Traction Company, Boise, Idaho.—The United States Circuit Court of Appeals at San Francisco has handed down an opinion affirming the findings of Judge Dietrich of the Idaho Federal District Court, who cancelled $718,000 of bonds held by the Idaho Traction Company on the property of the Idaho-Oregon Light & Power Company. The fight for the cancellation of the bonds was made by what was known as the Priest committee against the so-called New York committee.

International Traction Company, Buffalo, N. Y.—The directors of the International Traction Company have formulated a plan for the retirement of the present $5,000,000 of 4 per cent cumulative preferred stock, together with the accumulated and unpaid dividends thereon, by the issuance on a share for share basis of new 7 per cent cumulative first preferred stock, which will have priority in all respects over the existing 4 per cent issue. Under this plan, which has already been approved by the greater part of the preferred and common stockholders, the elimination of 42 per cent of accumulated and unpaid dividends will increase the company's credit and the value of its outstanding securities. The accumulation of dividends on the 4 per cent stock came about through the restrictive provisions of the original collateral trust indenture, which prevented the International Railway, the operating company, from issuing any securities to provide for improvements and extensions required by its rapid growth. The readjustment of the indebtedness in 1912 obviated this situation, and since then the company has paid the regular 4 per cent dividend on the preferred stock. Now a dividend will be declared and paid on this stock from the date of the last dividend payment to the date from which the dividend on the new 7 per cent first preferred stock will accrue. A two-thirds vote of both preferred and stock is necessary for the adoption of the plan.

Kansas City Viaduct & Terminal Railway, Kansas City, Mo.—The protective committee for the first mortgage 4½ per cent bonds of the Kansas City Viaduct & Terminal Railway has called a meeting of the holders of its certificates of deposit for Sept. 9 to vote on a proposition to extend for a period of two years the life of the protective agreement, which expires by limitation on Jan. 1, 1916. Within this period the committee hopes to procure a purchaser for the property. Since the receivers of the Metropolitan Street Railway in 1911 failed to secure a reduced toll charge for the viaduct structure, there has been no street car service upon the viaduct. Negotiations for the disposal of the structure have been carried on unremittingly with various prospective purchasers, but with no results thus far. It is stated that until the Metropolitan Street Railway property is reorganized, no plan can be intelligently worked out for the rehabilitation or sale of the viaduct property.

Montreal (Que.) Tramways.—The stockholders of record on Sept. 10 have been offered the right to subscribe until Oct. 25 for $1,000,000 of common stock of the Montreal Tramways in the proportion of one new share for every three shares held. The subscriptions are payable 10 per cent on Oct. 25, with the balance in assessments on two months' notice.

Newport & Fall River Street Railway, Boston, Mass.—The stockholders of the Newport & Fall River Street Railway at their recent annual meeting approved a proposition to issue $100,000 of additional capital stock and $123,000 of bonds, both in accordance with leases to the Bay State Street Railway.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The California Railroad Commission has authorized the Oakland, Antioch & Eastern Railway to issue two notes, one for $90,400 to the Union Trust Company, San Francisco, and the other for $10,000 to A. W. Maltby, in place of a note for $100,400 previously authorized for issuance to the Union Trust Company.

Pacific Gas & Electric Company, San Francisco, Cal.—The gross operating revenue of the Pacific Gas & Electric Company for the calendar year 1914 was $16,912,688, as compared to $15,869,006 in 1913. The maintenance, operating expenses, taxes and reserve for uncollectible accounts and casualties in 1914 amounted to $8,913,922, and for 1913 to $9,331,206, leaving net earnings from operations of $7,998,766 in 1914 and $6,537,799 in 1913. After adding the other income and deducting fixed charges, the balance for 1914 was $3,645,666, as compared to $2,723,044 in 1913. Of the year's gross, including miscellaneous income, only 3 per cent came from street railway operation, that of the Sacramento Street Railway. This company's gross revenue for 1914 was $556,908, a decrease of 2.79 per cent, as compared to the result for 1913. This decrease was caused by temporary local conditions and also, to some extent, by the competition of jitney buses. The total number of passengers carried during the fiscal year amounted to 12,256,142, and the car mileage to 2,481,968. During the year the stockholders of the holding company increased 133 per cent. Since June 3, 1914,, the company has sold $10,177,300 par value of first preferred 6 per cent stock, $6,039,600 or 59 per cent of which was purchased by stockholders and $4,137,700 or 41 per cent by employees, patrons and others. The total amount realized was $8,396,272, of which $7,840,229 has already been paid in.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The United Properties Company, which is the holding company for the San Francisco-Oakland Terminal Railways, was on Aug. 11 sued for approximately $2,500,000 in a San Francisco Court by the Anglo-California Trust Company, trustee. The suit was brought on behalf of N. W. Halsey & Company, who loaned that sum to the Oakland Railways in August, 1912. The loan bore interest of 6 per cent and was payable June 12, 1913. No part of the principal has ever been paid, according to the complaint. It is said that at the time the loan was made the outstanding stock of the Oakland Railways was 270,000 shares, of which the United Properties Company owned 169,990. The company's proportionate stockholders' liability for the loan, therefore, is stated to be $2,488,796. Simultaneously with the filing of this suit, a similar suit was filed against several hundred owners of stock in the San Francisco-Oakland Terminal Railways, which the complaint says is the actual holding company of the Oakland Railways. These stockholders are declared to be liable according to the number of shares owned. The same judgment is asked in this suit.

Virginia & Ohio Securities Corporation, New York, N. Y.—The controlling stock interest in the Steubenville, Wellsburg & Weirton Railway and the Wellsburg Electric Light, Heat & Power Company, formerly held by the Tri-State Railway & Electric Company, was recently acquired by the Virginia & Ohio Securities Corporation. The railway and the lighting companies, however, have not yet been merged.

DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 50 cents, common.

Central Arkansas Railway & Light Corporation, Hot Springs, Ark., quarterly, 1¾ per cent, preferred.

Connecticut Valley Street Railway, Greenfield, Mass., quarterly, three-fourths of 1 per cent, common.

Northern Texas Electric Company, Fort Worth, Tex., 3 per cent, preferred; quarterly, 1 per cent, common.

Terre Haute Traction & Light Company, Terre Haute, Ind., 3 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.					
1m., Jun., '15	$10,420	$7,960	$2,460	$1,123	$1,337
1 " " '14	11,458	8,870	2,588	1,085	1,503
12 " " '15	118,966	98,844	20,122	13,463	6,659
12 " " '14	121,731	102,208	19,523	12,868	6,655
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO					
1m., Jun., '15	$39,213	*$21,790	$17,423	$10,953	$6,470
1 " " '14	41,178	*20,501	20,677	11,075	9,602
6 " " '15	179,739	*106,410	73,329	65,724	7,605
6 " " '14	187,069	*101,311	85,258	65,933	19,325
EL PASO (TEX.) ELECTRIC COMPANY					
1m., Jun., '15	$72,931	$40,496	$32,435	$4,194	$28,241
1 " " '14	80,052	49,850	30,202	4,202	26,000
12 " " '15	997,414	540,820	456,594	50,328	406,266
12 " " '14	963,471	532,768	430,703	47,961	382,742
HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.					
1m., May, '15	$21,897	*$12,601	$9,296	$4,644	$4,652
1 " " '14	24,176	*15,669	8,508	4,438	4,070
12 " " '15	265,217	*170,818	94,399	55,677	38,722
12 " " '14	290,023	*177,504	112,519	55,695	56,824
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO					
1m., Jun., '15	$119,785	*$78,189	$41,596	$36,350	$5,246
1 " " '14	127,203	*76,702	50,501	35,470	5,031
6 " " '15	625,124	*434,619	190,505	216,277	†25,772
6 " " '14	658,106	*431,645	226,461	211,721	14,740
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO					
1m., Jun., '15	$331,977	*$200,879	$131,098	$52,504	$78,594
1 " " '14	317,780	*199,525	118,255	51,020	67,235
6 " " '15	1,756,651	*1,101,646	655,005	308,465	346,540
6 " " '14	1,721,700	*1,059,635	662,065	301,835	360,230
PENSACOLA (FLA.) ELECTRIC COMPANY					
1m., May, '15	$20,789	*$11,690	$9,099	$6,083	$3,016
1 " " '14	22,746	*14,393	8,353	6,065	2,288
12 " " '15	251,397	*156,464	94,933	73,766	21,167
12 " " '14	285,349	*178,830	106,519	71,780	34,739
PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.					
1m., May, '15	$618,364	$382,464	$235,900	$181,306	$54,594
1 " " '14	706,471	431,041	275,430	175,324	100,106
12 " " '15	7,983,915	4,956,970	3,126,945	2,147,088	979,857
12 " " '14	8,717,662	5,048,226	3,669,436	2,091,915	1,577,521
SAVANNAH (GA.) ELECTRIC COMPANY					
1m., May, '15	$64,413	*$41,188	$23,225	$21,453	$1,772
1 " " '14	71,500	*46,310	25,190	21,249	3,941
12 " " '15	822,339	*533,831	288,508	257,019	31,489
12 " " '14	844,556	*560,819	283,737	253,712	30,025

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*Includes taxes. †Deficit.

Traffic and Transportation

JITNEY JOTTINGS

Eighteen Paragraphs Which Deal Briefly with the Moribund Jitney

The jitney in Camden, N. J., has proved to be a financial failure. Competition has ruined the business, according to Charles Austermal, president of the Camden Jitney Company, which has suspended operation. The Camden Jitney Company was incorporated at $50,000 and was one of the first in business there. It started with three large touring cars. Business proved to be so profitable that, after a month's operation, the company was incorporated and ran twelve cars. Other companies which operate jitneys in Camden are the West Jersey Jitney Company and the Winton Line. Including the independent operators, it is said there are about 300 cars doing business in Camden.

Numerous arrests of jitney drivers at Galveston, Tex., have followed the failure of the drivers to provide the bond of $10,000 as protection for passengers and the public against accident. Steps are being taken by the jitney operators to carry one of the cases now pending on the corporation court docket here through the higher courts for an opinion from the State Supreme Court. The Galveston ordinance affects the automobiles now running on the Galveston-Houston line, and the contention of the jitney men will be that neither Houston nor Galveston has jurisdiction over the business as the men in the business are operating strictly an inter-city line.

The City Council of El Paso, Tex., has revised its jitney ordinance by providing for larger indemnity bonds by jitney drivers. Under the old requirement companies owning and operating as many as ten cars were required to give bond for only $500 per car. Under the new requirement, a bond of $1,000 per car is required regardless of the number of cars a company operates.

A grievance committee has been named by the jitney men of Dallas, Tex., to express their objections to the new ordinance which was agreed upon by the president of the jitney union and the City Commissioners. The head of the chauffeurs' union is opposed to the ordinance and says it has never received the sanction of the membership. The new ordinance is being strictly enforced.

Another test of the rights of cities to regulate jitneys will be made in the case of the jitney men of Austin, Tex., where a recent city ordinance has been enforced. An effort will be made to get the case before the Supreme Court of Texas and avoid the Court of Criminal Appeals, which has already upheld the cities' right in the case of I. W. Sullivan concerning the Fort Worth ordinance.

A petition asking for a referendum election on the new jitney ordinance of Houston, Tex., was presented to the City Council on Aug. 7, following the refusal of the city to reduce the license fee from $72 to $36. All of the principal requests of the jitney men were granted by the city except as to license fee. The ordinance does not require a bond and in many respects is regarded as very liberal to the jitney interests. The new regulations were to have gone into effect on Aug. 10, but the referendum election will suspend them indefinitely. Mayor Campbell is in favor of having the voters express themselves on the subject.

R. E. Platt, manager of Idora Park at Youngstown, Ohio, and five of his employees on Aug. 7 filed suits for damages aggregating $60,000 on the charge of false arrest against ten jitney bus owners and their attorneys. When the Youngstown Park & Falls Street Railway began charging an entrance fee of 10 cents to people taken to the park by the jitney buses, the owners retaliated by having the park employees arrested on the charge of violating the Sunday closing law. They were dismissed recently.

The new ordinance in Des Moines, Iowa, regulating the operation of jitney buses did not go into effect on Aug. 9 because of an appeal to the Supreme Court from the decision of District Judge Utterback, who held that the jitney ordinance recently passed by the Council was valid in every particular. It provided that jitney operators must designate their routes and give bond for the protection of passengers and pedestrians.

The City Council of Charlotte, N. C., has passed a jitney regulatory ordinance. The feature of the ordinance is the provision requiring the filing of a bond for $1,500 for the first bus operated and of a bond for $1,000 for each bus after the first one. Routes must be designated and a record filed of the hours during which it is intended to render service. The routes are subject to approval by the officials of the city.

On July 30 Mayor Grace of Charleston, S. C., ratified the ordinance passed by City Council recently for the regulation of the jitney bus traffic in Charleston. Thirty days after the affixture of the Mayor's signature are allowed jitney operators in which to file the bond assessed according to the provisions of the ordinance.

On Aug. 3 the City Commissioners of Passaic, N. J., passed an ordinance on first reading to regulate the jitneys. The ordinance provides that the license for a bus carrying twenty or more passengers shall be $25 a year. Smaller buses will be charged $15, and $5.50 will be asked from those using automobiles as jitneys.

The Muskogee (Okla.) Electric Traction Company has announced that it will operate one-man cars in that city on account of jitney competition.

The Dominion Power & Transmission Company, which owns the street railway at Hamilton, Ont., has reported to City Treasurer Leckie that the jitneys have been responsible for a decrease in its receipts of $24,218 for three months. The number of jitneys on the main streets is now about 200. The city is taxing cars at the rate of $5 a seat.

Police Judge Meyers at Cedar Rapids, Iowa, holds the bond feature of the jitney ordinance recently adopted in City Council to be unconstitutional. The measure provided for a bond of $3,000 to guarantee indemnity to passengers injured through the carelessness of a jitney bus operator. The court held this amount to be prohibitive.

The City Council of Albuquerque, N. M., by a vote of five to two has served notice on the Albuquerque Traction Company that the franchise of the company will be forfeited if within thirty days it does not show to the satisfaction of the Council that arrangements have been made for adequate service before October. This is the reply of the city to the receiver of the company, who threatened to continue the present curtailment of service for six months unless the Council passed a jitney regulation prepared along lines suggested by him.

The Mayor of Quincy, Ill., has returned to the Council without his approval the ordinance to regulate the jitney passed there. He considers the ordinance unduly burdensome. He expressed the hope that the Council will see its way clear "to prepare a new ordinance which will be fair and reasonable, and generally acceptable."

In Kansas City the opportunity to go into the jitney business, hailed as a godsend to the laboring man and mechanic to get into business for himself, turned into a catastrophe when companies were organized to give scheduled service, largely eliminating the "little fellow." The companies in turn quickly got into trouble through inability to handle labor questions with facility, and through inexperience in the management of the new form of industry. Leavenworth, Kan., offers another phase of the distressing situation. Here the jitney owners were called upon to provide the same protection to the public, the same contribution, proportionately to the incomes, to the public, as other institutions, and had to quit business. In Muskogee, however, the alleged profits of the business have appealed strongly to the City Commissioners, who advocate establishing a municipal system to eliminate the private owner. One of the most illuminating incidents of the recent news is the estimate at Muskogee that the city could set aside $30,000 a year from the proceeds of a municipal jitney system for street maintenance.

The city of Ottumwa, Iowa, has been sued by the estate of Charles Chesser for $20,000, the deceased having been killed in an accident involving a jitney bus and a street car. The attorney for the estate asserts that the street railway is not liable, but that the city is, one point being that the jitney skidded on an iron grating in a gutter and was thrown into the street car, and another that the city has adopted no regulatory measures intended to govern the operation of jitneys.

ALBANY SERVICE ORDER

Summary of the Provisions of the Latest Order of the Commission Regarding Cars

The Public Service Commission for the Second District of New York made an order on Aug. 13 for the improvement of the rolling stock of the United Traction Company, Albany, in the case which has been before the commission since May 1, 1912. The latest order provides as follows:

The immediate purchase of fifteen new modern cars, completely equipped, seating capacity at least thirty-four, to be put in service in Albany before Dec. 1.

The purchase of ten more like cars to be placed in service in Albany during 1916.

Removal of present cars from "A" Belt Line to be rebuilt and re-equipped for service on the Albany-Troy lines.

Fifteen double-truck, double-end cars now on Albany-Troy line to be rebuilt for tripper service on the belt and other lines.

Eleven double-truck, double-end cars to be rebuilt for the Troy-Albany lines.

Eight single-truck, double-end prepayment cars with 21 ft. 3 in. bodies to be improved as to entrances and exits.

Sixteen single-truck cars with 21 ft. 3 in. bodies to be similarly rebuilt.

One single-truck car to be similarly improved.

Ten single-truck, 18-ft. cars to be rebuilt into five double-truck, center-entrance cars for use on various lines in Albany.

General overhauling and repairing of twenty-eight single-truck cars which have already been rebuilt for prepayment operation.

These alterations, repairs and additions will cost the company between $100,000 and $200,000, will increase the number of cars available by about fifty and the seating capacity of the system by between 400 and 500.

The order is made as the result of the decision of the Appellate Division, which compelled the United Traction Company to fulfill all but one of the provisions of the commission's order of last December. Upon that one, involving the purchase of new cars, the commission was ordered to give the company a rehearing, the company alleging that financial difficulties incident to the war in Europe made it impossible to purchase the new equipment ordered. Of this impossibility the present order of the commission says with regard to the evidence submitted at the rehearings held on May 25, June 1 and June 23:

"While it did not appear on the hearings to the entire satisfaction of the commission that the respondent was unable to comply with the provisions of Paragraph 7 of the order of Dec. 11, 1914, because of the European war, yet it did appear that the earnings of the respondent in Albany had decreased very materially during the first half of the year 1915 and that there would probably be no material improvement in the earnings of the company during the continuance of the present business depression. No evidence was submitted to the commission to show that the purchase of new cars and improvements in the present operating equipment of the respondent were unnecessary, and the commission is still satisfied that the respondent should improve its service in these respects forthwith. The respondent also indicated that it was willing to purchase and place in service in the city of Albany during the present year at least fifteen new cars in order partially to comply with the provisions of Paragraph 7 of the order of Dec. 11, 1914."

Paragraph 7 of this order called for the immediate purchase of twelve new modern cars seating forty, to take the place of the 18-ft. cars then in use and the subsequent purchase of thirty more new cars. While the present order does not provide for the purchase of quite so many new cars it provides in addition a practical rehabilitation of all of the rolling stock of the company, bringing it all up to the most modern standards of prepayment cars.

The order is based to some extent on a recommendation of Charles F. Hewitt, the company's manager, and C. O. Birney, the car expert of Stone & Webster, Boston, who made a report to the commission, checked by the commission's own experts in which the recommendations of the order of Aug. 13 were embodied, with the reasons therefor and the expense of carrying out the improvements.

The present Belt line cars are ordered rebuilt for the Troy service in accordance with the recommendations of Messrs. Hewitt and Birney by installing bulkheads, remodeling doors so that the rear doors will slide one on the other for entrance and exit, dividing rails and fare boxes to be removed and wood slat seats placed about the rear platform for ten passengers, making a total seating capacity of sixty-two, and the wheels, axles, gears and motors of the present Troy cars be substituted for those now on the Belt line cars.

The fifteen cars now in Albany-Troy service will be rebuilt for Albany service by lengthening the platforms and providing folding doors and folding steps on each side, removing the bulkheads and installing the fare boxes, wheels, axles, gears and motors taken from the present Belt line cars. All defects will be remedied and the cars painted and varnished.

Eleven cars now in service to Troy will also be brought up to date by lowering and lengthening the platforms, installing folding doors and steps, the rearrangement of bulkheads and the removal of the smoking compartment and the placing of all cross-seats on one side as in the present Belt line cars. These cars also will be thoroughly painted and varnished.

Eight of the present single-truck, prepayment cars in use on the Quail Street division are to be remodeled by rearranging doors and steps in a safer manner with the steps folding automatically with the doors, the sagging ends trussed up and the cars touched up and varnished. These cars are those numbered between 554 and 573. Sixteen cars numbered between 501 and 535 will be rebuilt by having the bulkheads removed, folding doors and steps on each side of each platform with doors opening outward, all defects remedied, cars painted and varnished and arranged for prepayment service. Car 570 will be equipped with folding steps.

The rebuilding of ten of the old 18-ft. cars into five double-truck, center-entrance cars will give Albany and vicinity the first cars of this type used here. Each of these new cars will have a seating capacity of fifty-four, or 270 seats in all as against the 240 seats now available in the ten 18-ft. cars. The work of rebuilding these and all the other cars, including shortening of the trucks, etc., will be done in the company's own shops.

Mr. Birney and Mr. Hewitt in their report recommend that the fifteen new cars to be purchased be used in the Belt line service and prescribe their construction, but only the purchase of the cars is ordered by the commission. According to the report these cars would be the most modern single-truck cars, 32 ft. long over the buffers and seating thirty-two passengers, doors, steps and platforms to be of the automatic folding prepayment type and the seats arranged six reversible and two cross-seats on each side with birch-wood slats and frames. They would weigh 21,000 lb. each and would cost about $52,000. Ten of these cars would furnish 640 seats for the 635 passengers on the line at the noon hour. The total weight of these cars would thus be 210,000 lb. against a total weight of 460,000 lb. for the present ten Belt line cars. Affording sufficient seats, the report says that thus in lighter weight $12,500 in power can be saved annually. It recommends the use of twelve cars on the belt line with three extras each way during the rush hour. The details of this report are not approved by the commission. For instance, it insists that the new cars contain two more seats than those recommended by Messrs. Hewitt and Birney. The company has until Aug. 25 to notify the commission whether it will comply with the terms of this last order or further appeal to the courts.

Milwaukee Skip-Stop Order Sept. 1.—The Railroad Commission of Wisconsin expects to issue its order calling for experimental skip stops on the Wells-Farwell, the Greenfield Avenue and the Walnut Street lines of The Milwaukee Electric Railway & Light Company so as to be effective on Sept. 1.

Electric Meets Steam Competition.—The Alton, Granite City & St. Louis Traction Company, Alton, Ill., has announced that it will sell ten-ride tickets between Alton and St. Louis for $4, good for sixty days, with transfer privileges in Alton. This is the cheapest rate ever made between the two cities, and was arranged to meet steam railroad competition.

Hearing on Trenton Fares in September.—Following a hearing on Aug. 17 before the Board of Public Utility Commissioners of New Jersey at Trenton, that body announced that it would delay for three months the plan of the Trenton & Mercer County Traction Corporation to abandon its six-for-a-quarter strip tickets in favor of a flat 5-cent fare. The commission has announced that a hearing on the matter will be held on Sept. 21.

Progress in Physical Connection Case.—The result of the hearing of the Public Service Commission of Oregon on the petition for physical connection of the Oregon Electric Railway and the Southern Pacific Company lines at Albany will not be made public for at least six weeks. After the testimony is filed the plaintiffs will have twenty days to file a brief. The Southern Pacific Company, contesting the petition, will then have fifteen days to file its answer, and the shippers five days.

Operating Agreement Between Ohio Roads.—An arrangement has been completed between the Northern Ohio Traction & Light Company and the Cleveland, Alliance & Mahoning Valley Railway by which limited trains will be run between Cleveland and Alliance. They will operate over the Northern Ohio Company's tracks to Ravenna and from there to Alliance over the Cleveland, Alliance & Mahoning Valley Railway. Warren, Niles and Youngstown may be reached over lines connecting with the latter road at Newton Falls and Leavittsburg.

Sign Changes in Cleveland.—In accordance with an ordinance passed recently the Cleveland (Ohio) Railway has arranged the signs on the front and sides of all cars so that the destination is shown. Signs are changed to comply with the direction in which the car is going. The street signs at the top of the cars, of course, are retained. Some further changes will be made in signs relating to the payment of fares, but before this can be done satisfactorily some standard policy for the payment of fares will have to be adopted by the street railway commissioner's office.

"Your King and Country Need You; We Can Spare You." These words were written on all the pay checks of the British Columbia Electric Railway, Vancouver, B. C., that were handed out to employees recently. A. T. Goward, local manager at Victoria, said: "There is no other meaning to the statement than that which the words convey. If any of the men feel called upon to go to serve their king and country, the company will not hinder them in doing so. We are following along the lines of the Canadian Pacific Railway and other big Canadian companies who have written similar intimations on pay checks."

Rules for Dogs on the Northern Ohio System.—A new rule regarding the carrying of dogs other than lap dogs on cars of the Northern Ohio Traction & Light Company, Akron, Ohio, is now in effect and duly covered by a supplement to the authorized tariff. Under this rule dogs other than lap dogs may be taken on cars only when a permit has been obtained from the company. A charge of 25 cents will be made for any distance. Permits will not be issued to take dogs on the limited cars. During the hunting season the necessity of obtaining a permit will be waived, but the charge will be as above stated. In all cases dogs must be properly secured by strap or collar and chain.

Transfer Controversy in Boise.—Further development in the situation brought about by the refusal of the Boise (Idaho) Railroad to exchange transfers with the Idaho Traction Company is the order by the Public Utilities Commission of Idaho directing Attorney General Peterson to file a complaint against the companies, in order that the matter may be formally brought before the commission for discussion. The lines of the Boise Railroad, for two years a part of the Idaho Traction Company's system, were recently taken over for separate operation by the Boise Railroad, and that company has refused to exchange transfers with the Idaho Traction Company. The commission's present idea is to compel the interchange of transfers, and the railroad companies will have to show cause why such an order should not be issued.

Personal Mention

Mr. Frank H. Miller, superintendent of the Louisville (Ky.) Railway, has been elected to the Louisville Rotary Club, as the railway power plant member.

Mr. John Holley Clark, formerly counsel of the Flushing Association, has been appointed secretary to Col. William F. Hayward of the Public Service Commission for the First District of New York.

Mr. Willis J. Ripley, who has been assistant secretary, assistant treasurer and auditor of the American Public Utilities Company, Grand Rapids, Mich., has been elected treasurer of the company.

Mr. Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, has been elected a director of the Chase National Bank, New York, N. Y., succeeding Henry M. Conkey, deceased.

Mr. Bradley B. Hogue, formerly associate editor of the *Times-Herald* of Dallas, Tex., has been made assistant to Mr. Edward T. Moore, secretary and manager of the Dallas Consolidated Electric Street Railway and has been placed in charge of the publicity department of the company.

Mr. A. L. Farquharson, manager of public utilities, Fort William, Ont., has taken over the management of the municipal electric railway there, succeeding Mr. M. O. Robinson, formerly manager of both the Fort William and the Port Arthur Municipal Electric Railways, who continues to manage the Port Arthur Electric Railway.

Sir Albert H. Stanley, managing director of the London tramway, omnibus and tubes companies, is defraying the cost of providing tea at treats for the wives and children of the London United Tramways employees now serving in the army. The treats takes place at some rural spot near each depot, and the incidental expenses and the cost of prizes are defrayed by the employees and the various clubs and institutes.

Sir Adam Beck, chairman of the Hydro-Electric Power Commission of Ontario, received an electric automobile at the opening of the London & Port Stanley Railway in London, Ont., on July 22, in conformity with the motion made by Mayor Church of Toronto last February at the convention of the Hydro-Electric Union. The presentation was made by Mr. Philip Pocock, London, chairman of the London & Port Stanley Railway.

Mr. Thomas B. Smith, Philadelphia, has been appointed to the Pennsylvania Public Service Commission by Governor Brumbaugh, taking the place of Congressman Keiss, who did not accept the appointment offered by the Governor. Mr. Smith was born in Philadelphia in 1869 and was postmaster there during the administration of President Taft. He served in the Philadelphia Common Council and was elected to the Legislature for two terms.

Mr. Harro Harrsen, who had charge of the Dr. Pearson interests in Mexico until he was driven out by the revolutionists, and in April last went to Barcelona to take charge of the Pearson syndicate's interests in Spain, has, according to advices from there, been elected vice-president of the Ebro Irrigation & Power Company, managing director of the Barcelona Tramways, managing director of the Barcelona Electric Company and director of the Sarria Railway.

OBITUARY

Albert Siegel Mohr, Lincoln, Ill., special agent for the Illinois Traction System, Peoria, Ill., is dead, following a stroke of paralysis.

Edward H. Hoyt died at his home in Haverhill, Mass., on Aug. 6, aged sixty-six years. Mr. Hoyt began his railway career with the Haverhill & Groveland Street Railway, Haverhill, Mass., afterward becoming electrical engineer for the Merrimack Valley Street Railway. Following the consolidation of these lines, he became electrical engineer for the Haverhill & Georgetown Street Railway. Later he became president of this road and was also prominent in the People's Telephone Company of Haverhill. He served in the Massachusetts House of Representatives in 1898 and 1899.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Rapid Transit Company of Illinois, Murphysboro, Ill.**—Incorporated in Illinois to construct an electric railway from East St. Louis to Mount Carmel, via St. Clair, Monroe, Randolph, Jackson, Williamson, Saline, Hamilton, White, Edwards and Wabash counties, with special branch lines to Chester and Murphysboro. Capital stock, $100,000. Incorporators: Joseph Vonnhame, Daniel P. Roberts, Conrad B. Vonnhame and M. Harned, East St. Louis, and Louis T. Hooltman, Collinsville.

***Fort Wayne, Decatur & Southern Railroad, Decatur, Ind.**—Incorporated in Indiana to build and operate an interurban railway. Capital stock, $10,000. Incorporators: M. Gerke, C. Oetting and C. Dirkson.

***Tennessee Electric Railroad, Nashville, Tenn.**—Incorporated in Tennessee to consolidate the interests of the Cumberland Valley Railroad, Tennessee & Kentucky Railroad and the Nashville, Springfield & Northern Railroad. Capital stock, $50,000. Incorporators: Lee Baker, William Myers, S. W. Thompson, E. G. Stribling, Robert C. Leonard and H. L. Shoulders.

FRANCHISES

South San Francisco, Cal.—The South San Francisco Railroad & Power Company has asked the Council for a franchise to construct, maintain and operate a single-track or double-track, standard-gage railway in South San Francisco. Bids will be received by William J. Smith, city clerk, until Aug. 30 for this franchise. A certified check of 10 per cent, payable to the treasurer of the city of South San Francisco, must accompany each bid.

Aurora, Ill.—The Aurora, Mendota & Western Traction Company has received a twenty-year franchise from the Council which gives the company the right to use the highways between the southern city limits of Aurora near the Spring Lake cemetery and the limits of the village of Montgomery.—[June 26, '15.]

Waukegan, Ill.—The Chicago & Milwaukee Electric Railroad has asked the Council for a franchise to operate cars in Waukegan.

North Andover, Mass.—The Bay State Street Railway has asked the Council for a franchise to lay double tracks on Sutton Street, North Andover.

Webster Groves, Mo.—The United Railways Company of St. Louis has received a new twenty-eight-year franchise from the Council of Webster Groves, which carries with it the improvement of Lockwood Avenue from Summit Avenue to Rock Hill Road, about 1 mile, at a cost of approximately $80,000. New rails will be laid.

Corpus Christi, Tex.—By a referendum election held in Corpus Christi on Aug. 10, the Corpus Christi Traction Company was awarded a franchise to build and operate an electric interurban line to connect with the county line. The principal terminal of the proposed road will be Ward Island, 8 miles south of Corpus Christi, where it is proposed to build an amusement park and pleasure resort. J. H. Caswell, San Diego, is interested. [July 31, '15.]

***Bremerton, Wash.**—W. D. Peters, Bremerton, has asked the Council of Bremerton and Charleston for franchises to construct an electric railway in both towns.

Vancouver, Wash.—The ordinance repealing the franchise of the Washington-Oregon Corporation on Fifth Street through the garrison at Vancouver Barracks, and on East Seventh Street has been put over until the latter part of August by the Council at the request of H. K. Lugger, manager of the corporation, who explains that the company was in the hands of a receiver, and that it expects to reorganize and consequently may have money with which to build the line.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—Surveys are being made of the last link of this company's line between Los Angeles and Corona. The road has been completed and in operation as far as Yorba Linda and Stern for some time.

Municipal Railways, San Francisco, Cal.—The Board of Public Works has passed a resolution awarding the contract for furnishing and delivering track special work, under contract No. 7, Section "E" Municipal Railway System, bond issue of 1913, to the United States Steel Products Company, at its bid on file.

West Sacramento Electric Company, Sacramento, Cal.—This company, which was incorporated in February, 1915, will be dissolved on Sept. 5. The company, with the consent of the California Railroad Commission, recently sold its properties to the Pacific Gas & Electric Company for the sum of $30,000. [Feb. 20, '15.]

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company reports that it expects to install track circuit signals on two miles of single track between French Village and O'Fallon division. Apparatus has been purchased from the United States Electric Signal Company.

Chicago, Ottawa & Peoria Railway, Joliet, Ill.—This company reports that it expects to build two plate girder bridges, one to consist of four 43-ft. spans and one to consist of two 35-ft. spans.

Murphysboro Electric Railway, Light, Heat & Power Company, Murphysboro, Ill.—Work has been begun by this company on the reconstruction of its line in Murphysboro.

Peoria & Chillicothe Electric Railway, Peoria, Ill.—A mortgage of $1,500,000 was authorized at a recent meeting of the stockholders and directors of this company. [Aug. 6, '15.]

Union Traction Company of Indiana, Anderson, Ind.—This company is placing the massive 50-ft. steel girders used in building the tracks over the Milton Avenue subway in Anderson.

Kansas City, Kaw Valley & Western Electric Railway, Bonner Springs, Kan.—It is stated that work will be begun at once on the construction of this company's extension from Bonner Springs to Lawrence.

***Salina, Kan.**—It is reported that a company is being organized to build an interurban railway from Salina to Fairbury, Neb., via Concordia and Belleville. The Arkansas Valley Interurban Railway will connect with the proposed line at Salina.

Salina (Kan.) Northern Railroad.—The Salina Northern Railroad will be operated as a standard gage steam railroad; but for the passenger service General Electric gasoline-electric motor cars will be used. The contracts for the equipment, and for materials for construction have been made. The railroad will be 90 miles in length, extending from Salina through Salina, Lincoln, Mitchell and Osborne counties, all in Kansas, to Osborne and Downs. Three miles of track have been laid out of Salina, the grading is practically completed between Salina and Lincoln, 35 miles, and several bridges are under construction. The Salina Northern Railroad is being built by the Keystone Construction Company, Salina, Kan., of which E. A. Tennis is president. Officers announce that they hope to have the line in operation by Jan. 1, 1916.

***Cumberland Traction Company, Edmonton, Ky.** — This company has been formed by G. H. Greenup, Elizabethtown, with a capital stock of $50,000, to build and operate a line between Edmonton and Elizabethtown. Plans as to the terminus of the road have not matured, although it is stated that the line may connect with the Hodgenville and Elizabethtown branch of the Illinois Central Railroad or with the Louisville & Nashville Railroad in Hart County. The first step proposed is the construction of the line between Edmonton and Hiseville, 16 miles. Right-of-way has been secured.

St. Tammany & New Orleans Railway & Ferry Company, Mandeville, La.—Operation by electricity has been begun on this company's line to connect Mandeville, Abita and Covington. The line was converted from motor-car operation to electric operation at a cost of $80,000. [April 17, '15.]

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.—Frederick B. Teeling, Litchfield, has suggested to A. H. Ford, third vice-president and manager of this company, the advisability of constructing an electric railway from Topsham to Monmouth. Under the plan outlined by Mr. Teeling, the road would start at Topsham or Brunswick, go to Bowdoinham, thence to Richmond corner, passing through Litchfield, crossing the Lewiston, Augusta & Waterville Street Railway at Tacoma and going to Litchfield Mills and on into Monmouth. The road would be 33 miles in length.

Portland (Me.) Railroad.—This company has been granted trackage rights on York Street in order to connect its tracks on the new Portland bridge with its regular street lines.

Boston (Mass.) Elevated Railway.—A contract has been entered into between the Port Directors of South Boston and the Boston Elevated Railway to lay double tracks and install overhead equipment and necessary connections for a line from Summer Street along the viaduct to the new Commonwealth Pier, thence down the ramp, crossing D Street and coming back up Northern Avenue to a point directly opposite the entrance of the Fish Pier. The extension will cost approximately $50,000.

Detroit (Mich.) United Railway.—This company is reconstructing its tracks in Birmingham on the Pontiac division.

Twin City Rapid Transit Company, Minneapolis, Minn.—This company reports that it plans to build a double-track extension from the Snelling-Minnehaha line to the new Twin City motor speedway, 1¼ miles, with storage tracks for 100 cars. The company has just completed a steel-plate girder bridge to carry the county road over the tracks of the Lake Minnetonka line at Brookside Station.

Metropolitan Street Railway, Kansas City, Mo.—John M. Egan, 1500 Grand Avenue, Kansas City, has been delegated by the receivers of this company to solicit sealed proposals on or before Aug. 25, 1915, to construct and complete ready for operation on or before Dec. 31, 1915, double track on portions of Broadway, Twenty-fourth Street, Thirty-first Street and Main Street and single track on Prospect Avenue and Twelfth Street, Kansas City, in all about 38,935 ft. Plans and specifications will be furnished upon application. Bids to be received for this work are officially advertised elsewhere in this issue.

***Three Forks, Mont.**—Construction has been begun on a new line between Three Forks and Radersburgh. It is reported that Julius Rosholt, Fairmount, N. D., is financing the new railway.

Alamance, Durham & Orange Railway & Electric Company, Burlington, N. C.—Plans are being considered by this company to build an extension of its line from Burlington to Elon College and Gibsonville and then to Altamahaw and Ossipee. Junius Harden, Burlington, is interested. [June 26, '15.]

Cincinnati (Ohio) Traction Company.—The Council of Cincinnati recently authorized a bond issue of $3,000 to extend and improve Reading Road in order to allow the construction of this company's extension to Bond Hill. It is proposed to build the line on Reading Road, as the courts have ruled that it cannot be built on Paddock Road because consents of the property owners cannot be secured.

Cleveland (Ohio) Railway.—County Commissioners Andrews and Metzger declared in favor of the issue of $2,200,000 in bonds on Aug. 14 for the construction of subway approaches to the new bridge across the Cuyahoga River from both the east side and west side for the use of the Cleveland Railway and interurban traffic. The commissioners have authority to issue bonds for this purpose, according to Assistant Prosecuting Attorney Green. J. J. Stanley, president of the Cleveland Railway, has expressed a willingness to pay rental for the use of the subways and Street Railway Commissioner Witt has been quoted as saying that the saving in time and expense on the part of the railway will almost equal the amount that will be paid in rental.

Oklahoma (Okla.) Railway.—A report from this company states that it will rebuild at once 1 mile of roadbed, using 100-lb. steel ties and concrete and brick paving.

Hamilton, Ont.—The Hamilton Hydro-Radial Union was informed on Aug. 10 that the engineers of the Hydro-Electric Power Commission of Ontario at work to the south of Hamilton are surveying for an electric line not only from Hamilton to Port Dover and other points on Lake Erie, but for a line which will enter into competition with those of the Dominion Power & Transmission Company, as well as the steam road of the Toronto, Hamilton & Buffalo Railway. The plans call for a Hydro-Radial railway to St. Catherines and all intermediate points, including a branch line to Dunnville, Cayuga, etc.

Portland Railway, Light & Power Company, Portland, Ore.—The Portland Railway, Light & Power Company is relaying its double tracks on East Glisan Street, between East Sixtieth and East Seventy-fifth Streets.

Southern Pacific Company, Portland, Ore.—D. W. Campbell, assistant general manager of the Southern Pacific Railway, stated recently: "We are ready to start work on our electrification to Corvallis as soon as the City Council of that city grants us a franchise." The Southern Pacific's proposition to the Council asks permission to lay a second track on Sixth Street, paralleling the existing track of the old Oregon & California Railroad; a second track on Ninth Street, paralleling the existing track on the old Corvallis & Eastern Railroad; a track on Van Buren or some other parallel street, satisfactory to the people of Corvallis, and another track on Washington Street, making a complete loop. The Southern Pacific Company has set aside money to pay for an electric extension from Whiteson, the present terminus, to Corvallis, 43 miles. This will give the company an electric line from Portland to Corvallis, 97 miles, with an alternate route between McMinnville and Portland of 50 miles. The proposition of granting the franchise will come before the Corvallis Council at an early date.

Philadelphia & West Chester Traction Company, Upper Darby, Pa.—The Philadelphia *Ledger* said recently: A determined effort on the part of the Philadelphia & West Chester Traction Company to force an entrance into Chester is believed to be behind a purchase of a tract of 5 1/3 acres of land in Sharon Hill immediately opposite the Collingdale terminus of the Philadelphia & Garrettford Railway, one of the subsidiaries of the Philadelphia & West Chester company. While entrance to Chester is believed to be the object of the company, the obvious route, which would be through Darby and Ridley townships, would strike almost through the property of the Baldwin Locomotive Works, and one of the most densely populated districts of the county would be traversed.

***Washington, Pa.**—Business men of Washington are interested in a proposition to construct a street railway to connect Washington with the mining communities of Ellsworth, Cokeburg, Bentleyville and adjoining districts. The proposition as outlined calls for a line about 11 miles in length that would join the Pittsburgh Railways system in Washington with the terminus of the Bentleyville-Charleroi Street Railway at Cokeburg.

Montreal & Southern Counties Railway, Montreal, Que., Can.—This company reports that it expects to install an interlocking plant and signals for a single-track diamond at Abbotsford, Quebec.

Tennessee Electric Railroad, Nashville, Tenn.—This company has recently been organized to consolidate the interests of the Cumberland Valley Railroad, Tennessee & Kentucky Railroad and the Nashville, Springfield & Northern Railroad. The rights-of-way of these three projects, two of which have already been surveyed and secured, aggregate 275 miles of road, which at present has no railroad facilities whatever. Nashville, it is stated, will be the pivotal point. The first step proposed is to be the construction of the Cumberland Valley road, which is to extend from Nashville via Smithville to Sparta. The Southern Finance & Construction Company is named as having arranged the financing of the project.

Dallas (Tex.) Southwestern Traction Company.—J. O. Andrewartha, consulting engineer of the Dallas & Southwestern Traction Company, has advised the Board of Commissioners that the interurban railway of that company will be built from Dallas to Austin and that a system of interurban lines will be constructed with Austin as the radiating center. He says that all financial arrangements for the construction of several hundred miles of interurban lines have been made and that the work will be carried on as rapidly as the material can be handled. Besides building a trunk line south from Dallas to Austin, branch lines will extend to San Angelo, Brownwood, Lockhart, San Antonio and probably to other towns. The Dallas & Northwestern Traction Company, which is owned by the same interests, is preparing to construct an interurban railway from Dallas to Denton. The cars will be operated by gasoline motors. [July 10, '15.]

Northern Texas Traction Company, Fort Worth, Tex.—This company advises that construction has been begun on the extension of its Summit Avenue line about 1 mile south.

San Antonio (Tex.) Traction Company.—Work has been resumed by this company on the construction of double tracks on Goliad Street, San Antonio, after a delay of almost a year. The work of concreting the tracks on South Presa Street has been completed.

Petersburg & Appomattox Railway, Petersburg, Va.—A contract for the construction of this company's line from Petersburg to City Point has been awarded to the Vaughan Construction Company, Roanoke, for about $200,000. [Aug. 14, '15.]

Radford-Willis Southern Railway, Radford, Va.—Grading has been begun at Little River between Snowville and the mouth of Indian Creek for this company's 28-mile line from Radford to Willis. Williams Brothers Construction Company, contractor. J. L. Vaughan, president. [July 10, '15.]

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—Plans are being considered by this company to construct a new passenger station at Pomona. No definite location has as yet been selected.

Municipal Railways of San Francisco, San Francisco, Cal.—The contract for the construction of the second story of the carhouse of the Municipal Railways of San Francisco at Geary Street and Presidio Avenue has been awarded to James L. McLaughlin by the Board of Works for $26,747.

Wilmington & Philadelphia Traction Company, Wilmington, Del. — William D. Haddock & Company have been awarded the contract to build an addition to this company's carhouse at Delaware Avenue and duPont Street, Wilmington, and work will be begun at once. The American Bridge Company received the contract for the steel structural work.

New York, N. Y.—Following are unofficial totals of bids opened by the Public Service Commission on Aug. 3 for station finish on Route No. 50, the Queensboro Subway extension, and on Sections Nos. 1 and 3 of routes Nos. 36 and 37, the Corona elevated railroad in Queens: Snare & Triest Company, New York, $611,563; Marble Arch Company, New York, $750,000. Bids opened on Aug. 4 for station finish on Section No. 2 of Routes Nos. 36 and 37, the Astoria elevated railroad in Queens: Charles Meads, New York, $272,000; Snare & Triest Company, New York, $274,296; Simon Russeck, Inc., New York, $285,270.

Toronto (Ont.) Civic Lines.—Works Commissioner R. C. Harris told the Board of Control in a report on Aug. 11 that it would cost $285,000 for the city to establish car shops with a maximum capacity of fifty car bodies a year. The commissioner repeated his former report that car shops are not necessary at present and that after the franchise expires the city would not be warranted in establishing a manufacturing plant, inasmuch as the requirements of a street railway system can be provided more economically by the car builders.

Marshall (Tex.) Traction Company.—This company reports that it has just completed an addition to its carhouse to accommodate three new cars received in June and July.

POWER HOUSES AND SUBSTATIONS

Montreal & Southern Counties Railway, Montreal, Quebec, Canada.—This company reports that it has awarded a contract to the Nicholson Construction Company of Montreal for the construction of a substation at Granby, Que. A contract has also been awarded to the Canadian Westinghouse Company for one 400-kw. motor generator set and to the Northern Electric Company for a switchboard.

Salt Lake & Utah Railway, Salt Lake City, Utah.—This company has contracted with the Westinghouse Electric & Manufacturing Company for a substation at Springville. The station will be equipped with three 250-kw. rotary converters but will be designed to accommodate additional machines as needed.

Manufactures and Supplies

ROLLING STOCK

St. Albans & Swanton Transit Company, St. Albans, Vt., has purchased one set of double trucks and two new four-motor equipments, complete.

Anaconda (Mont.) Street Railway reports the addition of six new 50-ft. cars to care for increased business on local lines. The new cars will be similar to the large motor cars now in use.

Albuquerque (N. M.) Traction Company has ordered from the St. Louis Car Company seven steel underframe double-end, one-man cars to be mounted on St. Louis 9-ft. wheelbase trucks equipped with Westinghouse WEE motors. The cars complete will weigh 11,500 lb.

United Traction Company, Albany, N. Y., has been directed by the Public Service Commission of New York, Second District, to purchase immediately fifteen new modern cars, completely equipped, with a seating capacity for at least thirty-four passengers, to be put in service before Dec. 1, and ten more similar cars to be placed in service during 1916. The company is also required to rebuild its present car equipment as noted in detail elsewhere in this issue.

New York & Long Island Traction Company, Long Island City, N. Y., has specified the following details of equipment for the six double-truck end-entrance car bodies recently ordered from the Southern Car Company:

Length over all	42 ft. 5 in.
Length of body	31 ft. 8 in.
Bolster centers	19 ft.
Width over posts	8 ft. 6 in.
Height, rail to sills	35½ in.
Body	composite
Interior trim	cherry
Roof	arch
Air brakes	West. Type H
Bumpers,	Hedley anti-climbers
Cables	West.
Control	West. K 35 G
Curtain fixtures	Cur. Sup. Co.
Curtain material	Pantasote
Destination signs	Hunter
Registers	Dayton
Gears and pinions	West.
Gongs	Brill Dedenda
Hand brakes	Lord
Hand straps	Rico
Heaters	Consol.
Headlights	"Golden Glow"
Journal boxes	Symington
Motors	West. 307-V
Paint	Chicago
Resistances	E.M.B.
Seats	Hale & Kilburn
Springs	Southern
Trolley	Nuttall
Trucks	Brill 27-M.C.B.-2
Ventilators	Ry. Utility

TRADE NOTES

Tubular Woven Fabric Company, Pawtucket, R. I., has been awarded the highest prize, a gold medal, for Duraduct, the well-known flexible non-metallic car conduit, by the award jury of the Panama-Pacific Exposition, San Francisco.

Metals Coating Company of America, Chicago, Ill., has opened an office at 100 Summer Street, Boston, Mass., in charge of Herbert Jaques, Jr., who is prepared to furnish information and demonstrate the Schoop metal coating process.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has purchased the good-will and stock of the Bintliff Supply Company, successor to Bintliff & Herb, who did a general railroad, mill and factory supply business and specialized in railroad track tools, such as Jim Crow rail benders, track drills, etc.

Ellcon Company, New York, N. Y., has received an order from the Connecticut Company for forty-six sets of unbreakable E. M. B. resistances for the new cars recently ordered by this company. The cars will weigh 17 tons and will be equipped with two GE 40-hp. motors and K-6 control. These resistances are also specified on the six cars recently ordered by the New York & Long Island Traction Company.

Harrisburg Water Laboratories, Harrisburg, Pa., have been organized for the purpose of making chemical examinations of water. The organization consists of L. McCreath of the firm of Andrew S. McCreath & Son, analytical and consulting chemists, Harrisburg, Pa., Dr. G. R. Moffitt, city chemist, and Farley Gannett, consulting engineer, formerly engineer of the Water Supply Commission of Pennsylvania.

W. S. Barstow & Company, Inc., New York, N. Y., have reorganized their department of construction engineering, with Arthur M. Torrey, formerly with Hildreth & Company, New York, in charge. Prior to 1908, this firm was very active in railway, public utility and industrial construction. In that year it branched out into the ownership and management of public utilities, of which it now controls about forty in the Eastern and Middle Eastern States. During the past seven years less attention was given the construction engineering department than formerly, though the company never retired from this field. The reorganization of the department betokens greater activity along this line. In connection with the construction engineering department, the company has instituted an industrial bureau for the purpose of assisting in developing industries in the communities where it controls utility properties. In these places working arrangements have been made with the local chambers of commerce and a co-operative plan of locating industries is being worked out.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" safety illumination headlights, reports shipment of headlight equipment to the following railways during the month of July: Altoona & Logan Valley Electric Railway; Fort Smith Light & Traction Company; Wichita Railroad & Light Company; Southern Traction Company, Waco, Tex.; Kentucky Traction & Terminal Company; Denver (Col) Tramway; Sioux City Service Company; St. Louis Car Company for new cars of the Southwestern Gas & Electric Company; Southern Car Company for new cars of the Corpus Christi Railway & Light ompany; Tidewater Power Company; Gulfport & Mississippi Coast Traction Company; Hutchinson Interurban Railway; Wason Manufacturing Company for new cars of the Tucson Rapid Transit Company; Shreveport (La.) Railways; Windsor, Essex & Lake Shore Railway; Detroit United Railway; Terre Haute, Indianapolis & Eastern Railway; McGuire-Cummings Manufacturing Company for new cars of the Iowa Railway & Light Company; Omaha & Council Bluffs Street Railway; East St. Louis & Suburban Railway; New York, Westchester & Boston Railway; Metropolitan Street Railway; El Paso (Tex.) Electric Railway; New York & Queens County Railway; St. Louis Car Company for the Wisconsin-Minnesota Light & Power Company's new cars; Rockford & Interurban Railway; Packard Motor Car Company for new trucks of the Honolulu Rapid Transit Company; Mason City & Clear Lake Railroad; Lebanon-Thorntown Traction Company; Hattiesburg Traction Company; Cincinnati Car Company for new cars of the Binghamton (N. Y.) Railway.

ADVERTISING LITERATURE

Tool Steel Gear & Pinion Company, Cincinnati, Ohio. has issued a folder which contains service comparisons between tool steel gears and pinions and special quenched gearing, which show a greater length of life in favor of the former type.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 47,406, which describes the company's Type F, Form K-20 oil switch, for use on voltages up to 2500. These switches are built in three capacities: non-automatic and automatic, for use on two, three and four-wire systems, and for current up to 300 amp. They are especially adapted for conditions where inflammable materials or explosive gases are present.

S K F Ball Bearing Company, New York, N. Y., has just made a notable contribution to the light car and power economy situation, by issuing a booklet entitled, "Economies of the Light Car in Electric Railway Service." At a time when electric railways are finding it necessary to use every possible source of economy, this book should be very welcome indeed. Facts and figures are presented to show why the big heavy car really is not as economical and efficient in the end as the small car, equipped with such modern devices as ball bearings. The problem is viewed broadly from the maintenance of car details to the promotion of travel by giving higher speed and shorter headways. A number of illustrations show what progress has been accomplished in light car construction to date, while others show energy tests and excellent drawings of the S K F bearings.

W. H. Huff, Beverly, N. J., successor to the Stokes Wood Preserver Company, has issued a catalog describing its preservative paint, "Locustine," for treating ties and poles. This compound increases the life of wood, toughens the wood and makes it less liable to mechanical abrasion, notably in the case of rail cutting on railroad cross ties. It alos increases the holding power of spikes and log bolts. The catalog shows illustrations, accompanied by testimonial letters, showing two black oak ties which have been under track on the Pennsylvania Railroad continuously for nineteen years and which are still in a fine state of preservation. Another illustration shows ties in process of treatment for use on the Phiiladelphia (Pa.) Rapid Transit Company.

Stow Manufacturing Company, Binghamton, N. Y., has issued Bulletin 400 describing and illustrating a few of its portable tools, both belt and electric driven. Special effort has been made to design these tools with a maximum proportion of power to size. Several of the designs are constructed to save floor and bench room, being of the suspended types, thus putting them out of the way in a safe place when not in use and always in easy reach of the operator. The tools described in the catalog include two spindle drills, electric breast drills, S1-U universal drills, drills for heavy work, friction sensitive drill, tool post grinder, electric bench grinder, electric hand buffer with flexible shaft motor combination, motor-driven screwdrivers, flexible shaft center grinders, radial flexible boring machines, suspended drills, portable energy grinders and suspended-type direct-connected buffer or grinder.

Q. & C. Company, New York, N. Y., has issued a large, complete and handsomely bound catalog describing and illustrating its railway materials, including Bonzano rail joints (used on the Pennsylvania Railroad), rolled steel step joints, cast metal rail joints, insulated rail joints, special reversible tie plates, Vaughan automatic rail anchor, guard rail clamps, adjustable rail braces, guard rail braces, portable rail saws, Samson rail benders, rail inspecting device, derails, Fewings wrecking frogs or replacers, skid shoes, Gilman-Brown emergency knuckles, Ajax vestibule diaphragms, snow flangers and Edman refrigerator car doors. All the illustrations and diagrams, especially those showing the rail devices, are large and clear, and in the case of the rail joints show how the lower part of the splice-plate projects between the ties below the base of the rail, thus forming a splice approximating the strength of the rail.

F. D. Spotswood, Lexington, Ky., safety promoter, has issued a catalog which describes and illustrates completely his illustrated safety-first campaign accident blotters, warning newspaper cuts, two color car signs and safety-first buttons. The catalog recommends especially the use of warning blotters in schools where their pictorial appeal to the children, when one design at a time is distributed, with explanation from teachers, is especially profitable, not only because of the widespread and permanent effect upon the growing generation, but also because it is the best and easiest way to interest and educate the general public through parents and friends of the children. The catalog illustrates a large number of designs which are being used by the Bay State Street Railway, St. Joseph Railway, Light, Heat & Power Company; Waterloo, Cedar Falls & Northern Railway; Milford & Uxbridge Street Railway; San Diego Electric Railway; Sheboygan Railway & Electric Company; Roanoke Railway and Electric Company; Great Falls Street Railway; York Railways; Tri-State Railway & Electric Company; Des Moines City Railway; Union Traction Company of Indiana; Knoxville Railway & Light Company; Georgia Railway, Light & Power Company; Reading Transit Company; Chattanooga Railway & Light Company, and Michigan United Railway.

Bureau of Safety, Inc., Chicago, Ill., has just organized and has sent out its first circular. In it is outlined the purpose of the bureau, namely, to conserve human life and to prevent needless physical and mental suffering by reducing the number of avoidable accidents. It also proposes to prevent needless loss of property by reducing the number of preventable accidents and fires. The plan of the special service offered by this bureau contemplates the formation of a practical scheme of safety work, and the assignment of properly qualified representatives for carrying out all the necessary details. The work of this representative would include lectures, the systematizing of methods for reporting accidents and the resultant grading of departments in safety work, methods for keeping minutes of safety meetings and the disposal of recommendations made by workmen, and plans for future inspection of accidents and fire hazards. The bureau will also issue a monthly publication devoted to accident prevention, welfare and sanitation, which will be supplied to companies availing themselves of the services of the bureau. It is also prepared to counsel and furnish information with reference to general accident prevention or with reference to any special accident prevention problems. The bureau will make regular inspections of the physical and mechanical conditions of plants and submit recommendations and suggestions for improvement.

NEW PUBLICATIONS

Standard Handbook for Electrical Engineers, Fourth Edition. Prepared by a staff of specialists under the editorial direction of Frank S. Fowle. McGraw-Hill Book Company, Inc., New York, N. Y. 1984 pages. Leather, $5 net.

The fourth edition of the well-known "Standard Handbook for Electrical Engineers" is practically a new work although it is based upon previous editions. The book is divided into twenty-five sections, each prepared by one or more specialists of international reputation. The sections from the old edition have been rewritten, simplified and rearranged in accordance with a more comprehensive editorial scheme, while entirely new sections on the following subjects have been added: Industrial motor application, electric vehicles, electric ship propulsion, mechanical engineering and general engineering and central station economics.

From the standpoint of the electric railway engineer the most important sections are those treating of electric railways, power plants, power transmission, properties of materials, and industrial motor applications. He will also find other sections, particularly that on units, conversion factors and tables of great reference value.

The section on electric railways was written by A. H. Armstrong, General Electric Company; N. W. Storer, Westinghouse Electric & Manufacturing Company; Azel Ames, Kerite Insulated Wire & Cable Company, and A. F. Ganz, Stevens Institute of Technology. One hundred and fifty pages are devoted to this subject, which is subdivided under three main heads; electric traction, railway signaling and electrolysis. The text on electric traction is a revision by Messrs. Armstrong and Storer of the former's section in earlier editions of the Handbook. It takes up the characteristics of railway operation, types of motors, braking, trucks and car bodies, self-propelled cars, electric locomotives, power distribution, distributing systems, etc. Mr. Ames gives an interesting general treatment of the intricate subject of signal systems, while Professor Ganz covers the much-discussed subject of electrolysis. In the last-named subject the bibliography is of particular importance.

The section of power plants is by R. J. S. Pigott, formerly mechanical construction engineer Interborough Rapid Transit Company, New York; A. T. Safford, consulting engineer, and G. I. Rhodes of White, Weld & Company. More than 200 pages are devoted to the subject and the elements of steam, gas, oil and hydraulic power plants are thoroughly covered. A special division is allotted to electrical equipment, and power-plant economics is also adequately treated. In view of the attention given to power plants in the Standard Handbook this subject was omitted from the electric railway handbook, recently issued by the same publishers.

It would, of course, be futile even to attempt to list the topics covered in the several sections, but the above illustrations will serve to indicate the general plan. In all sections particular attention is paid to definitions and bibliographical references and to useful typographical display. The total issue of the Standard Handbook to date is 35,000 copies, indicating the place which it occupies in the industries. Its many friends will appreciate the efforts of the editor and his collaborators, during two and a half years of continuous effort, in giving to the engineering profession what eight years of experience in publishing the Standard Handbook have shown to be the most useful data.

Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of Street Railway Journal Journal and Electric Railway Review

Vol. XLVI NEW YORK, SATURDAY, AUGUST 28, 1915 No. 9

THE SKIP STOP AS AN ECONOMY

Since the skip-stop idea has begun to take hold in the electric railway industry we have made several comments upon its time-saving features to the traveling public, and it might be proper to refer to the advantages that it offers as well to the railway companies. To this end it is, of course, necessary to make rather broad generalizations, for the possibilities of the skip stop vary through a wide range even on adjoining lines of a single property, but on this basis it may be said that the gain to the railway is an increase in schedule speed without necessity for any increase in the maximum running speed. This results in a proportional decrease in the number of cars required to do the work, which in turn directly reduces several of the items that comprise the operating expenses, most prominent among these being platform costs. According to the last census report the latter item alone constitutes nearly 30 per cent of the operating expense of the average electric railway, and as the same thing applies to the charges for power, amounting to some 18 per cent more, nearly half of the operating expenses are reduced proportionately to the increase in speed obtained by omitting stops, even neglecting the savings in inspection, insurance, superintendence, and the like, which must follow a decrease in the number of cars. Since the operating expenses average 60 per cent of the revenue, an increase of 10 per cent in schedule speed, which may be reasonably expected from the skip stop, will decrease at least one-half of these expenses by 10 per cent, resulting in a saving equal to 3 per cent of the gross revenue. This is almost one-third of the average net income for the street railways of the country, as shown in the last census, and it is an economy that is well worth the effort involved in its introduction.

MEETING OPPOSITION TO THE SKIP STOP

The proposed three months' trial of the skip stop on several lines in Milwaukee is a most encouraging sign that the time-saving idea is making headway. Of course, the fact that the Milwaukee authorities are consenting to a short trial by no means establishes a foregone conclusion that the skip stop will be permanently adopted, but it does provide an entering wedge which is bound to exert a future influence even if the present experiment fails to achieve popular support. This is an outcome that is by no means improbable in view of the experience in Denver. Here the skip stop was discontinued on one line by city ordinance, notwithstanding the result of a referendum vote that later showed 70 per cent of the affected householders to be in favor of its retention, a popular petition resulting in its reintroduction some time afterward upon an adjoining route. In the first case the 30 per cent opposition was sufficiently bitter and sufficiently well organized to influence the local authorities regardless of the wishes of a non-aggressive majority, and this, no doubt, will be a prominent characteristic of the movement elsewhere. To meet it there seems nothing better than a long-continued reiteration of the facts regarding the loss in time that stops entail. For a railway line with a schedule speed of 8 m.p.h., and averaging ten stops per mile, the time spent in stops is of the order of two and one-half minutes per mile—no less than 33 per cent of the whole schedule. A skip-stop plan that saved even one-third of this to the passengers ought to be welcomed by them, and if they really understood the facts there is hardly a doubt but that the innovation would be welcomed.

FARE INCREASES AND REASONABLE RETURNS

It is satisfactory to note that the Massachusetts Public Service Commission has authorized another road in that State to charge 6-cent fares because at the former rate there had been an inadequate return on the stockholders' investment. Some interesting figures are also cited in the decision, showing the traffic before and after similar increases in fares on other roads. These figures show a falling off in number of passengers carried from 2 to 18 per cent in the seven roads mentioned. Of course this does not mean a loss in income; in fact, if the average fare increase in each case was 20 per cent or that from 5 cents to 6 cents it would mean an increase in practically every case. Nor can we assume that the increased fare is the only cause for the loss in traffic, although it might fairly be assumed to be an important reason. Presumably such a loss will be temporary only and until the community served becomes accustomed to the higher price. Then the traffic will resume its normal volume, and the beneficial effect of the rate increase will be appreciable. It may be assumed that there is a more or less fixed volume of traffic which is normal for a given community at a given time. Reductions in rates of fare cannot materially increase this volume nor reasonable increases reduce it permanently. At the same time it must be remembered that the traffic will only bear a certain charge which is set by conditions of competition, inherent value of the service, etc. Along with increasing rates of fare must go amelioration of the tax and other burdens carried by the utilities. When a company is practicing all possible operating economies and providing for the future by proper depreciation allowances, and cannot make ends meet, it is justified in pressing for relief from financial loss in all directions practicable.

INTERNATIONAL ENGINEERING CONGRESS

Two hundred and thirty-nine papers in all are scheduled for presentation at the International Engineering Congress which is to be held in San Francisco during the week beginning Sept. 20. Of these, fifty-eight, or nearly 25 per cent, are from foreign countries, an indication that the congress will be truly international in character. England leads the list with fourteen papers and with her colonies, twenty-three; Italy follows with ten papers, France with six, the Netherlands with five, Sweden and Japan with three each, Argentina, Russia and Switzerland with two each, and Austria and China with one each. This is a good showing in view of the distractions to which foreign engineers are subjected at present. The topics favored by the foreign writers are municipal engineering, irrigation, railway engineering, electrical engineering, mechanical engineering, mining engineering, naval architecture and marine engineering, material of construction and waterways, in the order named.

On page 329 of the issue of this paper for last week attention was directed to the titles of some of the papers which are likely to be of great interest to electric railway men. These were selected from the programs of a number of sections of the congress. While there is no section devoted exclusively to electric railways, papers of interest to workers in this field will be delivered before several sections, such as those on railway engineering, municipal engineering, mechanical engineering, electrical engineering and metallurgy. Among the list of names of writers well known in the electric railway field are those of Sir Albert Stanley, general manager Underground Electric Railways (London, England); George H. Pegram and W. F. Reeves, engineers Interborough Rapid Transit Company; William Barclay Parsons, E. H. McHenry, H. S. Putnam and H. F. Parshall (London, England), consulting engineers, and Prof. L. Luiggi (Rome, Italy), former member Italian State Railway Board.

The subjects considered by these authors are also so varied as to include in a very comprehensive manner the general field of electric railway engineering. Thus, transportation methods, considered broadly, are represented by the papers of Sir Albert Stanley and Mr. Reeves, as well as by those on city planning and streets. Track and way questions are treated directly by Mr. Pegram and indirectly by the papers on electrolysis and electric welding by Professor Ganz and Mr. Auel; heavy electric traction by the papers of Messrs. McHenry, Eaton and Hood; power stations by those of Messrs. Parshall and Putnam and many papers on prime movers, boilers and station apparatus; and the broad problems of utilities in general by the papers of President Humphreys and Mr. Willis of England. These, of course, are in addition to the many other related topics in electric railway engineering which will be discussed by authors of international reputation.

Each nation wishes to be adequately represented in such a symposium of engineering progress, and loyalty to country as well as to profession furnishes an unusual incentive. We may therefore confidently expect that the publications of the congress proceedings will furnish a valuable epitome of the present status of engineering throughout the world.

COURT DECISIONS AFFECTING LABOR

A very useful publication has come from the bureau of labor statistics in the form of a review of 1914 decisions affecting labor. These cover at some length the many new workmen's compensation statutes, employment contracts, hours-of-labor laws, employers' liability and related subjects.

In reading the excellent summary that accompanies the decisions quoted, as well as in looking over the decisions themselves, employers will be forced to a realization of the fact (if they have not already reached this conclusion) that we are now living under a new body of laws and judicial interpretations so far as workmen's compensation is concerned. Under the Michigan statute, for example, it has been held that an employee who injured himself while running to punch the time clock when the noon whistles blew was entitled to compensation. The courts of the State have also held that a workman leaving a roof for lunch at the invitation of his employer and injured while coming down by a way of his own choosing, while other uninvited employees came down safely by another course, was within the protection of the act. The Wisconsin act was held to cover an injury to a workman on the way to the place of his employment. Compensation was allowed under the New Jersey act to a girl who was hurt while combing her hair to remove particles of wool acquired in the course of her employment in a mill.

A new twist in the fellow-servant doctrine, now modified or entirely changed by statute in several states, is found in a North Carolina case. There it was held that the incompetence of a fellow servant was the cause of the liability of the employer, the court stating that a workman assumed the risk of negligence of his fellow servant but not of the negligence of the employer in selecting incompetent employees. Extended and developed as many decisions of this character have been, it may readily become a rule that injuries resulting from what it is easy to show is the "incompetence" of a fellow servant are chargeable to the employer. Placing incompetents in positions where they endanger other employees is evidently as unsafe as it is indefensible.

One of the Supreme Court decisions reported emphasizes the value of this review to electric railway managers in particular. In this case (Smith vs. Texas) the court held unconstitutional a Texas statute restricting the employment of railroad conductor to persons of certain specified experience, it being decided that the requirements were arbitrary and unreasonable and so in violation of the fourteenth amendment. The application of this decision to laws which seek to prevent electric railways from employing non-residents or others who may be available during strikes is clear.

It is not so much, however, the direct application of many of these decisions to the railway business that makes this review of great importance; it is the insight given into the later interpretation of laws which change the whole structure of employers' liability and workmen's compensation, define the responsibility of labor unions (as exemplified in the Hatters' case and others) and put on a new basis such issues as were involved in the interpretation of the Kansas statute which sought to make it unlawful for an employer to require of employees that they should not be members of labor organizations. Justice Pitney's opinion in the latter case (Coppage vs. Kansas) is a veritable employers' bill of rights.

BROADER STANDARDS IN TRAINING MEN FOR PLATFORM SERVICE

The new schoolroom of the Brooklyn Rapid Transit System, described elsewhere in this issue, is a splendid example of effective co-operation between the transportation and mechanical departments of that company in broadening the instruction of platform men. Time was when a man was declared a full-fledged motorman or conductor on the strength of a week's platform training under men who knew but little themselves. In those days non-technical men in the transportation department were responsible for the curriculum, and but little thought was given toward achieving economical operation and avoiding the abuse of equipment. If the motorman made his schedules without accidents and if the conductor gave an honest accounting, no more was expected of them.

That these requirements must now be exceeded is evident from a survey of instruction practices devised during recent years. The skeleton car and dummy stand have been supplemented by complete floor layouts of the standard equipments so that each part can be inspected and explained in detail; simplified wiring diagrams and demonstration boards have been devised to show the course of current from trolley to rail in an interesting way; moving-picture scenarios have been written to point out the consequences of wrong and of right operation; tracks have been built for trial runs and, as at Brooklyn, even full-section car models and portions of track and line construction have been incorporated.

The elaborate equipment which has been assembled by the Brooklyn company is not for the purpose of making expert mechanics of the platform men, but to make them appreciate the correct use and value of the electro-mechanical equipment placed in their charge. If the new Brooklyn school will produce a larger proportion of men who can meet schedules without baking armatures and make stops without excessive use of brakeshoe metal, the money that the school has cost will soon prove well spent. Yet the excellent work that this school can do for the benefit of the mechanical department is but a trifle compared to the excellent results it can achieve in lower energy consumption, in decreased number of accidents and in fewer interruptions to the service.

DISARM THE YELLOW JOURNAL WITH FACTS

Newspaper reporters as a rule dote on the sensational side of any accident regardless of how trivial it may be, but after all they are human and generally have the layman's viewpoint. This was clearly demonstrated recently when two trains on the Elevated Railroads of Chicago came together in an insignificant collision at a point near one of the Chicago River bridges. An accident as slight as this would ordinarily have been instantly forgotten. Unfortunately, this trivial collision immediately followed the sinking of the steamer Eastland in the Chicago River, since which disaster the Chicago public has been working under a nervous tension that is reflected in every phase of the transportation business. Newspapers took advantage of this situation and emphasized the sensational side of this collision, dwelling upon what might have occurred if the river bridge had been open and the car had been pushed off the end of the structure.

Undoubtedly the yellow journalist made a deep impression upon his readers, but to counteract this President Budd of the Elevated Railroads immediately requested the manager of one of the prominent Chicago morning newspapers to send a reporter to examine the entire situation in detail. The request was granted and the reporter was taken in tow by the electrical engineer and the engineer of maintenance of way, and every phase of the accident was carefully explained to him. He was then taken to the site of the accident, where the various functions of the interlocking plants which protect all bridges were carefully demonstrated, as well as all the auxiliary protective devices which each plant controlled. Fortunately while the reporter was in the tower a signal indicating that the bridge was to be opened was received. This, of course, necessitated the sequence of operations required to protect traffic before the bridge could be turned from its normal position. As he watched these operations the reporter was deeply impressed with the great number of protective devices installed to safeguard the public. Armed with these facts he returned to his desk and worked up a half-column article in the usual sensational style. The sensational feature in this case, however, consisted in showing how mechanically impossible it was for a train to plunge into the river, and how untruthful were the reports contained in his competitors' newspapers.

This incident seems to indicate that when a newspaper is not obsessed with the idea of disparaging public utilities in general, the reporters and editors are open to conviction. It is certainly a good policy for the railway managers to devote sufficient time and attention to furnishing newspaper reporters, and in turn the public, with the facts. It is particularly important that these facts be presented so as to be clearly understood by the layman. As a rule a layman is more easily convinced by a demonstration, and undoubtedly so it is with newspaper reporters, who cannot always be expected to understand a technical description given from the office desk. The reporter is liable to construe such a technical description as "bunk" and proceed to write a sensational story drawn from his own imagination.

A Modern Railway School

In the New Surface Car Schoolroom of the Brooklyn Rapid Transit System the Operation and Equipment of Each Important Type of Car Is Taught by Means of Full-Section Models—Moving Pictures and a Miniature Trolley-to-Rail Demonstration Board of Original Design Are Among the Instructive and Interesting Features

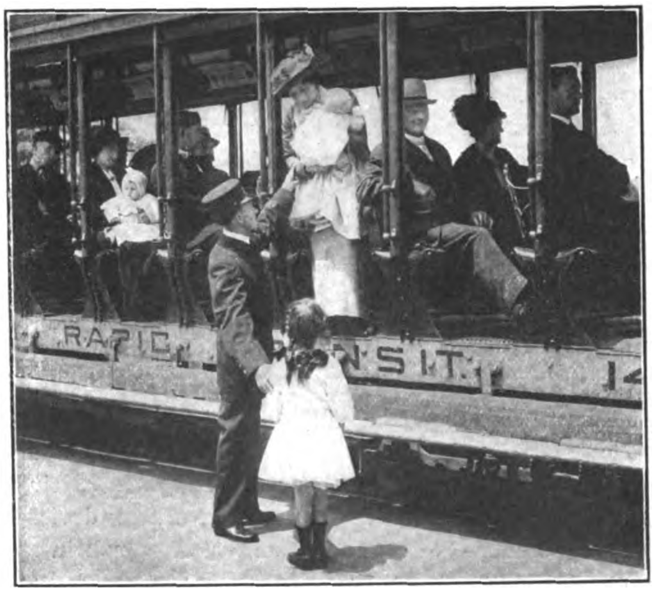
The Brooklyn Rapid Transit System completed this past spring, after nine months' work, a most extensive and modern surface railway school, chiefly for the instruction of platform men. The location of the old school, at Fifty-eighth Street and Second Avenue, was retained on account of the facilities on Second Avenue for the road instruction of the men in connection with their work at the school. The new school occupies approximately three times the space of the former school, or more than 5000 sq. ft. of floor space. It comprises a conductors' room, motormen's room with apparatus, and the office of the supervisor of instruction.

The installation is most attractive and substantial, all layouts being of steel as far as possible, while all wiring is inclosed in conduit pipe.

As first impressions are often lasting, the very entrance to the school has been laid out in a way that will place the students in a friendly and receptive mood. On entering the office of the supervisor of instruction they will see some tastefully-grouped photographs which illustrate different features of B. R. T. employees' welfare work. Here, for example, they see the interiors of the several welfare centers with their restaurants, reading rooms, pool tables, bowling alleys, electric driers for clothing, etc. Thus they are impressed with the fact that the relations with their future employer will have human as well as business aspects. Groups of safety campaign pictures framed uniformly serve to impress the new men that the physical well-being and consequently the happiness of many passengers will lie largely in their care.

PARK ROW
BE CAREFUL!
WAIT
UNTIL
This Car
STOPS
SAFETY ALWAYS
1498

BROOKLYN SURFACE CAR SCHOOL—INSTRUCTION SLIDE TO SHOW POSSIBLE DANGER OF FORBIDDEN TALKS



BROOKLYN SURFACE CAR SCHOOL—INSTRUCTION SLIDE SHOWING HOW CONDUCTOR CAN AID PASSENGERS

The new school is the result of co-operation of the operating and mechanical departments throughout, William Siebert, superintendent of transportation, designating E. C. Clarke, supervisor of instruction, in charge for the operating department, and W. G. Gove, superintendent of equipment, designating O. T. Kreusser as engineer in charge for the mechanical department, to design and care for the work involved.

All construction was handled by the company, the engineer of way and structure caring for the remodeling of the building and heating, the line department for the illumination, and the Fifty-second Street surface shops for the makeup and installation of the equipment and apparatus.

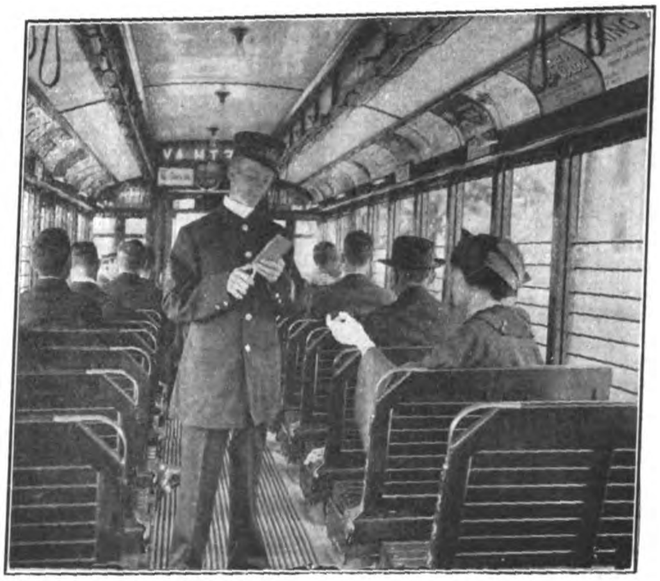
The stationary equipment hereinafter described is to be supplemented by a specially designed and equipped instruction car which will be operated over the system on regular schedule, for any specific purpose or for any reinstruction found necessary at the different operating depots.

As each class of motormen or conductors is taken in hand by the supervisor of instruction he addresses them briefly on the scope of their duties, on the possibilities of their future career, on the functions and value of the Employees' Benefit Association, and on the need for safe operation and courteous treatment of their patrons. The classes then go to their respective rooms for the instruction hereinafter described.

CONDUCTORS' ROOM

The room for conductors is equipped with fifty-four benches and desks of the public school type. It is devoted chiefly to instruction in fare collection, in the preparation of reports, and in such other matters as cannot be demonstrated on the full-section car models in the motormen's room. As accompanying views show, the conductors' room has no other mechanical apparatus than two frames with cash and transfer registers thereon, including ringing devices. The use of signal bells and cords is also shown. The register frames are

BROOKLYN SURFACE CAR SCHOOL—INSTRUCTION SLIDE SHOWING HOW A WAGON MAY OBSCURE VIEW OF PLAYING CHILDREN



BROOKLYN SURFACE CAR SCHOOL—INSTRUCTION SLIDE SHOWING CONDUCTOR'S CORRECT POSITION WHEN PUNCHING TRANSFERS

mounted on the instructor's platform at the front of the room. Behind him and on part of the side walls are blackboards. Enlargements of the principal report forms used by conductors, such as the day sheet, general time slip and car-service time slip, are painted on part of the side wall blackboards to permit the instructor to illustrate his talk. The use of other forms, such as accident reports, is also illustrated and taught to the men.

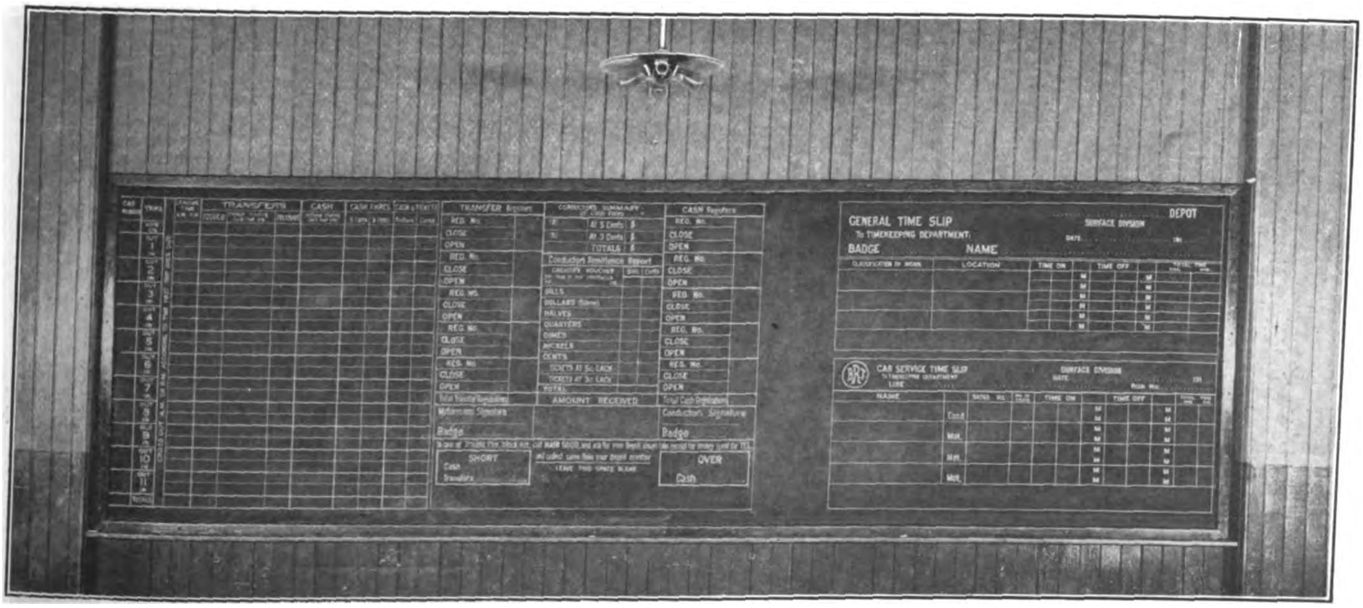
In addition to the instruction of this formal character, a more attractive and unusual form of teaching is afforded by the use of a series of stereopticon slides, the room being equipped with a stereopticon machine and spring roller curtain. These slides show enlarged views of the register dials, the correct positions that the conductor should assume in registering fares, in issuing transfers and in assisting passengers to enter or alight. The slides also illustrate the need for constant watch of street conditions to avoid accidents to persons and collisions or side-wipes with vehicles. Moving pictures of the same tenor, including the now famous "Price of Thoughtlessness," are also used.

Although, as noted, the embryo conductors can be handled up to classes of fifty-four, the instructor does not remain constantly on the platform or at the blackboards but is always prepared to give individual instruction to the more backward students. Moreover, all the pupils are supplied with a series of pamphlets whereby they can refresh their memories of the knowledge gained in the classroom.

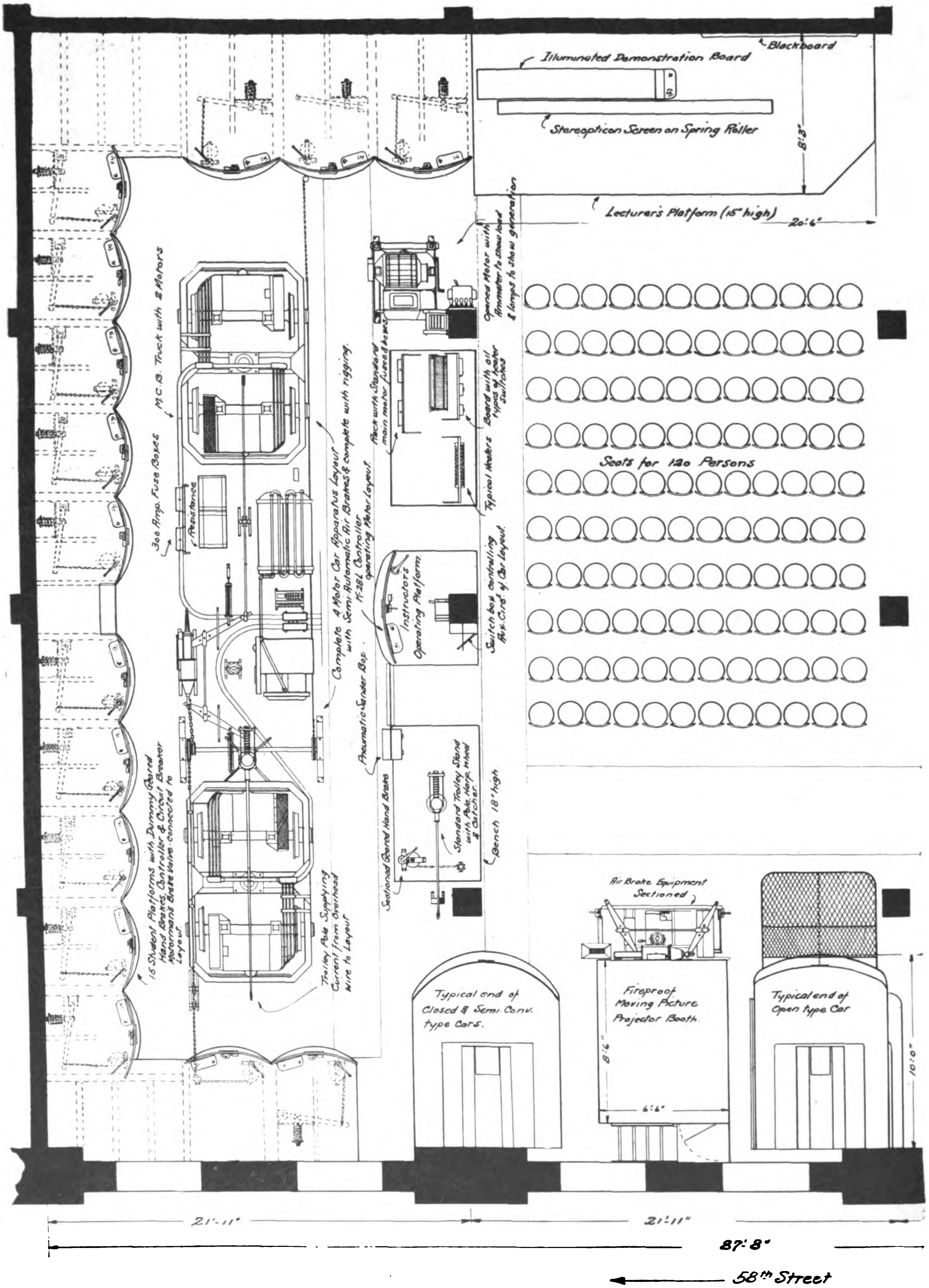
MOTORMEN'S ROOM

As the recruit motormen and conductors enter the motormen's or apparatus room, they are likely to be bewildered by an array of car equipment so extensive that it looks like an electric railway convention exhibit on but a slightly reduced scale. Yet, a few minutes' inspection will convince the visitors that they have before them an attractive as well as an instructive array of apparatus and equipment. In fact, news of the very elaborate outfit of this school has brought to the room many car platform veterans who have come on their own time to get a clearer idea of the apparatus that they handle every day. On a recent day, for example, 120 regulars visited the school.

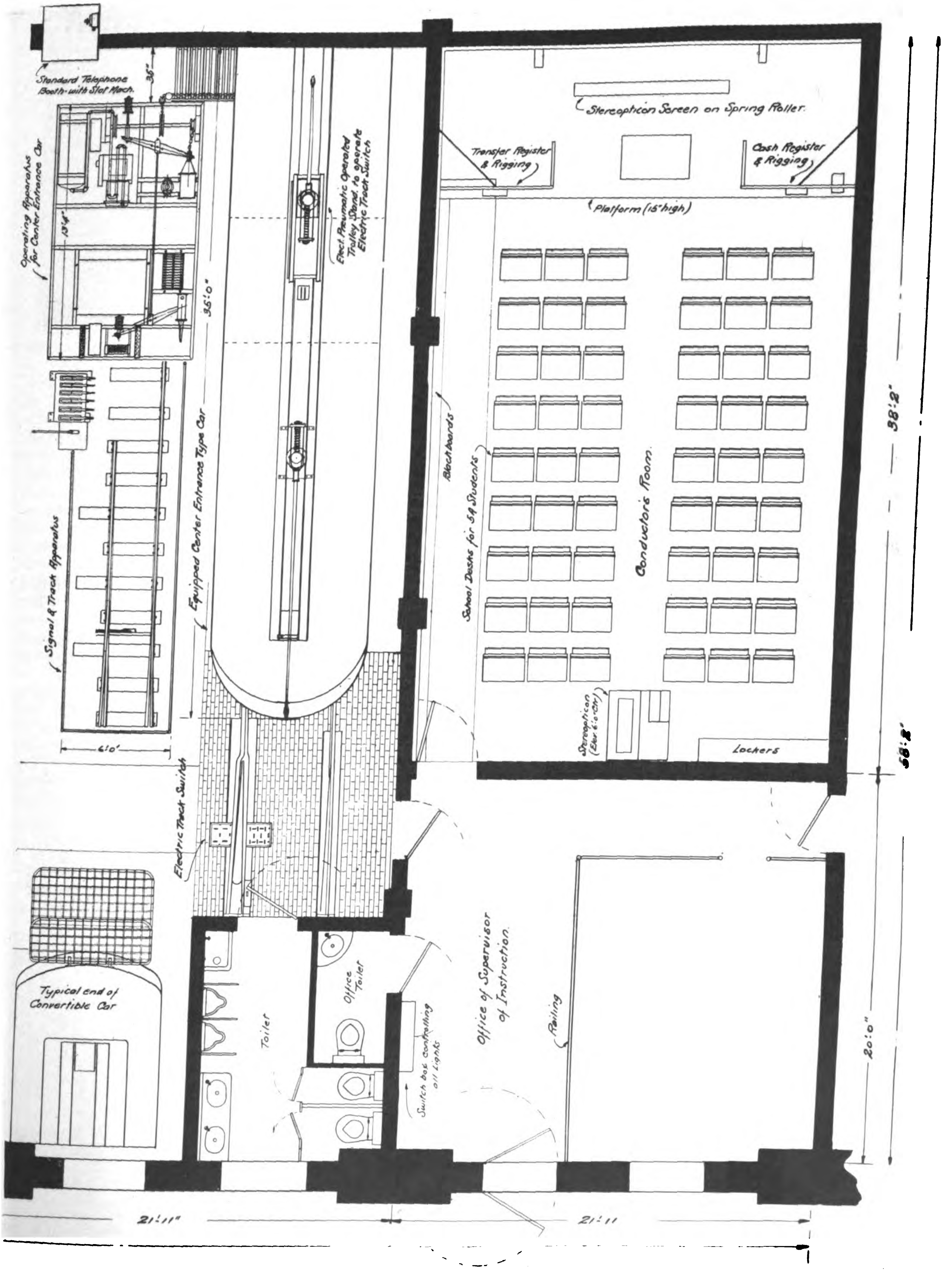
The motormen's room contains all the working apparatus, equipment and car sections beside the audi-



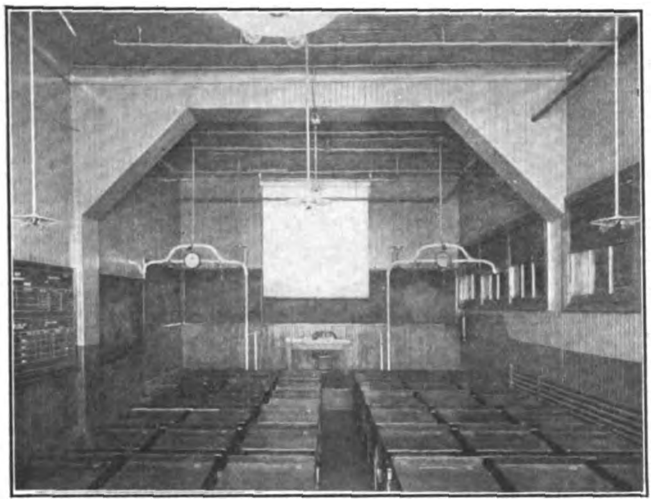
BROOKLYN SURFACE CAR SCHOOL—ONE SIDE OF THE CONDUCTORS' CLASSROOM SHOWING ENLARGED REPORT FORMS


Blackboard
Illuminated Demonstration Board
Stereopticon Screen on Spring Roller
8'3"
Lecturer's Platform (15" high)
20'6"
Opened Motor with Ammeter to show load & lamps to show generation
M.C.B. Truck with 2 Motors
300 Amp. Fuse Boxes
Resistance
Complete 4 Motor Car Apparatus Layout with Semi-Automatic Air Brakes & complete with rigging.
K-28L Controller operating Motor Layout.
Rack with Standard main motor fused boxes
Board with all types of heater switches
Typical Heaters
Seats for 120 Persons
Instructor's Operating Platform
Switch box controlling Aux. Circ's of Car Layout.
Pneumatic Sander Box
Sectional Geared Hand Brakes
Standard Trolley Stand with Pole, Harp, Wheel & Catcher.
Bench 18" high
15 Student Platforms with Dummy Geared Hand Brakes, Controller & Circuit Breaker Motorman's Brake Valve connected to Layout.
Trolley Pole Supplying Current from Overhead wire to Layout
Air Brake Equipment Sectioned
Typical end of Closed & Semi-Conv. type Cars.
Fireproof Moving Picture Projector Booth.
8'6"
6'6"
Typical end of Open type Car
10'0"
21'-11"
21'-11"
87'8"
58th Street

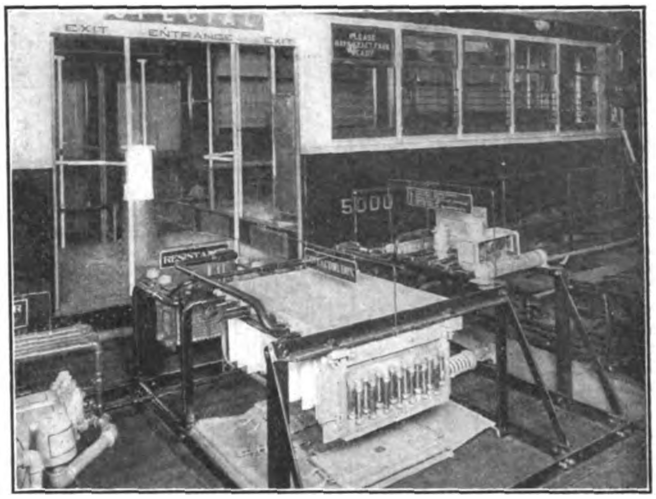
BROOKLYN SURFACE CAR SCHOOL—PLAN OF NORTHERN HALF OF SCHOOL LAYOUT SHOWING AUDITORIUM, FULL-SIZE SECTIONS OF TWO TYPES OF CARS, FIFTEEN DRILL PLATFORMS, INSTRUCTOR'S PLATFORM, COMPLETE FOUR-MOTOR OPERATING EQUIPMENT AND DISPLAY STANDS


Standard Telephone Booth-with Slot Mach.
3'5"
Operating Apparatus for Center Entrance Car
13'4"
35'0"
Elect. Pneumatic Operated Trolley Stand to operate Electric Track Switch
Stereopticon Screen on Spring Roller.
Transfer Register & Rigging
Cash Register & Rigging
Platform (15" high)
Equipped Center Entrance Type Car
Signal & Track Apparatus
6'0"
Blackboards
School Desks for 54 Students
Conductor's Room
38'2"
Stereopticon (Elev. 6'-0" Ctr.)
Lockers
58'8"
Electric Track Switch
Typical end of Convertible Car
Office Toilet
Toilet
Switch box controlling all lights
Office of Supervisor of Instruction
Railing
20'0"
21'11"
21'11

BROOKLYN SURFACE CAR SCHOOL—PLAN OF SOUTHERN HALF OF SCHOOL LAYOUT SHOWING CHIEF INSTRUCTOR'S OFFICE, CONDUCTORS' ROOM, MODEL CENTER-ENTRANCE CAR, ELECTRIC TRACK SWITCH, SIGNAL OUTFIT AND FULL-SIZE SECTION OF CONVERTIBLE CAR



BROOKLYN SURFACE CAR SCHOOL—INTERIOR OF CONDUCTORS' CLASSROOM WITH STANDS FOR REGISTERS



BROOKLYN SURFACE CAR SCHOOL—CONTACTOR AND OTHER EQUIPMENT ALONGSIDE CENTER-ENTRANCE CAR

torium, which has individual seats for 120 persons, a lecturer's platform and a moving picture booth and equipment for illustrating lectures.

FULL SECTION CAR MODELS

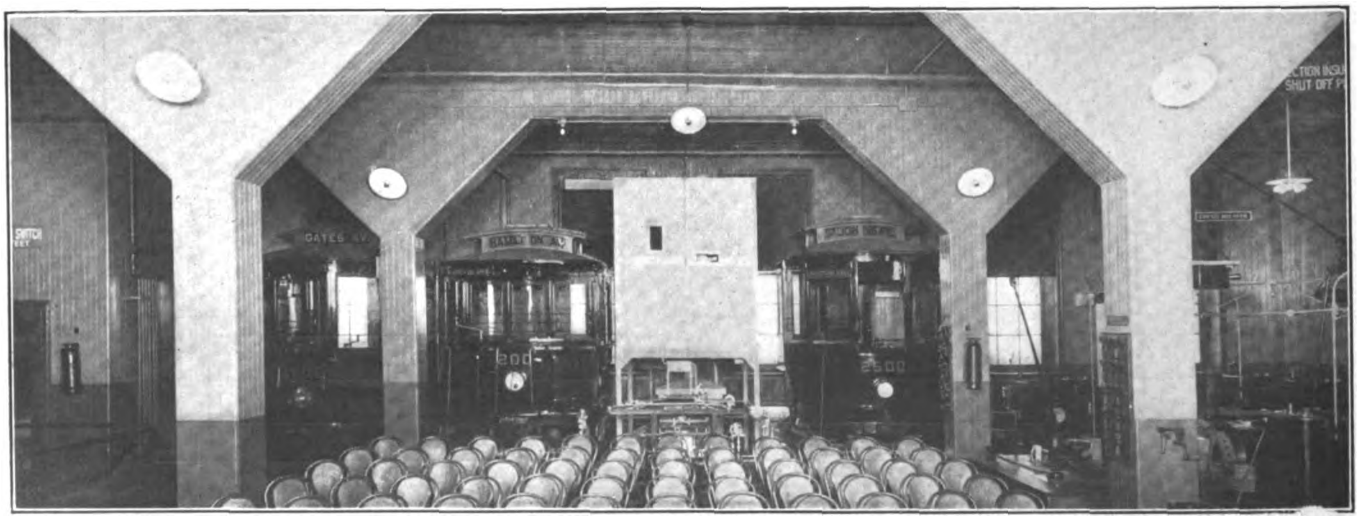
As shown on the accompanying plan, immediately on entering the room the visitors will observe at their left a series of three full-size sections of the general types of drop platform cars used in Brooklyn, comprising the cross-seat convertible four-motor type car, the semi-convertible closed two-motor type car, and the open car. Each model is 10 ft. long, so that it comprises not only a complete and operative vestibule but has also enough interior to show the seating arrangement, the location of register mechanism, signal cords, the position of the sand box, transfer box, heater switch and positions of most company announcements; also all bulkhead fittings, including curtains and the door mechanism. In the case of the convertible car, one side is shown with summer sash and the other with winter sash, while the open car has the regulation standard running boards and guard bars which can be raised and lowered. This car also has a composite platform equipment, representing the heavier open cars which have air brakes and pneumatic sanders in addition to the standard geared hand brakes, while the lighter cars of this type are without air brakes and have mechanically-operated sand boxes.

While, of course, the models are not movable, the vestibules and platforms are fitted with every part of the equipment in its standard location, such as the switch boxes, controller brake staff and ratchet, brake valve, conductor's emergency valve, record card holder, etc. Many of the items bear metal signs to accustom the men to call things by their proper names so that, for example, a man will not refer to a contrivance as a wheelguard when he means a fender. The drills which the recruits receive on these models help to teach them their proper position on the cars and the correct operation of controllers, brakes and circuit breakers, closing or fastening of platform gates, adjustment of fenders and wheelguards, and the use of the switch irons, foot gong, conductor's emergency valve, etc., also the proper position and methods for the registration of fares and the transmission of signals.

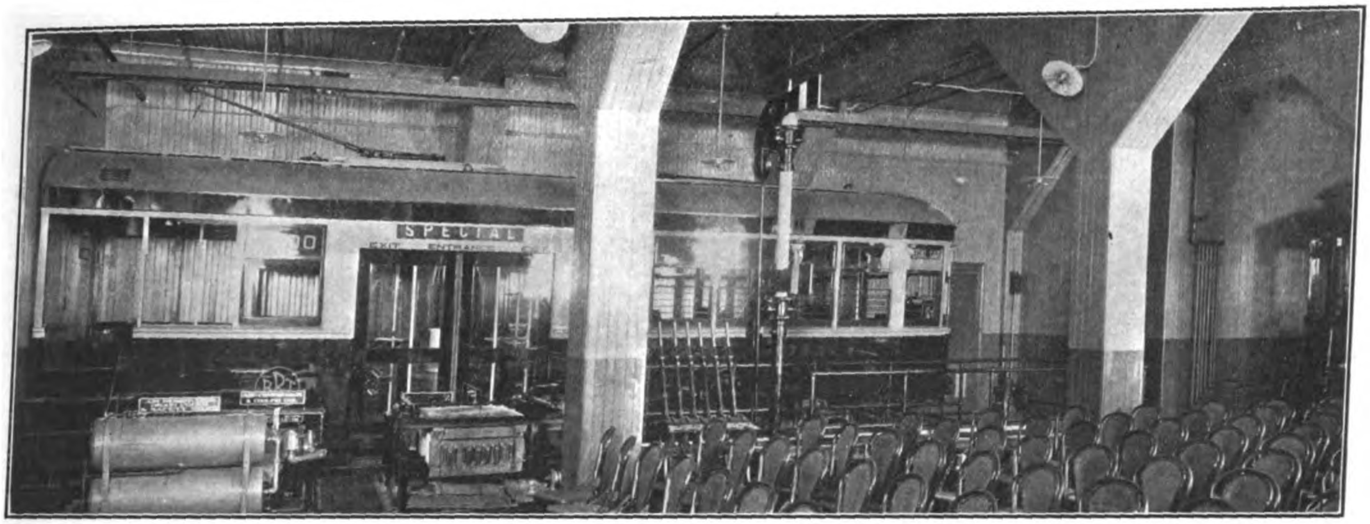
The wheel-guard equipment has also been comprehensively covered, showing the two different types used in Brooklyn, and demonstrating their operation and the proper use of the emergency hooks during heavy snow storms, or when the guard becomes damaged. The two standard types of fenders also are shown, and instruction is given in their proper handling. The proper location and use of drawbars are also covered.

THREE-QUARTER MODEL OF CENTER-ENTRANCE CAR

To teach the men the use of the center-entrance car it was deemed desirable to build a three-quarter length, full-section model of the body in order to include the en-



BROOKLYN SURFACE CAR SCHOOL—REAR OF THE AUDITORIUM, SHOWING THREE FULL-SIZE SECTIONS OF CARS AND THE MOVING PICTURE BOOTH

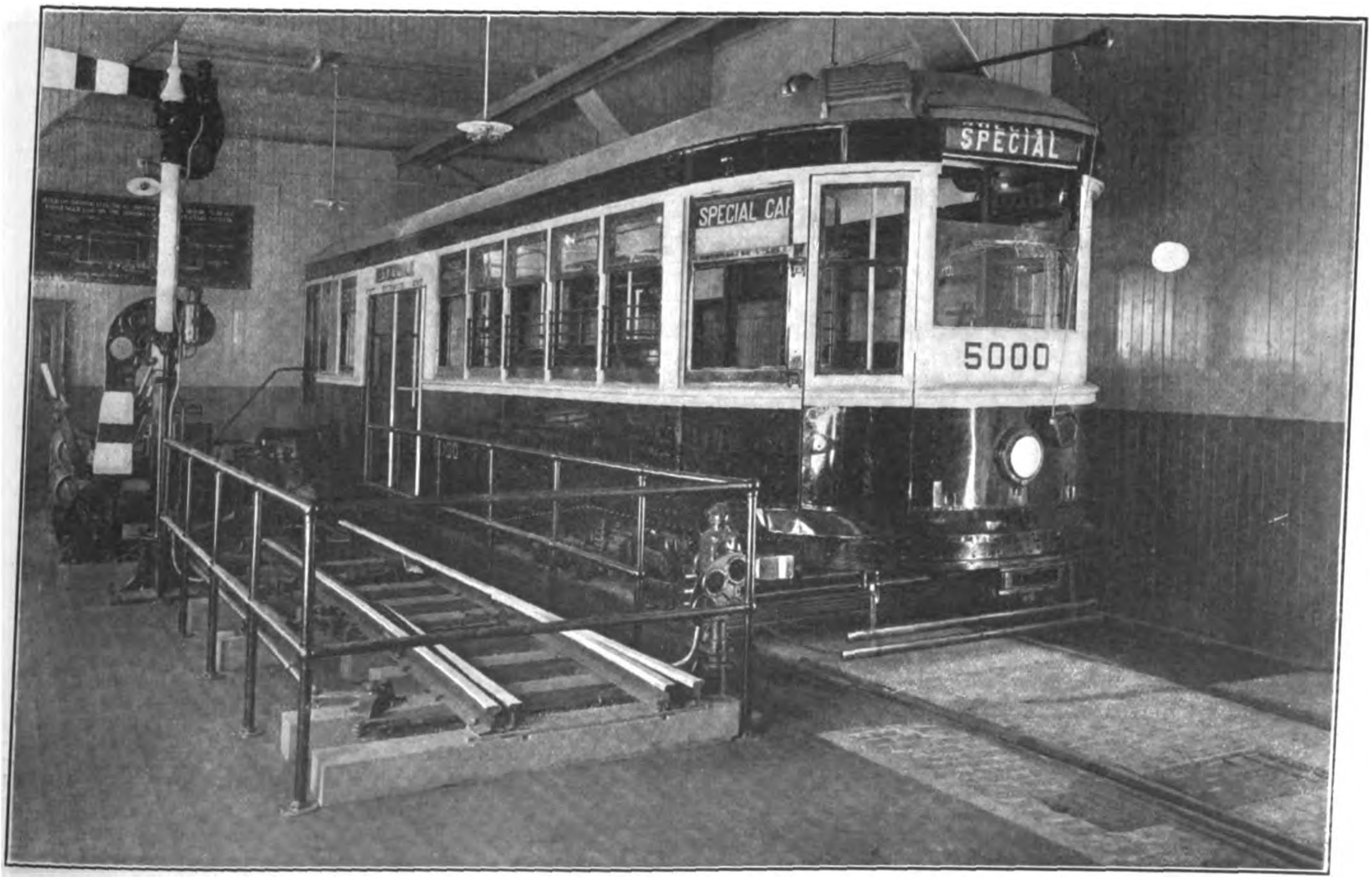


BROOKLYN SURFACE CAR SCHOOL—SIDE VIEW OF THREE-QUARTER LENGTH CENTER-ENTRANCE CAR SHOWING LAYOUT OF EQUIPMENT ALONGSIDE, SPECIAL TRACK AND STUDENTS' STAIRWAY AT THE REAR

tire well construction and the ramps leading therefrom. In short, this model, which is built of steel, is a faithful replica of an actual car except that a portion of the seating is absent to give room for class instruction and to permit the exposure of the electropneumatic operation of the doors. Further, the working of the door-operating mechanism by hand or air is visible through the screens which replace the usual steel casing at this point, and a portion of the ceiling remains open to show the duct and fan motor used in the vacuum ventilating system.

Unlike the other models, this car is equipped with all the electrical and pneumatic apparatus connected and working. However, all the equipment ordinarily used under the cars and consisting of the contactor box, resistors, relays, air compressor, governor, tanks, brake cylinder, slack adjuster, brake rigging, etc., is installed beside the car on the floor in approximately the same relative positions that the parts have under the operative cars. This permits ready inspection and examination. Following the practice applied throughout this room, each piece of apparatus is neatly finished in light colors and bears a metal sign with its name or identifying number, like the following: "Contactor Box"; "Air Reservoir, Drain Cocks and Safety Valve"; 1—"Control Resistance," 2—"Control Relay," etc.

The roof of the car is equipped with two trolley poles connected as in service, the entire equipment obtaining



BROOKLYN SURFACE CAR SCHOOL—THREE-QUARTER LENGTH MODEL OF CENTER-ENTRANCE CAR WITH AUTOMATIC TRACK SWITCH IN FRONT AND SIGNAL MECHANISM ALONGSIDE THE FRONT HALF OF THE CAR its current from a standard trolley wire overhead. The rear pole in addition has a sliding device, used in connection with the electric track switch located ahead of the car.

In the case of the center-entrance car, therefore, the equipment is operated from the cab in such fashion that when the students are on the floor they can see what takes place in the main control and braking apparatus. Further, they can see the workings of the several safety relays which prevent opening of doors when power is applied as well as the opening of the control current when doors are open. Other operations observed by the pupils are fare collection, door operation, response to door and buzzer signals, automatic control of heaters by means of the thermostat, proper use of switches, replacement of fuses, etc.

TRACK SWITCH AND SIGNAL INSTRUCTION

The use of the electric automatic track switch is taught in connection with the operation of the center-entrance car equipment. A suitable area in front of this car is paved and equipped with a complete operating electric track switch. Placed on the wall to face the motorman is the standard warning sign "Electric Switch—100 ft.," used in connection with automatic switches. As the car itself cannot be moved, the rear trolley stand and pole are moved to produce the same condition that arises when the current collector of a moving car enters the insulated section of the overhead contactor which is used in operating the automatic switch. The trolley stand is mounted on a ball-bearing track and returns to its normal position automatically. This movement of the trolley stand is obtained by means of electropneumatic mechanism similar to that of the center doors. This mechanism is operated by the instructor from a push button in the cab.

The students are shown that for straight rail the car must be run over the switch without power, while for taking the switch they should apply power only on the first point of the controller. The instructor meanwhile presses the button provided, which causes the trolley pole to move past the contactor located on the trolley wire and to cause the track switch to throw automatically. Of course, the proper throwing of switches by hand is also taught.

A portion of the space alongside the center-entrance model is employed for an exhibit of the signals which are used on those portions of the system where surface cars are operated over elevated tracks. As one of the illustrations shows, the equipment includes a dwarf signal, two-arm semaphore and switch levers with mechanical locks.

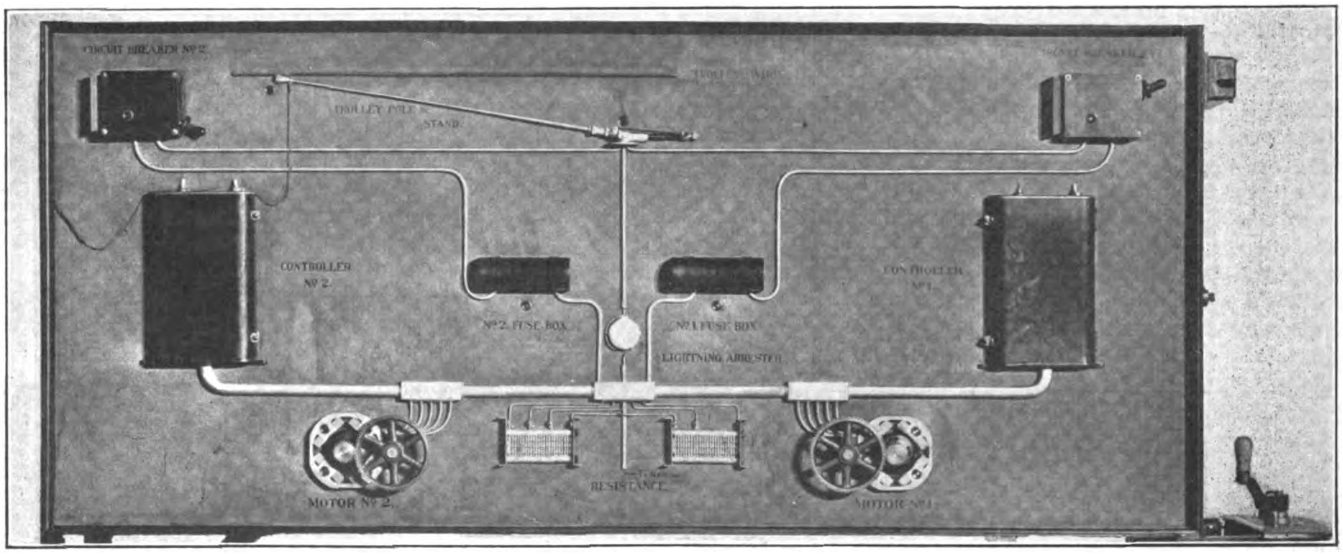
DESCRIBING THE COURSE OF THE CURRENT

The demonstration board which has been devised to show the course of the current and the operation of the control equipment from the point of entrance at the trolley wire to the point of return at the rail, is most ingenious and instructive. It is built of steel and ebony-impregnated asbestos and is placed in the front of the auditorium section on the lecturer's platform.

The accompanying illustration of the front of the board shows that it is laid out for a two-motor equipment with the usual appurtenances in miniature, all suitably designated. The energy for operating the devices on the board and for its lighting effects, is obtained by means of the trolley wire on the board and a standard K-11 controller with a special geared supplementary drum, carrying twenty-five fingers.

It will be seen that by use of the trolley cord a miniature trolley pole and stand of metal can be put in or out of contact with the strip of copper which is the source of all power supply. When the main switch is in, energizing the trolley wire and the trolley wheel placed against the wire, small cut lenses are illuminated at the trolley pole and stand, showing the live condition of these parts. When the circuit breaker is cut in, the lamp at that point is lighted as well as the one at the fuse box, and when the controller is opened the slots representing the trolley fingers are also illuminated, showing the live condition of all the various apparatus to that point.

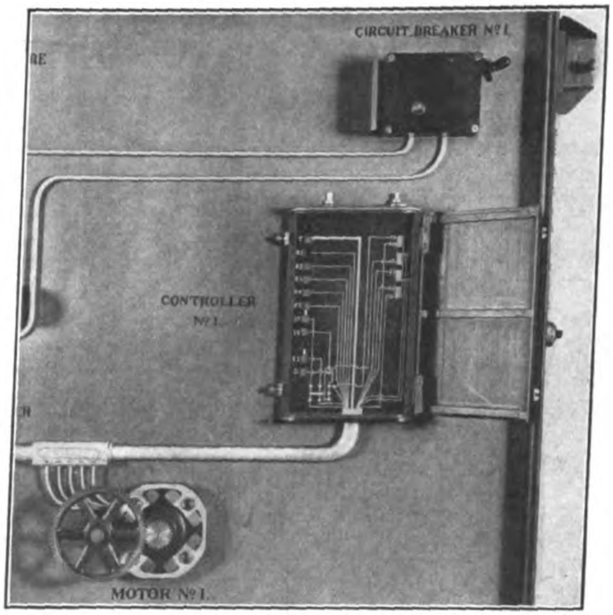
Near the base of the board are cross-sections of two four-pole motors which are also arranged with lenses illuminated to various intensities. The shafts of these sections are extensions of the shafts of real motors installed behind the board. Each extended shaft carries a pinion which meshes with a corresponding gear. As the controller handle is turned, the slots inside the miniature controller are illuminated showing the various combinations of connections in the controller and the motor armature and gearing. The connections made in the real controller at each notch and the path of the current through the real, though concealed, resistors are ingeniously shown in the miniature controllers (the covers of which are hinged) by adapting the punctured-



BROOKLYN SURFACE CAR SCHOOL—MODEL BOARD SHOWING THE COURSE OF CURRENT FROM THE TROLLEY TO GROUND roll principle of automatic piano players and by throwing lamps in or out of circuit by means of the contacts on the supplementary drum.

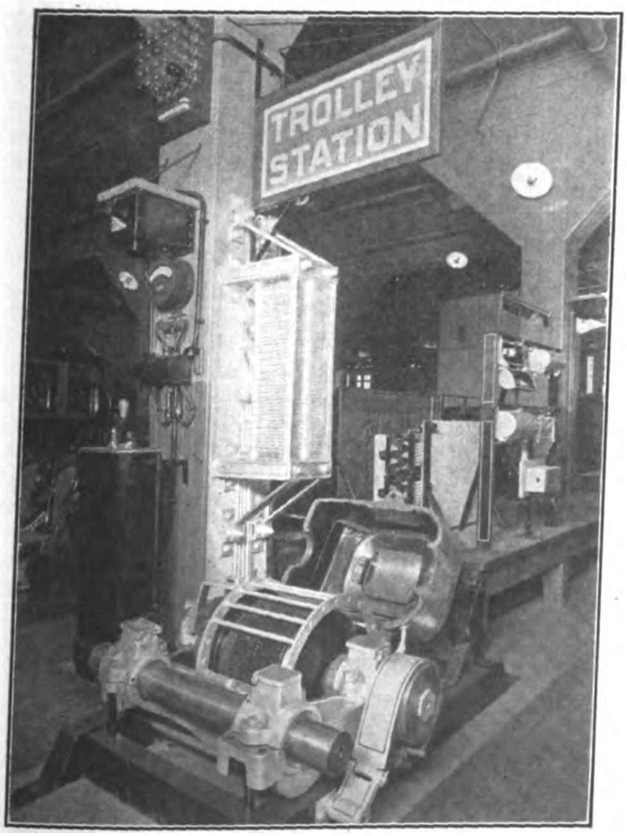
This third drum in the operating controller is used to secure the lighting, current flow and heating effects shown on the front of the board. When so employed, several banks of lamps behind the board are placed in circuit, but their illumination cannot appear on the front of the board because intervening brass screens cut them off from all openings. These brass screens, however, are perforated at such intervals that at each notch of the controller the various slots, of which there is one for each controller finger, are either covered, shutting off the light, or uncovered, permitting light to shine through and show the "live" condition. The screens are moved mechanically by means of a pinion and rack which is actuated through gearing on the K-11 controller. The slots representing the fingers have their connections painted and lettered so that the path of the current from the energized fingers can be readily traced out to the main cable through the resistors and motors. By the use of red lamps behind the miniature resistors a simulation of their heating is obtained, each point of resistance having a separate screened lamp put in or out by means of the supplementary drum at the proper time. The board is operated directly on the regular 550-600-volt circuit, and the lamps used are 23-watt and 10-watt, with five or more in series.

The demonstration board is supplemented by a diagram on which the circuits and apparatus are shown in heavy white lines against a faint outline of a two-motor car to indicate the position of each piece of apparatus on the car. The diagram also bears the necessary explanatory words and phrases to make it as clear as possible.



BROOKLYN SURFACE CAR SCHOOL—DETAIL VIEW OF BOARD, SHOWING INSIDE OF MINIATURE CONTROLLER, GEARING AND SECTION OF MOTOR

A modern moving picture and stereopticon equipment with a steel and asbestos booth placed between two car models and elevated above the floor is another feature of the auditorium section. The special resistors necessary to reduce the 550-600-volt current are located in a housing under the booth and these, as well as the booth, are ventilated by means of a duct. A buzzer circuit enables the lecturer to signal the picture operator concerning changes in slides or films. A large spring roller curtain for images up to 12-ft. square is provided over the lecturer's platform for use with the stereopticon equipment.



BROOKLYN SURFACE CAR SCHOOL—TEST EQUIPMENT WITH AMMETER AND BANK OF LAMPS TO ILLUSTRATE USE OF MOTOR AS A GENERATOR

DEMONSTRATING MOTOR

At the left of the instructor's platform is an opened GE-800 motor with a K-11 controller, standard resistors, circuit breaker, ammeter and bank of lamps above the breaker. A foot brake and brake drum are provided to demonstrate with the help of the ammeter how the energy consumption of the motor is increased when it is running against brake friction.

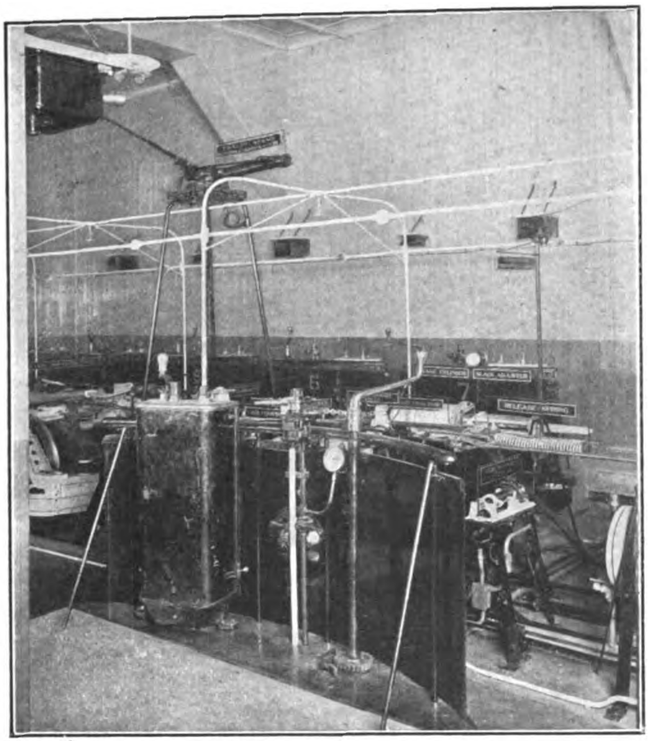
As this motor is open the explanation of the function of its various parts is understandingly made. This motor is also arranged to be operated as a generator by permitting the armature to spin and then throwing the circuit breaker and reversing the controller. Visual evidence of generation is afforded by means of the lamp bank which is momentarily lighted by the current generated. The brush-holders and revolving armature as well as all resistors are protected to prevent anyone making contact with them.

HEATERS, FUSES AND OTHER DETAILS

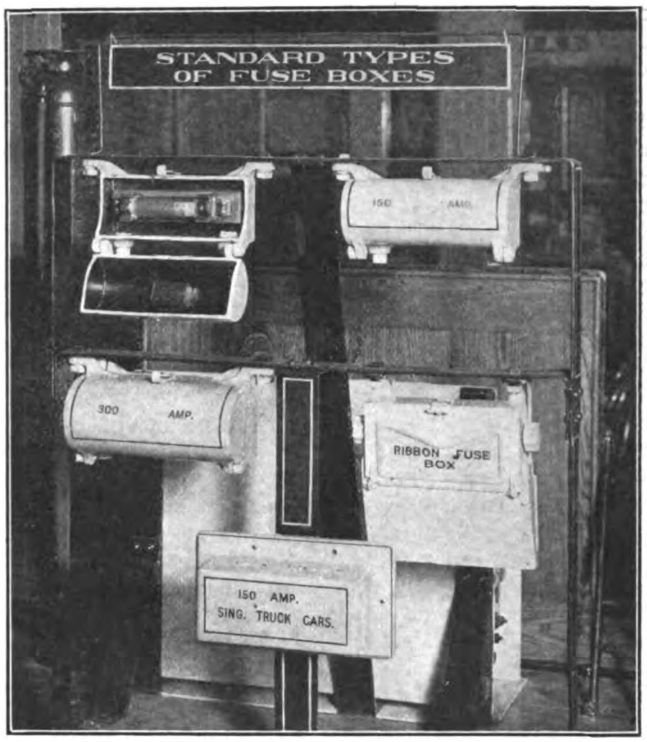
Directly in line with the demonstration motor is a rack showing the company's different types of heater switches, with and without covers. These are used to teach the correct way of cutting heaters in and out in operation. On the same stand and in electrical connection with the switches are one cross-seat and one panel heater.

On the opposite side of the same stand are mounted a group of 150-225-300-amp cartridge and one-ribbon type of motor fuse. Here the students are shown how to insert fuses correctly and to distinguish between the different sizes.

Boards are also provided on the columns for carrying the controller and air-brake handles used for the



BROOKLYN SURFACE CAR SCHOOL—INSTRUCTOR'S PLATFORM WITH PORTION OF OPERATING FOUR-MOTOR EQUIPMENT



BROOKLYN SURFACE CAR SCHOOL—DISPLAY OF DIFFERENT STANDARD TYPES OF FUSE BOXES

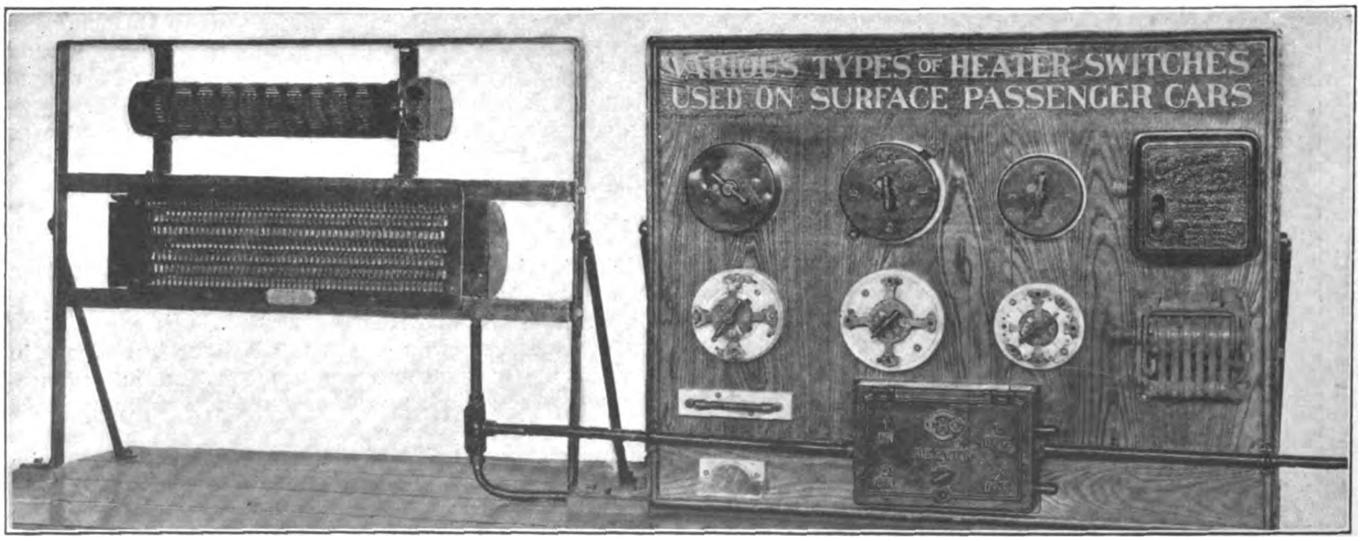
students' dummy platform outfits hereinafter mentioned. Each handle is stamped with the number of its location, partly for convenience and partly to inculcate the student's mind with the absolute need for orderliness.

Another display bench, 18 in. high, carries a complete current-collecting outfit made up of a trolley base, pole, harp, wheel and catcher. The instructor shows how emergency repairs can be made to current collectors quickly and safely. The same bench has a geared hand brake which is standard for Brooklyn cars, cut in section to show the features of its design, and a pneumatic sand box in operating condition.

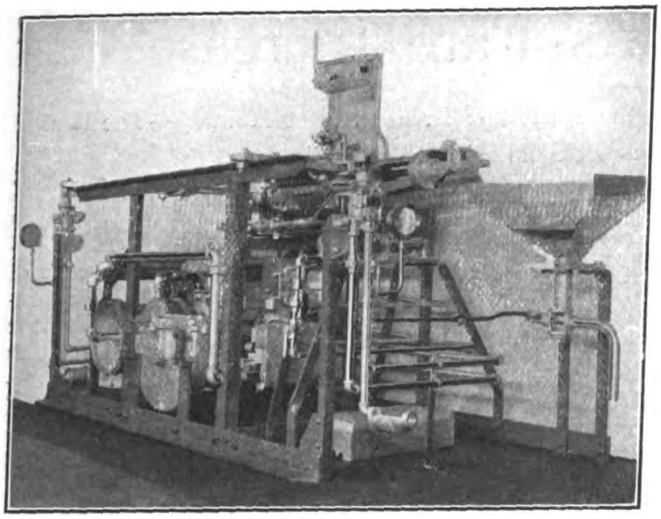
A more elaborate detail equipment is that of a complete semi-automatic surface-car air-brake equipment with live and dead levers, connecting rod, pneumatic sand box, slack adjuster, etc. All the apparatus and piping are cut in section so that the instructor may describe the internal operation and connections. This equipment is used not only for the enlightenment of platform recruits but also for men from the maintenance forces of the company.

Drill Platform Instruction

For instruction in the correct handling of controllers, fifteen drill platforms have been equipped with dummy geared hand brakes, controller, circuit breaker and foot gong, but with operative motorman's brake valves. The stands are so placed that all members of the class at drill can see every move of the instructor, whose own stand comprises operating equipment throughout. Between the instructor and his class is installed a complete four-motor car apparatus layout, including semi-automatic air brakes, whereby the instructor demon-


VARIOUS TYPES OF HEATER SWITCHES USED ON SURFACE PASSENGER CARS

BROOKLYN SURFACE CAR SCHOOL—SPECIMENS OF THE DIFFERENT STYLES OF HEATER SWITCHES AND HEATERS USED ON SURFACE CARS



BROOKLYN SURFACE CAR SCHOOL—SECTIONALIZED AIR-BRAKE AND PNEUMATIC-SANDER EQUIPMENT

strates the different features of controller and brake operation.

The trucks of the M. C. B. type are raised off the floor and are equipped with two GE-800 motors, each of which has been rewound for slow speed since they are run without load. They operate with noiseless fiber pinions. As the air brake is operative from the valves on all sixteen platforms, a compressor of extra large capacity is used. The brake equipment consists of governor tanks, cooling coil, emergency valve, brake cylinder, slack adjuster and conductor's valve completely connected with the standard foundation rigging right to the trucks.

To simplify instruction the following features have been incorporated: Different colors for the various circuits and air pipes; illumination for each point of the screened resistors to show what resistance grids are in circuit; a double-face gage on the brake cylinder to show the entire class how much air has been used in different applications; a turnbuckle in one of the pull rods to illustrate the working of the slack adjuster; a system of double-faced signs to designate properly every device; a complete car circuit of lights to illustrate the distribution of the different lamps of each circuit.

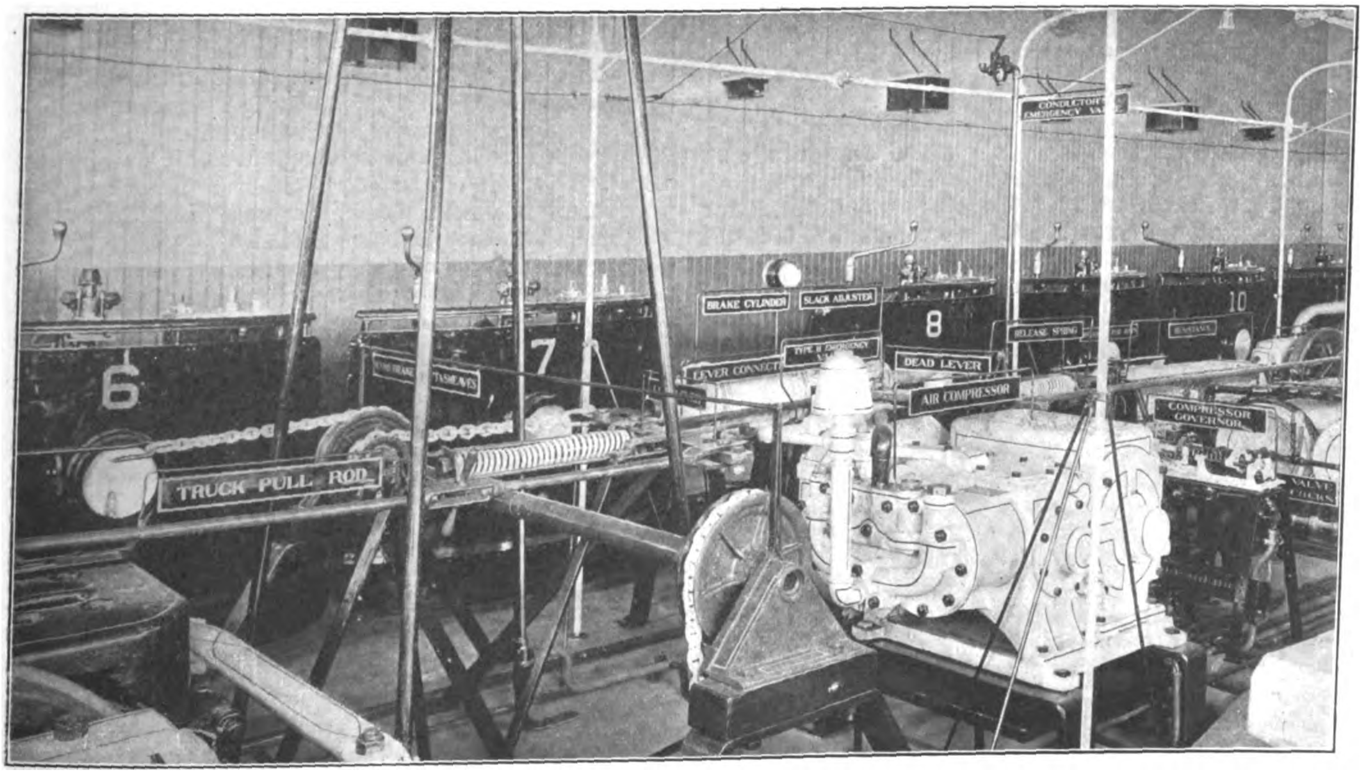
As most Brooklyn cars are equipped with semi-automatic air brakes and pneumatic sanders, instruction in their safe and economical operation receives much attention. The instructor, therefore, takes special pains to show the danger and waste inherent to excessive use of air, particularly by making needless emergency applications, as well as the proper methods in applying and releasing brakes so that smooth and efficient stops will be obtained.

INSTRUCTION IN TELEPHONING

To educate the students in the correct use of the telephone, a standard pay station with slot machine has been installed. This outfit is connected with a telephone in the outer office so that a regular conversation can be conducted. The need for instruction of this kind, even on city systems, is illustrated by instances where excited platform men have called up headquarters for a wrecker or other service but before hanging up the receiver have failed to mention the place where succor was needed.

OVERHEAD AND WAY SIGNS

To familiarize the recruits with the overhead and way signs, standard steel placards are suspended from span wires bearing such markings as the following: "Trolley Station"; "Cars Will Not Pass On This Curve"; "Section Insulator—Shut Off Power"; "Theater Stop"; "School Stop" and the arrow signs which are placed at intersections to show what lines have the right of way. The meaning of the different signs is explained to the men during their course of instruction.



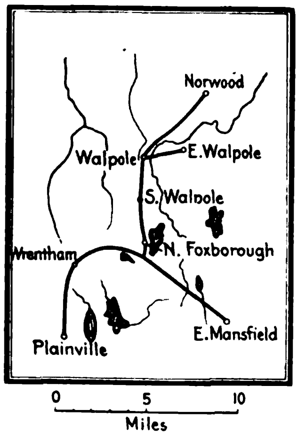
BROOKLYN SURFACE CAR SCHOOL—A CLOSE VIEW OF APPARATUS ALONGSIDE DRILL STANDS SHOWING THE SYSTEM OF APPARATUS SIGNS

Another Massachusetts Fare Increase

The Public Service Commission Grants a 6-Cent Fare to the Norfolk & Bristol Street Railway—The Reason Given Is "Inadequate Return on the Stockholders' Investment"

The Massachusetts Public Service Commission issued a decision on Aug. 19 granting to the Norfolk & Bristol Street Railway authority to establish a 6-cent fare unit upon its lines, in accordance with the petition of the company addressed to the board on March 12, 1915. The present cash fare is 5 cents. The company further desired to charge 1 cent per transfer issued, but the board refused to allow this. The decision is the third of its kind within a year, the Middlesex & Boston Street Railway and the Blue Hill Street Railway being the other companies to receive fare increases according to a well-defined policy of the commission, which recognizes the importance of additional revenue in cases where the petitioner demonstrates its necessity.

The main line of the Norfolk & Bristol runs from Norwood through Walpole, South Walpole and Foxborough to Mansfield, with a branch from Foxborough to Wrentham and a shorter branch from Walpole to East Walpole. This main line substantially parallels lines of the New York, New Haven & Hartford Railroad, the total trackage covering 22.02 miles. All but 0.5 mile is in the public streets.



LINES OF NORFOLK & BRISTOL STREET RAILWAY

In brief, the company's petition asked:

1. To make the cash fare 6 cents within the limits of any fare zone.
2. To charge 1 cent for every transfer issued.
3. To sell ticket books containing fifty tickets each at $2.75 and books of 100 tickets for $5.50. At present there are no tickets of this kind, but on certain routes round-trip tickets are sold at 15 cents under restrictions.
4. To sell for school children, entitled by law to half-fare transportation, special ticket books containing thirty-four tickets for $1 and strips of ten tickets for 30 cents. At present strips of ten tickets are sold for 25 cents.
5. To issue transfers on the East Walpole branch between Lake Avenue, Walpole and the Norwood town line, and vice versa, for a single fare plus the 1-cent transfer charge.
6. To establish fare limits providing for one zone on the Wrentham branch with no transfer privileges, and to eliminate the zone between the Foxborough-Walpole and the Foxborough-Mansfield town lines.

After presenting the petition, the company, in conference with citizens of the affected towns, agreed to modify the proposed schedule as follows:

In addition to the ticket books and school tickets, the company proposed to issue strips of ten tickets for 50 cents, good for one ride within any fare limit when tendered at a point which the car is scheduled to pass before 8.30 a. m., and between 5 and 7 p. m.

The company estimated that the changes proposed would, if allowed, and if no decrease in traffic resulted, produce about $10,000 additional revenue per year. The total operating revenue for the year ending June 30, 1914, was $93,978.

The company is the successor of the Norfolk Southern Street Railway, organized in 1897 which went into a receiver's hands in 1899, with liabilities at the time of $493,000. The road was sold in 1901 to a syndicate including the National Shawmut Bank, Boston, and other concerns. The total investment of the syndicate was $303,670, in March, 1902. The Norfolk & Bristol company was organized in 1901 and purchased the road from the syndicate for $345,000. It appears that the amount of stock and debts of the new company exceeded the replacement cost of the property by $8,000. A part of the property was also involved in the claims of other parties supplying rails and car equipment, totaling about $21,000. In 1908 the company effected a cancellation of liabilities amounting to $147,168 by agreement of note holders in order to float a new bond issue. Since 1904 the present management has been in charge. Up to the present there has never been a fare increase, due in part to the 5-cent fare provisions in some of the original grants of location. The population of the territory increased from 19,044 in 1900 to 28,721 in 1915, a gain of 50.8 per cent. The respective towns on the system have the following populations by the 1915 State census: Norwood, 10,970; Walpole, 5478; Foxborough, 4115; Mansfield, 5765; Wrentham, 2393. No freight or express business is conducted.

OPERATING RESULTS

Since the beginning of operation the property has had a total operating revenue, to June 30, 1915, of $1,003,012; operating expenses, $848,726; net operating revenue, $154,286; miscellaneous income, $2452; gross income less operating expenses, $156,739, with a deficit in net divisible income of $18,191. The only dividends paid have been two of 3 per cent in 1912 and 1913. Earnings have been falling off since 1913, the gross operating revenue then being $96,007 against $88,435 for 1915. The accumulated deficit is $30,191. The total assets are $488,714, and the company has a capital stock of $200,000 and funded debt of $200,000, with no outstanding notes. Since the date of the last bond issue (1909) permanent additions have been made to the extent of $30,009, taken from surplus earnings.

The book value of the permanent property is only $21,627 per mile, a low figure in comparison with other Massachusetts companies. The engineering department of the board estimates the cost of the property at $449,837, or only $24,000 less than the total permanent investments reported in the company's balance sheet. The board holds, as in the Middlesex & Boston and Blue Hill cases, that the capital honestly and prudently invested must, under normal conditions, be taken as the controlling factor in fixing the rates, and sets forth $400,000 as the amount upon which the return should be calculated, in view of the fact that the failure of the company to make adequate provision for depreciation does not appear upon the evidence to be due to the payment of unwarranted dividends or to mismanagement.

The income record of the company from 1909 to 1915 inclusive shows a net divisible income ranging from nothing to 6 per cent on the stock and averaging 3.27 per cent over and above operating expenses and fixed charges. The commission states that "as they stand, these figures indicate an inadequate return on the stockholders' investment," but before determining the need of additional revenue, the board considers a study of the operating expenses essential. This study shows that the company's officers have devoted part time to the management of the Norwood, Canton & Sharon Street Railway, operating 6 miles of track in adjacent territory, and the Norfolk & Bristol road rents equipment to the former at 1.5 cents per car-mile, while it actually costs the Norfolk & Bristol Street Railway at least 2.8 cents per car-mile for maintenance. Pending an agreement no bills have been rendered the Norwood, Canton & Sharon. The commission points out that the companies should reach a speedy agreement, effect a prompt settlement and adjust their relations on a definite cash basis for the future, so that the true operating expenses and income may appear. Such agreements, in the opinion of the board, should be in writing, and notice to that effect will be sent by the commission to all the operating companies in the State. Other criticisms are directed toward the company's methods of accounting, with the recommendation that an experienced bookkeeper be placed on the payroll instead of calling upon outside assistance. It is also held by the board that if the company's automobile equipment is confined to an existing runabout and a motor truck, eliminating from its expense account two touring cars garaged at the manager's residence in Boston, about $1,750 per year can be saved. A comparison is made in the decision of the company's accounting and of the expenditures as determined by the Interstate Commerce Commission classification, adopted in 1914. Issuance of vouchers in more detail is also emphasized as desirable.

MAINTENANCE AND DEPRECIATION

An analysis of the maintenance expenses indicates that on the whole adequate provision has been made for this purpose. Until 1915 the company had accumulated no depreciation reserve, as such, when $2,167 was so charged. The board points out that the rough rule of allowing 20 per cent of operating revenue to cover maintenance and depreciation is particularly questionable when applied to a small road with relatively low gross earnings. The commission finds that despite the fact that the company, out of its total net earnings has paid only $6,000 in dividends to its stockholders and has apparently turned back more than $30,000 into the property, it appears that the property may have depreciated in value to the amount of nearly $110,000 as compared with the investment of $400,000. Says the board: "The accumulation of a depreciation reserve or surplus fund equal to the entire amount of the estimated depreciation is perhaps more than good business policy necessarily requires; but the evidence demonstrates, we think, that while the Norfolk & Bristol has made some provision for depreciation, it has not made due provision."

NEED OF INCREASED REVENUE DEMONSTRATED

The inspection department of the board estimates about $14,000 as the average expenditure which should henceforth be made each year for several years in order to maintain tracks and overhead structures in a safe and proper condition, and about $11,000 for maintenance and depreciation of equipment. It appears that for the past two years, if the company had expended $25,000 a year for maintenance and depreciation, it would have shown a deficit during that period of $2,263. In order to make up this deficiency and to permit of a 6 per cent return to its stockholders, says the decision, the company must show an increase of more than $13,000 over its average net earnings for the past two years. With the possible economies in operation indicated the company would appear on this basis to be entitled to an additional revenue of something more than $10,000 a year. The evidence does not indicate that the return to the stockholders, allowing for depreciation and an accumulation of proper surplus funds, would have been adequate if earnings had been more nearly normal, considering the effect of the financial depression. With a steady increase in population in the territory served and improving business conditions and with economies in operation or management it is possible, the board holds, that the company could in future earn an adequate return without an increase in rates; but the commission upon the evidence states that it would not feel justified in refusing an increase because of such speculations. The opportunity to reduce rates at any time if earnings prove excessive is always open. Upon the evidence, therefore, the commission finds that the need of additional earnings has been demonstrated.

EFFECT OF 6-CENT FARE ON TRAFFIC

The company's estimate of about $10,000 increased revenue from the proposed changes in fare and zones, transfer charge and tickets, is based on the fares collected in 1914, and is made up on the assumption that the changes will not produce a decrease in traffic. The board calls attention to evidence that this assumption is likely to prove incorrect by the following table of revenue passengers carried by seven Massachusetts electric railways in the year before and in the year after the change was made:

Company	Revenue Passengers Carried Before 6-cent Fare	After 6-cent Fare
Blue Hill	1,680,543	1,525,154
Boston & Worcester	11,143,040	10,481,902
Brockton & Plymouth	2,255,320	1,856,723
Concord, Maynard & Hudson	1,146,088	969,621[1]
Connecticut Valley	3,714,765	3,357,857[2]
Lexington & Boston	2,766,618	2,688,114
Newton & Boston	1,402,385	1,313,947

[1] Five months at 5 cents, seven months at 6 cents.
[2] Three months at 5 cents, nine months at 6 cents.

While there may have been other contributing causes in certain cases, the table supports the theory that a 6-cent fare decreases traffic. The board considers that the company's estimates are on the whole reasonable. These assume that 40 per cent of the passengers will use the workmen's tickets in the morning and evening, and that 25 per cent of the remainder will use the 5.5-cent tickets.

APPROVAL OF INCREASED FARE

So far as the essential features of the petition are concerned, except with regard to a transfer charge, the board approves the proposed new schedule. Transfers are not to be issued at an additional charge, the board holds, because the total length of ride which can be secured with the use of a transfer is no longer than can be secured on other parts of the system, where cars are routed through.

Relative to the sale of tickets, the commission holds that the company should issue books containing eighteen tickets for $1, so that regular patrons may have the opportunity, upon payment of a comparatively small sum, to secure transportation at a somewhat lower cost than the transient rider. The use of ticket books containing fifty rides for $2.75 is also permissible. The board approves the reduction in the number of fare zones on Wrentham branch from two to one, with the abolition of the present transfer privilege between the Mansfield-Foxborough and the Foxborough-Walpole town lines, the company holding the view that the distance is not long enough to justify a two-fare zone at 6 cents. In the board's opinion, the necessity for the other changes in zones and transfer facilities is not demonstrated. The decision is to take effect within thirty days.

Cleveland Builds Four Operating Stations

Attractive Trainmen's Quarters, Commodious Running Repair Shops and Loop Storage Yards Are the Principal Features of These $225,000 Layouts, of Which the Superior Avenue Station Is Described

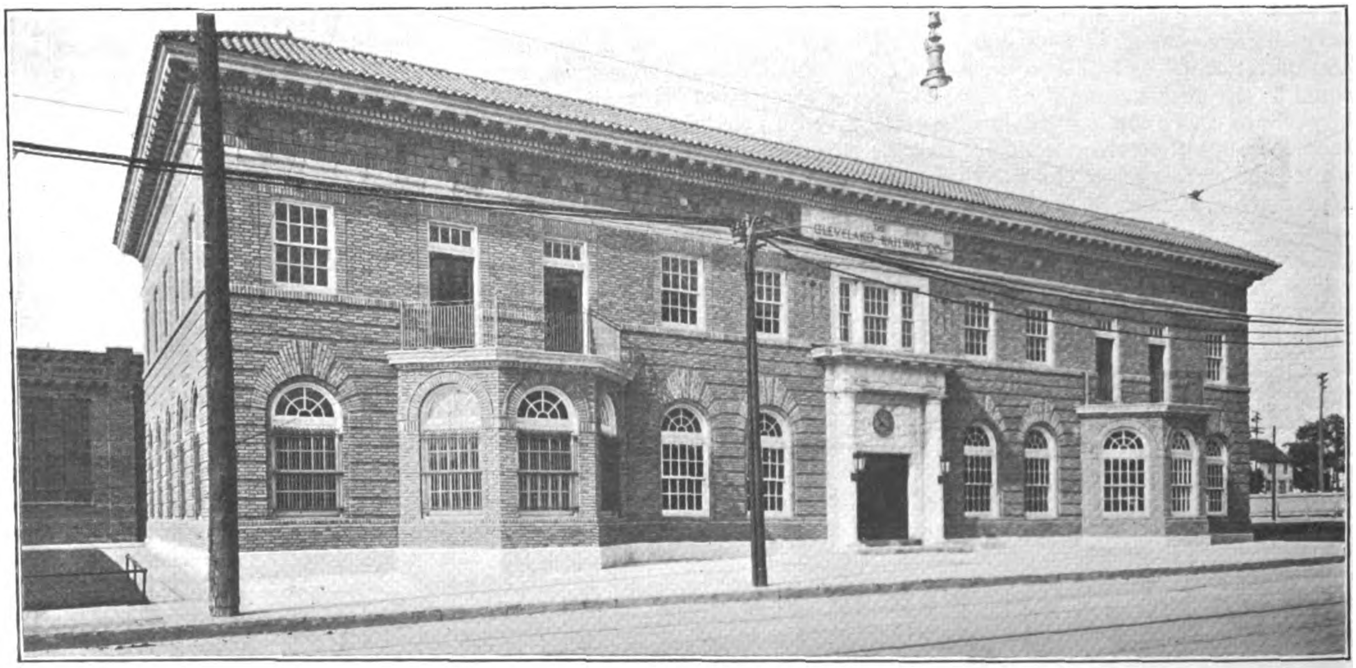
In its operating station rehabilitation the Cleveland (Ohio) Railway has adopted loop-yard tracks and outside car storage in preference to inside car storage. The loop-yard tracks are a unique feature and have been found very advantageous from an operating standpoint. The shops for making running repairs at these stations are more extensive than those usually installed at such points, and greater attention than usual has been paid to the architectural appearance of these stations, as most of them are in residential districts. Finally, a great many conveniences for the trainmen were included in these buildings, and their interiors resemble in arrangement and pleasing appearance the rooms of a private club.

REASONS FOR PRINCIPAL FEATURES

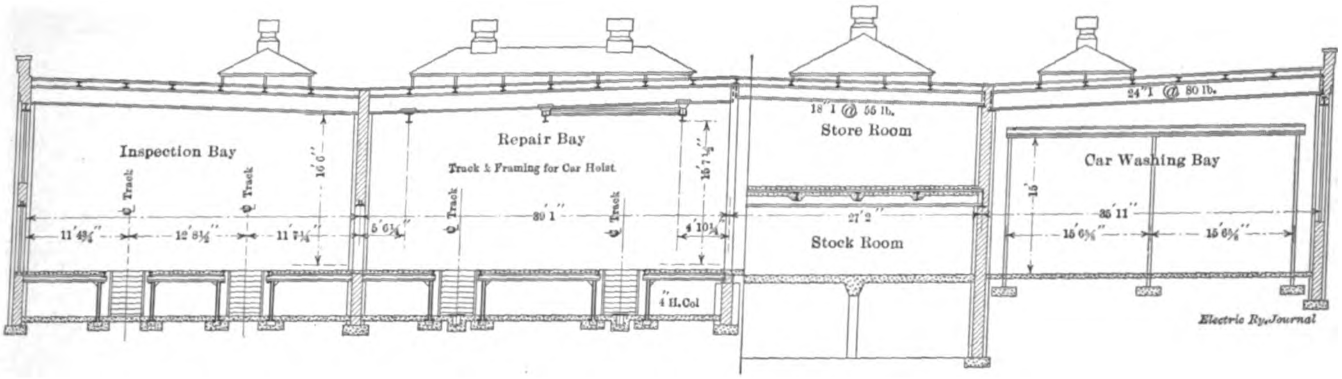
Attractiveness, because the buildings were erected in residence districts, and permanency, because that class of construction has been found most economical, were the fundamental features which governed the design. Locations in residential districts or on property certain to develop into them, were selected because they would afford homes for the trainmen near at hand. In addition, dwellings are quite certain to spring up near the end of a line, the best location for a carhouse, and in the end contribute to the patronage of the service. Outside storage was adopted because the management believed that the interest on the unit price of inside storage would more than care for the reduction in paint life and other supposed disadvantages of this method of storing cars. The management also felt that since cars were on the streets practically eighteen hours each day, it was not essential to house them for the six remaining hours, particularly when land for yards could be purchased at a reasonable price. The attractive quarters for the trainmen conform to the policy of this company.

Four operating stations similar in design to the Superior Avenue station will be constructed before rehabilitation is complete. The St. Claire Avenue station was completed about two years ago. The Superior Avenue station has just been finished, and similar stations at Harvard Avenue and Fifty-fifth Street, and at Denison Avenue and Seventy-third Street will be constructed in the near future. Each outside loop storage yard is designed to store 193 cars, but sufficient area has been included in each property so that this capacity can be materially increased. In general, the loop storage yards occupy the rear of the property, with the operating station and the running repair shop near the track entrances. The loop storage yard arrangement provides entrance at one side of the yard and exit at the other, and the car movement in the yard is always in one direction. The general layout of the Superior Avenue station is shown in one of the accompanying illustrations.

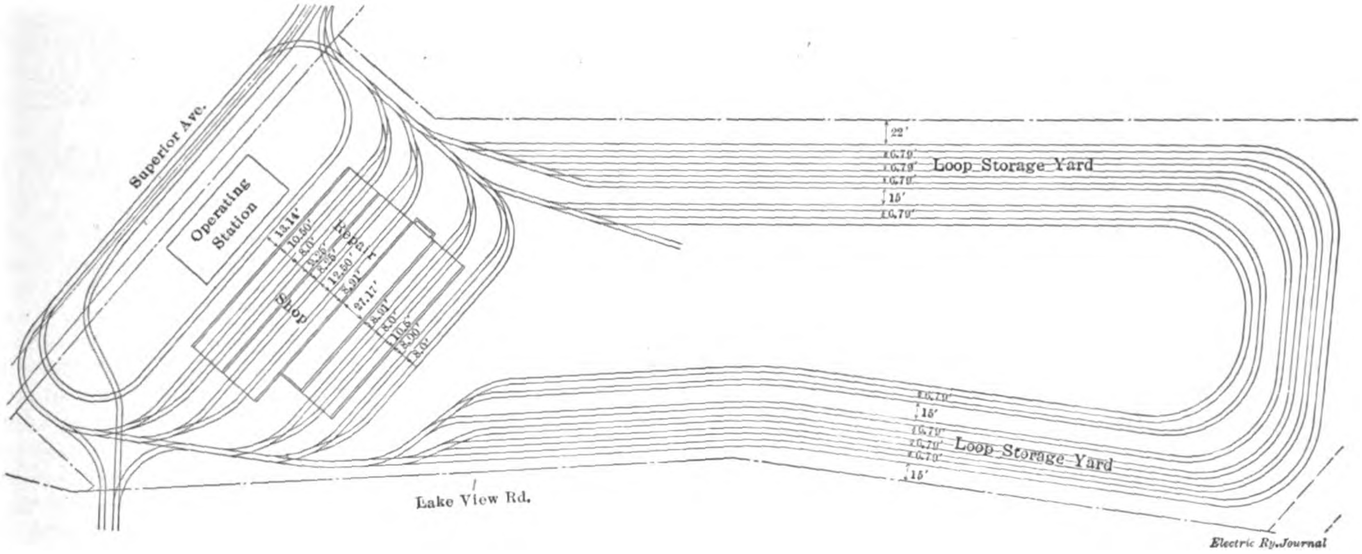
It is of particular interest to note that expert knowledge of real estate values was employed when the sites for these new operating stations were purchased, as well as when the old ones were sold. While the business of the company is primarily that of railway operation, it has made it a policy to endeavor to collect profits from other sources. This has been particularly true of past real estate purchases for carhouses and shops, which at the present time have greatly enhanced values. The site purchased for the Superior Avenue station included 10 acres in what was originally a gully of little real estate value. At the time of the purchase, however, the company had in mind disposing of the waste track excavation and, in time, filling the gully to the level of the surrounding property. This has been accomplished during the last few years, and, because of the improved condition, the rapidly enhanced real estate values in the surrounding property has netted a handsome return to the company. In fact, it has received offers for small parts of this property which would much more than reimburse it for the original price paid for the entire tract. At the same time the location is central for the



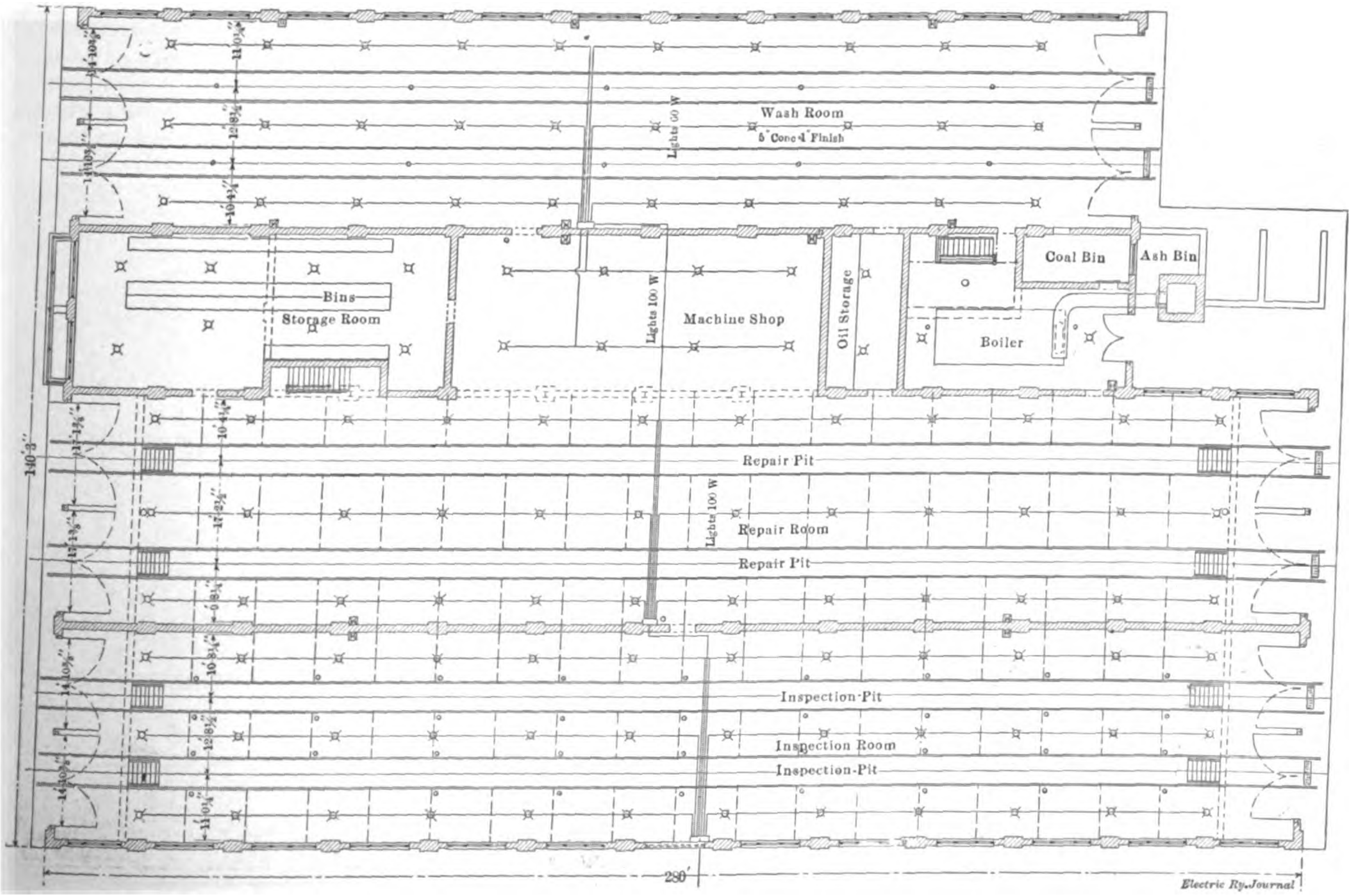
CLEVELAND OPERATING STATIONS—FRONT VIEW OF SUPERIOR AVENUE STATION BUILDING


Inspection Bay
℄ Track
℄ Track
16′ 6″
11′ 4¾″
12′ 8½″
11′ 7¼″
5′ 6¼″
Repair Bay
Track & Framing for Car Hoist
℄ Track
39′ 1″
℄ Track
15′ 7¼″
4′ 10¼″
4″ H. Col
18″ I @ 55 lb.
Store Room
27′ 2″
Stock Room
24″ I @ 80 lb.
Car Washing Bay
15′
35′ 11″
15′ 6⅝″
15′ 6⅝″
Electric Ry. Journal

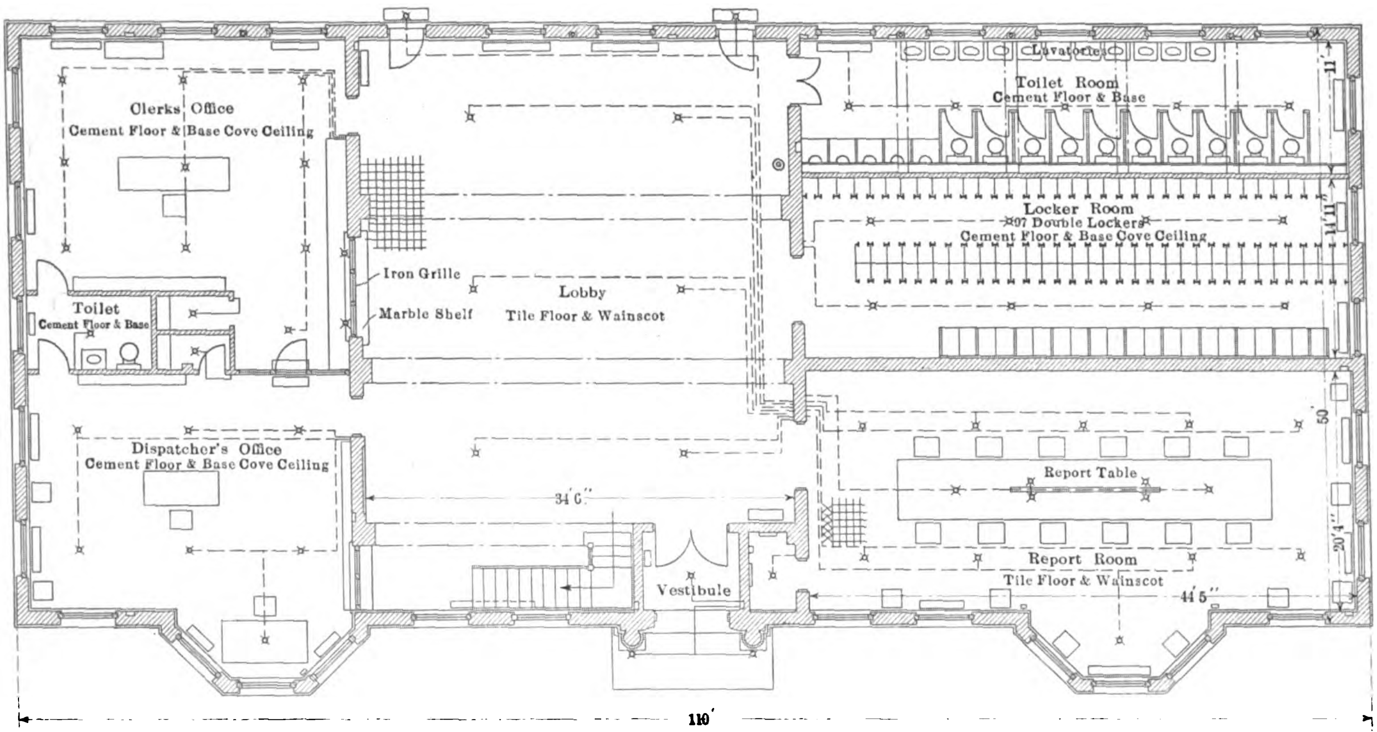
CLEVELAND OPERATING STATIONS—CROSS-SECTION OF REPAIR AND INSPECTION SHOP BUILDING


Superior Ave.
Operating Station
Repair
Shop
13.14′
10.50′
8.0′
8.26′
8.96′
12.50′
8.91′
27.17′
8.91′
8.0′
10.6′
8.00′
8.0′
22′
6.79′
6.79′
6.79′
15′
6.79′
Loop Storage Yard
6.79′
15′
6.79′
6.79′
6.79′
15′
Loop Storage Yard
Lake View Rd.
Electric Ry. Journal

CLEVELAND OPERATING STATIONS—GENERAL LAYOUT SUPERIOR AVENUE YARD AND BUILDINGS


Wash Room
5″ Conc'd Finish
Lights 50 W
Bins
Storage Room
Lights 100 W
Machine Shop
Oil Storage
Coal Bin
Ash Bin
Boiler
140′-3″
Repair Pit
Repair Room
Lights 100 W
Repair Pit
Inspection Pit
Inspection Room
Inspection Pit
280′
Electric Ry. Journal

CLEVELAND OPERATING STATIONS—PLAN OF REPAIR AND INSPECTION SHOP BUILDING


Clerks' Office
Cement Floor & Base Cove Ceiling
Toilet
Cement Floor & Base
Iron Grille
Marble Shelf
Lobby
Tile Floor & Wainscot
Lavatories
Toilet Room
Cement Floor & Base
Locker Room
97 Double Lockers
Cement Floor & Base Cove Ceiling
11'
14'11"
Dispatcher's Office
Cement Floor & Base Cove Ceiling
34'6"
Vestibule
Report Table
Report Room
Tile Floor & Wainscot
44'5"
50
20'4"
110'

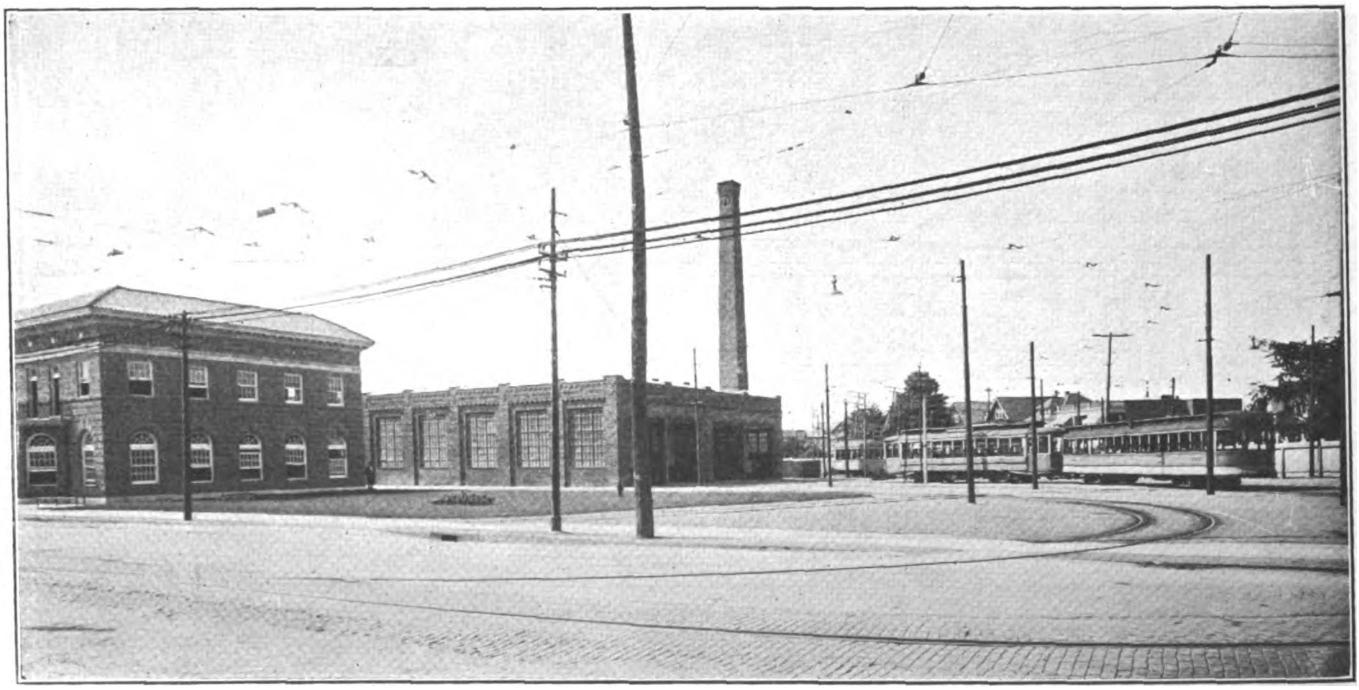
CLEVELAND OPERATING STATIONS—FIRST-FLOOR PLAN OF SUPERIOR AVENUE STATION

track department, consequently an economical point from which to dispose of waste excavated material. The company believes that the cost of improving the property has been more than made up in the savings to the track department.

General Layout

The Superior Avenue operating station occupies a tract of land approximately 300 ft. wide by 1500 ft. deep. Wye-track entrances lead in from Superior Avenue on each side of the property and form ladders for the tracks leading into the running repair-shop bays. From these the entrance tracks connect to the six loop storage tracks which occupy the rear of the property. Cars enter the yard from the corner of Indiana and Superior Avenues and leave by the tracks at the opposite side of the property. A small loop passes around the operating station building at the front of the property and serves to turn the Superior Avenue cars in regular service, this being the end of the line.

The operating station is a two-story structure, 50 ft. x 110 ft. in plan, and the repair shop is a one-story building, 140 ft. 3 in. x 208 ft. in plan, with a partial second floor and basement. The floor plans of both of these buildings are shown in the accompanying illustrations. The station is a thoroughly fireproof, brick, concrete and steel structure in which there is no exposed steel other than the stairway, windows, doors and furniture. The shop building is also a brick, concrete and steel structure, but the beams and columns supporting the roof are exposed. A complete sprinkler system is installed in the shop, however, and this protective feature



CLEVELAND OPERATING STATIONS—GENERAL VIEW OF TRACK ENTRANCES TO SHOPS AND YARD

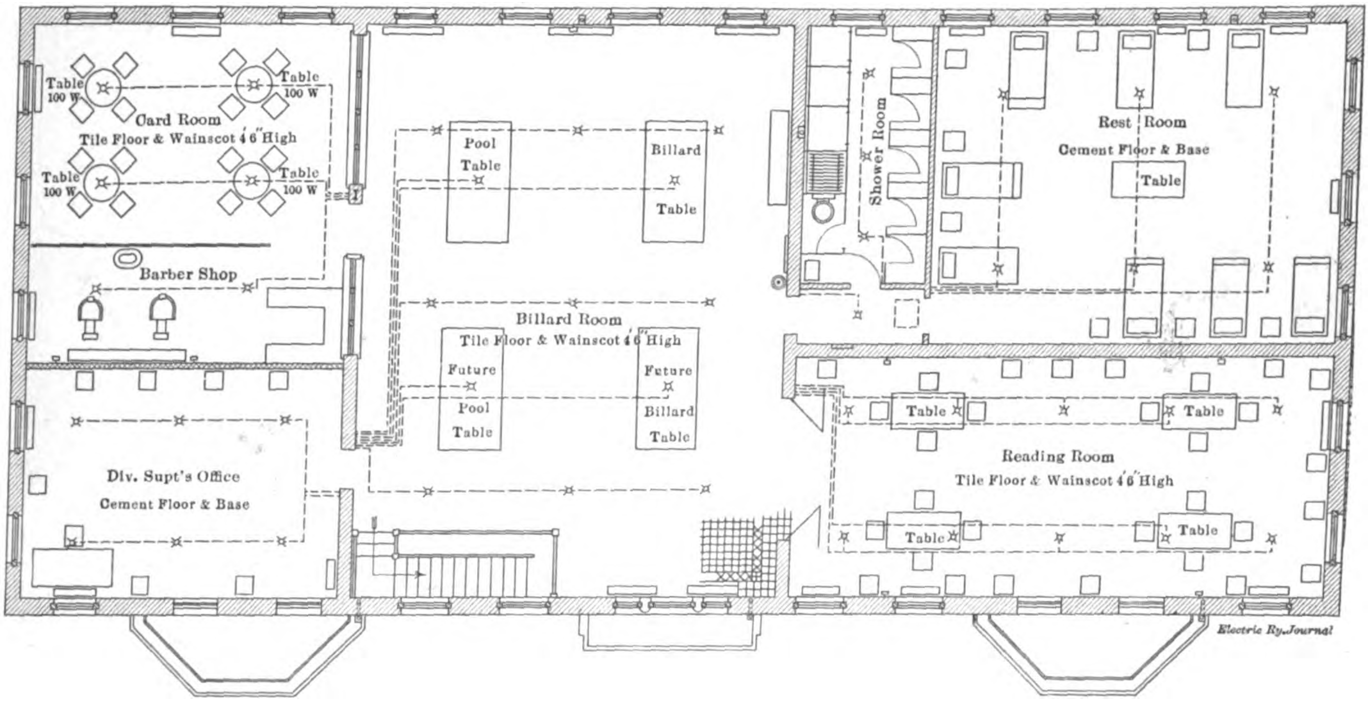


Table 100 W
Table 100 W
Card Room
Tile Floor & Wainscot 4'6" High
Table 100 W
Table 100 W
Barber Shop
Pool Table
Billard Table
Billard Room
Tile Floor & Wainscot 4'6" High
Future Pool Table
Future Billard Table
Div. Supt's Office
Cement Floor & Base
Shower Room
Rest Room
Cement Floor & Base
Table
Table
Table
Reading Room
Tile Floor & Wainscot 4'6" High
Table
Table
Electric Ry. Journal

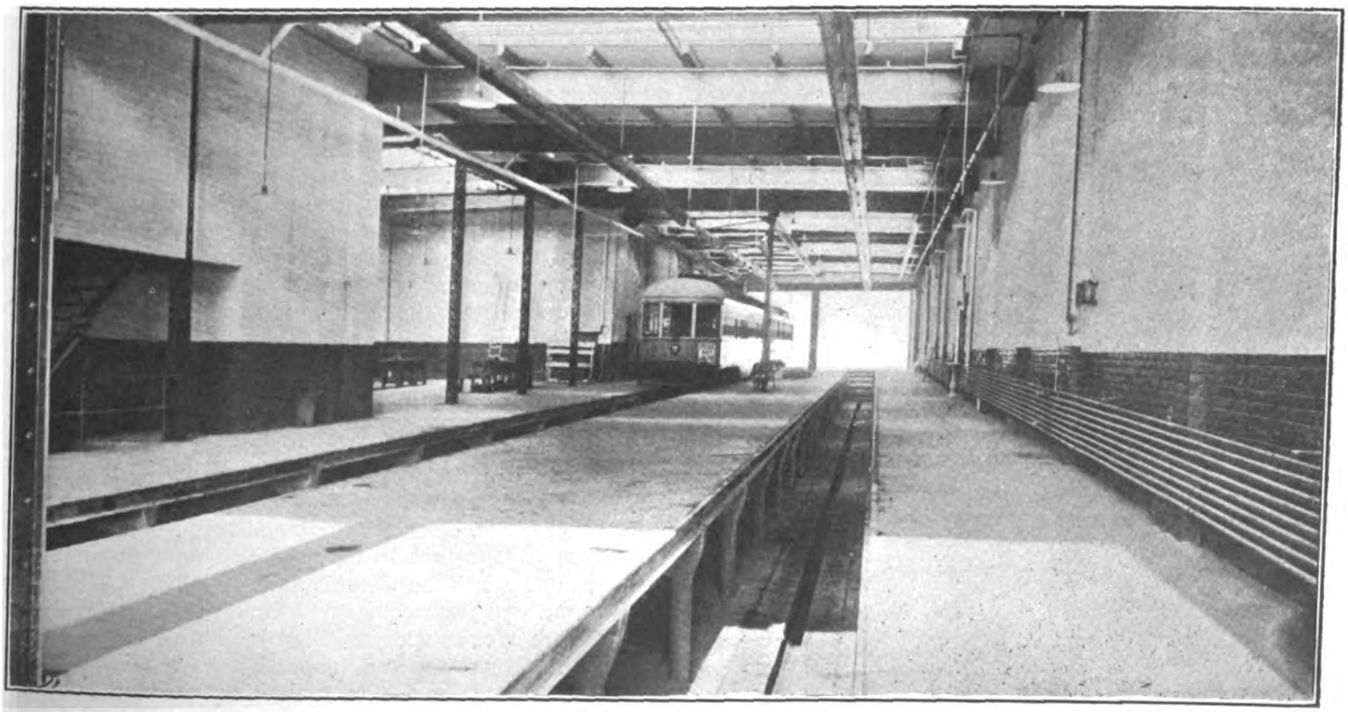
CLEVELAND OPERATING STATIONS—SECOND-FLOOR PLAN OF SUPERIOR AVENUE STATION

makes this a building upon which the minimum insurance rate was obtained.

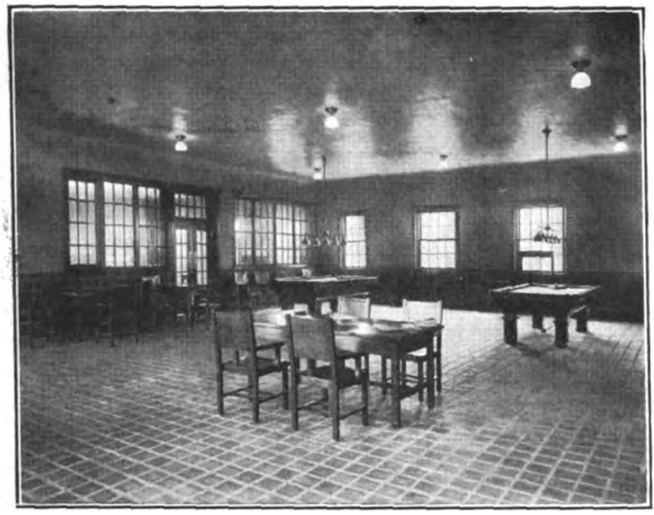
Aside from the two large buildings there are a pump house and a concrete water storage well, both used in connection with the monitor fire-protection system in the open storage yard. The pump is electrically operated and automatically controlled, and has a capacity of 1000 gal. per minute at 125-lb. pressure. The grounds surrounding the operating station have been parked, while the track entrances flanking this area have been paved level with the top of rails with limestone screenings. The overhead construction was carefully planned to obtain permanency with the minimum number of poles. Tubular steel poles and span-wire construction were used throughout the layout. The tracks are laid with standard A.S.C.E. 80-lb. rail and manganese center special work. The yard is lighted with 500-watt Mazda lamps suspended at 60-ft. intervals from the span wires. Reinforced-concrete trash bins between and beside the yard tracks were also provided at convenient intervals so that it would be unnecessary to litter the yards when cars were cleaned.

OPERATING STATION DETAILS

Essentially the operating station was planned as a division headquarters and includes dispatcher's, cashier's and division superintendent's offices. The portion of the building occupied by these, however, is small as compared with that devoted to the convenience and welfare of trainmen. The cashier's and dispatcher's offices are in one end of the first floor of this structure, while the remaining portion is divided into a handsomely-



CLEVELAND OPERATING STATIONS—REPAIR-SHOP BAY SHOWING CHARACTER OF CONSTRUCTION

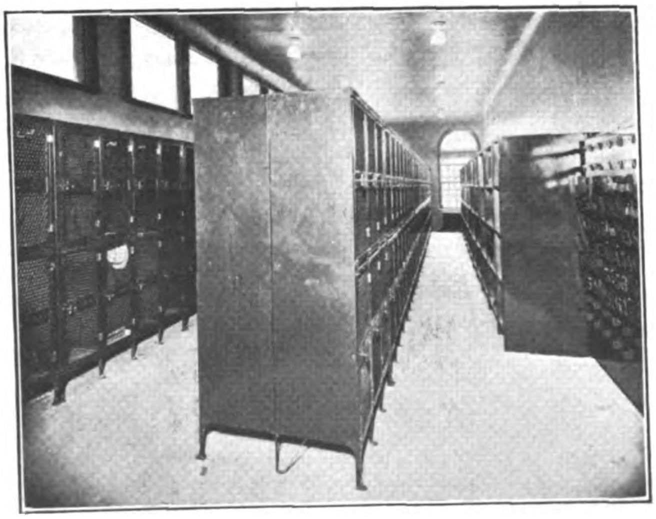


CLEVELAND OPERATING STATIONS—VIEW OF BILLIARD ROOM ON SECOND FLOOR

CLEVELAND OPERATING STATIONS—VIEW OF SCHEDULE ROOM WITH METAL FURNITURE

furnished tile floor lobby, from which entrances lead into large toilet and locker rooms and a trainmen's schedule room. The space on the second floor is devoted to club rooms, with one corner serving as the superintendent's office. On this floor are card room, barber shop, billiard room, rest room, reading room and shower baths. Some of the more important rooms are shown in the accompanying illustrations. They are attractively finished in every detail and furnished with artistic all-metal furniture. The floors and wainscoting are of red square tile laid with black mortar. The lighting scheme is of both the direct and the semi-indirect types. A complete outfit of lockers for both the operating station and the repair shop was furnished by Merritt & Company of Camden, N. J. The metal furniture was purchased from the Art Metal Construction Company of Jamestown, N. Y.

In connection with the operating side of this station it is interesting to note that the cashier, in addition to handling the trainmen's supplies and turn-ins, also acts as a clerk to the dispatcher. The dispatcher, in turn, is the car-mileage accountant who keeps a careful record of the mileage made by each of the cars operating out of his station. This is a very important duty because under its contract with the city the earnings of the Cleveland Railway are based upon the car-miles run. This station operates regularly 101 cars, consisting of fifty-eight motor cars and forty-three trailers.



CLEVELAND OPERATING STATIONS—VIEW IN STATION LOCKER ROOM

In round numbers 200 trainmen work out of this station, and the club-room features are under their control. Certain nominal charges are made, and these are collected by the barber, who also cares for the club rooms. This money is turned over to the dispatcher who, in all cases, is the treasurer of the club and under a $500 bond. Each club has a president and secretary elected to office, but it was deemed advisable that the dispatcher should be treasurer. A charge of 5 cents a night is made for the use of the cots in the rest room, there being fourteen in all. The barber is paid $18 a week for his services in caring for the club rooms, showers and beds. He usually runs a small stand where cigars and candies may be had. With this and his barber work, he earns some money in addition to his weekly wage. A charge of 1 cent a cue is made for the use of the billiard tables, and a record of the collections for this is kept on a register. The company furnishes the billiard tables and twenty-four cues, and the employees keep them in repair.

RUNNING REPAIR SHOP

This building is divided into three bays, one serving for inspection purposes, another for running repairs and the third for car washing. Occupying a portion of the repair bay is a stock room where the repair parts are under the supervision of a clerk. A machine shop, an oil room and a boiler room containing the heating plant of the shop building and the operating station also occupy space in this bay. The repair shop of this station was made somewhat larger than those contemplated for the other stations, as it was intended to be a branch of the general repair shop. Light repairs to cars from the other operating stations will be made.

Included in the repair-shop equipment are one No. 2 Bridgeport wet and dry grinder, one 20-in. 8-ft. engine lathe, one 20-in. vertical drilling machine, one power-driven hack saw, one 26-in. power-driven hand saw, a forge and an anvil. Facilities for handling repair parts include a pit jack for motors, three 12-in. air hoists employed in lifting car bodies and removing trucks, two revolving jib cranes, one at each end of the shop, used in general movement of materials, and a motor-driven air compressor installed in the basement to supply air to the pneumatic hand tools and air hoists. A complete oil pump and tank equipment furnished by the Milwaukee Tank Works was installed in the oil room.

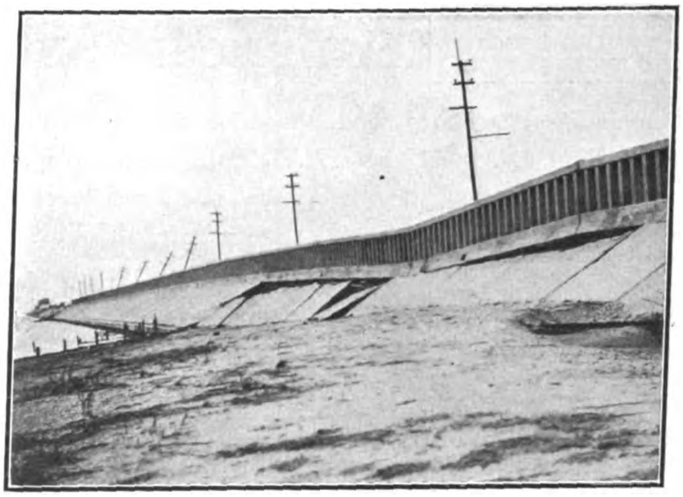
Both the repair and inspection bays are built with concrete floors and pits extending the full length of the bay under each track. These pits are constructed with 7-in. plain girder rails spanning the interval between 4-in. H-column supports. The tracks in the inspection bay are on 17-ft. 2½-in. centers, a spacing which provides liberal aisles along the walls between the tracks.

All tracks in the repair shop are through tracks, entering each bay through openings equipped with double wooden swinging doors. A liberal number of Drouvé skylights equipped with Swartout ventilators furnish a uniform natural illumination. Artificial illumination is supplied by 60-watt tungsten lamps suspended on drop cords. The trolley wire is made continuous through the bays and the usual wooden trolley-trough construction is used. Heat in the repair shop is furnished through pipe coils mounted on racks, while in the operating station there are ornamental cast-iron radiators. Steam is supplied from the central boiler in the repair shop, and the system is of the vacuum type with Dunham vacuum traps for each radiator.

The partial second floor in the repair shop bay over the storeroom is given over to locker and toilet rooms for the shop employees. A portion of the second floor, however, is used for storing the Peter Smith Heater Company's hot-air heaters during the summer months. This storeroom opens into the car washing bay, where a hoist is provided to raise the heaters to the storeroom.

In connection with the washing and cleaning system it is interesting to note that the outsides of all cars are washed every three or four days and the cars are thoroughly washed on the inside every two months. Of course, the usual sweeping and dusting done each night is also a general practice. In connection with the regular method of cleaning, however, two types of vacuum cleaners are being installed for test at this station. Both of these cleaners are of a stationary type, one being furnished by the Spencer Turbine Cleaner Company, Hartford, Conn., and the other by the United Electric Company, Canton, Ohio. If these installations prove satisfactory it is contemplated that the vacuum method of cleaning cars will be extended to include all the stations on the system.

The several departments interested in this operating station installation supervised the design and construction work. Terence Scullin, master mechanic, was in charge of the shop layout; C. H. Clark, engineer maintenance of way, was in charge of track construction; L. P. Crecelius, electrical engineer, was in charge of the electrical layout, all work being under the general direction of J. J. Stanley, president. The building design and construction work, however, were under the supervision of David W. Morrow, of the firm of Morrow & Cross, civil and architectural engineers.



TEXAS HURRICANE—100-FT. BREAK NEAR ISLAND END OF GALVESTON CAUSEWAY APPROACH

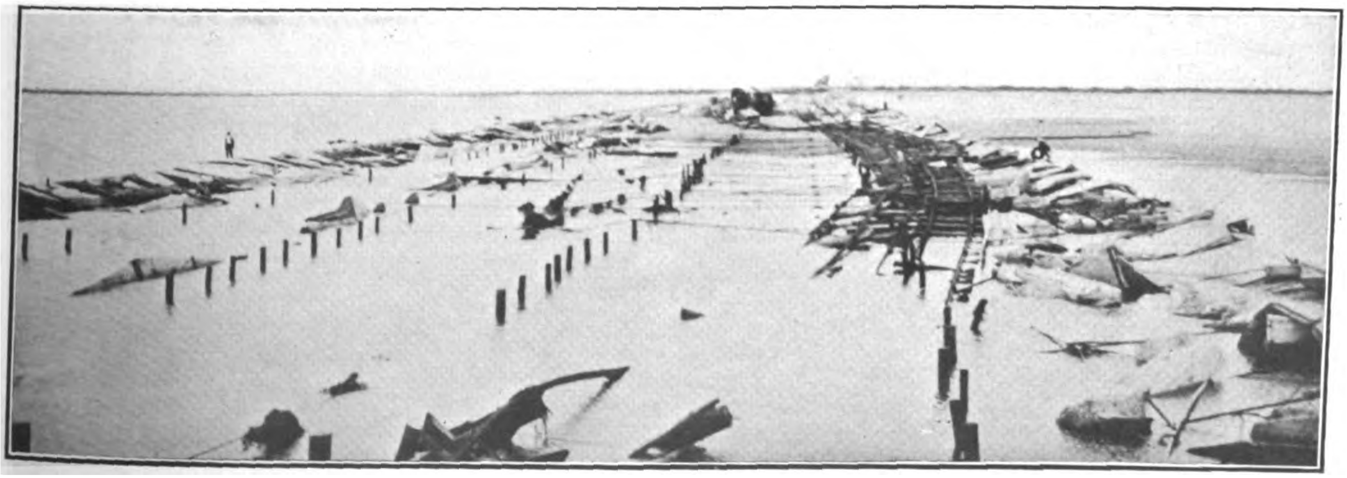
Texas Hurricane Damage

The coast of Texas was swept on Aug. 16 by a tropical hurricane, considered the most severe in the history of Gulf storms. A gale which at times reached a velocity of 90 miles, took a heavy toll of lives and wrought property damage which it is impossible accurately to estimate. The storm centered at Galveston, but much damage was reported as far north as the central part of the State. Interurban and city railway service was demoralized along the coast.

About two o'clock on the afternoon of Aug. 16 an interurban car loaded with passengers attempted to leave the island for Houston. The car proceeded nearly to the lift bridge in the center of the causeway over Galveston Bay when a section crumbled and 2000 ft. was swept away by the current. The car rolled to one side, but remained partially in the breach. Most of the passengers escaped without injury. A single-track trestle over Galveston Bay is being discussed by railroad and traction men, as it would not take as long to build the trestle as to repair the causeway.

The city of Houston fared little better than Galveston as to wires and poles. In Waco all street cars were rerouted to avoid passing a seventeen-story building around which the storm seemed to converge.

The Southwestern Traction Company, operating between Belton and Temple, suffered only from trouble caused by wind. The entire damage to all the traction interests, excluding loss of revenues, is unofficially estimated at $700,000.



TEXAS HURRICANE—VIEW OF THE GALVESTON CAUSEWAY, SHOWING WRECKED INTERURBAN CAR

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 to 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

Convention Program Includes Addresses by Governor H. W. Johnson, Ex-Senator Jonathan Bourne, Jr., Bion J. Arnold, Jesse W. Lilienthal, Paul Shoup, Prof. H. R. Hatfield, Prof. Carl C. Plehn and Messrs. Winslow and Teesdale, of the U. S. Forest Products Laboratory

PROGRAM FOR THE CONVENTION

The following program has just been announced by Secretary E. B. Burritt. It is still subject to revision.

PROGRAM OF AMERICAN ASSOCIATION

Monday, Oct. 4

9.30 a. m. to 5 p. m.

Registration and distribution of badges at booth, lobby of Native Sons of the Golden West Building.

Tuesday, Oct. 5

9.30 a. m. to 12.30 p. m.

Address of welcome, by Hon. Hiram W. Johnson, Governor of California.

Annual address of the president.

Annual report of the executive committee.

Annual report of the secretary-treasurer.

Appointment of convention committees:
- (a) Resolutions,
- (b) Nominations,
- (c) Recommendations contained in president's address.

Reports of committees:
- (a) Subjects,
- (b) Education,
- (c) Representing association at the American Good Roads Congress,
- (d) Valuation,
- (e) National joint committee on overhead and underground line construction.

Address on "Welfare Work," by Jesse W. Lilienthal, president United Railroads of San Francisco, San Francisco, Cal.

General discussion.

Reports of committees (continued):
- (f) Company membership,
- (g) Company section medal,
- (h) Federal relations,
- (i) Anthony N. Brady medal,
- (j) Compensation for carrying United States mail.

Wednesday, Oct. 6

9.30 a. m. to 12.30 p. m.

Reports of committees:
- (a) Electrolysis,
- (b) Ways and means,
- (c) Company sections and individual membership,
- (d) Dues of company section members,
- (e) Changes in constitution and by-laws,
- (f) Relations with State and sectional associations,
- (g) Public relations.

Address on "Government Ownership," by Ex-United States Senator Jonathan Bourne, Jr.

General discussion.

Reports of committees (continued):
- (h) Operation of motor vehicles,
- (i) *Aera* advisory,
- (j) Insurance,
- (k) Standards for car loading.

Thursday, Oct. 7

9.30 a. m. to 12.30 p. m.

Reports of committee:
- (a) Cost of passenger transportation service, including report of Bureau of Fare Research.

Address on "The Foundation Principles of the Valuation of Electric Railways," by Bion J. Arnold, chairman Board of Supervising Engineers, Chicago Traction, Chicago, Ill.

General discussion.

Reports of committees (continued):
- (b) Taxation matters,
- (c) On recommendations contained in the president's address,
- (d) Resolutions,
- (e) Nominations.

Unfinished business.

Election of officers.

Installation of officers.

Adjournment.

Friday, Oct. 8

3 p. m., Exposition Grounds

Presentation of testimonial from the Panama-Pacific Exposition Company, commemorative of the 1915 meeting, by exposition officials.

(Particulars to be announced.)

PROGRAM OF ACCOUNTANTS' ASSOCIATION

Monday, Oct. 4

9.30 a. m. to 5 p. m.

Registration and distribution of badges at booth, lobby of Native Sons of the Golden West Building.

Monday, Oct. 4

2 p. m. to 4.30 p. m.

Annual address of the president.

Annual report of the executive committee.

Annual report of the secretary-treasurer.

Appointment of convention committees:
- (a) Resolutions,
- (b) Nominations.

Reports of committees:
- (a) Standard classification of accounts,
- (b) Accounting definitions,
- (c) Representing association at convention of railroad commissioners,
- (d) Education,
- (e) Freight and express accounting,
- (f) Passenger accounting,
- (g) Joint report, passenger and freight and express accounting.

4.30 p. m. to 5 p. m.

Joint session with Transportation & Traffic Association

Report of committee:
- (a) Transportation-accounting.

Tuesday, Oct. 5

2 p. m. to 4 p. m.

Address (topic to be announced), by Prof. H. R. Hatfield, University of Chicago.

Paper on "The Merits of Prepayment Cars from the Viewpoint of the Accounting Department," by R. J. Clark, comptroller Metropolitan Street Railway, Kansas City, Mo.

4 p. m. to 5 p. m.

Joint session with Claims Association

Report of committee:
- (a) Claims-accounting.

Wednesday, Oct. 6

2 p. m. to 3 p. m.

Joint session with Engineering Association

Reports of committees:

(a) Engineering-accounting,
(b) Life of railway physical property.

3 p. m. to 5 p. m.

Changes in constitution and by-laws.

Address on "Treatment of Charges for Rent of Tracks and Facilities and Rent of Equipment," by Paul Shoup, president Pacific Electric Railway, Los Angeles, Cal.

Address on topic to be announced, by Prof. Carl C. Plehn, University of California.

Reports of convention committees:
(a) Resolutions,
(b) Nominations.

Election of officers.
Installation of officers.
Adjournment.

Friday, Oct. 8

See program of American Association.

Program of Engineering Association

Monday, Oct. 4

9.30 a. m. to 12.30 p. m.

Registration and distribution of badges at booth, lobby of Native Sons of the Golden West Building.

2 p. m. to 5 p. m.

Annual address of the president.
Annual report of the executive committee.
Annual report of the secretary-treasurer.
Appointment of convention committee:
(a) Resolutions.

Reports of committees:
(a) Lightning protection,
(b) Standards,
(c) Power distribution,
(d) Standards (on recommendations contained in above report).

Tuesday, Oct. 5

2 p. m. to 3 p. m., joint session with Transportation & Traffic Association.

Reports of committees:
(a) Block signals for electric railways,
(b) Standards (on recommendations contained in above report),
(c) Joint sub-committee on block signal rules,
(d) Transportation-engineering.

3 p. m. to 5 p. m.

Reports of committees:
(a) Equipment,
(b) Standards (on recommendations contained in above report),
(c) Buildings and structures,
(d) Standards (on recommendations contained in above report).

Wednesday, Oct. 6

2 p. m. to 3 p. m., joint session with Accountants' Association.

Reports of committees:
(a) Engineering-accounting,
(b) Life of railway physical property.

3 p. m. to 5 p. m.

Reports of committees:
(a) Constitution and by-laws,
(b) Power generation,
(c) Standards (on recommendations contained in above report),

Thursday, Oct. 7

2 p. m. to 5 p. m.

Reports of committees:
(a) Way matters,
(b) Standards (on recommendations contained in above report).

Paper on "Some Factors Affecting the Application of Wood Preservation to Electric Railways," by Messrs. Winslow and Teesdale of the Forest Products Laboratory, United States Department of Agriculture, Madison, Wis.

Reports of committees:
(c) Heavy electric traction,
(d) Standards (on recommendations contained in above report),
(e) Electrolysis.

General Business.

Report of convention committee:
(a) Resolutions,

Report of committee on nominations.
Election of officers.
Installation of officers.
Adjournment.

Friday, Oct. 8

See program of American Association.

Program of Claims Association

Monday, Oct. 4

9.30 a. m. to 12.30 p. m.

Registration and distribution of badges at booth, lobby of Native Sons of the Golden West Building.

2 p. m. to 5 p. m.

Annual address of the president.
Annual report of the executive committee.
Annual report of the secretary-treasurer.
Appointment of convention committees:
(a) Resolutions,
(b) Nominations.

Reports of committees:
(a) Accident prevention board,
(b) Employment,
(c) Ways and means.

Paper on "Automobiles," by S. B. Hare, claim agent Altoona & Logan Valley Electric Railway, Altoona, Pa.

Written discussion.

Tuesday, Oct. 5

2 p. m. to 4 p. m.

Paper on "Standardization of Claims Statistics," by E. E. Slick, claim adjuster Union Traction Company of Indiana, Anderson, Ind.

Written discussion.

4 p. m. to 5 p. m., joint meeting with Accountants' Association.

Report of committee:
(a) Claims-accounting.

Wednesday, Oct. 6

2 p. m. to 3 p. m., joint session with Transportation & Traffic Association.

Report of committee:
(a) Claims-transportation.

3 p. m. to 5 p. m.

Changes in constitution and by-laws.

Paper on "A Card Index and What It Means," by J. J. Reynolds, claims attorney Boston Elevated Railway, Boston, Mass.

Written discussion.

Thursday, Oct. 7

2 p. m. to 5 p. m.

Paper on "Safety and Its Relation to Conservation," by B. F. Boynton, claim agent Portland Railway, Light & Power Company, Portland, Ore.

Written discussion.
General business.
Reports of convention committees:
(a) Resolutions,
(b) Nominations.

Election of officers.

Installation of officers.
Adjournment.

Friday, Oct. 8

See program of American Association.

PROGRAM OF TRANSPORTATION & TRAFFIC ASSOCIATION

Monday, Oct. 4

9.30 a. m. to 12.30 p. m.

Registration and distribution of badges at booth, lobby of Native Sons of the Golden West Building.

2 p. m. to 4.30 p. m.

Annual address of the president.
Annual report of the executive committee.
Annual report of the secretary-treasurer.
Appointment of convention committees:
  (a) Resolutions,
  (b) Nominations.
Reports of committees:
  (a) Rules,
  (b) Construction of schedules and time-tables,
  (c) Definitions.
4.30 p. m. to 5 p. m., joint session with Accountants' Association.
Report of committee:
  (a) Transportation-accounting.

Tuesday, Oct. 5

2 p. m. to 3 p. m., joint meeting with Engineering Association.
Reports of committees:
  (a) Block signals for electric railways,
  (b) Standards (on recommendations contained in above report),
  (c) Joint sub-committee on block signal rules,
  (d) Transportation-engineering.

3 p. m. to 5 p. m.

Report of committee:
  (a) Standards.
Paper on "Relation of Electric Railways to Agriculture," by Paul Shoup, president Pacific Electric Railway Company, Los Angeles, Cal.

Wednesday, Oct. 6

2 p. m. to 3 p. m., joint session with Claims Association.
Report of committee:
  (a) Claims-transportation.

3 p. m. to 5 p. m.

Changes in constitution and by-laws.
Reports of committees:
  (a) Freight and express traffic,
  (b) Passenger traffic.

Thursday, Oct. 7

2 p. m. to 5 p. m.

Reports of committees:
  (a) Fares and transfers,
  (b) Training of transportation employees.
General business.
Reports of convention committees:
  (a) Resolutions,
  (b) Nominations.
Election of officers.
Installation of officers.
Adjournment.

Friday, Oct. 8

See program of American Association.

AMERICAN ASSOCIATION LOCAL CONVENTION TRANSPORTATION COMMITTEE

President C. Loomis Allen has appointed the following Pacific Coast railway men as a local transportation committee to co-operate with the corresponding Manufacturers' Association committee of which A. G. Jones, General Electric Company, San Francisco, is chairman; Henry T. Jones, general superintendent United Railroads of San Francisco, chairman; J. H. Handlon, claim agent of the same company, and George H. Harris, general superintendent San Francisco-Oakland Terminal Railways, Oakland, Cal. The names of the members of the Manufacturers' Association committee were printed on page 319 of the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 21.

COMMUNICATION

Dangers of the Jitney

GARFORD MOTOR TRUCK COMPANY

LIMA, OHIO, Aug. 18, 1915.

To the Editors:

So long as the jitney movement is confined largely to the second-hand motor car or prompted from a determination to get even with the public service corporations, there cannot be much assurance of permanence. The feeling of being imposed upon and a spirit of revenge may induce a part of the public to endure hardships, exposure and risks in cheap, poorly-constructed and wornout equipment, but before long the same people will become dissatisfied with such service and will no longer be willing to be pushed around in crowds while waiting on sidewalks for the privilege of riding home in a motor car.

The progress of motor-bus transportation, whether in the hands of public service corporations or in the hands of private individuals and known as the jitney, depends upon the following among other conditions:

1. Regularity and dependability of service.
2. Improvement of street conditions in the average city to insure the lowest cost of maintenance; otherwise, the cost will be excessive.
3. Selection of equipment from careful study of requirements in order to insure comfort and safety equal to that offered by the competitive service.

We hold public service corporations responsible for the safety of their passengers, and why should not the individual who attempts public service work be required to safeguard his patrons? He should be held responsible, and his responsibility should be beyond any question of doubt. Every street car is constructed with an allowance of safety beyond any possible occupancy. The placing of passenger-carrying bodies, with seating capacities of from ten to fifteen people and standing room for as many more upon a second-hand pleasure car chassis or equipment, originally built for a maximum load of four to seven passengers, and bodies not more than one-third to one-half the weight of the bus bodies, endangers life and should not be allowed. These conditions now exist wherever the jitney movement is under promotion, and in the end must prove disastrous.

We would quickly condemn the public service corporations were they to offer the public such a conglomeration of unsightly and unsafe equipment as may now be seen upon the streets of many of our cities. I do not mean to discourage the movement, but I believe we should be fair to ourselves in demanding safety and fairness to those whom we have invited to come into our communities and invest their money in public corporations and from whom we have always demanded every comfort and safeguard. The adoption of the air brake and block signal by the railroads came from the demand for protection from their patrons and a realization by the railroads of the value of such protection to their patrons. The old wooden coaches, when all went well, delivered their occupants to their destination but not with that assurance of safety as with the present-day steel coaches. Why should not the same consideration be given in the transportation of passengers over the streets of our cities?

S. M. WILLIAMS, Sales Manager.

Equipment and Its Maintenance

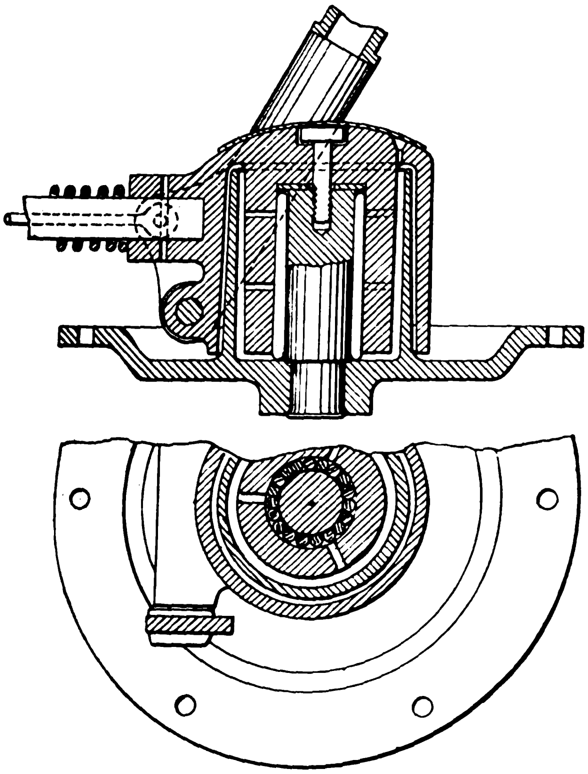
Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Sioux City's Self-Lubricating Trolley Stand

BY C. M. FEIST, MASTER MECHANIC SIOUX CITY (IOWA) SERVICE COMPANY

Self-lubrication combined with a dustproof, watertight bearing has been attained in the trolley stand which has been in use on the Sioux City (Iowa) Service Company's cars for the past three years. This end was accomplished by designing the top member of the stand so that it completely incloses the bearing portions of the bottom member. These two members in turn are so constructed and arranged with respect to each other that intercommunicating oil wells and passages are produced which practically maintain all the bearing surfaces in a state of constant lubrication. A plan and a section of this stand are shown in the accompanying illustration. Ninety of these self-lubricating bases are in service on the company's cars and all of them were finished in the company's shops. The cost of each stand complete is approximately $10.50. Fifty of the stands have been in service for three years and are still in perfect condition, it being necessary, however, to add a little oil each spring to make sure that the lubrication is perfect.



SIOUX CITY SELF-LUBRICATING TROLLEY STAND

As mentioned before, the stand comprises essentially two parts, a top and a bottom casting. The bottom casting is dished and made with a centrally-located bearing post and a vertical annular wall concentric with the post. The annular wall is integral with the base plate and the bearing post is formed by a pin riveted at its lower end to the plate. The cap or top casting is also integral in construction and rotates on the base. It is formed with inner and outer annular walls, the inner wall fitting into the space between the annular ring of the bottom casting and the post. Ducts through the inner top casting ring permit oil to flow freely on each side of it.

The cap is fastened to the center of the post by a stud bolt. The lower portion of this bolt screws into the post and the head fits into a recess in the cap casting. A brass washer interposed between the upper end of the post and the under base of the cap forms the bearing seat. By this arrangement the cap casting is supported entirely on the bearing post and rotates freely. The lower edges of the top-casting annular walls are a short distance above the bottom of the well formed by the bottom casting, hence friction between these parts at this point is obviated. The oil chamber between the post and the walls of the top casting is designed to receive a series of anti-friction roller bearings which fix the position of the upper casting on the post. In this way the side and vertical bearings are immersed in oil at all times, and being entirely inclosed are free from dust and water tight.

Reinforcing Metal Poles

BY G. H. M'KELWAY, LINE ENGINEER BROOKLYN RAPID TRANSIT SYSTEM

In practically all large cities and also in many places where not only good appearance but also permanence is required, the metal pole, either iron or steel, has replaced the wooden pole which was at one time the standard. Although the first cost of the metal pole is much more than that of the wooden one, yet the former lasts so much better than the latter that, except for temporary work or where the wood poles can be obtained very cheaply, the iron or steel is to be preferred.

But the metal pole has been in service long enough to show that it cannot by any means be considered as a permanent fixture and that in time it must be either repaired or replaced. It might be supposed that careful painting would so prolong its life that it could be considered as never having outlived its usefulness, but the truth is that where the protection is most needed is the point where it is most difficult to apply the paint. A careful examination of the tables prepared by the manufacturers of trolley poles will convince a person that the weakest point on the pole, if it be made up of three sections of pipe, which is standard practice, will be at the base of the second section. Yet very few poles fail at that point and when they do they are nearly all new poles. After a pole has been set in the ground long enough to become weakened by rust the almost universal point of failure will be found to be at the ground line or very near to it.

So well have the manufacturers recognized the fact that there is the weakest point that they now make many poles with sleeves of standard or even extra heavy weight either rolled or shrunk on to the lower section at the ground line and so placed that when the pole is set the ends of the sleeve will extend a foot or more above and below the surface of the ground. By the use of such a sleeve the thickness of the pole at the ground line is perhaps doubled and the life of the pole is increased even more than that, as, of course, it is not necessary that the pole be eaten entirely through before it fails.

Poles that have been set without the sleeves can be reinforced by either installing such sleeves after the rusting has begun or by interior reinforcement. The latter plan can be used even if the pole has been equipped with a sleeve. It could be arranged to install a second sleeve over one that had already been installed but that had been eaten through, although the writer has never heard of such a practice. The principal objection to such a plan would be the steadily increasing diameter of the butt of the pole owing to the added sleeves.

When reinforcing by means of the sleeve is used a choice can be made between the use of a solid or a split sleeve. If the solid sleeve is to be used on a pole already in service all of the arms and wires attached to it must be removed so that the sleeve can be slipped over the top and drop to its place at the butt. Many poles have ornamental rings placed around the joints and also at the ground line and these must be removed before the sleeve can be lowered into position. These rings or collars, although adding slightly to the appearance of the pole, are of no value in protecting the pole against rust, a claim sometimes made for them. On the contrary, they weaken rather than strengthen the pole because they afford a place where water can settle and remain instead of running off at once, as it will do if the joint is properly made and the ends of the pipe are chamfered so as to give no place for the water to lodge.

Either before or after the sleeve has been slipped over the pole, the ground or pavement at the base is broken away and excavated to a sufficient depth to allow the sleeve to be put on at the right height. The sleeve is then supported at the right height and the earth tamped around its bottom to hold it there. After that the sleeve is fastened to the pole by pouring into the annular ring betwen it and the pole a liquid material which will harden and hold them fast together. The first material to be used between the sleeve and the pole, so far as the writer is aware, was molten lead. This has now been superseded generally by either cement grout or sulphur. The grout is the more common filling material as the use of sulphur is patented, being the base of the patents issued to C. B. Voynow of the Philadelphia Rapid Transit Company. The sulphur, although costing more than the grout, makes a better job as it not only holds the sleeve tighter to the pole and so increases the strength of the pole, but also is an insulator and therefore prevents the leakage of current to the ground at the ground line, although of course leaving a path open for it further down where it will not do so much damage.

Many persons regard the claim that poles are injured through the leakage of current from the trolley wire or feeders through defective or weak insulators as being unfounded, but the writer cannot agree with them. Its truth was forcibly impressed upon him at one time when he was examining the poles on a certain street where all on one side of the street were in good condition but on the other side there were many badly weakened at the ground line. The only explanation that could be given for the difference in condition was that where the poles were bad they were used to support not only the spans and trolley wire but also a feeder wire, so that the deterioration must have been caused by electrolytic action due to the leakage of current over the feeder insulators and down the poles to the ground.

When pouring the sulphur into the opening between the pole and the sleeve a piece of leather is held around the sleeve with its top slightly higher than the top of the sleeve. This is for the purpose of having the sulphur at the pole, when it solidifies, a little higher than at the sleeve, a result that is accomplished by wiping off the outer edge of the sulphur before it becomes too hard. The effect of this treatment is similar to that of a chamfered sleeve and causes the water to run off instead of lodging between the sleeve and the pole, which would occur if this plan was not followed and which does occur very often when the sloping portion of the sulphur is broken off after it has been carefully installed. This trouble is not confined to poles where sulphur has been used but is also found where the filling between the sleeve and the pole is of cement, which also should be so sloped off as to permit all water to escape.

The slipping of the sleeve over the top of the pole requires considerable work and makes a rather expensive repair when a number of spans or pull-offs are attached to one pole or when one or more feeder arms are attached to the pole and must be removed and the wires cared for while the sleeve is being put into place. In order to avoid this difficulty split sleeves have been used which need not be slipped over the pole but are merely put together at its base. These sleeves are made of either steel, or cast or malleable iron. Those first made had lugs through which bolts were passed in order to hold the two halves together. Since much trouble was caused by persons catching and tearing their clothes on the projections of either the lugs or the bolts that type is not much used at present. A malleable-iron sleeve of this type but without its objections is made and patented by the St. Louis Malleable Casting Company. Here the two halves have lugs cast upon them, so placed that the two halves dovetail into each other and are held together by means of steel pins passing through holes in the lugs, which are so rounded off as to prevent the possibility of anything catching in them.

Another sleeve very similar to that just described is made by the Drew Electric & Manufacturing Company, which also consists of a malleable-iron sleeve made in halves. The ends of these halves, however, are formed so as to look as if they had been bent over. As one edge bends outward while the other turns inward they engage with each other and the two parts are fastened together by merely slipping one edge into the other. Both of these last-named sleeves are made 3/8 in. in thickness but the Drew sleeve is further reinforced by ribs that run down it from end to end. Both have inwardly projecting lugs which keep the sleeves a short distance from the pole and allow a space to be filled with cement or some similar material.

There is one more type of reinforcement which not only does away with the necessity of stripping the pole of its cross-arms and other attachments but also avoids the necessity of any digging about the foot of it in order that the sleeve may project below the ground level. In order to avoid these troubles the reinforcement is applied to the interior instead of to the exterior of the pole and consists of a plug of reinforced concrete.

Although poles have been reinforced by dropping into them a piece of tee-rail and filling in around this rail with concrete, this does not insure a good job as the piece of rail is not likely to be well centered, so that the pole is stronger in one direction than in another and there is no way of insuring that the direction in which the greatest strength can be shown will be the same as that from which the greatest pull will come. Again, there is not the same adhesion between the concrete and the steel in this plan that there is in some of the others in which concrete is used.

A patent has been obtained for the use of a piece of pipe instead of the rail but by whom the writer does not know, and he also has never heard of the plan being widely used.

In the system installed by the New York Pole Company, which is covered by patents, the reinforcement consists of twisted steel rods fastened together at one end by being inserted into a casting and at the other by means of a cap, which, when released permits them to spring out into the shape of an inverted cone. This cone-shaped placing of the rods arranges the steel in the form best suited to the strain coming upon it. The strength of the reinforcement can be altered by changing the size or the number of the rods.

With this method the first thing to be done is to remove the pole cap and then to pour sand down into the pole until it is filled up to a point about 3 ft. below the ground line. The amount of this sand filling to be used is determined by dropping a weighted tape line into the top of the pole and pouring in the filling until the weight rests on the sand at the proper point below the top of the pole. Then the rods, held together at the bottom by the casting and at the top by the cap, are lowered into the pole, and when they reach the bottom the cap is pulled off allowing the tops of the rods to spring out until they touch the inside surface of the pole. Lastly the concrete is poured into the pole until it is filled above the ends of the rods which are generally 5 ft. in length. The pole cap is then replaced and the job is finished.

While this method does not have the protecting quality due to the insulating properties of the sulphur, employed with another plan of reinforcement, yet the reinforced concrete core is generally calculated so as to be equal in strength to a new pole of the size in which it is used as a reinforcement. Therefore, as the reinforcement can be considered as being indestructible, the pole never deteriorates below the strength of a new pole, even if the entire metal shell should rust away at the ground line.

Paint Renovator for Exterior of Cars

BY R. E. HEWITT, MASTER MECHANIC SOUTHERN PACIFIC COMPANY ELECTRIC LINES, WEST ALAMEDA, CAL.

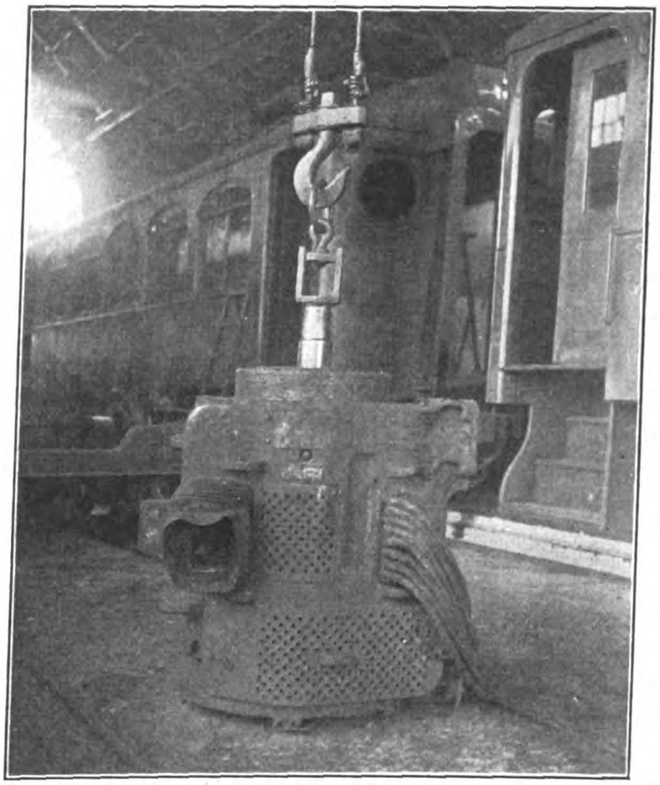
The usual procedure for cleaning paint on cars when they came in for inspection, which is after 1200 to 1500 miles for motor cars and 2000 miles for trailers, was to place them on the wash tables and wash the outside of the car with a diluted mixture of oxalic acid and water, after which the car was thoroughly rinsed off with clear water. Due to the fact that the water used was more or less alkaline, it had a detrimental effect on the life of the paint and varnish. In order to overcome this condition various emulsions and car cleaners were tried without much success. Finally an experiment was made with what is known as Brook's "Car Renovator" and results obtained therewith have been most satisfactory.

This renovator is applied to a car once a month, and between these applications the car is simply rubbed down with clean waste. The renovator has a tendency to feed the varnish and paint, lengthening the life of both, and keeps the paint on the car looking clear, bright and otherwise presentable. This renovator has been adopted as standard for car cleaning by the Southern Pacific Company's electric lines.

Armature Removal

BY R. R. POTTER, SUPERINTENDENT OF EQUIPMENT NEW YORK, WESTCHESTER & BOSTON RAILWAY

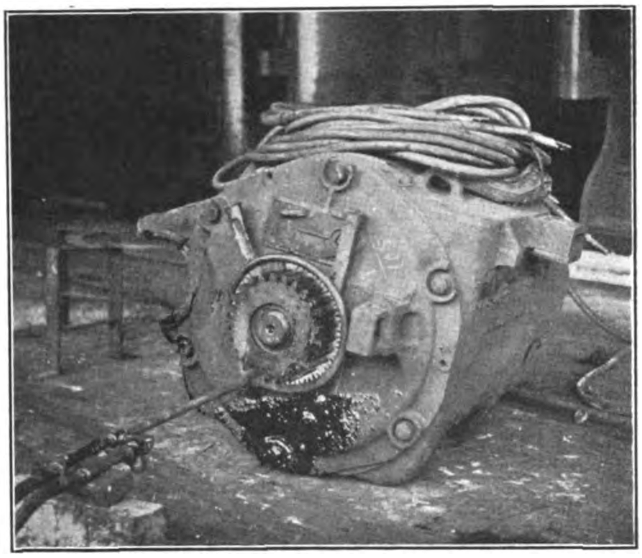
The box type of motor frame has many obvious advantages, but its use involves a certain amount of difficulty in making repairs because of the lack of ready access to the armature that was the prominent characteristic of the early split-frame designs. The common method of dismantling the box-type motor requires the installation of a special machine with a heavy bedplate upon which are mounted two arms or centers to support the armature and a movable carriage upon which to rest the motor frame. This arrangement permits the frame to slide longitudinally off the armature after removing the bolts from the bearing housings, and the armature may then be inspected as it rests on the centers or else may be removed and transported to another part of the shop for repairs. However, this method is slow, and the machine requires some skill in handling and involves a considerable investment as well as a material amount of valuable space upon the shop floor.



WESTCHESTER ARMATURE REMOVAL—LIFTING ARMATURE OUT OF FRAME

Wherever the shop space is limited and when economy has to be carefully considered the use of a special machine for armature removal is obviously undesirable, and as a substitute the method described in the following paragraphs may be used to good advantage. The only equipment required is an overhead crane or other lifting device, which is needed in any case if the armatures are to be handled with reasonable economy. This method, it may be said, has been in use at the shops of the New York, Westchester & Boston Railway for the past three years, during which time it has proved to be thoroughly satisfactory in every respect.

Under the method in question the first step is, of course, to remove the oil and waste packing from the motor bearings. The pinion nut is then unscrewed, and the pinion is heated gently with the circular flame of a gas pipe heater and at the same time wedged away from

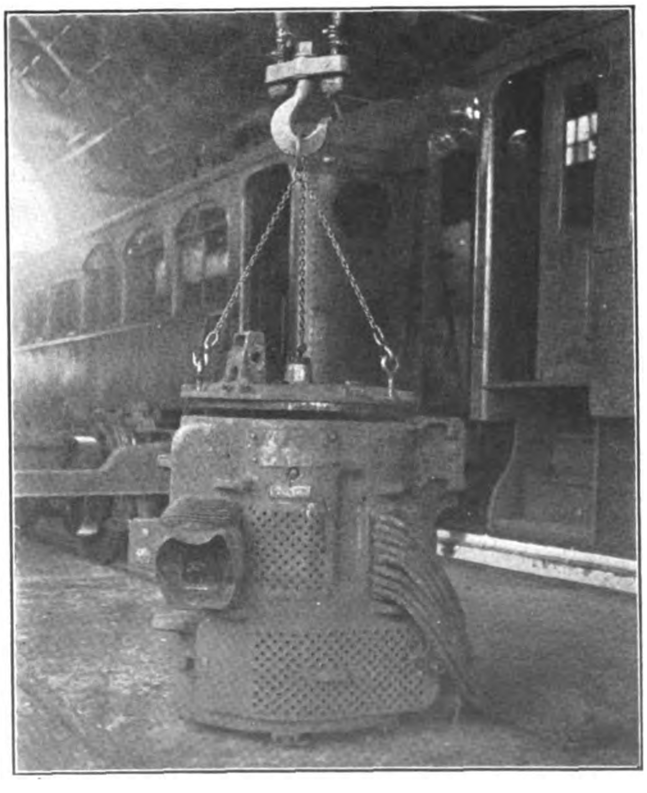


WESTCHESTER ARMATURE REMOVAL—HEATING PINION

the bearing housing until it comes off. After the removal of the pinion the motor is placed upon the floor with the commutator-end down and the pinion-end up. This allows easy access to the nuts for the pinion-end bearing housing, and these are unscrewed, permitting the housing to be lifted off the frame. A special bail, or swivel ring, with the lower portion threaded to fit the threaded end of the armature shaft, is then screwed onto the shaft in place of the pinion nut to provide a hold for the crane hook. With the aid of the crane, or any other suitable form of lifting apparatus, the armature may then be readily lifted out of the motor frame and moved to any part of the shop for inspection and repair.

The motor frame is left in the upright position in which it is originally placed, because when the frame is in this position the windings, brush-holders and other interior parts may be readily inspected and repaired, although it is, of course, possible to move the frame into any other location or position that may be more convenient. The return of the armature to its frame when the motor is again ready for assembling is accomplished by a reversal of the process previously described.

With a reasonable amount of care in centering the hoisting cable over the frame during the operation, the danger of injury to the windings is minimized, because the point of support is directly over the center line of the armature shaft and the armature hangs in a perfectly vertical position. Consequently, when the armature is raised from or lowered into the frame there is no possibility of its becoming fouled on the pole pieces or brushes. A traveling electric crane is, of course, especially suitable for this work, and it offers the advantage of transporting the armature with a minimum of handling to whichever part of the shop is most convenient for making repairs. However, the use of a jib crane or air hoist is just about as convenient in so far as the actual removal of the armature is concerned.

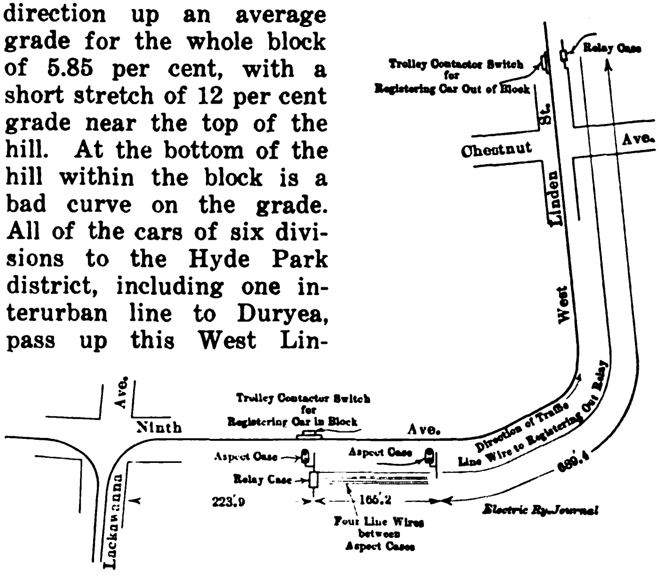


WESTCHESTER ARMATURE REMOVAL—LIFTING OFF END HOUSING

Special Application of Car-Spacing Signals

BY A. P. WAY, ELECTRICAL ENGINEER AMERICAN RAILWAYS COMPANY, PHILADELPHIA, PA.

An interesting installation of a car-spacing signal has been in operation on the property of the Scranton (Pa.) Railway since March, 1915. The installation has materially improved a difficult situation of car operation on a steep hill including a bad curve. The accompanying diagram shows the general layout of the single track, upon which a heavy schedule is maintained in one direction up an average grade for the whole block of 5.85 per cent, with a short stretch of 12 per cent grade near the top of the hill. At the bottom of the hill within the block is a bad curve on the grade. All of the cars of six divisions to the Hyde Park district, including one interurban line to Duryea, pass up this West Linden Hill making twenty-two regular cars per hour. The average headway is therefore 2.7 minutes under regular schedule, but it is less during evening rush hours. Heretofore cars frequently became bunched on the hill, making a very heavy peak load on the feeder and often opening the feeder circuit breaker. On numerous occasions motormen were unable to hold their cars on the hill with heavy load, with power off the line, and could not prevent them from backing into following cars with consequent damage. Now only one car is allowed on the hill at a time, which keeps the power peaks down



Trolley Contactor Switch for Registering Car Out of Block
Relay Case
St.
Chestnut
Ave.
Linden
West
Ave.
Ninth
Trolley Contactor Switch for Registering Car in Block
Ave.
Direction of Traffic
Line Wire to Registering Out Relay
Aspect Case
Aspect Case
Relay Case
680.4
Lackawanna
223.9
166.2
Four Line Wires between Aspect Cases
Electric Ry. Journal

CAR-SPACING SIGNAL—DIAGRAM SHOWING RELATIVE POSITIONS OF TROLLEY CONTACTOR SWITCHES, RELAY CASES, ASPECT CASES, ETC.

and the cars better spaced. The depreciation of trolleys has also been materially reduced.

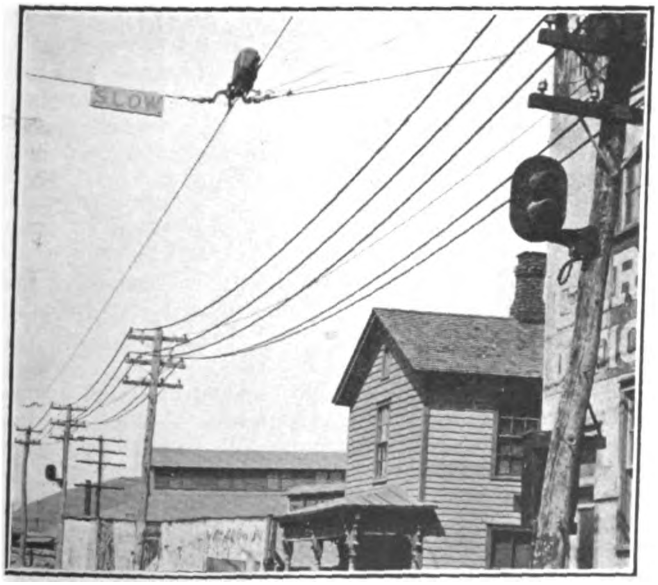
The diagram shows the relative locations of trolley wire, trolley contactors, aspect cases and relay cases.

Two aspect cases are used, each being equipped with a red lens and a green lens. Normally when the block is unoccupied a green light is displayed in the first aspect case directly opposite the entering contact-maker and a red light is displayed in the second aspect case about 165 ft. ahead. A motorman can enter the block if green is displayed at the first aspect case. Upon passing beneath the contact-maker, if the signal operates properly, the red light in the second aspect case will be extinguished and the green illuminated, giving him permission to proceed, while at the same time the green light will be extinguished on the first aspect case which is now behind the car, and the red will be illuminated, protecting his from a following car. Thus each car passing into the block runs by two green lights and leaves a red light behind it in the first aspect case.

If, however, a car should not properly operate the signal mechanism it would be stopped by the red light in the second aspect case. It will be seen that there is at all times a red light showing in one of the other of the aspect cases and a green light in the other. These two lights are in series and the opposite two lights are in series.

When the car passes out of the block under the contact-maker at the top of the hill the lights return to normal indication. The accompanying halftone shows contact-maker, aspect cases and relay box at the entering end of the block, located near a left-hand curve at the bottom of the steepest portion of the hill. The relay at the leaving end allows a normally alive operating wire which prevents the signal being cleared if the wire becomes crossed with the trolley. Provision is made that a dead ground or 'open' in this wire will prevent the signal being operated to show a proceed indication and will hold cars up by the red light.

A second lamp is provided in each aspect case to come into operation when one burns out, and constant current is provided in the lamp circuit to give uniform illumination with variable voltage. The current regulator is a simple laminated core solenoid device which so regulates the current that the amperage remains constant in the signal lights, regardless of the fluctuation in line voltage. This is ingeniously accomplished by having the core of the solenoid shunt steps on a resistance tube to increase or reduce the resistance in the line as the voltage rises or falls. The lamps are hooded and show well even with the sun shining against them.



CAR-SPACING SIGNAL—SIGNAL EQUIPMENT AT ENTERING END OF BLOCK

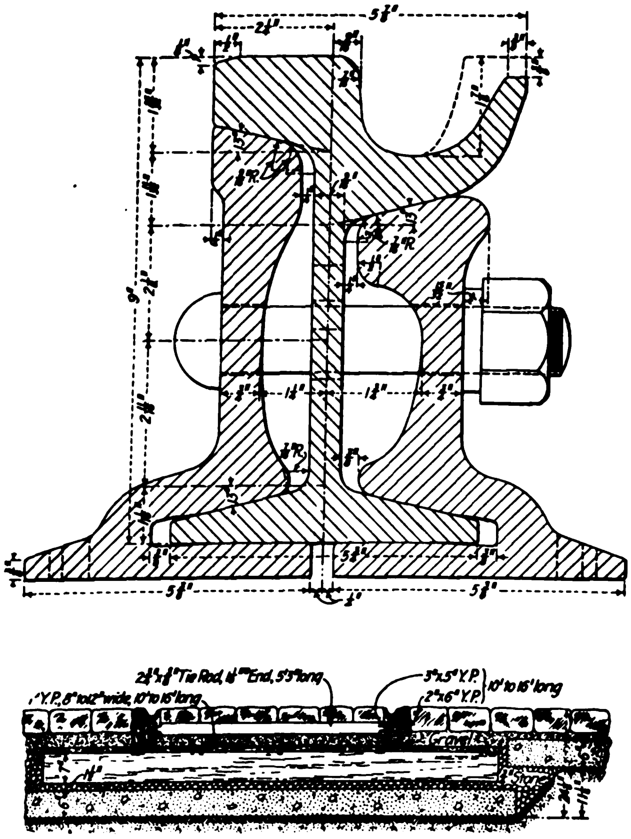
The signal has operated to date without failure, has given protection to approximately 44,000 through car movements, and has relieved an unsatisfactory operating condition. The signal used was purchased from the United States Electric Signal Company and is known as the Type S-2 car-spacing signal.

New 9-In. Grooved Rail for M. C. B. Flanges

The South Philadelphia improvement, now being carried out by the city of Philadelphia and the Pennsylvania and Baltimore & Ohio Railroads, involves, among other things, the laying of several miles of permanent track at grade in Delaware Avenue. In this connection the railroads and the city have worked out a design for a 159-lb. girder rail for general use in the city streets. Cross-sections of the rail and splices and of the approved form of track construction are shown.

Each joint is held with four 1¼-in. bolts, passing through 1 7/16-in. holes in the rail web, 1 5/16-in. round holes in the inside splice, and 1 5/16-in. x 1⅝-in. elliptical holes in the outside splices. The spacing of the four holes is 7½ in., 5½ in. and 7½ in., and the angle plates are 26 in. long. Each plate has two slots and two holes for spikes. The rails are laid on four-hole tie-plates 10¾ in. x 7 in. x ⅝ in., with a ⅜-in. shoulder on top and a ¼-in. shoulder on the bottom. The ties are spaced eighteen to a 33-ft. rail, and for each 33-ft. length the rails are connected with six tie rods, consisting of 2¾-in. x ⅜-in. forged bars threaded at the ends and held by a standard square nut each side of each rail web.

The adaptability of this type of rail for tracks laid and operated in a public street used intensively by all


5⅝"
5⅝"
5⅝"
2¾" x ⅜" Tie Rod, 1¼" End, 5'3" long
5" x 5" Y.P.
2" x 6" Y.P.
10' to 16' long
1" Y.P., 8" to 12" wide, 10' to 16' long
Gravel
Stone

CROSS-SECTIONS OF JOINT AND TRACK, DELAWARE AVENUE, PHILADELPHIA classes of vehicles was carefully considered before a conclusion was reached.

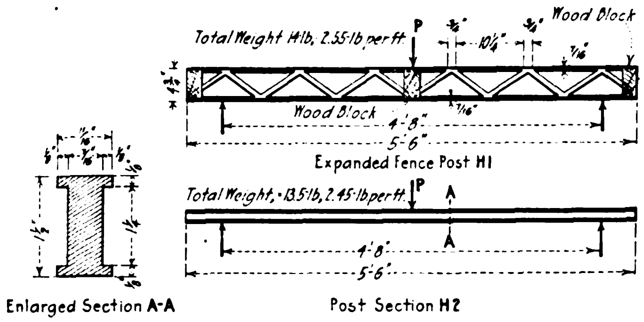
Arrangements have been made with the Pennsylvania Steel Company to supply this new section of rail, which is undoubtedly the heaviest rail of the grooved girder type in this country for which rolls have already been cut.

Steel Pole Strength Per Pound Increased

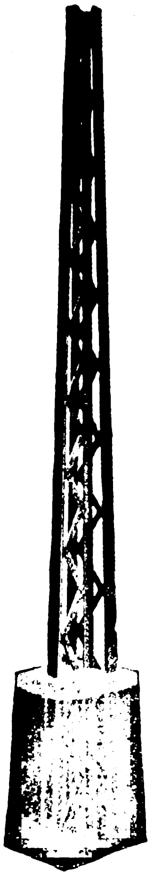
The demand for a light steel pole weighing about the same as a wooden pole and costing but little more has been supplied by an expanded-metal steel pole which has been put on the market recently. This pole is manufactured from a special rolled H-beam section by an expansion process which increases the strength about 400 per cent without adding to the weight. Accordingly comparatively light sections which, as they come from the rolls are not strong enough to serve as poles in span-wire construction, are sheared, expanded hot and formed into Warren trusses which furnish sufficient strength to meet any average line demand. Although the result is unusual it is logical from an engineering standpoint since it is a well-known fact that a truss structure provides maximum carrying capacity at minimum weight. By utilizing the web for the truss members the expanded-steel pole has no metal which is not performing its proportional share in carrying any load applied to the pole.

An expanded 6-in. H-section in a 30-ft. pole tapers from 6 in. at the top to 17 in. at the base. Careful tests to determine the strength of this pole indicate that it will carry eighty No. 8 wires at 100--ft. spacing or twelve No. 4 wires at 300-ft. spacing. A 30-ft. pole weighs complete without cross-arms or fittings 588 lb., which is slightly in excess of the weight of the 30-ft. wooden pole required for span-wire service. On the other hand, this expanded metal pole costs little more than twice the wooden pole but has much greater strength. Under actual test, a force of 1500 lb. applied 18 in. below the top of a 30-ft. pole set 5½ ft. in the ground, deflects the pole 1 11/16 in. A comparison of the strength of one of these expanded sections with the original section is shown in the accompanying illustrations. This test was made in the Illinois Steel Company's testing laboratory, and the results show quite clearly the increased metal efficiency obtained by the expanded process. Any tendency of the metal to crystallize or fatigue in the expansion process is obviated by preheating the sections to a cherry red just before they are expanded.

The advantages claimed for this pole by the Bates Expanded Steel Truss Company, Chicago, Ill., the manufacturers, include primarily a light-weight steel structure of great strength which may be installed at a cost of material and labor equal to that of wooden poles. Maximum life is obtained by setting these poles in concrete and being a one-piece structure with all exposed surfaces, all parts are readily accessible for painting. The metal is ¼ in. thick, consequently will resist corrosion for a long time. The pole also has all the advantages of a fabricated structure but the elimination of bolts and rivets permits equivalent strength at a greatly reduced weight. Being a light-weight simple structure these poles are as readily and cheaply set as wooden poles and require no special apparatus. Wooden or steel cross-arms may be attached to these poles by L-bolts, the poles being drilled for any number at the time they are manufactured. It is also interesting to note in connection with the manufacture of these poles, that they are dipped while hot into a special preservative bath shortly after they leave the expansion machine. In the heated condition the preservative penetrates the metal which should give it extraordinary life in resisting the elements. The expanded-metal pole is only one of many products which this company is marketing. The others include expanded-metal concrete reinforcement, expanded-metal fence posts, car sills and truck frames.



EXPANDED AND UNEXPANDED POST SECTIONS, SHOWING POINTS OF APPLICATION OF TEST FORCES (See table)



CORNER POLE

EXPANDED POST H1

Load P in Pounds	Deflection in 0.001 in.	Set in 0.001 in.
100	9	
200	12	
300	23	
400	30	
500	45	
600	55	
700	46	
800	61	
900	63	
1000	66	
1100	91	
1200	82	
1300	92	
1400	104	
1500	...	
1600	120	No.
1700	121	2
1800	122	1
1900	136	2
2000	146	4
2100	145	4
2200	150	4
2300	179	11
2400	173	11
2500	190	15
2750	214	26
3000	238	37
3250	454	239

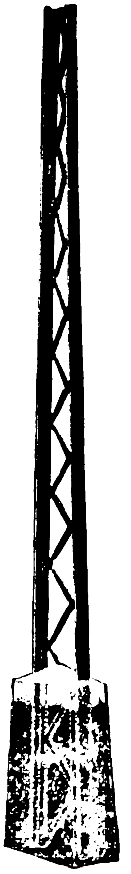
Failed by bucking in top flange at 3250-lb. load

POST SECTION H2

Load P in Lbs.	Deflection in 0.001 in.	Set in 0.001 in.
100	200	
200	250	
300	300	
400	350	
500	500	5
600	680	200

Failed at 600-lb. load.

TABLE OF RESULTS OF TESTS



TROLLEY POLE

Cause of Noisy Gears

In an English contemporary it is suggested that noisy gears are caused by small quantities of air which are trapped in the interstices between the teeth that are in mesh and then are hurled out at sufficient frequency to produce an audible musical note, the general action resembling that of the siren. Tests show that the pitch of the note is a simple function of the number of teeth passing a given point per second. For example, a thirty-six-tooth gear making 484 turns per minute (giving 290 teeth passing a given point per second) gives the note that is produced on the standard musical scale by a frequency of 290. Where more than one pair of gears are operating the interferences obscure the musical note and produce an objectionable noise.

News of Electric Railways

PROTECTING LONG ISLAND AUTOMOBILISTS

One Automobile Every Four Seconds at Merrick Road Crossing Presents Safety Problem

The extent of automobile traffic on Long Island, and the urgent necessity for co-operation by motorists in the efforts to prevent accidents at railroad crossings, are strikingly shown by the results of a special count of the traffic taken on Sunday, Aug. 8, by the Long Island Railroad. At the Merrick Road crossing, in Springfield, 9408 automobiles passed between midnight Saturday and midnight Sunday. Of these 4245 were east-bound and 5163 west-bound. At the Barnum Island Road crossing, on the Long Beach branch, 4739 cars passed in the same period, of which 2620 were east-bound and 2119 west-bound. In the single hour from 11 a. m. to noon on Sunday, 845 motor cars passed over the Merrick Road crossing. This is at the rate of more than fourteen cars a minute, or about one every four seconds. The cars counted at these two crossings were, of course, only part of the total number that were operated on Long Island on Aug. 8. Furthermore, nearly all of them must have crossed the company's tracks at other points, not once but several times during a day's run.

The Long Island Railroad is continuing to do all in its power to protect the crossings. Heavy pole gates similar to those recently put in operation on the Long Beach branch have been installed at Central Islip, Suffolk County, protecting the main line tracks through that town. These gates are expected to prove a deterrent to those motorists who, in the past, have been reckless enough to dash their cars through the lighter wooden gates directly before approaching trains. The company has been authorized by the Board of Supervisors of Nassau County to install, at certain points, traffic posts similar to those used by the New York City traffic squad. It is expected that this will be very helpful in the campaign for safety.

STILL ANOTHER COMPANY PUBLICATION

Puget Sound Company Recognizes Value of Proper Propaganda Work

The Puget Sound Traction, Light & Power Company, with head offices in Seattle, Wash., has closed the contest which had for its object the selection of a name for a pamphlet issued by the company in the interests of the company, its employees and its patrons. The pamphlet first made its appearance on the cars of the company July 28, and since that date has appeared regularly each week. To date the leaflet is known as *What's Its Name.*

The contest mentioned closed on Aug. 15, and it was announced that the name selected would be made public on Aug. 25. Three prizes were offered as follows: $15 for the best name; $10 for second best and $5 for third best. In speaking of the contest *What's Its Name* said:

"Some of the suggestions sound good, but we won't give them away until Aug. 25. A number of them are red-hot brickbats, not without a touch of humor. For instance: *The Last Gasp, The Wail, The Sardine Box, The Apologist, The Last Stand.*"

In addition to propaganda the publication contains information of value to the traveling public, such as city car schedules, interurban schedules, etc. Through it the company is placing before its patrons the side of a corporation in the controversy between the local company and the city of Seattle. In the issue of Aug. 11, *What's Its Name,* on a page entitled "Out in the Open," said:

"Some people have criticised us because we have applied to the Public Service Commission of this State for relief from the continued attacks made on our business by the city of Seattle. 'Brazen audacity of a predatory corporation' is what critics call it. It's nothing of the kind. In taking our case before the State Commission, we told the truth, went into all the details, made a clear and concise statement of our position—and asked for judgment and justice, nothing more."

DISORDER IN WEST PENN STRIKE

The cars of the Allegheny division of the West Penn Traction Company, Pittsburgh, Pa., were tied up on Aug. 19 by a strike of the union operators, who demanded the recognition of their organization. The company issued a statement asking the indulgence of its patrons until it could resume operations. This statement announced that the company was recruiting new men. The company says that its open shop contract runs until 1916 and was signed by all its employees. It is asserted that no favoritism was shown to anyone, whether a member of the union or not, and that all men who desired to do so might belong to the union without prejudice. On Aug. 21 the company re-established service. Disorder followed almost immediately, and on Aug. 22 several cars were stoned and one was set on fire in East Deer Township. On Aug. 24 Patrick Gilday, head of the State Bureau of Mediation and Conciliation, and Francis Feehan, local representative of the department, interviewed representatives of the company and striking employees of the Allegheny division. Mr. Gilday was quoted as stating that there was every hope of a speedy settlement by a submission of the controversy to arbitration.

RHODE ISLAND ARBITRATION

Hearings in the Rhode Island Company arbitration proceedings were continued at Providence with the introduction of evidence by employees in miscellaneous shop departments on behalf of the union. Five weeks of testimony have now been heard by the board. The company's side of the case will probably be begun soon. In the recent proceedings, W. D. Wright, superintendent of maintenance and equipment, said that had there been no union agreement, it would have been probable that the wages of men in the shop would have been increased in the past two years, following a policy of recognizing able workmen. Considerable evidence was presented by the men as to the compensation of various trades in the shops. Among the hourly rates were: welder, 28 cents; wheel grinder, 28.5 cents; tinsmith, 33 cents; radial drill operator, 26.5 cents; wheel stripper, 23 cents; car cleaner, 23 cents; storekeeper, 25.5 cents; assembler, 22 cents; babbitters, 24 cents and 29 cents; valve grinder, 32 cents; boring mill operator, 29 cents; air compressor repairer, 28 cents; blacksmith, 31 cents; car wiring, 20 cents and 26.5 cents; steam fitter, 25.5 cents; armature winder, 22 cents and 23 cents; carpenter, 32 cents. The board has visited the principal shops, power plant and electric freight station of the company. In testifying about power plant conditions, a switchboard operator said that while the capacity of the Manchester Street station at Providence has been increased 50 per cent in the last eight years, the work of a switchboard operator has not increased in severity although the responsibility was greater now.

BIDS RECEIVED FOR RAPID TRANSIT MATERIAL

During the week ended Aug. 21 the Public Service Commission for the First District of New York opened bids on many important rapid transit contracts. Following are the lowest bids received on the contracts, excepting that for the supply of ties and timber, which is not yet available:

Station finish, Routes Nos. 16 and 18, being respectively the Jerome Avenue and White Plains Road elevated lines in The Bronx: Altoria Realty & Construction Company, $860,636. Supply of felt pads: The Q & C Company, $9,957. Tie plates: Type "A," Herbert W. Lockwood, $123,975; type "B," L. D. Rockwell, $13,267; type "C," L. D. Rockwell, $5,140; type "D," Herbert W. Lockwood, $8,239; types "E-2," "W" and "X," Ramapo Iron Works, $2,901. Cast iron: American Brake Shoe & Foundry Company, $10,528. Special Work, Order No. 3: Ramapo Iron Works, $54,950. Special Work, Order No. 4: William Wharton, Jr., & Company, $41,907. Malleable iron: Foran Foundry & Manufacturing Company, $36,118. Screw spikes: American Iron & Steel Manufacturing Company, $25,741.

The contract for ties and timber calls for about 35,000,000 board feet, for use on all lines of the dual system.

EXTENSION OF CIVIC OPERATION RECOMMENDED

R. C. Harris, Works Commissioner of Toronto, Ont., has reported in favor of civic operation of the Mimico and the Scarboro branches of the Toronto & York Radial Railway. Replying to a request from Mayor Church for an expression of his views on the question, Mr. Harris on Aug 10 reported as follows:

"I am of opinion that, having decided to acquire the Mimico and Scarboro branches of the Toronto & York Radial Railway, the city should operate a service over the section acquired, namely, within the city limits. I estimate that the deficit on operation alone, after crediting probable fares, would amount to $23,200 annually on the Mimico line and $21,280 annually on the Scarboro line. This is, of course, exclusive of interest, sinking fund and depreciation. When Kingston Road is widened a further expenditure will be entailed for permanent double tracks, located in the center of the roadway. Against these deficits would be credited such amounts as the Ontario Railway Board decides should be paid to the Toronto & York Radial Railway for operating privileges."

Of the Mount Pleasant Road car line Mr. Harris says that if the property for the complete extension is acquired he will, at the next meeting of the committee on works, present bridge plans for the crossing of the Belt Line Railway. It will then be necessary to proceed with the grading of the street and the construction of the railway. Prior to construction being started it will be necessary for the corporation to adopt a policy as to the southerly terminus of the line.

THE STORM AT ST. LOUIS

The storm of Aug. 20 played havoc with the steam and electric lines at St. Louis. Despite the adverse conditions, traffic was restored on the morning of Aug. 21 on nearly all of the divisions of the United Railways with the exception of the Jefferson Barracks, Creve Coeur Lake and Market Street and Manchester lines west of Kings Highway and the Kirkwood-Ferguson line. The University line was placed out of commission early on Aug. 20, as water flooded the tracks and made traffic impossible. About 8 p. m. the line was re-opened. The regular Creve Coeur line suspended operations entirely. Passengers to Vinita Park were carried over the Midland line from Page Avenue and the Suburban tracks. Cars to Jefferson Barracks were unable to cross the bridge at the River des Peres, as the spans were considered dangerous early in the day. While the cars on the Cherokee, Tower Grove, Bellefontaine, Cass Avenue, Seventh Street, Broadway, Grand Avenue, Jefferson Avenue, Sarah Street, Union Avenue, Wellston, Broadway, Park, Compton, Eighteenth, Natural Bridge, Vandeventer and Page lines did not run on schedule, traffic was not suspended on these divisions. Special telephone operators were placed at the switchboards at the general offices of the United Railways at Park and Vandeventer Avenues to furnish information to the public as to traffic conditions. More than 3000 inquiries had been answered up to 9 o'clock p. m. on Aug. 20.

DECISION IN TORONTO EXTENSION CASE

The Ontario Railway & Municipal Board on Aug. 16 confirmed the right of the Toronto & York Radial Railway to construct a line connecting its Yonge Street tracks with a proposed terminal on its Farnham Avenue property. The board's judgment approved the company's application and plans, subject to modifications that may be necessary after hearing the city's objections on enginering grounds. The judgment, which overrules the city's objections on legal grounds to the company's application, was not pleasing to Mayor Church, and the Board of Control may be asked to authorize an appeal against the order. Chairman McIntyre, in giving judgment, stated that there could be no doubt whatever of the need of such a terminal as was proposed, since the returns of the company showed that 5,000,000 passengers and considerable freight were carried annually. The chairman said:

"The right claimed by the company is so trifling an amplification of rights long enjoyed without question, and so obviously necessary to the proper discharge of its functions, that it might well be held to be implied on the ground of powers lawfully exercised by the company for years."

He said further that, apart from implied authority, the express terms of the railway act warranted the conclusion that the company was entitled to connect its tracks with its terminal.

The Board of Control, in conference privately with the city legal department, decided on Aug. 17 to appeal to the Privy Council against the decison of the board in allowing the Toronto & York Radial Railway Company this right. The Board of Control claims that its decision in appealing is not so much a question of the right-of-way across the street being a menace to the public as of a policy on the part of the city. One of the comptrollers said:

"If the company secures that right-of-way, there is a possibility that the Canadian Northern Railway interests might extend their steam railway over the present right-of-way along the west side of Yonge Street to the old terminal."

If such should be the case the city might not be able to prevent the steam road from connecting with the radial lines, because the steam road has a dominion charter. The city previously received a decision from the Privy Council preventing the Toronto & York Radial Railway from crossing the streets south of Farnham Avenue over its own private right-of-way.

WORK OF NEW YORK INDUSTRIAL COMMISSION

A statement of the working of the new State Industrial Commission law in New York was prepared for the New York *Times* by W. C. Archer, second deputy commissioner in direct charge of the settlement of claims, and approved by John Mitchell, chairman of the commission. The statement, published on Aug. 24, follows in part:

"The new Industrial Commission which superseded the State Workmen's Compensation Commission and the Department of Labor on June 1 finds itself after two months in command of the situation but with its hands full of work. It should be appreciated, however, that with functions so vast, powers so various, and duties so numerous, it will take time for the commission to develop the plans in the minds of the lawmakers in framing the law creating the department. The new workmen's compensation law under which employers, in accordance with the schedule of benefits, may make direct agreements with their workmen for compensation, has not been in operation long enough fully to develop a normal experience and thus give a basis for accurate and useful comparison with the former law. It may be said, however, that the number of accidents reported is on a par with experience developed under the first compensation laws.

"Fully 90 per cent of compensatable cases arising under the new law have already developed into claims and agreements and the relative percentage is increasing day by day. The first two months under the new law showed a falling off in cases. This is attributable to the general lack of understanding of the terms of the new law, the time required by insurance companies to reorganize to meet the new situation, and the time required to make and distribute the required forms and to become acquainted with them. But the last two months have seen the very reverse of such condition, and the gain has been so rapid as to bring the aggregate up to 90 per cent, and to indicate an early approach to a fully normal condition as measured by the experience of the last year.

"The bureau has about cleared its books of all cases arising before April 1, namely, under the old law, except those which because of continuing disability must reappear from time to time on the calendar until recovery can guide a final disposition. Death benefits and benefits arising out of the more serious cases, such as amputations, &c., will run on, some of them for years and some of them during the lifetime of beneficiaries. In handling its claims this bureau, in spite of the disadvantage of the vacation period, is up to date with its work and few complaints are heard.

"The State insurance fund enters upon its second year with a substantial increase in the amount of business done and with a splendid demonstration of its ability to retain its first year's business. This is a splendid showing, especially in the face of its being compelled to do business without solicitation and with no other means than through correspondence to explain away the many misrepresentations made by those whose personal interest would desire to embarrass it. Notwithstanding its initial lower rates it has been able further to reduce its rates and at the same time to give back to its contributing employers substantial refunders through rate reductions."

Mr. Archer said that not only did the direct settlement make possible a saving of upward of $100,000, but that it enabled the commission to keep within 1,000 cases of the calendar, the minimum possible under the two weeks' injury clause, whereas under the old law, by which the commission heard every claim, the calendar was generally about 6,000 cases behind. Under the new law the commissioners hear only claims where the employer and employee are unable to agree upon a settlement.

Plea Allowed for Fuller Particulars.—Circuit Judge Hunt in the Federal District Court at New York has granted the plea of the indicted directors, officials and counsel of the New York, New Haven & Hartford Railroad for an opportunity to learn more particulars regarding the prosecution for conspiracy begun by the government.

Two Holyoke (Mass.) Arbitrators Selected.—William H. Brooks, attorney for the Holyoke (Mass.) Street Railway, has been chosen by the company as its representative in the forthcoming arbitration proceedings dealing with wages and related conditions of working. Former Mayor John J. White of Holyoke has been named by the union as its representative. The third member of the board is to be appointed by Governor Walsh.

Chicago Elevated Moves Offices.—The general offices of the Elevated Railroads of Chicago, Ill., have been moved from the Royal Insurance Building, where they have been for a number of years, to the new Edison Building, at the corner of Adams and Clark Streets. For the present the general offices will be located on the eleventh, twelfth and thirteenth floors of this building, but eventually the entire twelfth floor will be given over to this company. The Edison Building is also the new home of the Commonwealth Edison Company.

Municipal Belt Line Suggested for Baltimore.—Mayor Preston of Baltimore, Md., has sent a plan to the city planning commission for a municipally owned and electrically operated belt line railroad connecting with the Pennsylvania, Baltimore & Ohio, Western Maryland and Maryland & Pennsylvania Railroads, with provisions for new tunnels through the city and a grand union station at the Fallsway and Biddle Street. The proposed roads and tunnels were outlined and suggested by William H. Maltbie and Daniel B. Banks and would represent an outlay of $17,369,000.

Detroit Purchase Election Nov. 2.—The Common Council of Detroit, Mich., has set Nov. 2 as the day on which the electors will vote on the proposition of purchasing the lines of the Detroit United Railway within the one-fare zone. At a meeting of the Council on Aug. 23, the plan for the purchase and the charter amendment authorizing it were laid upon the table for thirty days, as provided by statute Mayor Marx, members of the Street Railway Commission and others addressed the Aldermen in advance of the selection of the date, urging the acceptance of the purchase plan.

Washington Valuation Progress.—On Aug. 23, E. W. Bemis, director of the valuation bureau, and Charles L. Pillsbury, his assistant in immediate charge of the work of valuing the properties of the public service corporations in Washington, D. C., reported to the Public Utilities Commission on the progress of the work. Whether or not the valuation of all the public utilities is entirely completed in November, it will be so nearly finished by that time, according to Mr. Bemis, that the commission will be in possession of sufficient information to enable it to take up rate and other questions that have had to be held in abeyance on account of lack of information.

Cincinnati Transit Commission Law in Effect.—The law creating the Rapid Transit Commission of Cincinnati has gone into effect, and Mayor Spiegel has called the attention of the City Council to the necessity of prompt action in passing an ordinance authorizing the appointment of members of the commission. It is the Mayor's idea that there should be public discussions of the subject to ascertain the will of the people in regard to the proposed bond issue and their choice of routes for a rapid transit railway as marked out by the present unofficial commission. It seems unlikely that the question of issuing bonds will be placed before the voters at the November election. The Mayor states that he will not make public the names of the commissioners until their appointment has been authorized by the Council.

Must Secure Permits for Highway Rights.—Public utility companies seeking to secure rights-of-way on Pennsylvania State highways must first secure permits from the State Highway Commissioner, according to a ruling made by Highway Commissioner Cunningham, in the South Portage Railway controversy. Tracks laid by the company were ordered removed by William Uhler, chief engineer of highways. The company secured an injunction to restrain the State from interfering with the tracks. Later Commissioner Cunningham informed representatives of the company that they must vacate the injunction and remove the tracks, after which the matter would be taken up.

Commissioners Continued as Constitutional Officers.—In a revised article which was reported on Aug. 19 by the committee on public utilities of the New York State Constitutional Convention, the public service commissioners are continued as constitutional officers, despite the criticism which that provision received in the debate before the article was sent back to the committee for revision. The revised draft provides that the present commissioners shall serve out their terms. Their successors will be removable by the Senate on the recommendation of the Governor, who must file a statement giving the grounds for asking their dismissal. Another feature transferred from the old article would prohibit the Legislature from undertaking any rate legislation, except after the Public Service Commission has been consulted and has submitted a report as to the reasonableness of the measure. A new provision in the revised article would permit the Legislature to change the jurisdiction and number of public service commissioners. The two commissions are continued.

Promoting Publicity in Dallas.—Edward T. Moore, manager of the Dallas (Tex.) Consolidated Street Railway, in announcing the appointment of Bradley B. Hogue as assistant to the manager in charge of publicity said in part: "I am glad to announce the appointment of a Dallas man to this position. We believe the steps the company takes to develop further and to improve more fully a Dallas service for Dallas people constitute news items that are a gratification to Dallasites and a valuable advertisement of the progressiveness of Dallas to outsiders. While our desire to give out news items of interest is strong, our nose for news is often weak. We have, therefore, decided on creating this position and filling it with a former newspaper man, who knows a 'story' when he sees one. A part of Mr. Hogue's duties will be to act as sort of first aid to the reporter in search of a story here. I know of nobody who shows more genuine enthusiasm over the job than a reporter after news and when I can help satisfy that enthusiasm I am glad to do it." The appointment of Mr. Hogue was noted in this paper for Aug. 21.

Signing of Construction Contract Ordered.—Supreme Court Justice Shearn in a decision handed down on Aug. 23 granted a peremptory writ of mandamus directing the Board of Estimate and Apportionment of New York City to "reconvene forthwith" and sign the contract with the Holbrook, Cabot & Rollins Corporation for the construction of the Times Square section of the Broadway-Seventh Avenue subway. The mandamus writ carries with it, too, an order that the Board of Estimate prescribe the amount of corporate stock needed to meet the city's obligation in carrying out the contract, and directs the Comptroller to issue the stock "without any condition or proviso whatever." The Public Service Commission is also directed to do its part. The Justice takes into consideration the act of the Board of Estimate in amending the contract with regard to extra work after bids had been opened and the Holbrook, Cabot & Rollins Corporation had been discovered to be the lowest bidder. This action of the Estimate Board was taken on the recommendation of Tilden Adamson, Director of the Bureau of Contract Supervision, after the Public Service Commission had accepted the contract form without alteration and sent it to the Estimate Board for approval. Justice Shearn finds that the Estimate Board had no power to so alter the contract. The principles involved in the case were referred to in the ELECTRIC RAILWAY JOURNAL of Aug. 21, page 328.

Financial and Corporate

ANNUAL REPORTS

Seattle Municipal Street Railway

The City Utilities Department, which has charge of the operation of the Seattle (Wash.) Municipal Street Railway, has issued the following income, profit and loss statement of the company for the year ended May 31, 1915:

	Division		
	A	C	Total
Revenues:			
Passenger	$14,854	$15,749	$30,604
Freight	....	1,802	1,802
Miscellaneous	2,938	103	3,041
Total	$17,792	$17,654	$35,447
Operating expenses:			
Way and structures	$ 659	$2,225	$2,884
Equipment	1,285	709	1,994
Power	6,056	4,944	11,000
Conducting transportation:			
Passenger conductors and motormen	10,732	8,764	19,496
Freight conductors and motormen	.....	788	788
Car house employees	3,412	1,201	4,613
Other transportation employees	578	1,036	1,614
Other transportation expenses	584	277	861
General and miscellaneous	79	3,039	3,118
Total	$23,385	$22,983	$46,368
Loss on operation	$5,593	$5,329	$10,921
Interest on bonds			13,500
Grand total			$24,421

The Seattle Municipal Street Railway has two lines owned and operated by the city—Division "A" within the city limits, approximately 4½ miles in length, consisting of 3½ miles of double and ¾ mile of single track, beginning at Third Avenue and Pine Street and running in a northerly direction to Thirteenth Avenue West and Nickerson Street. The other line, Division "C," was a gift to the city by real estate speculators who, finding the property a heavy financial burden, offered it to the city as a gift. The road cost $125,000, is approximately 8½ miles long, with 4½ miles within the city limits and 4 miles outside, runs in a southerly direction beginning at Spokane Avenue and Iowa Street, and ends at Seahurst. The lines are widely separated—about 3 miles apart, and in opposite parts of the city—one in the south and the other in the north end.

The miscellaneous receipts of Division "A" in the above table represent simply accrued book accounts for the rental of cars by Division "A" to Division "C," no cash being involved. During the year Division "A" carried 339,611 pay passengers and Division "C" 305,495, or a total of 645,106. The passenger car miles totaled 168,452 for Division "A" and 143,942 for Division "C," while the freight car miles numbered 4,328 on Division "C." The earnings per car mile were $0.1056 on Division "A" for passenger service and $0.1101 on Division "C" for passenger service and $0.4161 for freight service, while the operating expenses per car mile were $0.1388 on Division "A" for passenger service and $0.1541 on Division "C" for passenger service and $0.1820 for freight service.

The loss of $24,421 for the year is exclusive of interest on borrowed funds, depreciation, taxes, damages, overhead charges of any kind, as well as accounting, superintendence and legal expenses. As showing what a small part of the loss suffered by the community through the operation of the railways is included in this figure, it has been estimated that exclusive of charges for superintendence, accounting, legal insurance or damage expenses, the charges for taxes, depreciation and interest on borrowed funds alone would amount as follows:

Interest at 4½ per cent on $90,000 borrowed from garbage fund	$4,050
Interest at 4½ per cent on $9,000 borrowed from general fund for operation	405
Interest at 4½ per cent on $27,500 borrowed from general fund to rehabilitate Division "C"	1,224
Interest at 4½ per cent on $10,000 borrowed from general fund for operation (three months)	113
Depreciation at 4 per cent on $403,000 plant cost Division "A"	16,120
Depreciation at 4 per cent on $156,000 plant cost Division "C"	6,240
Lost taxes, Division "A," on 45 per cent valuation	7,435
Lost taxes, Division "C," on 45 per cent valuation	2,878
Loss 2 per cent on gross passenger receipts	612
Total	$39,077

Alabama Traction, Light & Power Company, Ltd.

The statement of income, profit and loss of the Alabama Traction, Light & Power Company, Ltd., New York, N. Y., for the year ended Dec. 31, 1914, is as follows after eliminating inter-company items:

Operating revenues:	
Light and power department	$513,234
Railway department	94,463
Gas department	45,358
Water department	4,539
Total	$657,594
Deduct:	
Rebates and discounts	$35,137
Reserve for bad debts	2,679
Total	$37,816
Net operating revenue	$619,778
Operating expenses:	
Light and power department	$217,577
Railway department	71,841
Gas department	27,665
Water department	5,209
General expense	1,000
Total	$323,292
Net operating income	$296,486
Add interest on deposits	3,070
Gross income before deducting bond interest and depreciation	$299,556

The war in Europe has resulted in a general business depression far more severe than any which had previously existed. As a direct consequence it has been impossible to secure new power business on the scale anticipated, and at the close of the year the company's revenue was very considerably short of the amount necessary to cover fixed charges and operating expenses.

At the outbreak of the war tentative arrangements which had been made in London for the further financial requirements of the company could not be consummated. In London on Oct. 21, 1914, about 75 per cent of the bondholders agreed to defer for three years the bond interest due on Sept. 1, 1914, and March 1, 1915; to cancel the obligations contained in the trust deed to provide a sinking fund for the repayment of the bonds, and to authorize any of the subsidiary companies to issue bonds or debentures in the nature of prior lien securities under certain restrictions.

The directors deemed it advisable to arrange for an issue of bonds of the Alabama Power Company, the principal operating company, and in connection with such issue to merge all the subsidiary companies into the Alabama Power Company. This merger was effected and arrangements were closed early in March, 1915, for the sale of $2,000,000 of three-year 6 per cent gold bonds to Harris, Forbes & Company, New York. The sale of the new securities enabled the company to liquidate all its obligations and to proceed vigorously with extensions.

ENGLISH LINES SHOW VARIED RESULTS

The London County Councils Tramway, London, England, had a deficit for the year ended March 31, 1915, after all charges, of £33,172. Passengers carried numbered 550,497,993 as compared with 522,952,640 in the preceding year. The total income for the year was £2,399,847 and operating expenses, including the war allowance to employees on active service, were £1,700,571, leaving net of £699,276. Car-miles operated during the year were 58,978,792 and the cost per car-mile of the electric railways, excluding war allowances, was 13 cents. Including war allowances, this cost was 13.6 cents a car-mile. The receipts on the electric lines were 19.4 cents a car-mile, as compared with 18 cents a car-mile for the preceding year. Up to March 31, 1915, capital expenditures on the lines had been £13,315,723, of which £287,604 was expended in the fiscal year.

The committee in charge of the tramways is taking steps to improve the financial position of the undertaking and attaches great importance to the consolidation and the linking up of the lines, a matter which has been held in abeyance for the present. The committee states that the conditions under which the undertaking has been worked since the outbreak of the war have been abnormal, producing results not fairly comparable with results under normal conditions. During the first four months of the financial year the tramways were worked under normal conditions, the results being satisfactory. The receipts from April 1 to Aug. 5, 1914, were about 5½ per cent more than the receipts for the corresponding period of 1913.

The effect of the war on the Manchester (England) Corporation Tramways was to reduce the revenue for the last year by £23,434. The total for the year ended March 31 was £901,875, as compared to £925,309 in the previous year. This decrease was caused by the great falling off in the traffic receipts since the outbreak of the war. If normal conditions had prevailed throughout the year the traffic receipts, instead of showing a decrease, would, according to the annual report issued, have shown a considerable increase. The receipts for the first four months clearly indicated this, and there is no doubt that but for the war the estimate of the revenue (£950,600) made at the beginning of the financial year would have been realized. The effect of the war, therefore, has been to cause a drop in revenue of nearly £50,000.

Considerable savings were made in the operating expenses as compared with last year, but the total expenditure was largely increased by the war service allowances (£31,763), representing mainly the payments made to the 1554 men who had joined the colors up to the close of the financial year. The net result shows that after paying the £100,000 in relief of the rates it was possible to pay only £48,584 to the reserve renewals and depreciation account, as compared to £97,219 paid to this account last year.

The total revenue of the Leeds Municipal Tramways for the year ended March 31 was £422,353, an increase of £6,312 over that for the previous year. Operating expenses being deducted left a net revenue of £200,310, as against £195,730 in the previous year. The working expenses are approximately 53 per cent of the total revenue. After deducting the interest paid on capital, income tax, rent on lines and war allowances to dependents of those employees on active service, there was left a balance to be carried to the appropriation account of £147,479, which compares with £151,735 in the preceding year.

The amount to be set aside for depreciation was £56,230; and with further deducting the cost of upkeep of permanent way and electrical renewals, there was left a net surplus of £79,389, available for the relief of the rates. This is the largest amount ever applied from this undertaking to the relief of the Leeds rates. Prior to the outbreak of the war it was estimated that the relief would amount to £92,463, but the first ten weeks after the war began showed a reduction in revenue of £6,800, while war payments to employees' dependents represent an annual sum of £4,340.

WEST VIRGINIA MERGER RUMORED.

The visit of a party of West Virginia traction officials and Eastern bankers to various traction systems of the state has led to the rumor that a gigantic traction merger is planned to give a continuous trolley system through the interior of the state, reaching almost from border to border. The rumored merger would mean the amalgamation of the Monongahela Valley Traction Company, the Weston-Glenville Traction Company, the Kanawha Traction & Electric Company and possibly the Parkersburg and Charleston systems and the construction of connecting links.

The bankers and traction officials are traveling in automobiles from the southern terminal of the Monongahela Valley Traction Company's system at Weston by way of Glenville and Burnsville to Parkersburg and Charleston. Among those in the party are George T. Watson, Fairmont, vice president Consolidation Coal Company; James O. Watson, Fairmont, general manager Monongahela Valley Traction Company; S. D. Camden, Parkersburg, president Parkersburg, Marietta & Interurban Railway; T. Edward Hamilton, president Hamilton Banking Company, Baltimore, Md., and R. C. Hoffman, of the Pennsylvania Steel Company, Philadelphia, Pa.

American Public Utilities Company, Grand Rapids, Mich.—At the annual meeting of American Public Utilities Company Walter H. Lippincott was elected a director to succeed Henry S. Morris, Philadelphia.

Buffalo (N. Y.) Southern Railway.—At a recent meeting of stockholders William A. Bundy and Charles B. Pheller, Buffalo; David K. Harrington, Orchard Park, and John J. Roberts, New York, were elected directors of the Buffalo Southern Railway.

Brantford (Ont.) Municipal Railway.—The Brantford Municipal Railway after six months of operation has earned sufficient to cover the operating expenses and leave a balance of $8,284. After payment of local taxes and fixed charges, however, there is a net deficit of $3,438. The commission hopes that the system will pick up within a year, when Mohawk Park is improved and a loop line in Eagle Place taps the factories of the city, which have hitherto not been reached.

Everett Railway, Light & Water Company, Everett, Wash.—An election was to be held on Aug. 24 on the question of issuing $1,100,000 of 6 per cent bonds, the proceeds of which it is proposed to use for financing the purchase or the condemnation and purchase of the plant belonging to the Everett Water Company, which is owned by the Everett Railway, Light & Water Company.

Fort Wayne & Springfield Traction Company, Decatur, Ind.—At a receiver's sale on Aug. 12 the Fort Wayne & Springfield Traction Company was bid in by Martin Gerke for Mrs. Rosetta Dirkson and Mrs. Emma Gere, who represent an organization of the old stockholders. It is reported that these stockholders have organized the Fort Wayne, Decatur & Southern Traction Company to operate the line. The sale price was $78,000, a deposit of $5,000 having been required of all bidders. The buyers have sixty days to pay the balance. It was the fifth time the road had been offered for sale and the second time it was sold. Last May the same persons bid in the road for $84,000, but failed to make the required payments, forfeiting a deposit of $1,000. The sale is expected to be confirmed at once by the Circuit Court. Previous references to this company were made in the ELECTRIC RAILWAY JOURNAL of May 13 and 22, June 19 and July 31.

Los Angeles & San Diego Beach Railway, San Diego, Cal.—The Los Angeles & San Diego Beach Railway has filed with the California Railroad Commission an application for authority to issue a $15,000 note for four months at 6 per cent to the American National Bank, San Diego, to renew a similar note. The proceeds were spent for betterments to the railway.

Philadelphia Company, Pittsburgh, Pa.—The Duquesne Light Company, which is controlled by the Philadelphia Company, recently issued $1,000,000 of additional 7 per cent cumulative preferred stock. The company now has $1,700,000 of such stock outstanding.

San Francisco (Cal.) Municipal Railways.—The gross receipts of the San Francisco Municipal Railways for July were $221,337. This averages $7,140 per day and is the heaviest gross return in any one month since the system has been operating.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The suit brought by the Anglo-California Trust Company, San Francisco, against the United Properties Company and other stockholders of the Oakland Railways, as noted in the ELECTRIC RAILWAY JOURNAL of Aug. 21, for recovery on the issue of $2,500,000 of Oakland Railways notes of Aug. 12, 1912, is said to have been made to protect the noteholders in the event that the pending reorganization of the San Francisco-Oakland Terminal Railways, which controls the Oakland Railways and is in turn controlled by the United Properties Company, is not carried out. It is said that the statute of limitations would have made the trust company unable to sue after Aug. 15. The California Railroad Commission has issued a supplemental opinion in the application of the San Francisco-Oakland Terminal Railways for authority to pledge with the Commonwealth Bonding & Casualty Insurance Company $18,000 face value of its general lien mortgage bonds and $40,000 face value of the same bonds as security for surety bonds in connection with damage suits.

Seattle, Renton & Southern Railway, Seattle, Wash.—The Supreme Court, in modifying an order entered some months ago by Judge A. W. Frater in the Superior Court, states that Peabody-Houghteling & Company, who are interested in the Seattle, Renton & Southern Railway, are entitled to interest as well as the full amount of the loans made to the local company. The claim was that of a general creditor and rested upon notes given from time to time in exchange for loans. The lower court declined to allow interest, as noted in the ELECTRIC RAILWAY JOURNAL of Feb. 13, 1915, but the Supreme Court has ruled that it must also be paid. The court has also affirmed the decision of Judge Frater making preferred the claim of Augustus H. Peabody, trustee for the holders of $1,000,000 bonds of the railway.

Southern Traction Company of Illinois, East St. Louis, Ill.—A suit to determine the various interests of claimants against the property of the Southern Traction Company of Illinois has been filed in the United States Court at Danville. The action is brought by the Union Trust Company & Savings Bank, St. Louis, Mo., trustee for the original bondholders. The line was partially constructed for 15 miles near St. Louis, by former United States Senator William Lorimer.

Syracuse & South Bay Electric Railroad, Syracuse, N. Y.—On account of unexpected and unavoidable delays of a routine nature, it is said that the foreclosure sales of the Syracuse & South Bay Electric Railroad and the Syracuse, Watertown & St. Lawrence River Railroad will not be possible until the latter part of October or early in November. Previous references to these companies were made in the issues of the ELECTRIC RAILWAY JOURNAL of May 29 and June 19.

Toronto (Ont.) Railway.—Seventy-nine 4½ per cent currency bonds, par $1,000, and 305 sterling bonds, par £100, issued under the first mortgage dated Sept. 1, 1892, have been drawn for redemption at par and interest on Aug. 31 by the Toronto Railway.

Union Traction Company, Santa Cruz, Cal.—A meeting of bondholders of the Union Traction Company was scheduled for Aug. 25 to investigate the condition of the corporation through the appointment of a committee of bondholders. Owing to the prevalence of the auto habit, the gross earnings of the company fell off from $82,000 during the year ended June 30, 1914, to $69,377 in the last fiscal year. The deficit for the year just ended was $11,116. An amount of $23,636 was on June 30 due to the Coast Counties Gas & Electric Company, which owns the Union Traction Company stock but has not guaranteed any of its obligations.

United Railroads of San Francisco, San Francisco, Cal.—The California Railroad Commission has extended the effective date of its order of May 17, requiring the United Railroads of San Francisco to set aside $550,000 a year for three years for betterments, until such time as the commission has denied or granted the petition for a rehearing that has been filed by the company. The company protested that it was impossible for it to comply with the order.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.—Up to the close of business on Aug. 17 stockholders had subscribed for $18,237,000 of new convertible bonds from the $18,695,000 offered for subscription at 105. Under the terms of the agreement the unsubscribed bonds, $485,000, will go to the holders of the old bonds. Of the total subscriptions payment was made in full for $16,423,000 of bonds. On the balance the first installment was paid. The conversion plan, which was declared operative by Kuhn, Loeb & Company in July, was described in the ELECTRIC RAILWAY JOURNAL of May 8.

Winnipeg (Man.) Electric Railway.—The Winnipeg Electric Railway has applied to the London Stock Exchange for the listing of £400,000 of 4½ per cent perpetual consolidated debenture stock. This makes a total listed of £900,000.

Youngstown & Ohio River Railroad, Leetonia, Ohio.—The gross earnings of the Youngstown & Ohio River Railroad during the year ended June 30, 1915, totaled $290,164, as compared to $273,603 for the preceding year. The operating expenses, taxes and rentals increased from $175,678 in 1914 to $185,674 in 1915, giving net earnings of $97,925 in 1914 and $104,490 in 1915. The bond interest each year amounted to $50,000, so that the surplus for the last fiscal year was $54,490 as compared to $47,925 in 1914.

DIVIDENDS DECLARED

Louisville (Ky.) Traction Company, 2½ per cent, preferred; quarterly, 1 per cent, common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1¼ per cent, common.

Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE RAILWAY, KENNEBUNK, ME.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July,	'15	$44,197	$35,006	$9,191	$654	$8,537
1 " "	'14	49,184	27,948	21,236	667	20,569

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun.,	'15	$163,746	$123,865	$39,881	$33,625	$6,256
1 " "	'14	192,559	118,152	74,407	38,816	35,591
12 " "	'15	1,982,599	1,299,352	683,247	472,112	211,135
12 " "	'14	2,113,082	1,337,587	775,495	459,075	316,420

BATON ROUGE (LA.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun.,	'15	$15,409	*$8,967	$6,442	$1,736	$4,706
1 " "	'14	15,603	*9,590	6,013	1,727	4,286
12 " "	'15	180,955	*110,823	70,132	20,765	49,367
12 " "	'14	175,937	*114,882	61,055	21,154	39,901

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun.,	'15	$10,420	*$7,960	$2,460	$1,123	$1,337
1 " "	'14	11,458	*8,870	2,588	1,085	1,503
12 " "	'15	118,966	*98,844	20,122	13,463	6,659
12 " "	'14	121,731	*102,208	19,523	12,868	6,655

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun.,	'15	$27,832	*$17,856	$9,976	$6,597	$3,382
1 " "	'14	29,697	*17,595	12,102	6,418	5,684
12 " "	'15	338,169	*208,227	129,942	78,608	51,334
12 " "	'14	373,646	*207,338	166,308	75,253	91,055

CITIES SERVICE COMPANY, NEW YORK, N. Y.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun.,	'15	$294,520	$14,022	$280,497	$40,833	$239,664
1 " "	'14	269,586	8,947	260,639	29,166	231,473
12 " "	'15	3,977,733	148,170	3,829,562	490,000	3,339,562
12 " "	'14	3,399,186	90,984	3,308,202	298,062	3,010,140

COLUMBUS (GA.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun.,	'15	$56,286	*$27,079	$29,207	$25,332	$3,875
1 " "	'14	54,120	*20,797	33,323	23,141	10,182
12 " "	'15	696,498	*318,140	378,358	305,871	72,487
12 " "	'14	646,505	*274,091	372,414	259,292	113,122

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun.,	'15	$58,584	*$31,324	$27,259	$8,713	$18,546
1 " "	'14	58,250	*34,201	24,049	8,351	15,698
12 " "	'15	672,517	*385,290	287,227	104,566	182,661
12 " "	'14	602,878	*381,390	221,488	99,695	‡143,328

EL PASO (TEX.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun.,	'15	$72,931	*$40,496	$32,435	$4,194	$28,241
1 " "	'14	80,052	*49,849	30,203	4,203	26,000
12 " "	'15	997,414	*540,820	456,594	50,328	406,266
12 " "	'14	963,471	*532,768	430,703	54,653	‡382,741

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun.,	'15	$24,589	*$14,070	$10,519	$5,661	$4,958
1 " "	'14	24,508	*16,610	7,898	5,552	2,346
12 " "	'15	265,299	*168,279	97,020	67,041	29,979
12 " "	'14	288,369	*179,649	108,720	67,140	41,580

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun.,	'15	$21,770	*$13,836	$7,934	$6,595	$1,339
1 " "	'14	24,613	*16,273	8,340	6,623	1,717
12 " "	'15	292,513	*186,460	106,053	80,914	25,139
12 " "	'14	308,017	*196,514	111,503	80,598	30,905

PENSACOLA (FLA.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun.,	'15	$21,511	*$11,745	$9,766	$7,137	$2,629
1 " "	'14	24,364	*14,869	9,495	7,138	2,357
12 " "	'15	248,544	*153,340	95,204	86,987	8,217
12 " "	'14	285,662	*179,361	107,301	85,708	21,593

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July,	'15	$1,939,905	$1,095,694	$844,211	$816,595	$27,615
1 " "	'14	1,951,265	1,137,700	813,563	809,364	4,199

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun.,	'15	$592,736	*$382,357	$210,379	$181,342	$29,037
1 " "	'14	668,255	*413,509	254,745	176,661	78,084
12 " "	'15	7,908,397	*4,825,817	3,082,579	2,151,772	930,807
12 " "	'14	8,701,960	*5,059,171	3,642,788	2,096,613	1,546,175

TAMPA (FLA.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Jun.,	'15	$77,004	*$41,898	$35,106	$3,631	$31,475
1 " "	'14	81,685	*44,012	37,673	3,700	33,973
12 " "	'15	986,739	*507,366	479,433	43,863	435,570
12 " "	'14	933,560	*514,778	418,782	46,580	372,202

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*Includes taxes. ‡Includes non-operating income.

Traffic and Transportation

JITNEY JOTTINGS

Public Service Commission and Court Action in New York on Jitney

The Public Service Commission for the Second District of New York, in addition to the court action taken recently to restrain the operation of jitney-bus lines in Rochester and Corning which have not secured certificates of public convenience and necessity, has instituted upon the complaint of the New York State Railways and the Corning & Painted Post Street Railway action against three jitney operators in Corning and seven in Rochester. These proceedings will be before the commission itself. The complainants allege that the jitney men are operating in violation of the law passed at the last session of the Legislature by carrying passengers within a city of the State for 5 cents and in competition with a common carrier, and invoke the power of the commission to stop them. The complaints have been served on the various jitney men, and upon receipt of their answers dates for hearings will be set by the commission.

Both the street railways allege that their business is being injured by the operation of these vehicles contrary to law, and claim the same protection from the Public Service Commission as might be afforded to an individual. The hearings before the commission will amount to a trial of the issue as to whether or not the jitneys are violating the law. Should it be proved that they are, the commission is empowered to take legal steps to prevent their operation.

In addition to the cases mentioned, the commission also has in the correspondence stage a number of similar matters from cities all over the State, in some instances originating with citizens and in others with street railways. As yet there has been but one formal application to the commission for a certificate of public convenience and necessity for the operation of a jitney line. This came from the Troy Auto Car Company, but was withdrawn in order that the proprietors of the line might make some changes in their incorporation. As rapidly as formal complaints are made the commission, according to its established procedure in all cases, serves the complaint on the alleged offender, and after giving him an opportunity to answer tries the issues which may thus be joined. The complaints served on Aug. 20 in the Rochester and Corning cases are the first which have been made formal.

The motor-bus service between Lockport, N. Y., and Olcott Beach on Lake Ontario, a distance of 12 miles, for which a fare of 50 cents was charged, was dealt a death blow by Justice Brown in the Special Term of the Supreme Court in Buffalo, N. Y., in an opinion handed down, in which the justice held that the owners of the line must get a certificate of necessity and convenience from the New York State Public Service Commission, Second District, and a permit from the City Council of Lockport. The court granted an injunction restraining Mr. Hurtgan from operating his motor vehicles and carrying passengers for hire in Lockport. Burt G. Hurtgan, Newfane, owned the line. Arguing before the court, counsel for the defendant claimed that he did not collect fares between points in Lockport nor did he discharge passengers anywhere within the city limits, but merely operated a bus line between two points in the State over a state highway, not in violation of any law and not under the jurisdiction of any commission or law-governing body. Representatives of the International Railway, who filed the complaint against the jitney service, held the line was in competition with the railway and ran parallel to its right-of-way for miles. The court held the service was under the jurisdiction of the Thompson law passed last winter.

The jitney situation in Philadelphia has undergone such rapid changes during the week that overnight developments have cut the number of cars operating on Broad Street from 1200 to eight. This was the result of the police department enforcing the ordinance regulating jitneys. Drivers who had threatened to run the police gauntlet and risk arrest underwent a change of heart. Three unbonded drivers who operated were arrested. One of them was released because he told Magistrate Beaton in City Hall that he operated from a fixed stand and charged more than 5 cents for a ride. The other two were discharged when they explained that they operated large machines and came under the provisions of the omnibus bill of 1907 by carrying thirty or more passengers.

That all the Philadelphia jitney ordinance is in force excepting that part of one section requiring the jitneys to travel over the whole of prescribed routes for a fare of 5 cents; that to make "sight-seeing" cars out of jitneys would be evading the law, and that the $2,500 bond required for each car operating as a jitney was prepared in accordance with the ordinance were declared to be the facts in an opinion given by City Solicitor Ryan to Director of Public Safety Porter. In his opinion Mr. Ryan said: "In connection with the general jitney question, I would suggest that neither you nor I have any power to alter or amend the terms and provisions of the ordinance in relation to the duties devolved upon us respectively by it, without regard to our private opinions on the subject."

The first section of the ordinance specifically exempts "any street railway car or motor-propelled vehicle used exclusively for sightseeing purposes." Mr. Ryan held that under this exemption any vehicle which is in good faith used genuinely for what are known as sightseeing purposes at the time of the passage of the ordinance should be permitted to run without reference to the requirements which the ordinance contains.

In Gloucester City, N. J., an ordinance regulating jitneys has been passed by Councils, fixing the license fee at $20 for each car having a seating capacity of four, $25 for a car having a capacity of five, $30 for those of six, and increasing by $5 per person up to $50 for machines carrying ten persons. The license fee applies to both residents and non-residents.

I. M. Howell, Secretary of State of Washington, reports that since the jitney bus-bonding law, passed by the 1915 Legislature, went into effect on April 1 911 jitney buses have been bonded in first-class cities of the State. Of this number eighty-three have been cancelled or surrendered, leaving 828 jitney buses operating on Aug. 15. The cities affected by the jitney bus law are Seattle, Tacoma, Spokane, Bellingham and Everett. The law provides for a bond of $2,500 for each jitney operating in a first-class city. The figures of Mr. Howell show that most of the withdrawals have come from Spokane, due no doubt to stringent municipal regulation, as compared with the ordinances regulating buses in Seattle and Tacoma. In Spokane eighty-eight jitneys have been bonded, but of this number twenty-two have surrendered their permits. In Seattle 628 permits have been issued. Of this number forty-five have been surrendered, leaving a total of 583 still operating. Surrender of the bonds and permit has been made either at the request of the bonding company or the jitney-bus operator himself. In the former instance the bondsman has asked to be relieved of the risk, while in the latter the operator has found a more lucrative field of endeavor in another city or has retired from the business. The complete figures are as follows: Seattle, permits, 628; cancelled, 45; net, 583. Tacoma, permits, 144; cancelled, 13; net, 131. Spokane, permits 88; cancelled, 22; net, 66. Everett, permits, 39; cancelled, 3; net, 36. Bellingham, permits, 12; cancelled, none; net, 12.

The Common Council of Lansing, Mich., has passed a regulatory ordinance governing jitney buses by which they must pay a license fee of $26 annually and provide a bond of $10,000 as a protection for passengers. The jitney bus men threaten court action to prevent enforcement of the ordinance. Considerable feeling exists against the jitney men because after the cars stop running at night they boost their fare to 10 cents.

The city of Los Angeles, Cal., on Aug. 5 paid to the secretary of the Auto-Bus Owners' & Operators' Association $4,000 as refund on excess jitney bus license fees received by the city. Other similar claims are pending.

The city ordinance of Austin, Tex., regulating the jitneys was held void and of no effect by District Judge A. S. Fisher in the N. C. Partin habeas corpus proceedings that grew out of opposition on the part of the jitney men to the ordinance. The court holds the attempt of the city to define certain cars as jitneys to be in violation of constitutional rights. It holds that the city has the power to license automobiles, but not to discriminate between service automobiles. Calling certain cars jitneys gives the city no right to impose a heavy tax upon them. The right of the city to control the street is upheld. Referring to the I. W. Sullivan case, in which case the Court of Criminal Appeals upheld the Fort Worth jitney ordinance, Judge Fisher ruled that, that where cases are similar it is the duty of the lower court to follow the higher court's ruling, but where the facts are not similar and there has been no ruling by the higher court, investigation and ruling in a case are within the right of the lower court. Judge Fisher ruled that the case of Partin was different in some of its particulars from the so-called Sullivan case.

Injunction against operators of some 300 jitney buses in Memphis, Tenn., having been denied the Memphis Street Railway in the local courts, an appeal has been taken to the State Supreme Court. An effort will be made to have the case argued before the sitting of the court at Knoxville in September. The street railway case does not involve the question of the constitutionality of the State law, which provides that municipal authorities may require $5,000 indemnity bonds. This, however, has been raised in other cases now before the Supreme Court. In Memphis such an ordinance was prepared but has not been made effective, pending decision of the question.

The Quincy (Ill.) Street Railway has filed a petition with the State Public Utilities Commission of Illinois for the regulation of jitney buses in that city. The company desires that the jitneys be restrained from operating on the streets on which there are street cars. The date for the hearing has not been set.

The jitney bus ordinance was passed by the City Commission of Springfield, Ill., on Aug. 10. The ordinance provides for a bond of $5,000 for cars carrying five or less passengers and an additional bond of $500 for each additional passenger capacity. Before the new ordinance was read Commissioner Reece was given leave to withdraw the original ordinance, which has been slumbering in committee. The substitute provides that the following licenses shall be paid each year: For cars carrying five passengers, $5; cars carrying from five to eight passengers, $7; cars carrying from eight to ten passengers, $10; cars carrying more than ten passengers, $25. The license shall be paid October 1. Drivers of cars engaged in jitney service must secure a permit from the Mayor and Commission on payment of a fee of 50 cents, and are to be provided with a numbered badge, and the age for drivers is from eighteen to sixty years. Owners of cars who apply for licenses will be compelled to certify the route over which they are to drive. This section of the ordinance was opposed by the owners at a recent hearing, upon the ground that the enforcement of this section would make the cars common carriers and place them under the jurisdiction of the State Utilities Commission. Terminals will be established, but must be outside of the zone bounded on the north by Madison Street, the south by Capitol Avenue, the west by Second Street and the east by Eighth Street. Cars are allowed to stop for a period of not to exceed five minutes at crossings, and cars must be brought to standstill not less than 70 ft. from the crossing intersection. The cars are to be operated for at least six hours a day. Violation of the ordinance is punishable by a fine of not less than $5 or more than $200, and conviction may also bring automatically the revocation of the license. The ordinance will go into effect thirty days after its passage.

The Jitney Service Company, Williamsport, Pa., has requested the Public Service Commission for permission to withdraw its request for a certificate approving its incorporation. The reason stated is that the business of the jitneys in Williamsport has fallen so much that it was not deemed to be expedient to make further expenditures at this time.

In upholding an ordinance enacted by the Council of Independence, Judge Foran of Cleveland, Ohio, said that jitney bus owners must be required to give continuous service at regular intervals and must bear a portion of the taxes. He also suggested a $10,000 bond and license fees. The court said that the jitney bus should be fostered within all reasonable limitations.

WISCONSIN JITNEY LAW

Summary of Provisions of Recent Measure Placing Jitneys Under the Jurisdiction of the Railroad Commission

The Governor of Wisconsin on Aug. 17 approved chapter 546 of the laws of 1915 relating to the operation of motor vehicles for the carriage of passengers for hire upon streets and highways. Except for two sections the act took effect upon passage and the measure in its entirety will go in effect on Sept. 1, 1915. The measure declares as a common carrier every motor vehicle affording a means of local street or highway transportation similar to that furnished by street railways and indiscriminately accepting and discharging passengers. Such vehicles are required to operate over such general routes or within such territory and during such hours as may be reasonably required for the accommodation of the public in accordance with the provisions of the measure. No vehicle is to be operated in passenger transportation unless there has been filed with and accepted by the Railroad Commission an indemnity bond issued by a security or indemnity company authorized to transact business in Wisconsin, and the bond must provide that the company issuing it shall pay all damages not exceeding $2,500 to any one person or $5,000 for any one accident resulting from the negligent use of the automobile. Applicants for permission to operate in Wisconsin must state their name and residence, the general route or the territory over which it is proposed to operate, the proposed hours of service and the rate of fare to be charged. Regarding the authority of the commission the law says:

"If the railroad commission shall determine that such bond complies with the provisions of section 1797-63 and that the rates specified in the application accompanying the same are reasonable for such character of service, and that the proposed general route, or territory to be covered, and the hours of such operation are reasonably adapted to the accommodation of the public, it shall, regardless of any other service now furnished, accept such bond and shall thereupon issue to such applicant a certificate setting forth the fact that the applicant has in respect to the vehicle described therein complied with the provisions of section 1797-63 and section 1797-64."

Any person who operates a motor vehicle in contravention of the provisions of the section of the law governing bonding, who transports in any vehicle a larger number of passengers than the number specified in the bond as the carrying capacity of the vehicle, who charges a rate of fare other than that prescribed in the application accompanying the bond, or who fails to operate the vehicle upon the general route or within the territory and during the hours set forth in his application, is to be deemed guilty of a misdemeanor and upon conviction be fined not less than $10 nor more than $100 for each offense and in default thereof may be committed to the county jail for not less than ten nor more than ninety days. Every city, village and town within or through which any motor vehicle is operated for public hire may require local consent for operation and as a condition of such consent may require reasonable compensation for the repair and maintenance of pavement and bridges and compensation for the regulation of street traffic and for any other expenses occasioned by the operation of the automobile.

LIMITS FIXED FOR PARCELS ON NEW YORK CARS

The Public Service Commission for the First District of New York has adopted a final order establishing rules and regulations to govern the carrying of parcels and newspapers upon the subway and elevated lines operated by the Interborough Rapid Transit Company, and upon the subway and elevated lines of the New York Consolidated Railroad Company, the Nassau Electric Railroad and the South Brooklyn Railway.

The regulations governing the Interborough Rapid Transit Company's lines allow the carrying of newspaper bundles in the rush hours under certain restrictions, prohibit the sorting of papers on the cars and the throwing of packages from the trains. In non-rush hours the restrictions are not as stringent. As to parcels other than newspaper bundles, passengers will not be allowed to enter any station with bulky baskets or bundles, but only with ordinary hand satchels and parcels that can be conveniently carried on their laps or under seats without inconvenience to other passengers. No inflammable material will be admitted.

The regulations on the other lines permit the carrying of bundles of newspapers upon the platforms of elevated trains, but not inside the cars except between the hours of 2 a. m. and 6 a. m. Such bundles will be carried, subject to certain restrictions, which are formulated in the regulations. Passengers will not be allowed to carry very long or bulky articles or packages which are likely to cause accidents or serious inconvenience to other passengers. All articles which the guard thinks may be carried without danger or inconvenience and which are too large to be carried on the inside of the car, including bass drums and other articles for which special permits have been issued, must be kept on the platform in the custody of the owner.

All companies have been notified to file an amendment to their passenger tariff schedules to conform with the regulations. The proceedings which brought about the order were begun last May, after several persons with large bundles had been denied access to the subway and had complained to the commission. The Publishers' Association has already given its sanction to the order so far as it applies to newspaper bundles.

NEW TRAFFIC REGULATIONS PROPOSED

As a result of numerous investigations of street accidents involving automobiles and horse-drawn vehicles, extending over a period of several months the street traffic committee of the Safety First Society of the City of New York, has approved reports recommending new regulations, which it is believed will tend to minimize the number of preventable accidents occurring upon the public streets. The following recommendations, approved by the street traffic committee have been referred to William Bondy, general counsel of the society, with instructions to prepare the necessary ordinances for early introduction in the Board of Aldermen.

1. A new ordinance to provide for the elimination of dazzling head and side lights.
2. An ordinance requiring parallel parking at the curb for all vehicles of the delivery type.
3. An ordinance requiring the use of mirrorscopes on all motor vehicles operated in Greater New York. (New Jersey now requires the use of mirrorscopes.)
4. An ordinance requiring owners of all motor vehicles with chain drive to inclose the chains with suitable guards.
5. An ordinance making it a misdemeanor for any person to "hitch on" or trespass upon a motor truck or horse-drawn vehicle, unless employed by the owner of such vehicle.
6. An ordinance requiring that when a motor vehicle is at a stand-still and unattended, the vehicle shall be safeguarded as follows: (a) The motor of a gasoline propelled vehicle must be stopped; (b) on electric motor vehicles the control handle or the current cut-off switch must be locked so that the vehicle is rendered inoperative; (c) on all steam-propelled motor vehicles, the throttle or shut-off valve must be locked so as to render the vehicle inoperative; (d) the emergency brakes on a motor vehicle must be properly set so as to prevent such vehicle from moving.

The police department has been requested immediately to enforce the 8-ft. leeway law, the ordinance requiring lights on all vehicles. Among the members of the street traffic committee of the Safety First Society of the city of New York are George Keegan, general superintendent of transportation of the New York Railways, and J. A. Ritchie of the Interborough Rapid Transit Company.

SHOWING THE FARMER

A recent bulletin from the bureau of crop estimates of the Federal Department of Agriculture is in line with the argument which R. H. Wyatt, general freight agent of the Louisville & Interurban Railway, Louisville, Ky., has been presenting to the farmer patrons of the lines. One of the important features of the bulletin, which contains the findings of an investigation, is the statement that the average length of haul for the farmer who takes his produce to market by wagon is 6.5 miles, while the average time required to make the circuit is slightly more than half a day. For those farmers who are located beyond the normal radius from their markets, not including the extreme cases, the average haul has been found to be 8.7 miles and the average time to make the circuit is three-fourths of a day.

Mr. Wyatt, discussing the proposition from the viewpoint of the Louisville & Interurban Railway, took the average figures, 6.5 miles and a half a day in time, and estimated that this represented a cost in time of man and team of at least $2.50 on the average, of course, figuring that no team owner would sell services of man, team and wagon for less, while the average cost for hauling produce from all points on the company's lines to the freight depot, where the commission men would get it, he figured at between 50 and 75 cents a load. The commission man's charges would hardly be more than 50 cents on the average load, which would give the farmer a margin of between $1.50 and $1.25, out of which the costs of his delivery to the electric line would have to come, of course. But Mr. Wyatt figures it as a probability that the commission merchant's superior salesmanship and greater familiarity with the market would enable him to sell the produce to better advantage.

Two of the drawbacks to increasing the volume of this farm-to-market business, Mr. Wyatt said, are the distrust of the commission man by the farmer and the fact that the farmer has not been educated up to figuring comparative costs. Both of these are things the electric railway people will have to overcome before they will make much progress in taking over this farm-to-market business, Mr. Wyatt believes. His own propaganda along the line that the farmer's time in his fields is much more valuable to him, especially during the growing season, than it is on the road or in the market, is bearing fruit, and Mr. Wyatt is frequently asked for his reasoning on the proposition by producers along the lines of the company.

Gorge Lines Inspected.—The members of the Municipal Board of the Province of Ontario, with directors and engineers of the International Railway, Buffalo, N. Y., have inspected the Canadian line of the Great Gorge Route along the brink of the gorge and in the vicinity of the recent accident. The board will make a report as to suggested changes in equipment. The Attorney-General of the Ontario province will not take any action until after the report has been filed.

Skip-Stop Rejected in Newark.—The Board of Works of Newark, N. J., has disapproved the plan for skip-stops within the city proposed on behalf of Verona and other places near Newark. The motion that the board should not agree to any skip-stop was carried with the comment that the citizens of Newark should not be deprived of any transportation accommodations to which they were entitled. Residents of Verona, Montclair, Bloomfield, Glen Ridge and Caldwell are said to be considering a plan for the operation of a skip-stop service by the Public Service Railway in these places.

"Near-Side" Stop Agitation in Denver.—The "near-side" stop has come up as a subject of controversy in Denver, Col. The Denver Tramway is trying to secure an expression of opinion from the people, and has published a pamphlet to inform its patrons before they make a decision. A vote is to be held to see whether a "near-side" or "far-side" stop shall prevail at street intersections. The tramway has resorted to the popular vote before in order to settle controversies, particularly in connection with running express cars, and has accepted the majority opinion. The policy of frankness with the public and willingness to meet the majority opinion in cases of controversy is doing a great deal to keep the company in popular favor.

Courthouse Dont's for Trainmen.—N. W. Funk, of the legal department of the Louisville (Ky.) Railway, in the last issue of *Trolley Topics*, makes the following suggestions under the heading of "Some Courthouse Don'ts." "Don't come in and take the witness stand chewing gum. Don't take the witness stand and chew your finger nails. Remember your testimony is the chief factor in our success or failure in the courthouse. A bad impression made on the jury by you cannot be cured by twenty disinterested witnesses. Many an employee will wonder why we have lost a case when we apparently have all the testimony. I have given you the answer. Don't guess wildly at speed. I have heard men state on the witness stand that they were going 1 m.p.h. between intersections. A man walking slowly goes

3 m.p.h. This sort of testimony will wreck the best defense in the world."

Unsuccessful Attempt to Compel Operation of Toronto Line.—The city of Toronto, Ont., through Works Commissioner Harris, made an unsuccessful attempt on Aug. 29 to secure from the Ontario Railway Board an order compelling the Toronto Railway to give a service on the new Ossington Avenue line. Mr. Harris pointed out that the delay of the city in completing the roadbed was due to difficulty in obtaining material, and claimed that but for the company's delay in laying tracks in the first place, the work would have been all done now. In any event, the line was quite safe for operation. Chairman McIntyre observed that the company held otherwise, and when the commissioner announced that he could produce evidence to prove that the line was safe, Mr. McIntyre informed him that the board's engineer had gone over the line and took the same view as the company's engineers. The operation of the line, accordingly, must wait until the city has completed the work of paving, which will be about Sept. 1.

Not a Fatal Accident in Louisville in a Year.—Results of the first year during which the safety-first work of the Louisville (Ky.) Railway has been in effect have been compiled by the company and show that the efforts of company and employees in eliminating accidents have been effective. In the first place the report shows that not one fatal accident has occurred on the city lines during the year, in the face of the fact that the company operated its greatest mileage and in the year carried a total of 100,000,000 passengers. There were four fatal accidents in the first half of 1914, before the safety-first movement got under way. In 1913 there were fifteen fatal accidents; in 1912 twelve, and eleven each in the two preceding years. In the case of the Louisville & Interurban Railroad the record is marred by one death, for which the coroner's jury held the company blameless. During the previous year there were six fatal accidents on the company's lines. Not only was the number of injuries to pedestrians reduced, but the movement was otherwise beneficial. Street car collisions were reduced by 62 per cent, and there was a reduction of 50 per cent in reports of persons falling in boarding or leaving cars or after leaving them. One item, the number of collisions between street cars and automobiles, shows an increase. This is attributed to the large increase in the number of automobiles. Since the inauguration of the police crusade against reckless motor driving, however, there has been a marked decrease in these accidents. There are sixteen lines in the city, covering 87½ miles of road. The mileage during the year was 11,897,848.

What the Interurban Has Done for Indianapolis.—Commenting recently on the growth of 38 per cent for Indianapolis and on 19 per cent for St. Louis during the last census decade the St. Louis *Republic* said: "A number of railroad systems are managed from St. Louis. Not one road of any size is managed from Indianapolis. St. Louis lies just across the Mississippi from the greatest deposit of good steam coal adjacent to any American city; Indianapolis gets its coal from considerable distances. St. Louis has a river channel connecting it with the sea; Indianapolis has no navigable water. St. Louis is located on rolling hills of great scenic beauty and giving ideal drainage; Indianapolis is as flat as the top of a dinner table. St. Louis is far from any other large city; Indianapolis has achieved its remarkable growth within 183 miles of Chicago. St. Louis has two important universities; Indianapolis has none. St. Louis is a wealthy city; Indianapolis has almost no large fortunes. St. Louis is the world's center in a number of lines of manufacture; Indianapolis has many small, prosperous shops, but few large ones. Fast interurban trolley lines have made it easy for the people of a circle of 250 miles in diameter to visit Indianapolis. In the streets of the capital, the man from Fort Wayne rubs elbows with the man from Terre Haute; the shopper from Columbus meets her old school friend from Logansport. A trolley map of Indiana looks like the spokes of a wheel whose hub is the city of Indianapolis. A city without great wealth, without large industries, without a university, without navigable water, without coal, without natural beauty of site, has grown because it made it easy for its neighbors for 100 miles around to drop in before dinner, per trolley car, and leaving after an early supper, to get home by bedtime."

Personal Mention

Mr. Daniel M. Shepler has been appointed superintendent of the Pekin (Ill.) Street Railway, controlled and operated by the city.

Mr. John M. Padgett, formerly with the Associated Press and the *Republican* at Denver, Col., for about two years with the *Daily Capital* at Topeka, Kan., has been appointed to the claims and publicity department of the Illinois Traction Company. He will handle work for the company's railways at Topeka, Wichita and Atchison.

Mr. William D. Ainey, Montrose, Susquehanna County, has been appointed chairman of the Public Service Commission of Pennsylvania by Governmor Brumbaugh. Mr. Ainey, who was appointed a commissioner in the spring of 1915, has been acting as chairman, being the junior in the commission. The new chairman has served as a United States Congressman and was a member of the House committee on foreign relations. He was born at New Milford, Pa., and was graduated from Mansfield Normal School and Lehigh University. He was District Attorney of Susquehanna County for two terms until elected as a Congressional representative.

OBITUARY

J. C. Espy, superintendent of transportation of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, is dead as a result of wounds self-inflicted, presumably in a fit of despondency brought about by the death of his wife and by his own failing health. Mr. Espy was for some time a locomotive engineer on the Lake Shore Railroad. Sixteen years ago he entered the service of the Cleveland, Painesville & Eastern Railroad as a motorman. After several years of service he was promoted to dispatcher, and five years ago was made superintendent of transportation of the company.

John R. Graham, president of the Bangor Railway & Electric Company, Bangor, Me., and one of the most prominent public utility men in the East, died at his summer home in Intervale, N. H., on Aug. 24. Mr. Graham was born in the north of Ireland in 1847. During the Civil War he served in Massachusetts infantry and cavalry regiments, and after the close of hostilities established a shoe factory at Quincy, Mass., which has since been continued by his sons. Mr. Graham entered the street railway field at the reorganization of the Quincy Street Railway and when that company was merged with the Old Colony system he became a vice-president of the latter. He was a member of the first rapid transit committee of the Massachusetts Legislature, established at Boston in 1893, was a member of the Quincy City Council for two terms, a director of the Quincy Electric Light & Power Company, and a trustee of the Quincy Savings Bank. In 1902 Mr. Graham engaged in the rehabilitation of the electric railway, lighting and power system at Bangor in association with the banking houses of J. & W. Seligman, New York, and E. W. Clark & Company, Philadelphia. Mr. Graham was also closely identified with the acquisition of the electric railways now forming the system serving the region between Waterville, Me., Lewiston and Bath. More recently he was instrumental in the formation of the Cumberland County Power & Light Company, Portland, Me., which now operates the electric railway and central station service of Portland and the surrounding region. Mr. Graham was a director of the Merrill Trust Company, Bangor; Union Trust Company, Ellsworth; president of the Bangor Power Company, the Orono Water Company, the Bar Harbor & Union River Power Company, and the Graham Realty Company. In July, 1914, he entertained the New England Street Railway Club at his hotel in Bangor and at his private and experimental farms in the outside country, the occasion being one of the most memorable in the history of the organization. He was an honored guest at meetings of the Massachusetts Street Railway Association, and in 1914 received a loving cup at a dinner at Young's Hotel, Boston, from former associates in the Legislature. Mr. Graham was twice married and leaves his second wife and ten children by his first marriage, one of whom, Mr. Edward M. Graham, is assistant to the president of the Bangor company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Boise Valley Traction Company, Augusta, Me.**—Incorporated in Maine to construct and operate a railway by steam, electric or other motive power. Capital stock, $1,000,000. Officers: Franklin P. Ferguson, Brooklyn, N. Y., president; E. M. Leavitt, Winthrop, treasurer, and E. L. McLean, Augusta, clerk.

***Salem-Pennsgrove Railway, Salem, N. J.**—Incorporated in New Jersey to construct a line from Salem to Pennsville and Pennsgrove. Incorporators: Arthur B. Smith and Isaac S. Smashey, both of Salem. [July 31, '15.]

FRANCHISES

Ceres, Cal.—The Tidewater Southern Railway has asked the Council for a franchise to extend its tracks through Ceres.

North Andover, Mass.—The Bay State Street Railway has received a franchise from the Council to extend its double tracks on Sutton Street, North Andover.

Westborough, Mass.—The Worcester Consolidated Street Railway has asked the Council for a franchise to relocate its track on Main Street, Westborough.

Cleveland, Ohio.—Petitions have been filed with the City Clerk of Cleveland asking for a referendum vote on the franchise granted the Cleveland, Akron & Canton Terminal Railway for a four-track freight subway under East Fifty-fifth Street, Cleveland. [July 31, '15.]

Portland, Oregon—City Attorney La Roche has been asked by Commissioner Daly to prepare a council resolution, declaring the franchise of George F. Heusner to construct an interurban electric line from Kenton to the West Side Business District forfeited, and providing for proceedings to confiscate the $10,000 bond furnished by Mr. Huesner to guarantee construction of the line. The franchise was granted to Mr. Huesner two years ago, and called for the completion of the line and starting of operations within eighteen months. This time has expired and nothing has been done toward construction. Mr. Huesner recently asked for an extension of time, which was denied by the Council.

Parkersburg, W. Va.—The Kanawha Traction & Electric Company has asked the Council for a franchise to lay double track on Murdock Avenue from Pottery Junction to Thirteenth Street.

TRACK AND ROADWAY

Phoenix (Ariz.) Railway.—This company has commenced taking up its double track on Roosevelt Street preparatory to changing the line to Fourth Street.

***Jonesboro, Ark.**—Plans are being considered to construct an electric railway from Jonesboro to Nettleton. Frank Weisbord, Indianapolis, Ind., is interested.

Pacific Electric Railway, Los Angeles, Cal.—The committee which was appointed a year ago to secure rights-of-way and subscriptions of money for condemnation proceedings, the purchase of depot sites, etc., which are to be turned over to the Pacific Electric Railway as a bonus for which it agrees to construct an electric railway to traverse the southeast section of Glendale and the eastern part of Tropico, reports that it has sufficient deeds to rights-of-way and subscriptions of cash to insure the construction of the road. The line will be 2½ miles long. A site has been purchased for depot, carhouse and park purposes. The total value of the depot sites and rights-of-way to be turned over to the company is estimated to be $51,000.

Castro Point Railway & Terminal Company, Richmond, Cal.—The Railway Commission of California has issued an order authorizing the Castro Point Railway & Terminal Company to issue 890 shares of its capital stock of a par value of $100 a share, to repay Blake Brothers $18,403, the San Francisco Quarries Company $21,070, and its attorneys $490. The balance is for other advances and for new construction on 2 miles of railway from the San Pablo quarry to a connection with the Richmond Belt Line Railway, all in Richmond. The company's capital stock is $100,000, divided into 1000 shares, of which 110 are outstanding. It has no other evidences of debt.

Municipal Railways, San Francisco, Cal.—The Board of Works has contracted for all material needed for the construction of the Municipal Railway lines on Church Street and across Golden Gate Park, and is awaiting action by the Board of Supervisors before proceeding further. The contract for 9800 ties has been awarded to the Navarro Lumber Company. The Board of Supervisors has yet to decide the route for the line across the park, and has to declare whether the city will lay tracks on Market Street, from Church Street to Van Ness Avenue, or use the United Railroads tracks for that distance.

Illinois Traction System, Peoria, Ill.—This company suffered the loss of 300 ft. of track and the Coon Creek bridge, near Clinton, during the recent severe storm and high waters.

Aurora, Elgin & Chicago Railway, Wheaton, Ill.—This company is being urged to build a loop through the western part of Elgin. Such a loop would connect the Wing Park line with the North State Street line. The laying out of the North State Street tracks, which are now being placed on a lower level on account of new paving, is in accordance with the loop idea.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company is making preparations to build 60-ft. concrete poles to be used on its high-tension lines, especially at railroad crossings. Wooden poles have been used heretofore. The company has for the last five years used concrete poles of shorter length which have proved entirely satisfactory.

Tri-City Railway, Davenport, Iowa.—Double tracks are now being laid by this company on Seventeenth Avenue between First and Seventh Streets, East Moline. It is more than likely service to Campbell's Island will be discontinued on Oct. 15.

Hutchinson (Kan.) Interurban Railway.—Work has been begun on the extension of this company's tracks, which will be used by the Arkansas Valley Interurban Railway as an entrance to Hutchinson. The Hutchinson Interurban Railway will lay the track from Avenue A and Lorain Street south across its tracks, east on Carey Boulevard to the section line ½ mile east of Lorain Street and north to a connection with the Arkansas Valley Interurban line extending west from Burrton.

Wichita Railroad & Light Company, Wichita, Kan.—New track is being laid by this company on East Douglas Avenue east of Rock Island Avenue, Wichita. Concrete foundation will be used.

Cumberland Traction Company, Edmonton, Ky.—Work has been begun on this company's proposed railway between Edmonton and Elizabethtown. It is stated that the Greenup Electric Company, Elizabethtown, will supply the power for operating the cars and that the plans contemplate the completion of the road by the first of the year. Burkesville, Ky., interests are quoted to the effect that if the Cumberland road is built they will construct a 30-mile line from Burkesville to Edmonton to connect with it. [Aug. 21, '15.]

***Topsham, Me.**—Fred B. Teeling, Litchfield, is interested in a project to construct an electric railway from Topsham to Monmouth, to connect with the Lewiston and Waterville division of the Lewiston, Augusta & Waterville Street Railway at or near Tacoma. Mr. Teeling has presented his proposition to A. H. Ford, general manager of the Lewiston, Augusta & Waterville Railway, who has signified his interest in the project. Under the plan outlined, the road would start at Topsham or Brunswick, extending to Bowdoinham and Richmond Corner, through Litchfield, crossing the Lewiston, Augusta & Waterville Street Railway at Tacoma, thence to Litchfield Mills and Monmouth, a distance of 33 miles.

Worcester (Mass.) Consolidated Street Railway.—Work has been begun by this company repairing its tracks on Berlin Street, Clinton.

Detroit, Almont & Northern Railroad, Detroit, Mich.—Operation has been begun on this company's extension between Almont and Imlay. The company is being urged to extend its lines to Brown City and Marlette.

Grand Rapids (Mich.) Railway.—Work will soon be begun on the construction of an extension of this company's line on Plainfield Avenue, Creston, from the present terminal at Ann Street, N. E., to Knapp Street, N. E.

Jackson Light & Traction Company, Jackson, Miss.—The work of reconstructing this company's tracks on West Capitol Street has been completed.

***Opheim, Mont.**—It is reported that North country farmers, allied with the American Society of Equity, contemplate the construction of an electric railway from Opheim to Nashua. It is also reported the towns of Glentana and Baylor will join in the movement, which has for its principal object the gaining of more efficient means of transportation for farm products to the main line of the Great Northern Railway.

Public Service Railway, Newark, N. J.—Work has been begun by this company on the relocation of its tracks on Springfield Avenue between the Elmwood Avenue loop and Forty-third Street, Irvington. The tracks are to be shifted to the center of the roadway.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—In connection with the repaving of West State Street between Calhoun and Prospect Streets this company is laying new ties and rails. The rails will be welded.

United Traction Company, Albany, N. Y.—This company is reconstructing and laying considerable new track in Albany and Troy. Rail weighing 70 lb. to the yard and 7-in. T-rail weighing 95 lb. to the yard is being used.

International Railway, Buffalo, N. Y.—New tracks will be laid by this company on Elmwood Avenue between Potomac and Forest Avenues, Buffalo. The company has agreed to remove one of the tracks of the abandoned line on Young Street between Main and Delaware Streets, the city to remove the other track. E. G. Connette, president of this company, announces that the directors of the system have decided to provide trolley service along Bailey Avenue on the east side. Tracks will be laid for part of the distance next year. The company has a franchise in the street and a year's extension was granted by the last Legislature.

Piedmont & Northern Railway, Charlotte, N. C.—Work has been begun by this company on the construction of a 1-mile extension at Charlotte to the Elizabeth Mill.

Cleveland (Ohio) Railway.—Work has been begun by this company on the extension of its Buckeye Road line from East 116th Street to East 130th Street, Cleveland.

Lake Shore Electric Railway, Cleveland, Ohio.—Plans are being considered by this company to double-track its line on West Erie Avenue, Lorain, between Ashland Avenue and the city limits.

Columbus Railway, Power & Light Company, Columbus, Ohio.—Plans are being made by this company to relay its tracks on Long Street and Main Street, Columbus. Mayor Karb has declared that the company must use grooved rails on these streets.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—Work has been begun by this company on the construction of its extension on East Washington Street, New Castle, to Cascade Park.

Oklahoma & Interstate Railway, Oklahoma City, Okla.—The Central States Construction Company has been chartered in Oklahoma with a capital stock of $100,000 to build this company's proposed line to connect Tulsa, Miami, Collinsville, Joplin and other points. The incorporators are John R. Rose, J. R. Eldridge, G. C. Jones and A. G. Ritz, all of Oklahoma City. [April 17, '15.]

Bridgeburg, Ont.—It is reported that the plan to construct a hydro-electric line to connect Bridgeburg, Ridgeway and Fort Erie is being revived. W. G. Athoe, Ridgeway, is interested.

Philadelphia, Pa.—The contract for the construction of the City Hall station section of the Broad Street subway under City Hall and Market Street has been awarded by A. M. Taylor, director Department of City Transit, to the Keystone State Construction Company for $1,700,000. The contract for the construction of nearly 5 miles of concrete foundations for the steel supports of the Frankford Elevated Line from Callowhill Street to Unity Street was awarded to James D. Dorney for $142,490. Construction work will be begun on Sept. 13. [July 10, '15.]

Scranton & Binghamton Railway, Scranton, Pa.—This company's extension from Foster to Brooklyn is practically completed and it is expected that cars will be running to Montrose by Dec. 1. Much progress has been made during the year on the extension to Binghamton.

Nashville & Eastern Railway, Nashville, Tenn.—DeKalb County has authorized the sale of $150,000 thirty-year 4 per cent bonds, the proceeds to be invested in an equal amount of the capital stock of the Nashville & Eastern Railway. This practically assures the construction of the line between Nashville and Smithville. The bonds are to be issued and sold after the railway is completed and in operation. The Nashville, Chattanooga & St. Louis Railway will be electrified from Nashville to Lebanon and will connect with the extension to be built to Smithville. Charles Edwards, Nashville, is interested. (July 31, '15.)

Dallas (Tex.) Consolidated Electric Street Railway.—City Commissioners of Dallas have passed an ordinance granting Edward T. Moore of this company and associates ninety days' extension in the franchise ordinance covering trackage privileges for the proposed union interurban passenger station at Wood Street and Jackson Street. The plans include the erection of a ten-story building to be used as a terminal interurban station and office building for street car properties. Mr. Moore stated that several interurban interests entering Dallas have come to an agreement for the joint use of an interurban station and financial negotiations necessary to procure the money have progressed to an extent to assure the beginning of the work within ninety days, for which the extension was asked.

Galveston (Tex.) Electric Company.—Repairs have been begun on this company's line on which part of the track was completely washed out by the recent storm. A single-track pile trestle will be immediately built from Virginia Point on Galveston Bay to replace part of the causeway wrecked by the storm.

Houston, Richmond & Western Traction Company, Houston, Tex.—This company has awarded a contract to Moore & Son, Lufkin, to grade from the Brazos River to the city. [July 24, '15.]

Rutland Railway, Light & Power Company, Rutland, Vt.—New 80-lb. rail has been received and work will be begun at once by this company on the reconstruction of its tracks on Strongs Avenue, Rutland, between Madison Street and City Hall. The company is also placing new ties at various points on the main line.

***Richmond, Rappahannock & Northern Railway, Richmond, Va.**—Surveys have been begun by C. L. Ruffin, Richmond, for this company's proposed line from West Point to Urbana, 17 miles. The company was incorporated on July 30 with $300,000 common stock and $200,000 preferred stock. Officers: Warner Moore, president; H. L. Lewis, vice-president; R. H. Bruce, treasurer, and James Mullin, Jr., secretary.

Virginia Railway & Power Company, Richmond, Va.—This company plans to build double track on Fourteenth Street from Mayo Bridge to Cary Street, Richmond.

Olympia Light & Power Company, Olympia, Wash.—Mayor Mottman and the Council have ordered this company to move its tracks on East Fourth Street from the north side to the center of the street.

***Washington Electric Company, Olympia, Wash.**—The State Highway Commission has granted to this company a railroad right-of-way 15 miles southeast of Chehalis in Lewis County, where it is reported an electric line will be built.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—An ordinance has been passed by the Council for the establishment of the proposed grade separation at Argo, and a date will be set in the immediate future for the hearing of the interested property owners and various railroad companies involved, which include the Puget Sound Traction, Light & Power Company, the Oregon-Washington Railroad & Navigation Company, the Great Northern Railway and the Chicago, Milwaukee & St. Paul Railway. The work will cost approximately $450,000, and will be borne by the companies named. A concrete tunnel 1700 ft. long is included in the improvement.

Monongahela Valley Traction Company, Fairmont, W. Va. It is reported that this company is considering the extension of its line to New Martinsville to connect with the lines along the Ohio River. One survey is between Mannington and New Martinsville and another between Lumberport and New Martinsville, but no decision has been reached as to which will be used. Either of them would connect Fairmont and Clarksburg with the western terminus. Another proposed line extends from Weston to Glenville, and another line which has been surveyed extends from Clarksburg to Buchannon. Surveys have also been made between Clarksburg and Philippi and some rights-of-way have been secured.

Ohio Valley Electric Railway, Huntington, W. Va.—It is reported that this company plans to build an extension from Ashland, Ky., north to Russell.

Pan-Handle Traction Company, Wheeling, W. Va.—This company is repairing its track between Warwood and Wellsburg.

SHOPS AND BUILDINGS

Shore Line Electric Railway, Saybrook, Conn.—Plans are being prepared by Cudworth, Woodworth & Thompson for the construction of a new carhouse to be erected by this company on the site of its old carhouse in Thamesville, destroyed by fire last fall. The building will be 60 ft. x 250 ft. and will be constructed of brick.

Joliet & Eastern Traction Company, Joliet, Ill.—Work will be begun soon on the new carhouse of this company at Frankfort, Ill. The building will be of concrete construction and will provide storage for four cars. There will also be repair shops in the building where cars of the eastern division will be repaired.

Pekin (Ill.) Municipal Railway.—This company will build a carhouse on the ground recently purchased for that purpose in the Rosedale addition to Pekin.

Kankakee & Urbana Traction Company, Urbana, Ill—This company has completed and is now using a new modern passenger and freight station at Rantoul, Ill.

Arkansas Valley Interurban Railway, Hutchinson, Kan.—Plans are being prepared by Crowell & Van Meter, Wichita, for the construction this fall of a $10,000 terminal by this company. The structure will be two stories high and will be of brick and stone.

New York Municipal Railway Corporation, Brooklyn, N. Y.—With the approval of the Public Service Commission for the First District of New York, the New York Municipal Railway Corporation has awarded to John Thatcher & Son the contract for the construction of stations in connection with the third-tracking work on the Broadway elevated line in Brooklyn, for $320,325. The contract calls for the construction of stations at Hewes Street, Lorimer Street, Flushing Avenue, Myrtle Avenue and Broadway, Kosciusko Street, Gates Avenue, Halsey Street and Chauncey Street. All these stations are on the Broadway line between Havemeyer Street and East New York, where the third-tracking work is already under way. The commission has awarded the contract for the construction of station finish on Section No. 2 of Routes Nos. 36 and 37, the Astoria elevated line in Queens Borough, to Charles Meads & Company, the lowest bidders, for $268,192.

Cleveland & Youngstown Railway, Cleveland, Ohio.—Petitions have been filed with the city clerk of Cleveland asking for a referendum vote on the franchise granted this company for a freight terminal at Broadway and Orange Avenue, Cleveland.

POWER HOUSES AND SUBSTATIONS

Shore Line Electric Railway, Saybrook, Conn.—This company has completed plans for a brick and concrete power station, 45 ft. x 80 ft., 25 ft. in height.

Illinois Traction System, Peoria, Ill.—This company has received four new transformers for use in its substations at St. Joseph, Ill. The plant will be rearranged at the time the new transformers are installed.

Manufactures and Supplies

ROLLING STOCK

Alton, Granite & St. Louis Traction Company, St. Louis, Mo., is reported as expecting to purchase new cars of a modern type to be used between Alton and St. Louis.

Manchester (N. H.) Street Railway has placed in service a new closed car, built in its shops. Another car is being constructed and will probably be in operation in two months.

Anaconda (Mont.) Street Railway, noted in the ELECTRIC RAILWAY JOURNAL of Aug. 21 as having ordered six new 50-ft. cars, has placed this order with the St. Louis Car Company.

Danville Street Railway & Light Company, Danville, Ill., has placed the third pay-as-you-enter car in service in this city, this car to be run on the West English and the Soldier's Home line.

Southwestern Gas & Electric Company, Texarkana, Tex., is about to receive three 21-ft. steel car bodies which have been built by the St. Louis Car Company. They are of the pay-as-you-enter, double-end vestibule type, equipped with GE-54 motors and Brill 21-E trucks. On May 15 this railway placed in service three cars built by the same company. These cars are of pay-as-you-enter type, 28 ft. long, double truck, steel bodies, equipped with GE-201 motors and Brill 39-E trucks.

TRADE NOTES

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" headlights, has received an order for the complete equipment of the Seattle, Renton & Southern Railway's cars with thirty SR-95 "Golden Glow" headlights. An order for equipping half of the interurban cars of the Atlantic City & Shore Railroad, using "Golden Glow" T-128 headlights has also been received. The Savannah Electric Company has ordered twelve SR-95 headlights for its suburban cars.

Duff Manufacturing Company, Pittsburgh, Pa., manufacturer of the well-known Barrett lifting jacks, is building an extension to its main factory building, 150 ft. x 125 ft. in width. With the extension the main building will be 625 ft. by 125 ft. wide, and will contain the most modern equipment. A 5-ton bridge transfer crane and monorail conveying system is also being installed, together with considerable additional equipment. All equipment has been purchased and is being installed.

Bertram Smith, well known in the storage battery business for the past fifteen years, has been appointed manager of the Detroit office of the Edison Storage Battery Company. About a year and a half ago Mr. Smith joined the Edison interests as assistant manager of the Edison Storage Battery Supply Company of San Francisco, the distributor for the Edison nickel-iron-alkaline battery on the Pacific Coast. Directly previous to his connection with the Edison company he was manager of the battery department in the Chicago branch of the United States Light & Heating Company. He was formerly secretary and treasurer of the National Battery Company of Buffalo until its consolidation with the United States Light & Heating Company. In order to better serve its customers in eastern Michigan, as well as Ohio and adjoining territory, the Edison Storage Battery Company recently moved its Cleveland office to Detroit, where it has located in the new David Whitney Building.

Thomas W. Casey has been elected vice-president and a director of the National Pneumatic Company of Chicago and New York. Mr. Casey will also be general sales manager of the company and will have charge of the sales office which will be located in New York City. Mr. Casey has been prominently identified with the popularizing and exploiting of the prepayment car from its inception into the United States, having come from Montreal with the first pay-as-you-enter car which was exhibited at the American Electric Railway Association convention held in Columbus, Ohio, in 1906. Mr. Casey was general manager of the Pay-as-You-Enter Car Corporation, and after the merger of that corporation with the Pay-Within Car Company in March, 1911, when the Prepayment Car Sales Company was formed to carry on the work, Mr. Casey was elected president of the new organization, and since that time the work has been carried on under his direction. Having decided to enter the manufacturing field he has joined the force of the National Pneumatic Company. Mr. Casey has a thorough knowledge of the electric railway business, especially in the mechanical line, having been connected with the Montreal Street Railway Company for upwards of seventeen years in various positions, being general purchasing agent at the time he resigned from that company. Prior to going with the Montreal Street Railway Company Mr. Casey was employed on the Canadian Pacific construction under the late Sir James Ross

ADVERTISING LITERATURE

D. & W. Fuse Company, Providence, R. I., has issued a catalog relating to the design and construction of its inclosed fuses. The catalog discusses the external appearance of the fuses, describes the link constructions of the various kinds, explains the filling of the fuses and finally contains an account of the mechanical methods employed in their construction.

S. K. F. Ball Bearing Company, New York, N. Y., has issued Bulletin No. 15 on the characteristics of ball bearings for automobile worm drives. The catalog describes the simplicity of the bearing construction, the ease with which the bearings are mounted and assembled, and their noiseless operation and efficiency. The proper method of lubrication for worm drives and the calculation of end thrust and radial loads are also explained.

The Engineer, London, England, has issued its regular annual directory, the contents of which include an abridged index to the editorial columns of *The Engineer*, from January to December, 1914, a list of technical terms in French, German, Italian and Spanish for use as a foreign buyers' guide, an iron and steel trade directory and buyers' guide, including telegraphic addresses and telephone numbers of firs included in the buyers' guide and a list of standard and new technical books.

E. I. duPont de Nemours Powder Company, Wilmington, Del., has issued a valuable booklet entitled "Road Construction and Maintenance." Although the booklet deals broadly with this subject, it includes information of special interest and value to the electric railway construction and maintenance of way engineer, owing to the helpful instructions which it contains on the proper methods of blasting for the construction of rights-of-way and pole holes. The process of loading poles for blasting is clearly described with the aid of diagrams, and illustrations of the blasting supplies required.

Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has issued a reprint of an article which appeared in the July issue of *The Foundry*, and entitled "How Titanium Aluminum Bronze Is Produced." The article is well illustrated with views of the modern equipment and facilities of this company's plant at Niagara Falls, N. Y., for making and testing this valuable alloy. This company makes a full line of brass and bronze castings and also specializes in the manufacture of high-grade bronzes. Where special requirements are presented use is made of a research or experimental foundry department equipped with both coke and electric melting furnaces and controlled, as is the production foundry, by complete chemical, physical and microscopical laboratories.

Carnegie Steel Company, Pittsburgh, Pa., has issued a pamphlet entitled "Structural Beams," second edition, dated as of August 1st, 1915, which covers a new line of sections supplementary to the American standard beam sections. In recent years, especially in the construction of modern office buildings and buildings intended for light machine shop work, it has frequently been found desirable to use deeper beams than required for safe carrying capacity as determined by the floor loads required by the building laws of various cities with a result that the full strength of a standard beam section is not always developed. It was natural that in the endeavor to meet this condition designers should follow the outline of the American standard profiles which, in turn, were based on the original German normal profiles, and in consequence light weight sections have been made heretofore with the flanges of the same width and taper but somewhat thinner and also with thinner webs than the minimum weight American Standard sections. The beam sections illustrated in this pamphlet constitute, however, a radical departure from those profiles as regards width, slope and thickness of flanges: the 24-in. beam with a width of 9 in. as compared with the 7-in. of the American Standard section. The 12-in. beam has a flange width of 6 in. as compared with the 5-in. width of the American Standard section. The 27-in. beam is made with the same flange width as the 24-in. beam, but the flange widths of the other sections follow the depths in a gradual sequence; the slope of the flanges is uniformly 1 in 11. The carrying capacities of these sections are theoretically somewhat less than the carrying capacities of the corresponding minimum weight standard sections. Pound for pound, however, the metal has equal if not greater efficiency with the additional advantage that the new sections have somewhat greater lateral stiffness due to the greater width of their flanges. There is no 20-in. beam in this new series which is graduated by intervals of 3 in. in the sizes, 12 in. deep and over.

NEW PUBLICATIONS

Resuscitation from Electric Shock, Traumatic Shock, Drowning, Etc. By C. A. Lauffer, M. D., medical director, Westinghouse Electric & Manufacturing Company. Second edition, enlarged. John Wiley & Son, Inc., New York. 90 pages. Price 50 cents.

This is a revised reprint of the paper presented by the author before the Philadelphia Electric Company Section, N. E. L. A., in 1912, and explains the prone-pressure or Schaefer method of inducing artificial respiration, including complete directions for self-instruction.

The Act to Regulate Commerce Construed by the United States Supreme Court. By Hubert Bruce Fuller. John Byrne & Company, Washington, D. C. 585 pages. Buckram, $6.

This book is intended to collate and to discuss the decisions of the United States Supreme Court on the interstate commerce act. While primarily a treatise for lawyers, it is not beyond profitable perusal by laymen who desire to know how rate, traffic and similar questions arising under the act are being construed by the court of last resort. To railroad officers, shippers, bankers and investors, the book is an invaluable compilation of needed information.

Graphical Determination of Sags and Stresses for Overhead Line Construction. By Guido Semenza, consulting engineer, and Marco Semenza, electrical engineer, both of Milan, Italy. Translated from the Italian by C. O. Mailloux. McGraw-Hill Book Company, Inc., New York. Twenty-four pages of text, with many inserted charts printed on bond paper. Cloth, $3 net.

This set of charts with explanations is designed for the use of men engaged in line construction. The charts are plotted from formulae which are derived and explained for the benefit of those who care to follow the theory, but the charts can be used without a knowledge of this theory. The method followed by the authors includes provision for ice and wind loads, temperature changes, difference in elevation of spans, etc.

Alternating Current Electricity and Its Application to Industry. By W. H. Timbie, head of the Department of Applied Science at Wentworth Institute, and H. H. Higbie, professor of electrical engineering at the University of Michigan. John Wiley & Sons, Inc., New York. 534 pages. Cloth, $2 net.

The authors have incorporated in this text-book on the elements of its subject the results of years of successful teaching experience. It represents an earnest attempt to assist students to secure a working grasp of a difficult subject by making it tangible. The book abounds in analogies and practical problems, and wherever possible pictures of commercial apparatus are introduced. While intended as a text-book for students with a very elementary knowledge of the elements of electricity, it could be studied with profit by electrical workers who are familiar with the fundamentals of physics, algebra, geometry and trigonometry.

Electric Railway Journal

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AN OPPORTUNITY FOR SALESMEN

A very interesting suggestion, which should appeal to the managers of electric railway properties, particularly small ones, was recently received by the editors from the superintendent of a railway and lighting company in the Middle West. The suggestion is simply that visiting salesmen be invited to talk to groups of employees interested in the salesmen's specialties. The plan has been tried on this property with good success, and undoubtedly the same idea has occurred to managers elsewhere. The modern salesman in this field is particularly well qualified to describe recent developments in the several lines of electric railway work. By the very nature of his work he must be up to date, and if he is successful in selling goods he must be enthusiastic regarding them. He has at hand exactly the information regarding railway supplies which operating men want and, as the average salesman is a fluent talker, he should have no difficulty in presenting this information attractively. If he will confine his remarks to topics on which he has first-hand information he is assured of the attentive interest of his audience. Here is a simple educational opportunity which requires no organization, would yield good results to all concerned, and would cost nothing to put into operation.

REAL DIRECTORS NEEDED

The caustic comment of the Interstate Commerce Commission in regard to the Rock Island board of directors adds one more authority on the side of those who assert that corporations have a vital need for directors who actually direct. We have long believed that too great a premium is placed upon the board membership of "big" men, chosen because of the glamor of their names rather than for the time, energy and enthusiasm that they can bring to their work. It is not a question of ability to direct in the case of the man of large affairs, but of his tendency to abuse his ability by accumulating so many directorships in addition to his regular business that he cannot acquire and maintain the close insight into the properties that a real business-minded director should have. "Big" directors are prone to acquiesce, without knowledge or investigation, in what certain others more directly concerned with the management of the property desire to have done, forgetting that a directorship is a position of trust and that any dereliction or neglect of responsibility therein is the more to be condemned as the prominence and the business sagacity of a director increase. We believe that no corporation should choose, and no man should accept a position as, a director unless he is prepared to acquaint himself thoroughly with the commercial, technical and public policy problems of the company. Furthermore, the board of directors should be small enough to permit frequent convening and prompt action—seven or nine members are quite sufficient in most cases. A board thus constituted would be organized for work and not for show.

REDUCING WAGES BY ARBITRATION

The decision of the board of conciliation and investigation in the British Columbia Electric Railway wage arbitration is vitally important to all electric carriers, for it is an excellent example of the use of the Canadian industrial disputes act as a means of lowering wages as well as of increasing them. The theory underlying the decision, however, is not altogether satisfactory. The points at issue were easily proved—the general business depression in Vancouver has led to a wide-spread wage reduction, the cost of living has decreased, the financial condition of the company is making it unable to continue the old wage rates, and since 1913, in spite of the depression, the wages, because of the sliding scale, have advanced about 8 per cent. Yet of the desired 15 per cent reduction only an average of 7 per cent is recommended by the board, with reasoning that seems to be a compromise on basic principles. The board concluded that the financial standing of the company should not be a governing or controlling factor in recommending wage rates, yet it remarks that an outline of the company's financial condition is wise as showing that the company is not in a position "to deal liberally" with its employees. In dealing with a prosperous company are we to suppose that the board would adhere to this principle that the financial standing is not a controlling factor, but would analyze such standing to show that the company could, if it so desired, deal "liberally" with its employees? Financial standing should or should not be considered—there should be no vacillation on this point. Incidentally. we may say, it should be considered until some system of control causes increases in wages to be automatically followed by equal increases in rates. The board in the present case believes in a "fair wage based on proper conditions"—this apparently under the general depression and lower cost of living means about 7 per cent less than existing wages. We wonder if this figure, however, did not easily come from simply reverting in general to the 1913 wages, in spite of the expressed approval of the board for the general principle of the sliding scale system, which had caused the increase since 1913. In short, while the reduction is gratifying, we are sorry that the board has not met with greater exactness and clearness the issues raised, for they merited an exhaustive and authoritative study.

ELECTRIC RAILWAYS AND THE JITNEY BUS

In a recent issue of the *American City*, Dr. Clyde L. King, the author of an article on the jitney in our issue for Aug. 21, discusses the probable effect of the jitney upon street railways. He concludes that "the jitneys will probably not seriously disturb the existing business of street railway companies, while they can be used to develop new business and to give the cities more elastic and more rapid transit facilities." This conclusion is based upon a consideration of the cost limitations of jitney development, the new avenues of transportation that will be opened up by both the jitneys and the larger buses, and of the facts that each type of transit tends to develop its own customers, that the jitney probably picks up many pedestrians who would not otherwise use the street cars and that the "riding habit" tends to increase more rapidly than the population. He adds, "That the jitney and the motor bus should be regulated, goes without saying. As a minimum, permits should be required, routes and fares specified, and minimum provisions for public safety and convenience enforced. Chauffeurs should pass an examination and be licensed, cars should be periodically examined, and requirements for driving and for loading and unloading should be enforced. Reasonable bonds may well be required to insure indemnities in case of accidents, limitations should be placed on overcrowding, * * * definite routes should be required, and destinations plainly indicated in large letters." He also recommends a special pavement tax based on the use of the streets and the additional cost of repairs to the pavements caused by jitney bus operation. If these conditions are enforced the jitney will begin to assume the aspect of a real public utility, not full fledged, perhaps, but at least incubated.

The position of the ELECTRIC RAILWAY JOURNAL on this subject was clearly stated in an editorial printed in the issue for July 3 where we expressed the belief that bus lines operating under electric railway conditions will not be permanently profitable. If the jitney or the auto bus should look for chances to serve where the street car cannot operate, it would be a welcome addition to the transportation needs of a community and might prove, in many cases, profitable to the operators. But it is cold comfort to be told that under the conditions under which these cars have been operated the existing business of street railway companies will not be seriously disturbed. The trouble has been that the jitney has thrived by skimming the cream from the business of the electric railway and has forced upon the latter an unfair proportion of the long-haul business. Professor King fears that the street railway companies will aim to have the tax on jitneys so high as to be prohibitive, but he recommends himself for the jitneys in addition to the requirements already mentioned, transfer provisions, limited franchises, police traffic regulation, limitation of traffic to designated roads of proper stability and character, efficient safety fenders and standardization and publicity of accounts. We have no fear, if the regulations on all of these points are at all as stringent as those applied to electric railways, that the motor bus will find that it can no longer compete with electric cars and will assume its proper place, namely, as a supplement to electric railway service rather than as a competitor to it, or else will drop out.

THE 1915 CONVENTION PROGRAM

The American Electric Railway Association is to be congratulated upon the early completion and announcement of its convention program, printed in full in last week's issue of the ELECTRIC RAILWAY JOURNAL. The members of the association little realize the labor involved in making up such a program and in marshalling the committee reports and addresses for actual presentation. Close scrutiny of the program will reveal a very ingenious dovetailing of the sessions to provide for overlapping where mutual interest makes joint consideration of certain topics desirable. Those who have followed week by week the reports of committee activities as they have been recorded in this paper must appreciate the substantial value of the work done this year. Never have there been more important reports to be considered and never have they been presented more systematically and effectively.

The industry looks to the annual convention program to reflect its live problems. Topics and speakers are selected with a view to stating the problems clearly and pointing out fundamentally correct solutions for them. The topics selected for consideration by the American Association this year are, therefore, significant. These topics are government ownership, principles of valuation, and welfare work, and these are to be discussed by Ex-United States Senator Jonathan Bourne, Jr., Bion J. Arnold and Jesse W. Lilienthal, respectively. It is interesting also to note the topics which are to take the attention of the affiliated associations. The accountants this year are to discuss their ideas of the prepayment car, under the leadership of R. J. Clark, and the more technical subject of the treatment of charges for rent of track and equipment will be presented by Paul Shoup. Two professors are to address the accountants, and these speakers are apparently left free to make their own selection of topics. The engineers, too, are this year calling in outside experts to give them the benefit of the government researches into wood preservation. At Madison, Wis., a federal laboratory is maintained for the conducting of researches on the properties of forest products. The electric railway industry has much to gain by close co-operation with this laboratory. In addition to papers on technical topics the Claims Association is to consider broadly the subjects of automobiles, and safety and its relation to conservation. The claims departments of electric railways "have magnified their office" in recent years by reaching out into the field of conservation of life with the idea of reducing claims to the minimum. The program of the Transportation & Traffic Association is also replete with interest, with one outside address and committee reports on subjects of great concern to the industry.

In commenting upon the 1914 program we called attention to a tendency to reduce the number of addresses and papers, as pressure for program space for the presentation of the committee reports became greater. While the idea was not expressed at the time, we had supposed that the limit had about been reached with a reduction of 40 per cent in the number of papers over the preceding year. That this is not so is indicated in the present program where the number is still further reduced. It seems to us most profitable to occupy the larger part of the convention time with careful consideration of committee reports, the balance being devoted to inspirational and technical addresses, few in number but comprehensive in scope and powerful in inception and in delivery.

CO-OPERATION IN "MISSIONARY WORK"

In encouraging manufacturers to build within their territory electric railway companies should co-operate with the local electric light and power companies in deciding what factory locations will be most economical for themselves as regards distribution of current, construction of new transmission lines and track and convenience of handling transportation. Having made this agreement they may then jointly, and therefore more effectively, describe to the prospective manufacturer the special local facilities afforded by natural resources, convenience of location and cheapness of light and power and of freight transportation. When these companies are under a single management with a common source of current supply, the matter is, of course, simplified. A still more economical arrangement is possible for the holding company interested in several electric properties. In this case it would be more profitable for the management to attract a residential population to one of its railway properties which specializes on passenger transportation, while manufacturers should be drawn toward a property capable of industrial development where an adequate equipment for handling electric railway freight is provided and where, if possible, cheap hydroelectric power may be obtained.

An example of successful co-operation was recently shown by the railway and power companies of a certain small-sized city, just outside of which lay a large undeveloped slate quarry. Representatives of the local electric companies succeeded jointly in interesting the investor in a process for grinding slate into a roofing material by selling him on the installment plan a plot of land for a factory and agreeing to build a freight siding alongside of the plant. Reasonable rates were granted for electric freight transportation and electric power. At one time the obligations of the manufacturing concern to the electric companies amounted to $12,000. This amount, however, was all paid back out of the earnings of the thriving industrial, which had increased its monthly payments for electric service from only $40 the first month to $1,800 two years later.

CARS AT LESS THAN COST

We are in receipt of a letter from a car builder who says: "If a railway man believes that he is entitled to a fair return on his investment, why is he so pleased when he cajoles a feeble-minded car builder into accepting an order for cars in ruinous competition at less than the cost of manufacture? If selling transportation at less than cost is an economic crime, why is not buying cars at less than cost an accessory to a similar crime? If the ELECTRIC RAILWAY JOURNAL protests against the one, why should it not also protest against the other?"

We do. We believe that cut-throat competition among supply dealers is just as disastrous in the long run for the purchaser as it is for the seller, and this is so whether the articles sold are car bodies, or anything else a company uses. No business can continue unless it makes a fair return on the investment. If the condition of the car-building business is such that the manufacturer who is favorably situated for manufacturing and uses economical methods cannot sell his output at a sufficient profit to pay a good return on his investment, the railway companies will ultimately suffer. Builders will have to turn to other lines of work, and when the demands for cars come, the few car-building companies which remain will be able to charge very high prices. Railway companies have a vital interest in the continued prosperity of those from whom they purchase supplies.

In stating this conclusion, however, we must not lose sight of the differences in underlying principles of the business conducted by a public utility and by a manufacturer. The prices at which the utility sells its service are fixed by law; those at which the manufacturer sells his product, by competition. The law says to the utility: "We guarantee you a monopoly of your business. The service which you sell is a necessity, and if you fixed your own prices the consumer would have to pay them no matter what they are. Hence you shall charge only so or so much." The manufacturer, on the other hand, can charge anything that he wishes, and no limit is set to the profits which he may make. If the railway is limited by law or by the action of public service commissions to its possible profits, it should have some assurance from the State that the prices which the State sets for its service should not be so low that the company cannot earn a fair return on a fair investment. There is no limit under the law for the prices which a manufacturer may receive for his products or for the profits which he can make, and, in return, there is no warrant under the law which will assure him even a fair return on a fair investment.

For these reasons the legal situation, so far as the manufacturer and the public utility are concerned, is radically different. But this does not change the business condition that the railway companies are not permanently benefited when the situation is such that for any considerable time they can purchase apparatus at less than the cost of its manufacture under economical conditions.

Steel Cars for Chicago & Milwaukee Electric Railroad

These All-Steel Interurban Railway Cars, Which Are Designed for High-Speed Train Operation, Are Built Without Continuous Center Sills and Are Provided with Extensible Vestibule Trapdoors for Use with Raised Station Platforms Having Various Clearances

The Chicago & Milwaukee Electric Railroad is about to place in service fifteen all-steel, double-end cars which are being delivered at the present time by the builders, The J. G. Brill Company. The cars are intended for high-speed interurban service, and they are constructed with corresponding strength, but they possess the unusual feature of an underframing without continuous center sills, the buffing and pulling strains being transferred to the side girders. The over-all dimensions conform to the clearance requirements of the Northwestern Elevated Railroad, to which the Chicago & Milwaukee Railroad connects and over which the interurban line may have occasion to operate to obtain entrance to the Chicago loop district. Owing to the presence of the raised station platforms over part of the route, vestibule trapdoors have been provided, these being arranged because of clearance variations so that they will slide outward when necessary and thus fill any gap between the station platform and the car.

For the present, the cars will be used in an hourly limited train service between Evanston, Ill., and Milwaukee, Wis., a distance of 73 miles. The limited trains in this service run through the densely populated suburban section immediately north of Chicago and through a number of manufacturing centers between this district and Milwaukee. Present schedules require two hours and eighteen minutes to make this run, which contains a maximum of twenty stops, but with the new equipment it is planned to reduce the time to one hour and fifty-five minutes. With this fast schedule, speeds up to 65 m.p.h. will be the rule, single cars and multiple-unit trains being operated according to the varying requirements of the daily service.

STEEL FRAMING DETAILS

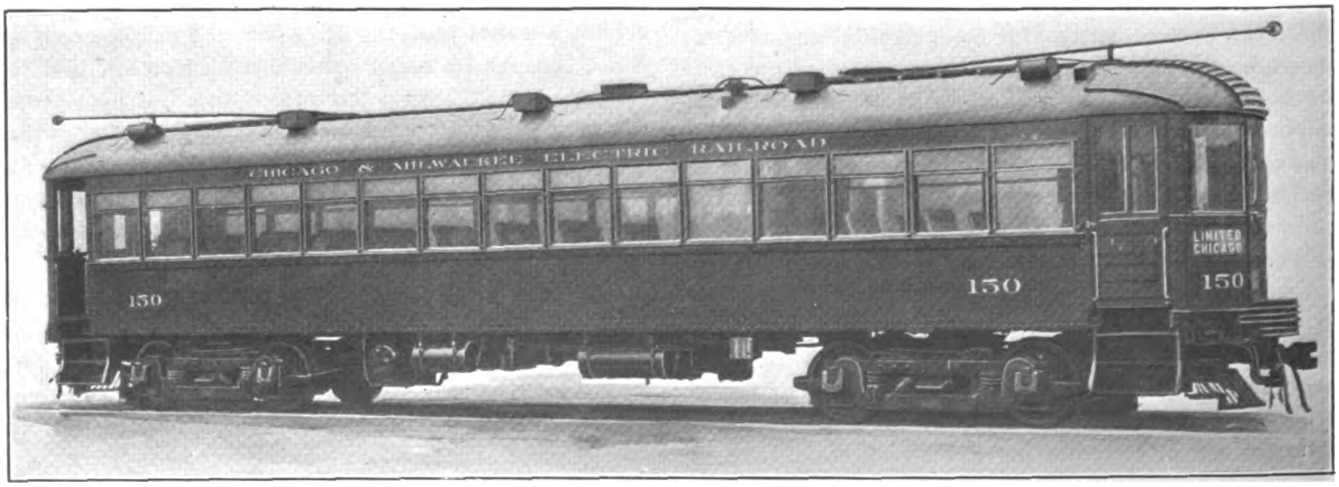
The car bodies contain the customary main passenger and smoking compartments and a saloon. There are vestibules at each end, and a corner of each of these is partitioned off to form a motorman's cab. The general dimensions are shown in the accompanying table.

The most striking feature in the design is the omission of continuous center sills between buffers. Although this constitutes a novelty for interurban service it conforms to the most modern practice in the design of the side-girder steel cars because it permits a more uniform distribution of the buffing and pulling strains throughout the car frame and provides, at the same time, a relatively light-weight structure. Details of the underframe are shown in one of the accompanying illustrations. In this it will be noted that two 6-in., 23.8-lb. girder-beam center sills transfer the buffing strains from the anti-climbers to the car-body framing. These beams are spaced on 28-in. centers, and they extend only from the anti-climbers to the first underframe panel points inside the body bolsters.

To provide against the destructive effect of collisions the vestibule underframing is made particularly heavy. The two girder-beam center sills under the vestibule have a ⅛-in. top cover plate riveted to them, and that portion of the vestibule between the circular 6-in., 10½-lb. channel buffer and the step openings also is covered with ⅛-in. plate. The vestibule framing above the underframe is substantially built, the end door openings being formed by 6-in., 13-lb. channels riveted between the center sills and the 3½-in. x 2½-in. x ¼-in. angle deck plate, which is made continuous across the end of the car.

The arrangement of the structural steel members in the body-bolster panel is rather unusual and results in a very rigid, shock-absorbing structure. The two heavy girder-beam center sills, in connection with two 6-in. x 3½-in. x 5/16-in. side-sill angles, form the longitudinal members. These are held rigidly in position by 4-in. x

Length over anti-climbers	56 ft. ¾ in.
Length over vestibules	53 ft. 7 in.
Length over body corner posts	44 ft. 2¾ in.
Length of platform	4 ft. 8 in.
Length of passenger compartment	32 ft. 3⅞ in.
Length of smoking compartment	11 ft. 10⅞ in.
Truck centers	32 ft. 8 in.
Width over side sheathing	8 ft. 8 in.
Width of car inside below windows	8 ft. 2 in.
Height top of rail to top of trolley board	12 ft. 5⅝ in.
Truck wheelbase	7 ft.
Minimum radius curve	49 ft.
Seating capacity	58



CHICAGO & MILWAUKEE CAR—EXTERIOR VIEW

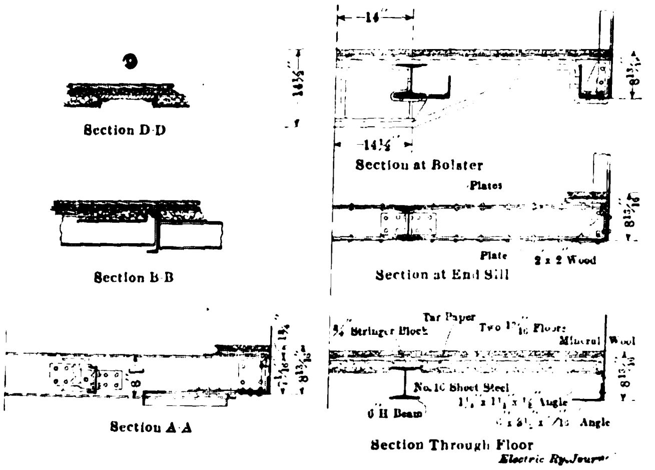
4-in. x 5/16-in. angle diagonal braces riveted between the outer corners of the underframe bolster panel and the point where the bolster connects to the girder-beam center sills. To give these diagonals additional stiffness under compressive strains, they are tied at the middle to the center sills by 2-in. x 1½-in. x 3/16-in. angles.

End sills are formed of 6-in., 10½-lb. channels, and to give them additional lateral stiffness these are provided with ½-in. x 6-in. cover plates which are securely riveted to the top and bottom flanges and to the side sills. The floor beam at the first panel point inside the body bolster is a heavy member, being formed of an 8-in., 11¼-lb. channel. The center sills are riveted to one side of this channel and the members of the floor system in the three central panels of the car-body underframing are riveted to the other. From the rigidly constructed bolster panels at each end of the underframe, buffing and pulling strains are transmitted to the central panels, which are also braced diagonally. The longitudinal floor-system members in these central panels are formed by two 5-in., 9-lb. channels spaced on 36-in. centers. Two transverse 3-in., 4-lb. channel cross-bearers to each set of diagonals also aid in stiffening the underframe between the bolster panels.

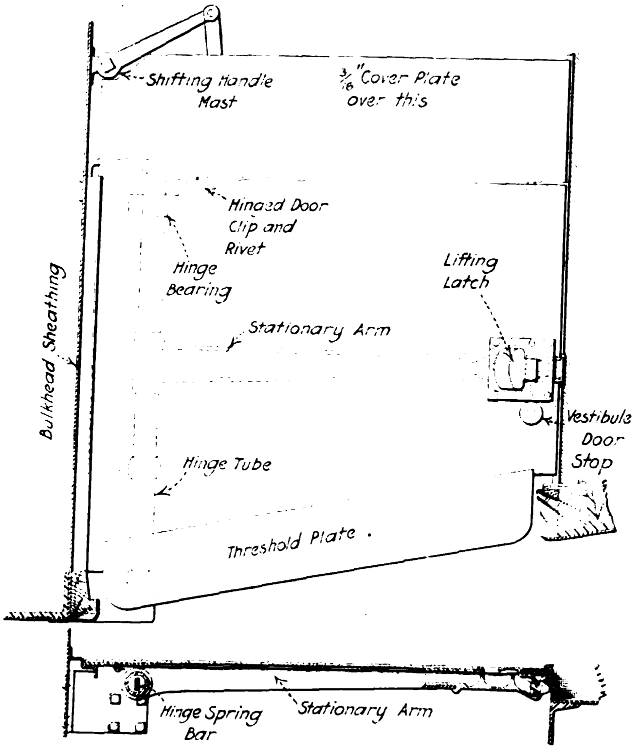
Structural steel shapes arranged for fifteen windows on each side are used in framing the car body. The side girder is formed of ⅛-in. plate 3 ft. ¾ in. deep which is riveted to a 6-in. x 3½-in. x 5/16-in. side-sill angle at the base, and to the 4-in. x ½-in. dropper bar at the belt rail. T-beam window posts on 2-ft. 11-in. centers are continuous from side sill to side sill. The letterboard is formed of two angles and a 10½-in. x ⅛-in. plate. The deck plate to which the letterboard is riveted is continuous around the car body and is formed of a 3½-in. x 2½-in. x ¼-in. angle on the outside of the car and a 2-in. x 1½-in. x ¼-in. angle on the inside. The roof is covered with 9/16-in. narrow tongued-and-grooved poplar nailed to wooden strips that are bolted to the steel ceiling carlines, and the headlining is No. 16 gage sheet steel.

OTHER DETAILS

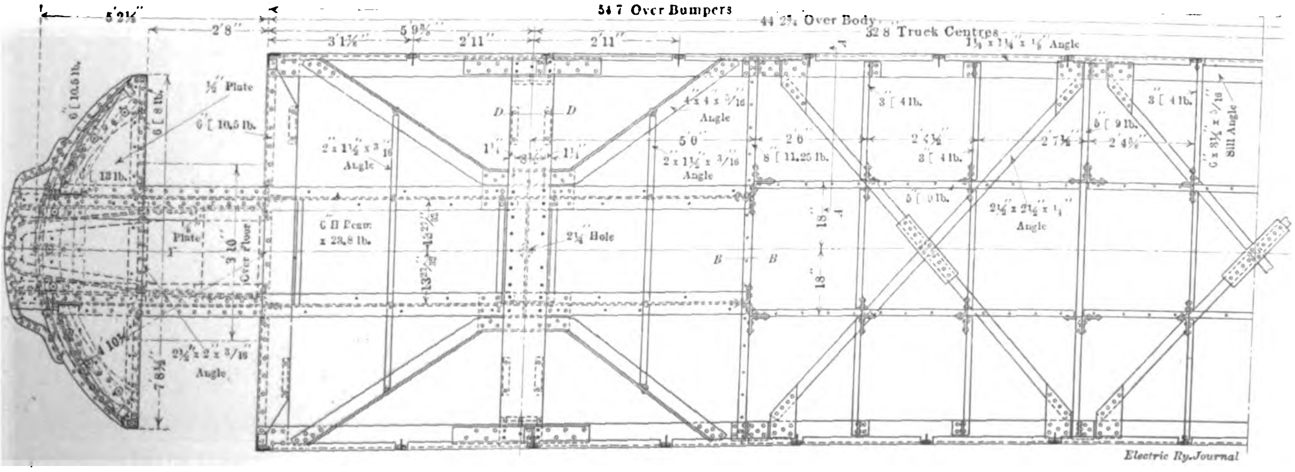
Framing connections are so arranged that no steel member is exposed both to the exterior and the interior of the car. This in addition to the ¼-in. Agasote panels, the mahogany trim below the window stools, and the double yellow-pine flooring with mineral wool closely packed beneath, thoroughly insulates the car body against heat and cold, and serves as well to dampen vibration. Battleship linoleum ¼-in. thick is cemented to the wooden car-body floors and is laid with as few joints as possible to make it practically waterproof. The mineral-wool insulation beneath the wooden floor is from 2 in. to 3 in. thick and is held in place by a


Section D-D
Section B-B
Section A-A
14"
14½"
14½"
8 13/16"
Section at Bolster
Plates
Plate
2" x 2" Wood
Section at End Sill
¾" Stringer Block
Tar Paper
Two 13/16" Floors
Mineral Wool
No. 16 Sheet Steel
1¼" x 1¼" x ⅛" Angle
6" H Beam
Angle
Section Through Floor
Electric Ry. Journal

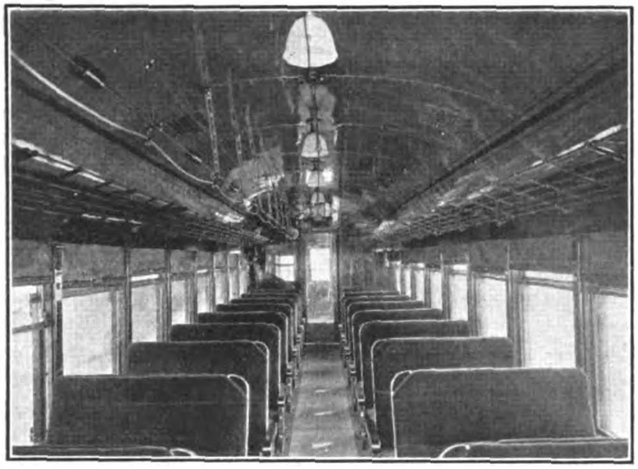
CHICAGO & MILWAUKEE CAR—SECTIONS THROUGH UNDERFRAME


Shifting Handle Mast
⅜" Cover Plate over this
Hinged Door Clip and Rivet
Hinge Bearing
Lifting Latch
Stationary Arm
Bulkhead Sheathing
Vestibule Door Stop
Hinge Tube
Threshold Plate
Hinge Spring Bar
Stationary Arm

CHICAGO & MILWAUKEE CAR—SLIDING VESTIBULE TRAPDOOR


5'2¼"
2'8"
54'7" Over Bumpers
44'2¾" Over Body
32'8" Truck Centres
3'1⅛"
5'9⅜"
2'11"
2'11"
1¼" x 1¼" x ⅛" Angle
6" [10.5 lb.
6" [8 lb.
½" Plate
6" [10.5 lb.
6" [13 lb.
½" Plate
3'10" Over Floor
2½" x 2" x 3/16" Angle
7'8½"
4'10½"
2" x 1½" x 3/16" Angle
6" H Beam x 23.8 lb.
13 27/32"
D
D
1¼"
1¼"
2¼" Hole
4" x 4" x 5/16" Angle
5'0"
2" x 1½" x 3/16" Angle
2'6"
8" [11.25 lb.
3" [4 lb.
2'4½"
3" [4 lb.
5" [9 lb.
18"
18"
B
B
2½" x 2½" x ¼" Angle
2'7½"
5" [9 lb.
2'4⅝"
3" [4 lb.
6" x 3½" x 5/16" Sill Angle
Electric Ry. Journal

CHICAGO & MILWAUKEE CAR—UNDERFRAME DETAILS



CHICAGO & MILWAUKEE CAR—INTERIOR OF PASSENGER COMPARTMENT

false floor that is formed by riveting No. 16 gage sheet steel to the underframe.

Seventeen Hale & Kilburn Walkover seats, 38½ in. long, and three non-reversible seats are installed in the main passenger compartment. Four seats of the same type, three non-reversible seats and one bulkhead seat furnish the seating space in the smoking compartment. All seats in the main passenger compartment are upholstered in green plush and those in the smoking compartment in rattan. Other specialties include Hedley anti-climbers, Tomlinson M.C.B. radial couplers, Advance air sanders with Ohio Brass air-sander valves, U. S. Trolley bases, Edwin S. Wood & Company's anti-friction side and center bearings, Curtain Supply Company's Rexall metal rollers, Forsythe brass sash, Ohmer fare registers, Pyrene fire extinguishers, Electric Service Supply Company's illuminated signs, luminous arc headlights, Peter Smith hot-water heaters, Monarch weatherstripping on the doors, Stanwood three-tread steel car steps, West's deodorizer, pressed prism glass, B. F. Goodrich corrugated rubber mats, Safety Car Heating & Lighting Company's fixtures, Consolidated Car Heating Company's buzzer system, A. & W. Company's ticket holders, and Ackley hand brakes. In painting the car the Detroit Graphite Company's primer was used and the Chicago Varnish Company's method of applying exterior car finish was adopted.

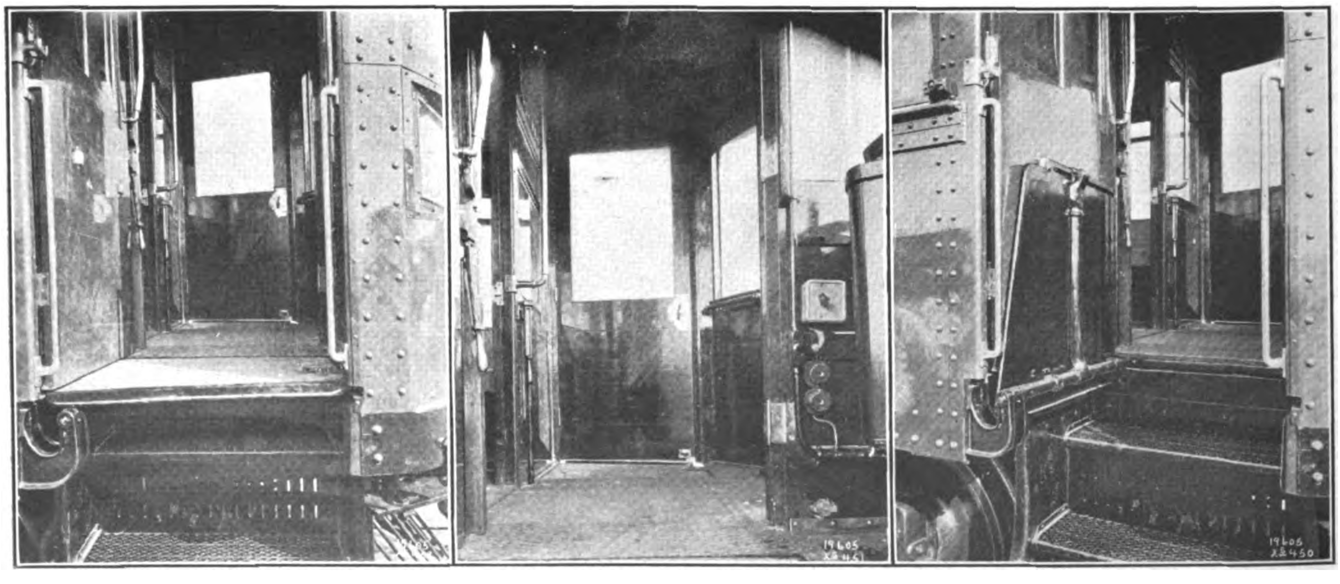
The bodies are mounted on Brill M. C. B.-type trucks with Midvale rolled-steel wheels and Carnegie heat-treated axles of the Association standard. Westinghouse 557-A-5 tap-field motors insulated for 1200 volts and rated at 140 hp. with 600 volts, 198 amp. and 840 r.p.m. were also specified, the equipment including Westinghouse HLS unit-switch control. The General Electric Company furnished combined automatic and straight air-brake equipment, which is of the variable release type.

SLIDING VESTIBULE TRAPDOORS

An item of exceptional interest in the equipment is the previously-mentioned extensible folding trapdoor over the vestibule steps. This permits the use of the cars on routes where stops are made both at crossroads and at stations with raised platforms having variable clearances. By extending the trapdoors when at a station with raised platforms, there is eliminated any possibility of accident to passengers because of gaps between the car and the station platform edge, such openings being inevitable if the station is located on a curve or if the car is operating over a foreign line having wider platform clearances than those for which it is designed. Thus an arrangement of extraordinary flexibility is provided which is, nevertheless, obtained in a very simple manner.

The trapdoors, which were furnished by the O. M. Edwards Company of Syracuse, are of a new design that operates normally in much the same manner as the standard Edwards vestibule trapdoor as it folds upward against the bulkhead when unlatched, the movement being made easy by a counterbalancing spring inside of the horizontal hinge tube on which the trapdoor pivots. The cover plate of the trapdoor, however, is supported at the bulkhead side upon two hinge bearings which slide upon the hinge tube. At the end-sill side it merely rests upon a narrow bracket upon which it can easily be moved.

The lifting latch, as shown in the illustration on page 389, is made in two mutually-engaging parts, one of which is attached to the cover plate and the other to the so-called stationary arm. The latter, of course, is attached to the hinge tube and swings upward when the trapdoor is folded up against the bulkhead but it does not slide horizontally and is not attached to the cover plate except through the interlocking of the two parts of the latch. In consequence, when the cover plate is slid outward the two parts of the latch are separated and disengaged, and the latch as a whole becomes inop-



CHICAGO & MILWAUKEE CAR—VIEW SHOWING EXTENSIBLE TRAPDOOR IN VARIOUS POSITIONS erative, the stationary arm being held in place by that part of the latch which is attached to it. The trapdoor, therefore, cannot be unlatched when it is in extended position.

Power for extending the trapdoor is applied through a mast with a folding handle which is placed close to the bulkhead on either side of the vestibule. An arm on this mast below the vestibule floor level is linked to a sliding plate to which the trapdoor is attached by clips and rivet-shaped catches. These clips and catches engage, of course, when the trapdoor is horizontal and this permits the trapdoor to be moved, although it has no permanent connection with the mast arm. The vestibule door, when it is in any but wide-open position, naturally prevents the trapdoor from being raised and this automatically provides a safety feature for the operation. Another feature is the introduction of a vestibule door stop, which is a small button of rubber set in the trapdoor cover plate in such a position that when the trapdoor is wholly or partly extended it interferes with the movement of the vestibule door. The latter, therefore, cannot be fully opened or fully closed if the trapdoor is partly extended, so that it is impossible for the trainman to close the vestibule door inadvertently and let the train proceed with the trapdoor projecting beyond the side of the car.

Power Economy Expert Obtains Results

Several months ago the Elevated Railroads of Chicago detailed an employee of the electrical department to investigate and make recommendations for reducing energy consumption. This company now purchases all its power from the Commonwealth Edison Company and any saving in energy could be measured in dollars and cents in the annual power bill. Numerous economies have been effected in the operation of cars, special attention at first being directed to regulating closely the use of the lights and electric heaters. During the summer months, however, this expert has devoted his attention to schooling motormen in the art of coasting and handling their controllers, and a decrease in the energy consumed is easily traceable to his efforts. An inquiry from the trainmen regarding the actual results or savings obtained by reason of the increased coasting brought out the following table from the management:

KILOWATT-HOURS PER CAR-MILE

	June, 1915	June, 1914	Decrease in Per Cent
Metropolitan	3.127	3.186	2
Northwestern	2.522	2.625	4
South Side	2.621	2.757	5
Oak Park	3.083	3.013	*2
Loop	3.407	3.726	10
Total	2.823	2.930	3

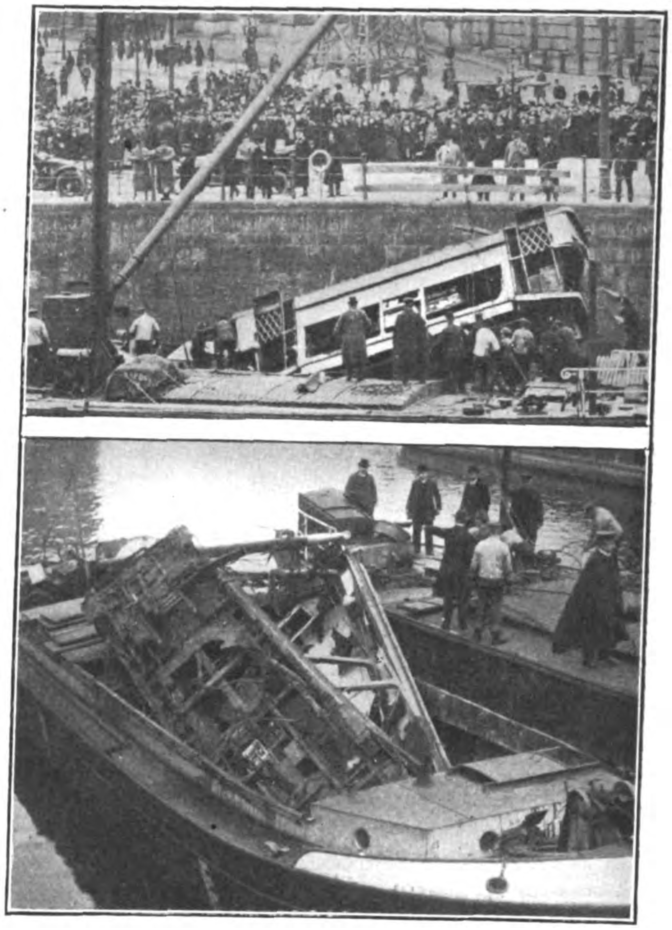
*Increase.

These cars averaged 25 tons each, the weights of the cars on the several divisions being as follows: Metropolitan, 24.55 tons; Northwestern, 25.95 tons; South Side, 25.95 tons; Oak Park, 22.80 tons; Loop, 25 tons. The tonnages given include average loads.

In explanation of the table it should be stated that the month of June was taken for the comparison because no electric heaters were in operation. This put the comparisons on the basis of the energy consumed by the motors and lights. The increase in energy consumed by the Oak Park line was because more motors were operated per train in June, 1915, than in June, 1914. The company is entirely satisfied with the results being obtained, and a steady improvement in the amount of energy consumed per car-mile is being noted from month to month. The larger amount of energy used by the Metropolitan-Oak Park lines over that consumed by the Northwestern-South Side lines is due to the relatively heavy local service with more stops on the first two roads.

Berlin Street Car Accident

Five people were killed and eight injured on April 22 when a street car of the Berlin (Germany) Stadtring line jumped the rails at a sharp curve near the Reichstag building and plunged over an embankment into the Spree River, 8 ft. deep at that place. Whereas the allowable speed limit in that particular locality was only 12½ m.p.h. the motorman approached the curve at the rate of 15 m.p.h. As the track was slippery from rain he failed to apply the brakes at the right moment and the car jumped the track. The motorman and conductor were able to jump from their platforms at the last moment, but unfortunately some of the passengers were imprisoned in the car and drowned.



BERLIN STREET CAR ACCIDENT—RECOVERY OF CAR FROM RIVER

A wrecking tug was chartered by the railway company to lift the car out of the river into a lighter. All parts joining truck to car body were disconnected and the truck was lifted separately. The upper figure shows the lifting of the car body into the lighter. At the moment in which the car was nearing the bottom of the lighter the cable slipped and the car body was badly crushed, as shown in the lower illustration.

Power house employees of the Louisville (Ky.) Railway appoint safety-first inspection committees each month, whose duty it is to visit each of the stations and substations during that period and inspect them for "accident opportunities" and for dangerous conditions which may be eliminated.

Seven Per Cent Wage Reduction Granted

British Columbia Electric Railway, Ltd., Receives Favorable Majority Report in Case Before Arbitration Board—Arbitrators' Comments on Company's Contentions Are Published

The arbitration board considering the dispute between the British Columbia Electric Railway, Ltd., Vancouver, B. C., and its employees on Aug. 25 presented a majority report favoring an all-around reduction of wages by about 7 per cent on the average. This was in answer to the company's contention before the board that the wage scale should be decreased 15 per cent. When the agreement between the union and the company expired on June 30 the company notified the men through the general manager that it desired to make a 10 per cent cut in wages throughout. This proposal was rejected by the union, and the company found it necessary to apply to the government for an arbitration board under the industrial disputes investigation act.

This act, which merits a few words of description because of its unusual character, provides that in the case of any dispute an application may be made by either employer or employees to the Minister of Labor for the appointment of a board of conciliation and investigation. This application must be accompanied by a statutory declaration, that failing of an adjustment by the board, to the best of the knowledge and belief of the declarant a strike or lockout will be declared. Under heavy penalties the employer is forbidden to declare or cause a lockout and any employee to go on strike prior to or during the reference of the dispute to the board. One of the members of the board must be recommended within a certain time by each party to the dispute or else be appointed by the Minister of Labor. The two members must agree on a third or he will be appointed by the minister. The decision rendered by the board is only a recommendation to the parties. Nothing in the act restrains lockouts or strikes in disputes which have been duly referred to the board and decided.

The arbitration board chosen in the present British Columbia Electric Railway case was composed of Justice McDonald, chairman, appointed by the Dominion Government; A. G. McCandless, representing the company, and J. H. McVety, representing the employees. Public hearings were opened on July 19 and continued from time to time until Aug. 13. At these hearings W. G. Murrin, general superintendent, and W. Saville, chief clerk, represented the company, and F. A. Hoover and W. Yates appeared for the employees.

POSITION OF BOTH SIDES

At the hearings the company sought a reduction of 15 per cent in the wage scale, basing its arguments on the following grounds: (1) The general business depression existing throughout the company's territory had led to an almost universal reduction of wages. (2) The financial position of the company, owing to decreased business, made it unable to continue the old wage rate. (3) If the rate of wage was determined by the cost of living, such cost had decreased since the last wage agreement was signed in 1913. (4) The wages paid by the company were, in general, higher than those paid by other street railways. (5) The wages paid had advanced 8 per cent since 1913 because of the sliding scale, this increase coming in the face of decreased business. The company also in a general way submitted that the rate of wage should depend upon the supply of and demand for labor. Representatives of the employees asserted that the wage scale which had prevailed could not be designated as a living wage, and that through the time of prosperity the wages should have been higher.

SUPPLY AND DEMAND

In discussing the question of the supply of and demand for labor, the board stated in its report that in general wages are dependent upon the universal law of supply and demand, but this has only a limited application to the employees of this company. It might be true that there is an over-supply of labor outside the employees' association that might be utilized for the operations of the company, but the company proposes to agree for its labor supply not with workmen generally, but with a particular union or association as representing the employees necessary for its purpose. Under these circumstances the question of supply and demand to a great extent loses its force in determining the rate of wages.

BUSINESS DEPRESSION

In the board's opinion, there is no doubt that a business depression has existed in the company's territory and may continue for some considerable time. The labor market has become congested and has resulted in reduction of wages generally. Wages in mercantile and industrial establishments have been reduced from 10 to 25 per cent. The City Council of Vancouver recently lowered the standard rate of wage 25 per cent, viz., from $3 to $2.25. In work on the new drill hall in Vancouver the previously stipulated carpenters' wages were reduced from $4.25 to $3.60; painters' from $4.50 to $3.60; plumbers' from $5 to $4.50; laborers from $3 to $2.40.

PRESENT COST OF LIVING

As to the present cost of living, as compared with 1913, it appears from statements based on information in the *Labor Gazette*, that with respect to a typical family of five, the cost of living in Vancouver, including all foods, fuel, light and rent, per week, in the month of March, 1913, was $16.28¼, and that it fell to $13.22¼ in March, 1915. It also appears that this later cost was lower than in the cities of Calgary, Edmonton, Regina, Winnipeg and Toronto.

A further investigation to cover different months and different cities showed that for this typical family, during January, March and May, the cost per week in 1913 for Vancouver was $16.48¾ as compared with $13.46¾ in 1915; in Victoria it was $17.87¼ in 1913 as compared with $14.31¾ in 1915; while in New Westminster it was $16.89¾ in 1913 as compared with $14.56¼ in 1915, thus showing decreases in each of these cities. A statement was also made of the compounded averages, according to the number of the company's employees in the respective cities, and this showed a decrease in cost between these two periods of 18.92 per cent for Vancouver, 19.89 per cent for Victoria and 13.80 per cent for New Westminster, or making a compounded average decrease for all the cities of 18.17 per cent.

As a result of these investigations the board was satisfied that as between 1913, when the wage scale was last fixed, and the present time, the cost of living had on the whole slightly decreased in the community affected by the inquiry. This result was brought about by the fact that while the cost of foodstuffs has risen to some extent, this was offset by a considerable reduction in rent and an appreciable decrease in the cost of fuel. The cost of cotton goods has fallen, and the present retail cost of woollen goods is less than it was two years ago, although the opinion of merchants is that in the near future the cost to the consumer of all woollen goods is bound to increase.

COMPARATIVE WAGE SCALES

The company contended that its employees were receiving a higher rate of wages than was paid by any other company carrying on a like business under similar conditions. It stated that, with reference to motormen and conductors, among more than 1000 street railways only a small number could be found paying a higher rate of wages, and that these exceptions could in most cases be accounted for by peculiar local conditions. This statement was found to be substantially proved. A statement filed showing the maximum rate paid in some of the cities gave the following information: Peterborough, 20 cents per hour; Hull, 23 cents; Hamilton, 25 cents; Montreal, 25 cents; Ottawa, 27 cents; Toronto, 27½ cents, as compared with the existing rate paid by the British Columbia Electric Railway of 35 cents in the cities and 36½ cents per hour on the interurban lines.

In the neighboring coast cities in the United States the length of service, in order to reach the maximum rate of pay, is greater in most cases than in British Columbia. The rates supplied were as follows: Tacoma, 21 cents per hour; Stockton, 27½ cents; Everett, 28 cents; Los Angeles, 30 cents; San Francisco, 33 cents; San Francisco (municipal), 37½ cents, and Oakland, 40 cents per hour. The board had no evidence showing the different agreements with their employees under which the railways in these cities were operatd, nor whether the employees had the benefit of privileges and concessions as liberal as those granted by the British Columbia Electric Railway. The nearest city to which it felt it might look for comparison was Seattle. There, however, the 32 cents maximum rate is only reached after six years' service. From the evidence the board was satisfied that on the whole there was no appreciable difference in the cost of living between the two cities. The climatic and general conditions of operation would be practically the same for the employees, but those working for the company in British Columbia have not only the benefit of an agreement guaranteeing permanent employment with reasonable working conditions, but also receive valuable concessions in the form of half rates for electric lighting, reduced charges for gas, free installation of meters, and free transportation for themselves at all times, and also for their families to a limited extent.

WAGES INCREASED SINCE 1913

In regard to the company's assertion that the rate of wages paid its employees, especially motormen and conductors, had risen 8 per cent since 1913, the board states that this was due to the sliding scale by which length of service entitled an employee to a higher rate of wages. The board did not think that this increase should be considered as an argument for lower wages now. The point, however, might be worthy of consideration to this extent—the employees were presumably satisfied to work for the company in 1913 at the then existing rate of wages and cost of living, and it would not now be unjust under the changed conditions to have them revert to the rate of wages then being paid. In other words, if the rate of wages to motormen and conductors were decreased by 8 per cent, they would, in these times of depression, receive the same wages as in the period of prosperity.

COMPANY'S FINANCIAL POSITION

The company presented statements in detail showing its financial position and inability to pay the present rate of wages. An extract shows that while the net profit for May, 1914, was $162,674, it had fallen to $23,745 in May of 1915, and other amounts showed a corresponding decrease. The whole capital investment in all undertakings of the company, on June 30, 1914, amounted to $45,935,669, and the net profit for the year was $2,156,585, giving a net profit of 4.69 per cent on the capital invested, while with the same amount invested the net profit up to June 30, 1915, was $1,273,603, representing only 2.67 per cent profit.

The proportion of the gross earnings absorbed by wages of motormen and conductors increased from 1913 to 1915. For example, the earnings in the city of Vancouver in June, 1914, were $161,589 and the wages to motormen and conductors amounted to $48,402, being 29.95 per cent of the gross earnings, while in June, 1915, the gross earnings were $84,023 and the wages of motormen and conductors were $41,488, being 49.37 per cent of the gross earnings. The entire system for the same period did not show disproportion to the same extent, viz., in June, 1913, the gross earnings were $315,205, and the wages of motormen and conductors were $81,638, being 25.89 per cent, while in June, 1915, the gross earnings were $186,586 and the wages were $71,707, being 38.43 per cent of the gross earnings.

On the subject of the financial standing of the company the board concluded that it should not be a governing or controlling factor in its recommendation as to the rate of wages. Whatever course a company might see fit to pursue of its own accord, the board did not think it should recommend that the company carry on its operations by paying its employees less than a fair wage, based on proper conditions. The arbitrators believed it well, however, to outline the financial condition to show that the company is not in a position to deal liberally with its employees. The presentation of the financial position of the company was also deemed important as a strong argument in favor of using extreme care in making recommendations.

WORKING CONDITIONS

With regard to the change in working conditions asked by the company, the majority report states that in view of the fact that the board which dealt with the dispute between the company and its employees two years ago, did not deem any change necessary; and also in view of the fact that the representatives of the men and the company had agreed upon a majority of the working conditions against which objections were raised, the board thought it advisable not to interfere with this phase of the dispute.

RECOMMENDATIONS

The majority of the board felt satisfied in recommending the adoption by the parties interested of an agreement containing reductions in the wage schedule. In the working conditions, the seniority clause was left intact. This protection, when coupled with efficiency, was believed to create permanency of employment, more especially to those who, by length of service, had secured to themselves an advantageous position under this privilege. In fixing the rates of wages the board did not attempt to capitalize in dollars and cents the concessions enjoyed by the company's employees, but did not overlook their consideration. In making the recommendations the board bore in mind the permanency of employment that will be guaranteed to the employees by the execution of an agreement covering a definite period. The board recommended that the agreement should expire on June 30, 1917, twenty-two months from Sept. 1, 1915.

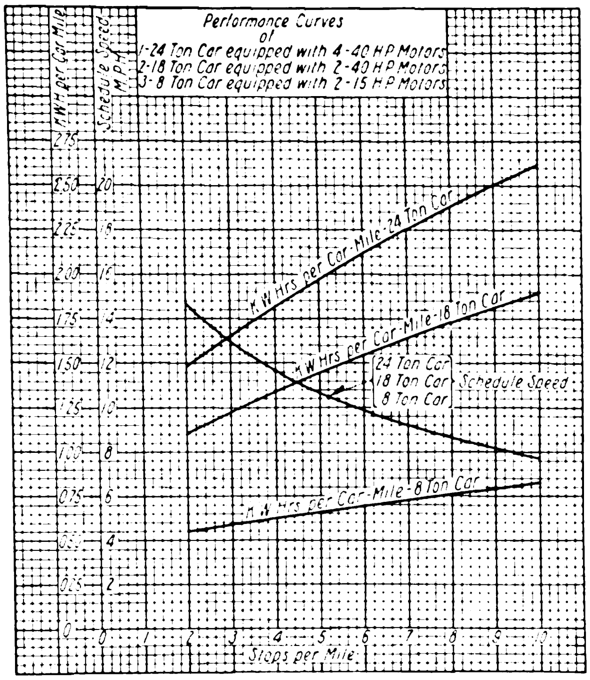
Reduction in the case of conductors and motormen was of a little more than 8 per cent. The suggested agreement provides that rates of wages on city and suburban lines for motormen and conductors be, for the first year, 26 cents per hour, rising gradually to 32 cents per hour after four years' service. The rate under the old agreement was 27 cents for the first year, rising gradually to 35 cents per hour after four years' service. A clause in the agreement stating that motormen and conductors on work train service shall receive 1½ cents additional is the same as prevails under the old agreement. The rate of wage for motormen and conductors on the interurban lines, i.e., Central Park, Burnaby Lake and Saanich, it is suggested be reduced to the same extent as conductors and motormen on city lines, the maximum wage on the interurban lines being 33½ cents per hour. For brakemen, trolleymen and baggagemen the rate recommended is 25 cents per hour for the first six months, 26 cents per hour for the second six months, 26½ cents per hour for the second year, 27½ cents per hour for the third year, and 28½ cents per hour for the fourth year and after. The recommendations also cover reductions in the wages of shop and carhouse employees.

The Small Car versus the Large Car

BY D. C. HERSHBERGER, WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

The advent of the jitney into the transportation field has caused serious investigation which already is bringing with it development and invention to meet the competition of this new system of selling transportation. It is somewhat doubtful if this form of competition will be long lived, so that it need not be taken very seriously. However, we are about to return to a small, but efficient car as a means of meeting this competition.

In returning to the small car we would appear to be retrogressing, but upon investigation it will be found that this is an illusion. The small car of to-day will have a greater weight efficiency as regards seating capacity than has been obtained heretofore. It will also be designed for more economical operation both as to crew expense and power cost.



POWER-CONSUMPTION CURVES FOR CARS OF VARIOUS SIZES

We naturally question the riding qualities of the small car as compared with that of the large car, but judging from the automobile it would seem reasonable that the riding qualities of the large car in city service could be approached very closely. In the small and medium-sized cities the small car will prove most adaptable in supplying frequency of service, thereby offering more opportunity to ride, especially in the short-haul service, which obviously is the most profitable.

There are some unfavorable features to be overcome in the operation of small cars, one of which is reduced schedule speed with the one-man type car, especially in rush-hour service, because more time is required to collect fares and issue transfers than with two men per car. This objectionable feature can be checkmated to a large extent by employing the skip-stop feature in the outlying districts where permissible and by equipping the cars with adaptable fare collecting apparatus. In the small number of places where it is absolutely necessary to maintain high schedule speeds, the cars could be operated during rush hours by a motorman and conductor. With a greater number of cars handling the same service the number of stops per mile will decrease slightly, which permits a higher schedule speed.

Assuming that the one-man car requires four seconds longer per stop than the two-man car, and that by reason of more cars and fewer passengers per car, the average number of stops per mile would be reduced from eight to seven, approximately the same schedule speed could be maintained. This statement will serve partially to give an idea of the effect of the number of stops and duration of stops on schedule speed.

The accompanying performance curve was made up to show graphically the relative power consumption in city service for (*a*) a 24-ton car equipped with four 40-hp. motors, (*b*) an 18-ton car with a double 40-hp. motor equipment, and (*c*) an 8-ton car with a double 15-hp. motor equipment operating at the same schedule speed. It will be noted that the 24-ton car is over-motored—a condition common to many cities and towns. It would be possible to make a slightly higher schedule speed with the four-motor equipment, which in turn would raise the power consumption considerably.

The accompanying table will give an indication of the relative operating costs of the three weights of cars covered by the above performance curve. The data employed for the basis of this comparison have been taken to represent the average condition throughout the country for medium and small-sized cities.

COMPARATIVE OPERATING DATA FOR LARGE AND SMALL CARS

Weight of car, loaded—tons...	24	18	8
Number of motors per car....	4	2	2
Horsepower per motor at 500 volts	40	40	15
Stops per mile..............	8	8	8
Average duration of stop—seconds	10	10	10
Kilowatt-hours per car-mile...	2.38	1.73	0.76
Kilowatt-hours per car per year at 30,000 car-miles per car..	71,400	51,900	22,800
Cost of power per car per year at 1 cent per kilowatt-hour at the car............	$714	$519	$228
Assumed seating capacity.....	45	35	25
Per cent increase in number of cars to carry a given traffic.	0	28.7	80
Number of cars required to accommodate the traffic on an assumed property	100	129	180
Yearly power bill............	$71,400	$66,900	$41,000
Yearly saving in power bill over four-motor car......	0 0	6.3 per cent $4,500	42.6 per cent $30,400
Crew-men per car.:..........	2	2	1
Average time of each car in service—assumed	12 hours	12 hours	12 hours
Cost of crew per day at 25 cents per man hour.........	$600	$774	$540
Cost of crew per year—365 days	$219,000	$282,000	$197,000
Yearly power bill and wages of crews on assumed property..	$290,400	$349,300	$238,000
Yearly saving of 8-ton car over 24-ton car...........	....	....	18 per cent $52,000
Yearly saving of 8-ton car over 18-ton car...........	....	....	32 per cent $111,000

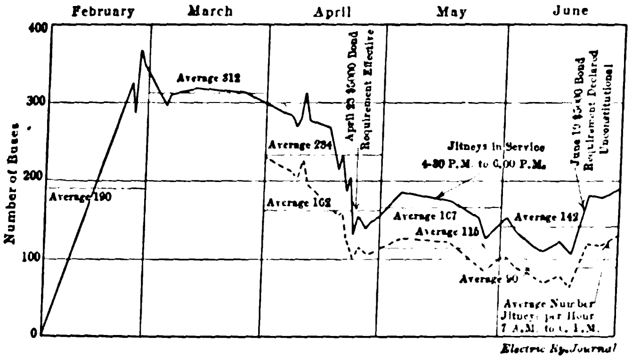
It will be observed that the yearly power bill decreases with the weight of the car, even taking into account the increased number of cars to handle the same amount of traffic. Any increase in traffic resulting from the more frequent service offered by the small car can be taken care of at a better load factor.

The crew expense is the greater item of expense as compared with the power bill. The above figures show that the 18-ton car is the most expensive to operate on account of larger yearly crew expense to handle the same traffic. This statement, however, does not apply to the latest type of two-motor cars with large seating capacity and in many cases larger motor equipments than considered here.

These figures show a saving in the yearly power bill of 42½ per cent in favor of the small car as compared with the four-motor car, and 18 per cent in crew expense and power bill combined. Furthermore, it shows a saving of 32 per cent in crew and power cost over the 18-ton two-motor two-man car.

Jitney Bus on the Wane in Memphis, Tenn.

The accompanying graph displays the record of the number of jitney buses in operation on the streets in Memphis, Tenn., since the beginning of the movement and until July. This record was inaugurated by T. H. Tutwiler, president Memphis Street Railway Company, and it shows that the general tendency of the jitney bus movement has been a steadily declining one after the first few weeks of its operation. The upper one of the two curves displays the number of jitneys in service during the afternoon rush hour only or from 4.30 p. m. to 6.30 p. m. The lower curve shows the average number of individual jitneys per hour from 7 a. m. to 6 p. m.



RECORD OF JITNEY BUS OPERATION IN MEMPHIS

It will be noted that there is a sharp break in both curves in the latter part of April, at which time there was made effective a requirement for a $5,000 bond for jitney buses in accordance with a State law. Within two weeks, however, the number of jitneys in operation increased enough to recover a large part of the loss, but thereafter, during the months of May and June, the downward tendency again was manifest, so that during the latter month the daily average of all-day jitneys was only ninety. During the latter part of June the $5,000 bond requirement was declared unconstitutional, and the immediate result was that the number of jitneys increased to a point approximately equal to that established in the early part of May, but by no means equal to the record of the early part of April, before the statute went into effect. During the month of July, which is not included in the graph, the high point was 190 for the rush-hour jitneys and 133 for the all-day operators, both maximums being reached on July 2. Thereafter the number of cars again fell off steadily, reaching minimums of 160 and 105 respectively at the end of the month.

In Memphis the types of jitney buses have been about equally divided between Fords and other miscellaneous types of cars, seating five passengers. There have been also about twenty seven-passenger cars, and during the past two months, about ten buses with seating capacities between nine and fourteen.

Traffic Count in Manila

The Board of Public Utility Commissioners at Manila recently made a count of the passengers on the electric railway system there to determine whether the service given the rush hours was adequate. The count was taken during the six week-days of the week from May 21 to May 27. The accompanying tabulation of the data obtained was made by the Manila Electric Railroad & Light Company. These data, particularly the percentage figures in the last three colunms, are interesting as bearing out the company's contention, made at the commission hearing and in its brief, that it was not responsible for the so-called inadequacy of service or overcrowding of cars, as long as reasonably adequate service was furnished. The alleged overcrowding was caused by the manner in which the public used the service in crowding certain cars. There was no occasion to do so, provided the passengers would distribute themselves more equitably over a reasonable number of cars and not congest a few cars during the rush hours.

The situation in Manila is complicated somewhat because the company must furnish facilities for both first and second class passengers on each car. The franchise of the company provides that "at least 60 per cent of the accommodation furnished will be second class." The figures show that approximately 15 per cent of the total passengers carried are first class passengers and approximately 85 per cent are second class passengers. In practice, the company requires its conductors to reserve for first class passengers such portion of the car as experience has shown should be reasonably adequate, preserving at least 60 per cent of the capacity of the car for second class passengers. The first class section of the car is separated from the second class section by means of a movable barrier. Conductors are required to set this barrier in position before the car starts on its journey from its terminal, and are not permitted to shift it to increase the space allotted for first class passengers unless there are unoccupied seats in the second class section of the car. In practice, about 80 per cent of the capacity of the car is reserved for second class passengers and 20 per cent for first class.

TABLE SHOWING RESULT OF TRAFFIC COUNT IN MANILA THREE PRINCIPAL LINES DURING RUSH HOURS, MAY 21-27, 1915.

					Passengers			Seats			Percentage seats to passengers		
Line	Direction	From	To	Cars	1st class	2d class	Total	1st class	2d class	Total	1st class	2d class	Total
Pasay-San Juan ..	in	6 a.m.	8 a.m.	95	980	4,285	5,265	1,161	2,742	3,903	118	64	74
Pasay-San Juan ..	in	noon	2 p.m.	47	185	822	1,007	604	1,396	2,000	326	169	198
Pasay-San Juan ..	out	noon	2 p.m.	47	418	1,542	1,960	609	1,347	1,956	145	87	99
Pasay-San Juan ..	out	3.30 p.m.	7.30 p.m.	199	1,131	5,704	6,835	2,261	5,321	7,582	199	93	110
Pasig-Tondo	in	6 a.m.	8 a.m.	24	171	798	969	280	734	1,014	163	92	104
Pasig-Tondo	in	noon	2 p.m.	24	89	556	644	294	1,078	1,372	330	194	213
Pasig-Tondo	out	noon	2 p.m.	24	170	774	944	278	738	1,016	164	95	102
Pasig-Tondo	out	3.30 p.m.	7.30 p.m.	48	185	1,476	1,661	586	2,002	2,586	317	136	156
McKinley-Tondo ..	in	6 a.m.	8 a.m.	23	119	707	826	232	596	828	194	84	100
McKinley-Tondo ...	in	noon	2 p.m.	24	62	188	250	242	622	864	390	330	345
McKinley-Tondo ...	out	noon	2 p.m.	24	140	392	532	242	622	864	173	158	162
McKinley-Tondo ...	out	3.30 p.m.	7.30 p.m.	46	127	766	893	472	1,184	1,656	371	155	185

Way Department Report Forms

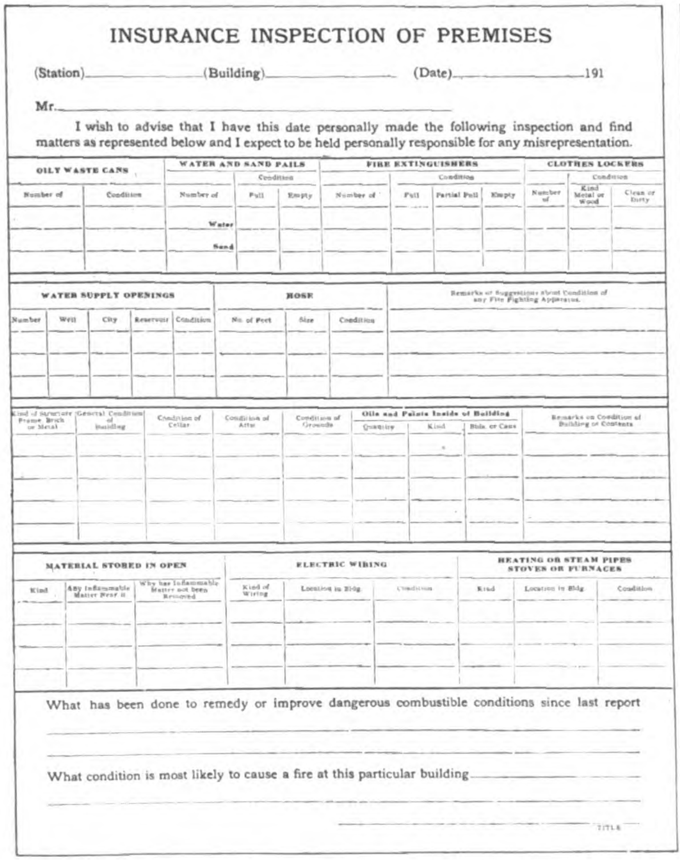
The Forms Were Designed for the Purposes of a Small Road with Particular Reference to Their Disciplinary and Record Value

The report forms which are used by the employees of the way department of the Chicago, Ottawa & Peoria Railway, Joliet, Ill., were designed with two objects in view. One was that they should include all the information desired from a record standpoint. The other was for their disciplinary value. It was found that when reports were required in the form of letters or brief memoranda, many of them did not contain all the information desired and, as the arrangement of the data in the letters varied, the information was difficult to check. Furthermore, there was a tendency on the part of the man who simply wrote a letter report to omit information which would seem to criticise a fellow workman. But with a printed report form the employees feel that they are in duty bound to answer the questions on the forms to the best of their ability, no matter where "the chips may fall." Another reason why the men prefer to submit their reports on forms is that the questions reduce the effort required to prepare a report by suggesting the subjects to be covered as well as by reducing the amount of information which must be recorded.

Probably the most striking example of the type of form employed to obtain both disciplinary value and financial return is that used in reporting the results of an insurance inspection of premises (Form 1). This report is compiled once each month by the substation repair foreman, whose duties include the inspection of all structures for insurance purposes. At this time the person in charge of the building is directed to eliminate fire hazards and not to take any extraordinary risks during the period between inspections. On his rounds the regular inspector examines all fire extinguishers, which, prior to the time of adopting this method, were occasionally found to be broken or stolen or cast into a hidden corner when empty. In a similar manner sand and water pails are inspected and the condition of fire hose and hydrants is determined. As a result of this monthly fire inspection the men in charge of buildings have begun to have pride in the condition of their premises, the fire-fighting equipment is kept in good condition, and fire risks are not taken. In connection with this report form the company has been enabled to reduce its insurance rate from $1.41 per thousand to 73 cents, by removing fire hazards and by providing certain fire protective apparatus.

Other forms designed to have disciplinary value as well as record interruptions to service are reports on accidents or damage to overhead lines and equipment, the line and signal maintainers' daily report and the dispatcher's line trouble record. The accident report (Form 2) is made out by the overhead line foreman and forwarded to the office of the engineer of maintenance of way, being a record of damage. Form 3, the dispatcher's report form, is designed to furnish a record of service interruptions, and at the same time it may be checked against reports of the line and signal department for discrepancies.

The work-train report (Form 5) also accomplishes the same end and in many instances has brought about



INSURANCE INSPECTION OF PREMISES

(Station)________ (Building)________ (Date)________191

Mr.________

I wish to advise that I have this date personally made the following inspection and find matters as represented below and I expect to be held personally responsible for any misrepresentation.

OILY WASTE CANS		WATER AND SAND PAILS			FIRE EXTINGUISHERS				CLOTHES LOCKERS		
			Condition			Condition				Condition	
Number of	Condition	Number of	Full	Empty	Number of	Full	Partial Full	Empty	Number of	Kind Metal or Wood	Clean or Dirty
		Water									
		Sand									

WATER SUPPLY OPENINGS					HOSE			Remarks or Suggestions about Condition of any Fire Fighting Apparatus
Number	Well	City	Reservoir	Condition	No. of Feet	Size	Condition	

Kind of Structure Frame, Brick or Metal	General Condition of Building	Condition of Cellar	Condition of Attic	Condition of Grounds	Oils and Paints Inside of Building			Remarks on Condition of Building or Contents
					Quantity	Kind	Bbls. or Cans	

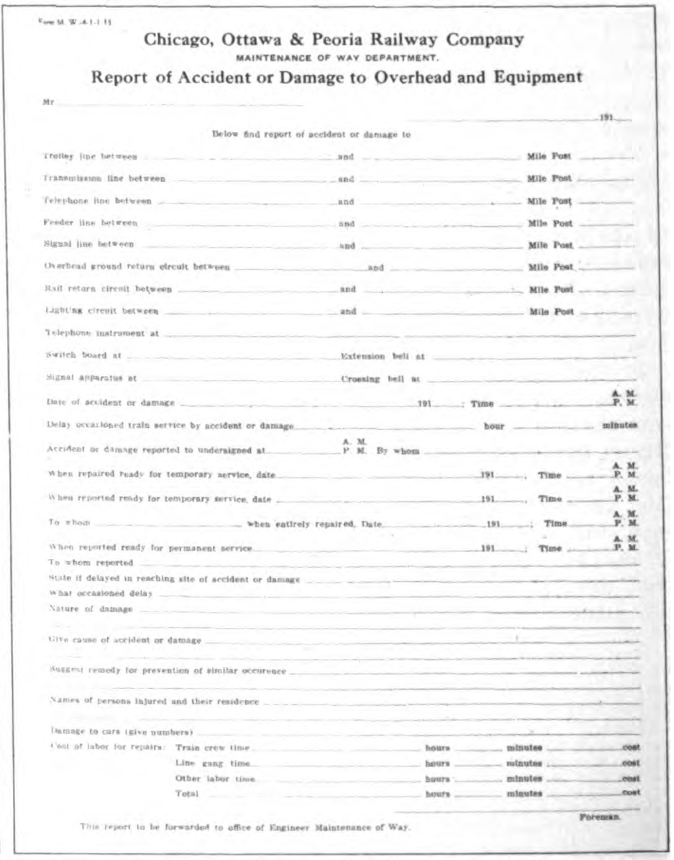
MATERIAL STORED IN OPEN			ELECTRIC WIRING			HEATING OR STEAM PIPES STOVES OR FURNACES		
Kind	Any Inflammable Matter Near it	Why has Inflammable Matter not been Removed	Kind of Wiring	Location in Bldg.	Condition	Kind	Location in Bldg.	Condition

What has been done to remedy or improve dangerous combustible conditions since last report________

What condition is most likely to cause a fire at this particular building________

________ TITLE

WAY REPORTS—FORM 1—INSURANCE INSPECTION OF PREMISES



Form M. W.-4-1-1-15

Chicago, Ottawa & Peoria Railway Company

MAINTENANCE OF WAY DEPARTMENT.

Report of Accident or Damage to Overhead and Equipment

Mr.________

________191__

Below find report of accident or damage to

Trolley line between ________ and ________ Mile Post ____

Transmission line between ________ and ________ Mile Post ____

Telephone line between ________ and ________ Mile Post ____

Feeder line between ________ and ________ Mile Post ____

Signal line between ________ and ________ Mile Post ____

Overhead ground return circuit between ________ and ________ Mile Post ____

Rail return circuit between ________ and ________ Mile Post ____

Lighting circuit between ________ and ________ Mile Post ____

Telephone instrument at ________

Switch board at ________ Extension bell at ________

Signal apparatus at ________ Crossing bell at ________

Date of accident or damage ________191___; Time ______ A. M. P. M.

Delay occasioned train service by accident or damage________ hour ______ minutes

Accident or damage reported to undersigned at________ A. M. P. M. By whom ________

When repaired ready for temporary service, date________191___; Time ______ A. M. P. M.

When reported ready for temporary service, date ________191___; Time ______ A. M. P. M.

To whom ________ when entirely repaired, Date________191___; Time______ A. M. P. M.

When reported ready for permanent service________191___; Time ______ A. M. P. M.

To whom reported ________

State if delayed in reaching site of accident or damage ________

What occasioned delay ________

Nature of damage ________

Give cause of accident or damage ________

Suggest remedy for prevention of similar occurence ________

Names of persons injured and their residence ________

Damage to cars (give numbers) ________

Cost of labor for repairs: Train crew time______ hours ______ minutes ______cost

Line gang time______ hours ______ minutes ______cost

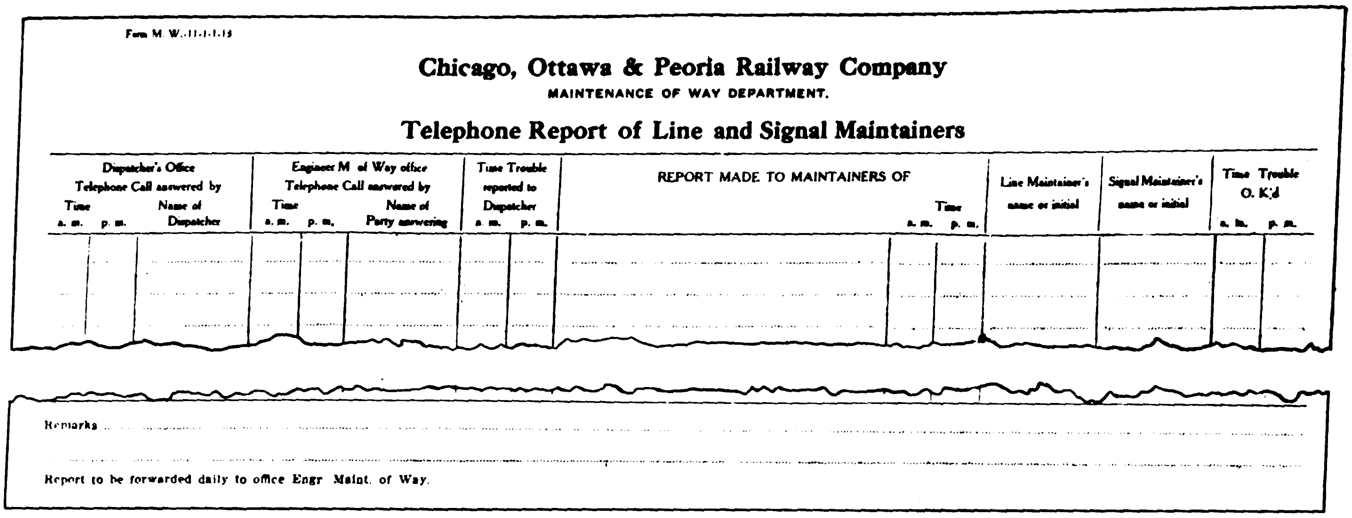
Other labor time______ hours ______ minutes ______cost

Total ______ hours ______ minutes ______cost

________ Foreman.

This report to be forwarded to office of Engineer Maintenance of Way.

WAY REPORTS—FORM 2—ACCIDENT TO OVERHEAD OR EQUIPMENT



Form M. W.-11-1-1-15

Chicago, Ottawa & Peoria Railway Company

MAINTENANCE OF WAY DEPARTMENT.

Telephone Report of Line and Signal Maintainers

Dispatcher's Office Telephone Call answered by			Engineer M of Way office Telephone Call answered by			Time Trouble reported to Dispatcher		REPORT MADE TO MAINTAINERS OF			Line Maintainer's name or initial	Signal Maintainer's name or initial	Time Trouble O. K'd	
Time		Name of Dispatcher	Time		Name of Party answering				Time					
a. m.	p. m.		a. m.	p. m.		a. m.	p. m.		a. m.	p. m.			a. m.	p. m.

Remarks

Report to be forwarded daily to office Engr Maint. of Way.

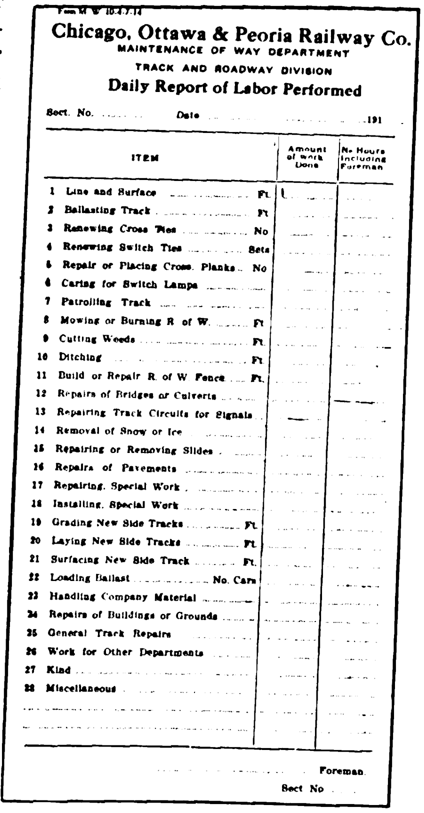
WAY REPORTS—FORM 3—DISPATCHER'S REPORT AND MAINTAINERS' TELEPHONE REPORT

real financial saving to the company. As a rule the operation of the work-train on an electric road is regarded by the transportation department as a favor to the way department, and as it is considered that the train has no rights of any kind, it therefore should be subject to any number and length of delays. With this company it was found that if the work-train received certain limited rights and had the benefit of extra time because of delayed trains or other reasons, the way department could accomplish more work for considerably less money and at the same time reduce the cost of work-train service to the department.

Perhaps the section foreman's daily report (Form 4) presents the most effective method of reducing the clerical work of the foreman, at the same time giving a legible record to the maintenance of way department. This report is printed on manila cardboard and on one side are the name of the railway company, the letters R. R. B. and blanks for the address. The reproduction of the report form shows that the writing which the section foreman must do includes the insertion of the date and his name. All of the entries regarding the amount of work done and the hours required to do the work may be made in figures. This reduces the work to routine and minimizes the time required to make a report.

Two other report forms which are not in general use but have proved of value are outlines of the labor performed and materials used by the overhead and the bridge and building departments. While it is general practice to require a report from the bridge and building department foreman, this company has gone one step further in setting down in printed form an outline of all the kinds of labor performed and materials used by this department (Form 6). This form also reduces the work of the foreman largely to recording figures rather than writing and thereby provides a much neater report to be filed away for record purposes. The same might be said of the overhead line daily report (Form 7), which is not in general use on electric roads. Both of these forms also have a disciplinary value in that they obtain a record of work performed, against which a check may be made at any time and the foreman disciplined for inaccuracies.

Similarly the daily report form for signal and crossing-bell operation (Form 8) was designed to minimize the clerical work and at the same time to be so comprehensive in character as to cover all the work which might be done by an employee of that department. Since this company has only 16 miles of block-signaled territory, with crossing bells scattered over the entire 106 miles of line, only one maintainer is necessary. In order to handle his work to best advantage he moves over the road on a predetermined schedule unless he is called away on special emergency trouble. To provide for the two classes of work, the upper portion of his report form is for emergency work and the lower for routine. This report form is also used by the transportation department, as well as by the signal maintainer, one being checked against the other; hence, it has a disciplinary value in the way of obtaining correct reports like the other forms used by this company.



Form M. W. 10-4-7-14

Chicago, Ottawa & Peoria Railway Co.

MAINTENANCE OF WAY DEPARTMENT

TRACK AND ROADWAY DIVISION

Daily Report of Labor Performed

Sect. No. .... Date 191

ITEM	Amount of work Done	No. Hours including Foreman
1 Line and Surface .... Ft.		
2 Ballasting Track .... Ft.		
3 Renewing Cross Ties .... No		
4 Renewing Switch Ties .... Sets		
5 Repair or Placing Cross. Planks .... No		
6 Caring for Switch Lamps		
7 Patrolling Track		
8 Mowing or Burning R of W. .... Ft		
9 Cutting Weeds .... Ft.		
10 Ditching .... Ft.		
11 Build or Repair R. of W. Fence .... Ft.		
12 Repairs of Bridges or Culverts		
13 Repairing Track Circuits for Signals		
14 Removal of Snow or Ice		
15 Repairing or Removing Slides		
16 Repairs of Pavements		
17 Repairing. Special Work		
18 Installing. Special Work		
19 Grading New Side Tracks .... Ft.		
20 Laying New Side Tracks .... Ft.		
21 Surfacing New Side Track .... Ft.		
22 Loading Ballast .... No. Cars		
23 Handling Company Material		
24 Repairs of Buildings or Grounds		
25 General Track Repairs		
26 Work for Other Departments		
27 Kind		
28 Miscellaneous		
....		
....		

.... Foreman.

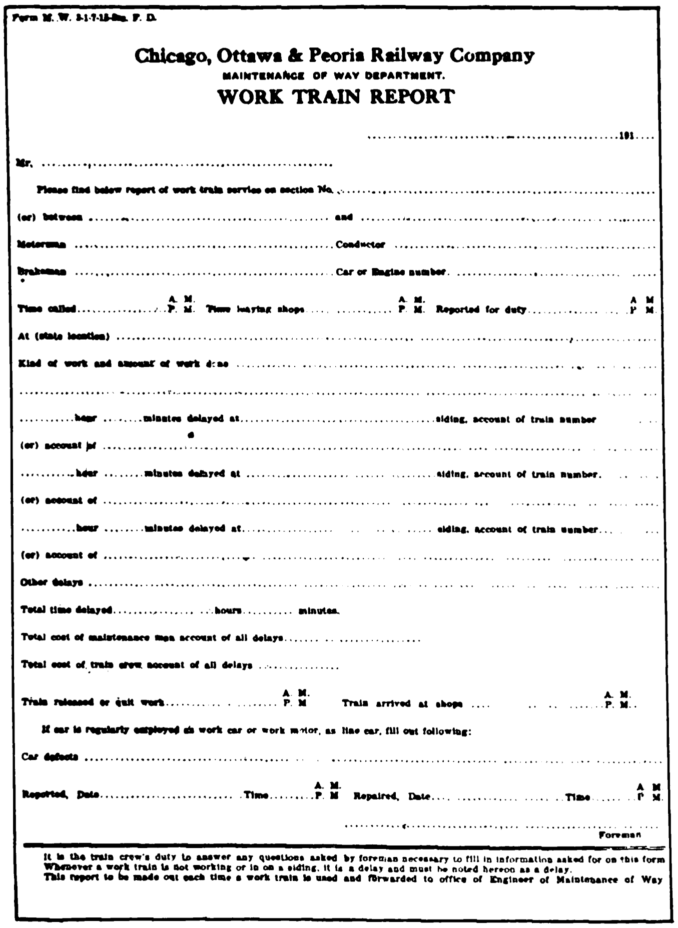
Sect No ....

WAY REPORTS—FORM 4—SECTION FOREMAN'S REPORT

In order to obtain a cost record of the material used and the labor performed in construction work or of money expended and charged to capital account, the bridge and building department is required to make a structural report. A copy of one of these reports is reproduced in Form 9. From this it will be seen that a complete record of every item of lumber used, as well as of all labor and haulage, is recorded. This being merely the actual cost of work done, to which engineering, superintendence as well as overhead may be added, makes it possible to obtain an accurate charge against any account.

STOREROOM RECORDS

This being a comparatively small property a large storeroom was unnecessary; hence a simple yet accurate method of compiling and filing storeroom records was



Form M. W. 5-1-7-15-8m. F. D.

Chicago, Ottawa & Peoria Railway Company

MAINTENANCE OF WAY DEPARTMENT.

WORK TRAIN REPORT

…………191…

Mr. ……

Please find below report of work train service on section No. ……

(or) between …… and ……

Motorman …… Conductor ……

Brakeman …… Car or Engine number ……

Time called …… A. M. / P. M. Time leaving shops …… A. M. / P. M. Reported for duty …… A. M. / P. M.

At (state location) ……

Kind of work and amount of work done ……

……

…… hour …… minutes delayed at …… siding, account of train number ……

(or) account of ……

…… hour …… minutes delayed at …… siding, account of train number ……

(or) account of ……

…… hour …… minutes delayed at …… siding, account of train number ……

(or) account of ……

Other delays ……

Total time delayed …… hours …… minutes.

Total cost of maintenance men account of all delays ……

Total cost of train crew account of all delays ……

Train released or quit work …… A. M. / P. M. Train arrived at shops …… A. M. / P. M.

If car is regularly employed as work car or work motor, as line car, fill out following:

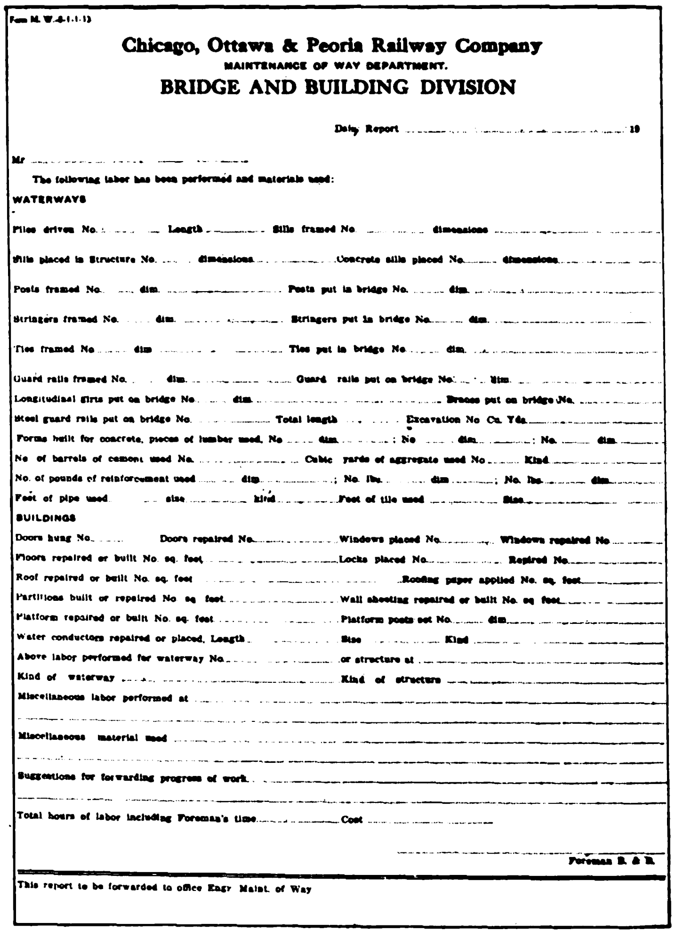
Car defects ……

Reported, Date …… Time …… A. M. / P. M. Repaired, Date …… Time …… A. M. / P. M.

……
Foreman

It is the train crew's duty to answer any questions asked by foreman necessary to fill in information asked for on this form
Whenever a work train is not working or in on a siding, it is a delay and must be noted hereon as a delay.
This report to be made out each time a work train is used and forwarded to office of Engineer of Maintenance of Way

WAY REPORTS—FORM 5—WORK-TRAIN REPORT



Form M. W.-6-1-1-15

Chicago, Ottawa & Peoria Railway Company

MAINTENANCE OF WAY DEPARTMENT.

BRIDGE AND BUILDING DIVISION

Daily Report …… 19

Mr ……

The following labor has been performed and materials used:

WATERWAYS

Piles driven No. …… Length …… Sills framed No …… dimensions ……

Sills placed in Structure No. …… dimensions …… Concrete sills placed No. …… dimensions ……

Posts framed No. …… dim. …… Posts put in bridge No. …… dim. ……

Stringers framed No. …… dim. …… Stringers put in bridge No. …… dim. ……

Ties framed No …… dim …… Ties put in bridge No …… dim. ……

Guard rails framed No. …… dim. …… Guard rails put on bridge No. …… dim. ……

Longitudinal girts put on bridge No. …… dim. …… Braces put on bridge No. ……

Steel guard rails put on bridge No. …… Total length …… Excavation No Cu. Yds. ……

Forms built for concrete, pieces of lumber used, No …… dim. ……; No …… dim. ……; No. …… dim. ……

No of barrels of cement used No. …… Cubic yards of aggregate used No …… Kind ……

No. of pounds of reinforcement used …… dim. ……; No. lbs. …… dim ……; No. lbs. …… dim. ……

Feet of pipe used …… size …… kind …… Feet of tile used …… Size ……

BUILDINGS

Doors hung No. …… Doors repaired No. …… Windows placed No. …… Windows repaired No ……

Floors repaired or built No. sq. feet …… Locks placed No. …… Repired No. ……

Roof repaired or built No. sq. feet …… Roofing paper applied No. sq. feet ……

Partitions built or repaired No. sq. feet …… Wall sheeting repaired or built No. sq. feet ……

Platform repaired or built No. sq. feet …… Platform posts set No. …… dim. ……

Water conductors repaired or placed, Length …… Size …… Kind ……

Above labor performed for waterway No. …… or structure at ……

Kind of waterway …… Kind of structure ……

Miscellaneous labor performed at ……

……

Miscellaneous material used ……

……

Suggestions for forwarding progress of work ……

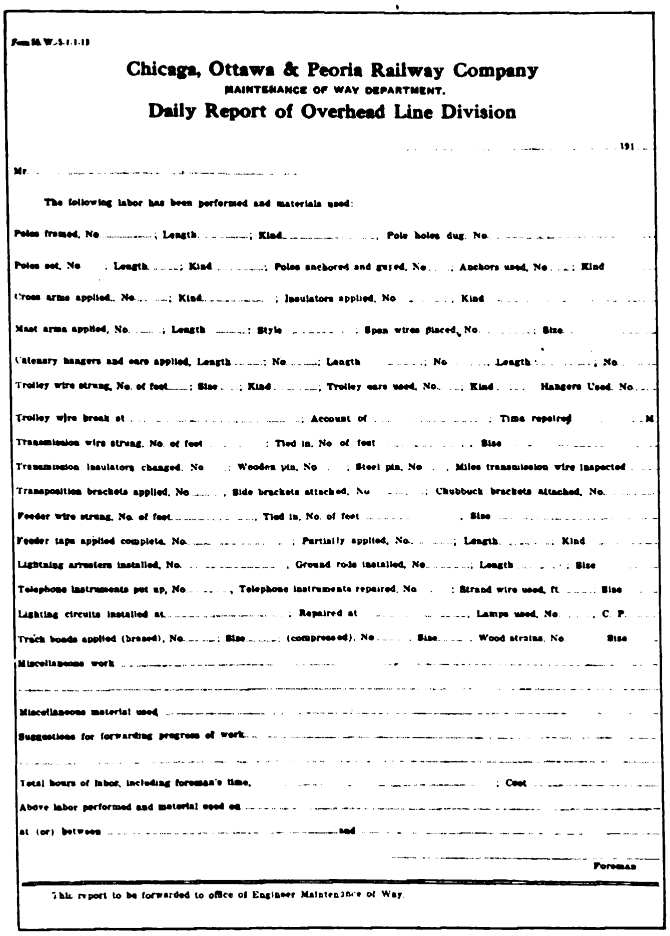
……

Total hours of labor including Foreman's time …… Cost ……

……
Foreman B. & B.

This report to be forwarded to office Engr. Maint. of Way

WAY REPORTS—FORM 6—BRIDGE AND BUILDING REPORT



Form M. W.-7-1-1-15

Chicago, Ottawa & Peoria Railway Company

MAINTENANCE OF WAY DEPARTMENT.

Daily Report of Overhead Line Division

…… 191 ……

Mr. ……

The following labor has been performed and materials used:

Poles framed, No ……; Length ……; Kind ……, Pole holes dug, No ……

Poles set, No ……; Length ……; Kind ……; Poles anchored and guyed, No ……; Anchors used, No ……; Kind ……

Cross arms applied, No ……; Kind ……; Insulators applied, No ……, Kind ……

Mast arms applied, No. ……; Length ……; Style ……; Span wires placed, No. ……; Size ……

Catenary hangers and ears applied, Length ……; No ……; Length ……; No ……, Length ……; No ……

Trolley wire strung, No. of feet ……; Size ……; Kind ……; Trolley ears used, No. ……; Kind …… Hangers Used. No. ……

Trolley wire break at ……; Account of ……; Time repaired …… M.

Transmission wire strung, No. of feet ……; Tied in, No of feet ……, Size ……

Transmission insulators changed, No ……; Wooden pin, No ……; Steel pin, No ……, Miles transmission wire inspected ……

Transposition brackets applied, No ……, Side brackets attached, No ……; Chubbuck brackets attached, No. ……

Feeder wire strung, No. of feet ……, Tied in, No. of feet ……, Size ……

Feeder taps applied complete, No. ……; Partially applied, No. ……; Length ……; Kind ……

Lightning arresters installed, No. ……, Ground rods installed, No ……; Length ……; Size ……

Telephone instruments put up, No ……, Telephone instruments repaired, No ……; Strand wire used, ft ……. Size ……

Lighting circuits installed at ……; Repaired at ……, Lamps used, No. ……, C. P. ……

Track bonds applied (brazed), No ……; Size ……; (compressed), No ……. Size ……. Wood strains, No …… Size ……

Miscellaneous work ……

……

Miscellaneous material used ……

Suggestions for forwarding progress of work ……

……

Total hours of labor, including foreman's time, ……; Cost ……

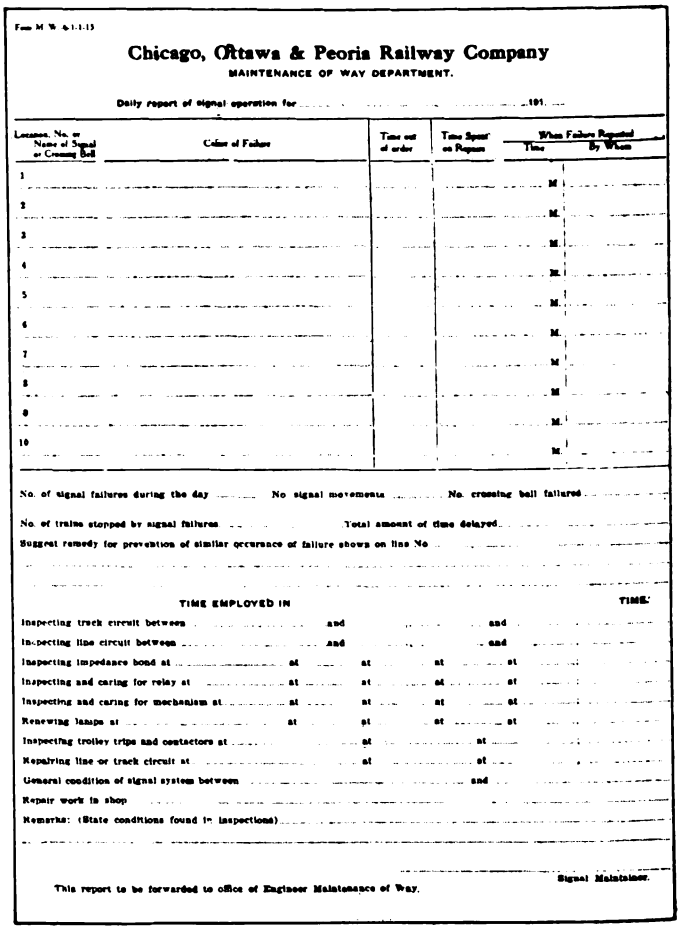
Above labor performed and material used on ……

at (or) between …… and ……

……
Foreman

This report to be forwarded to office of Engineer Maintenance of Way.

WAY REPORTS—FORM 7—OVERHEAD LINE DIVISION REPORT



Form M. W.-8-1-1-15

Chicago, Ottawa & Peoria Railway Company

MAINTENANCE OF WAY DEPARTMENT.

Daily report of signal operation for …… 191 ……

Location, No. or Name of Signal or Crossing Bell	Cause of Failure	Time out of order	Time Spent on Repairs	When Failure Reported	
				Time	By Whom
1				M.	
2				M.	
3				M.	
4				M.	
5				M.	
6				M.	
7				M.	
8				M.	
9				M.	
10				M.	

No. of signal failures during the day …… No signal movements …… No. crossing bell failures ……

No. of trains stopped by signal failures …… Total amount of time delayed ……

Suggest remedy for prevention of similar occurance of failure shown on line No ……

……

……

TIME EMPLOYED IN …… TIME:

Inspecting track circuit between …… and …… and ……

Inspecting line circuit between …… and …… and ……

Inspecting impedance bond at …… at …… at …… at …… at ……

Inspecting and caring for relay at …… at …… at …… at …… at ……

Inspecting and caring for mechanism at …… at …… at …… at …… at ……

Renewing lamps at …… at …… at …… at …… at ……

Inspecting trolley trips and contactors at …… at …… at ……

Repairing line or track circuit at …… at …… at ……

General condition of signal system between …… and ……

Repair work in shop ……

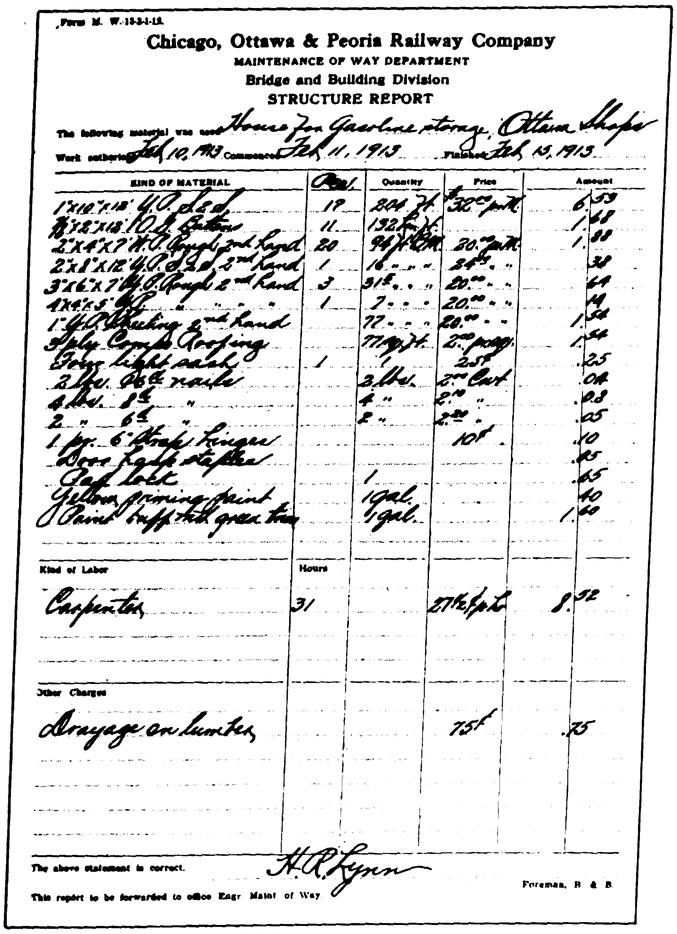
Remarks: (State conditions found in inspections) ……

……

……
Signal Maintainer.

This report to be forwarded to office of Engineer Maintenance of Way.

WAY REPORTS—FORM 8—SIGNAL AND BELL REPORT



Form M. W.-13-3-1-13.

Chicago, Ottawa & Peoria Railway Company
MAINTENANCE OF WAY DEPARTMENT
Bridge and Building Division
STRUCTURE REPORT

The following material was used House for Gasoline storage, Ottawa Shops
Work authorized Feb. 10, 1913 Commenced Feb. 11, 1913 Finished Feb. 15, 1913

KIND OF MATERIAL	Pcs.	Quantity	Price	Amount
1"x10"x12' Y.P. S2S	19	204 ft.	$32.00 per M	6.53
1"x2"x18' Y.P. Batten	11	132 lin. ft.		1.68
2"x4"x7' W.O. Rough 2nd hand	20	94 ft. B.M.	20.00 per M	1.88
2"x8"x12' Y.P. S2S 2nd hand	1	16 " " "	24.00 " "	.38
3"x6"x7' W.O. Rough 2nd hand	3	31½ " " "	20.00 " "	.64
4"x4"x5' W.O. " "	1	7 " " "	20.00 " "	.14
1" Y.P. Sheeting 2nd hand		77 " " "	20.00 " "	1.54
3 ply Comp. Roofing		77 sq. ft.	2.00 per sq.	1.54
Four light sash	1	1	25¢	.25
2 lbs. 10d nails		2 lbs.	2.00 Cwt.	.04
4 lbs. 8d "		4 "	2.10 "	.08
2 " 6d "		2 "	2.20 "	.05
1 pr. 6" Strap hinges			10¢	.10
Door hasp staples				.05
Pad lock		1		.65
Yellow priming paint		1 gal.		.40
Paint buff with green trim		1 gal.		1.60

Kind of Labor	Hours			
Carpenter	31		27½¢ per hr.	8.52

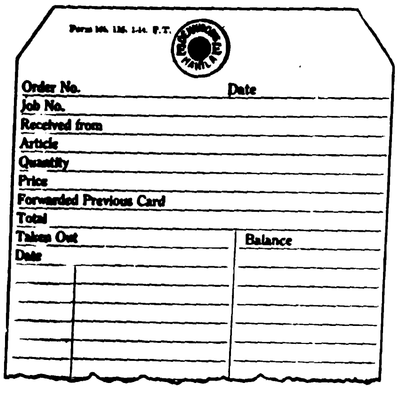
Other Charges				
Drayage on lumber			75¢	.75

The above statement is correct. H. R. Lynn
Foreman, B. & B.

This report to be forwarded to office Engr. Maint. of Way.

WAY REPORTS—FORM 9—STRUCTURAL REPORT

important to minimize the force required to accomplish the work. A single storekeeper performs all the duties required in this department, but to permit him to keep up his records, the storeroom is open only during certain hours. Except in emergencies, the various departments must anticipate their needs and secure material when the storeroom is open. To simplify the work the company has adopted the bin-tag method of keeping a temporary count of the stock on hand, with very satisfactory results. These tags (Form 10) are printed on a heavy manila cardboard, 4 in. x 7½ in. in size, one card being hung on a hook provided on the front of each bin. Each tag gives a history of the contents of the bin to which it is attached and also a record which may be transferred to the stock ledger from time to time as the storekeeper is able to devote time to its transfer. From time to time material is purchased for special jobs and held in the storeroom. To designate which bins contain this special material red bin tags are used in the place of the manila ones. When a requisition is made for material contained in one of the bins marked with a red tag, it must state specifically that the material is to be used on the job number for which it was ordered. This insures correct distribution of the charges as well as a sufficient quantity on hand for a particular job when it is needed.



Form No. 138. 1-14. F.T.

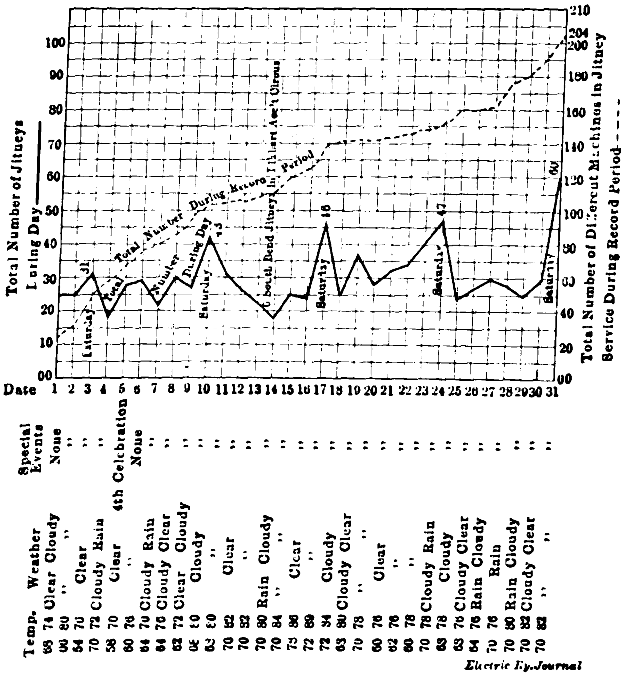
Order No. Date
Job No.
Received from
Article
Quantity
Price
Forwarded Previous Card
Total

Taken Out	Balance
Date	

WAY REPORTS—FORM 10—BIN TAG

South Bend Collects Jitney Data

During the month of July the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., collected sufficient jitney traffic data to make a graphical study of their operation. The result of this graphical analysis is shown in the accompanying diagram. It shows the total number of jitneys operated during the various days of the period and the total number of different machines in the jitney service during the month. In addition a careful record was kept of the temperatures and the weather conditions. It was found that in South Bend the peak of the jitney service always occurred on Saturday, and that the peak increased from thirty-one jitney buses on the first Saturday of the month to 120 on the last Saturday of the month. It is also interesting to note that as a rule the low points in the jitney bus service are on the rainy days. It will also be noted that during the month of July the total number of different machines operated increased from twelve to 204. Many of these, however, were only operated one day, and others ran only on Saturdays.



Electric Ry. Journal

GRAPHICAL STUDY OF SOUTH BEND JITNEYS DURING JULY

It will also be seen that the total number of automobiles operated has increased much faster than the rise in the peak of jitney service offered. In other words, many drivers were disappointed with their earnings and after operating a few days decided that they were in an unprofitable business.

The railway company intends to continue the collection of jitney data and will make a more complete analysis showing the number of jitneys in service during the various periods of the day. The management expects to find that the maximum number of jitneys will be operated at about 6 o'clock in the evening and the minimum number in the early morning hours.

The *Tramway & Railway World* states that the Germans in their search for various metals have taken away the overhead tramway wires and telegraph wires in a number of the Belgian and French towns and districts which they have devastated.

COMMUNICATIONS

Operating Costs and Shifts in Service

AMERICAN ELECTRIC RAILWAY ASSOCIATION
BUREAU OF FARE RESEARCH
NEW YORK, N. Y., Aug. 27, 1915.

To the Editors:

Some question may be raised as to the validity of comparing costs of operation with an index number determined by adding together twenty-four differences in percentages, as was done in my article on "Operating Costs and Shifts in Service" appearing in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 21. It may therefore be of interest to indicate here somewhat more fully than was done in that article the steps which preceded that comparison, and their significance.

In making a study of the effect of changes in distribution of service throughout the day, a number of cases were assumed, and it was found that the unit cost of operation, that is to say, the total cost per day divided by the number of car-hours per day, showed a considerable variation. An effort was made to relate these costs to the various load diagrams.

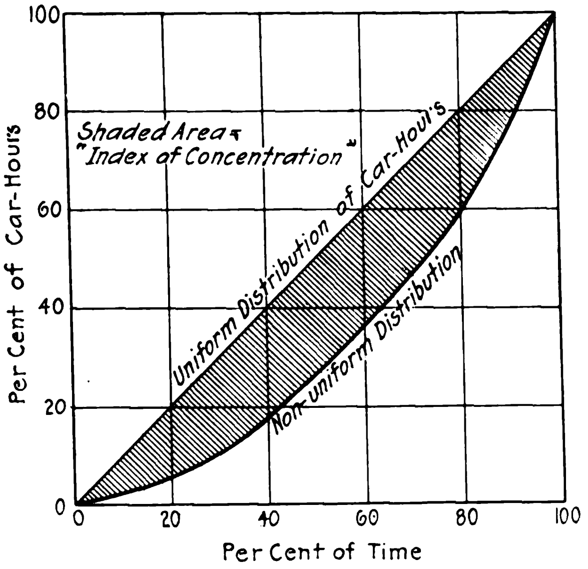


DIAGRAM OF TIME DISTRIBUTION OF CAR-HOURS

A load diagram, is, in itself, a rather difficult thing to express in units of any sort, but as the differences between the diagrams assumed lay in the extent of the concentration of the service within certain periods, resort was had to a well-known statistical method of measuring concentration. This consists in representing graphically such data as were given in the table on page 307 of the issue for Aug. 21, as in the accompanying illustration. Here per cent of total car-hours is plotted against per cent of total time for uniform and non-uniform service. The principle is the same as that employed in statistical studies of the concentration of wealth, in the "Lorenz graph," which is readily adapted to the purpose of indicating and measuring concentration of service.

In the diagram the straight diagonal line represents uniformity of distribution, or no concentration. The curved line drawn between the same points as the diagonal line shows the actual distribution of service as determined from an assumed load diagram. The area between these two lines is a measure of the departure from uniformity of the variable, in this case per cent of car-hours, and may be termed the index of concentration. It graphically represents the sum of the per cent differences in car-hours as given in the table, and enables one to visualize this difference.

The conclusions from this analysis are simply that the cost per car-hour is not fixed for any property but tends to increase with increased concentration of service. The concentration index is not a pure functional unit of cost, but it serves the purpose of affording a concrete conception of a complicated array of facts.

F. W. DOOLITTLE, Director.

Girder and High T-Rail Renewals

THE TOLEDO & WESTERN RAILROAD COMPANY
SYLVANIA, OHIO, Aug. 14, 1915.

To the Editors:

I note on page 179 of your July 31 issue certain statements regarding the rate of rail wear in paved streets. There are some points with which I agree, but for the sake of discussion I shall give you my views concerning the subject of this article.

While I have had no great amount of rail corrugation, yet I believe that in some cities it should be taken into serious consideration when determining the life of various classes of rail. Corrugation is generally taken care of by grinding down the rail head and this naturally shortens the life of a rail. Therefore the life limits for a certain weight of rail under the same traffic will not be the same in different cities. Engineers in deciding rail life must necessarily bear the idea of corrugation in mind, as I understand that in some cities it amounts to considerable.

I imagine it was the intention of the article mentioned to suggest the establishment of rail wear limits so that, for the sake of valuation purposes, all railroads could work toward the same end and with the same general ideas in mind. I disagree with you that an arbitrary limit would probably never be reached in service, but that the mere fixing of a wear limit would place the economics of rail renewals on a definite basis. I believe engineers should not fix a limit that would not be reached in service, but that this question should be thoroughly threshed out to get the limit as near the actual life as possible. There is no doubt that the question of a proper foundation is a very great item in the life of rail so that I believe there must necessarily be established life limits for both open and paved track work.

I have never thoroughly understood why street railways use the tram rail and girder-groove rail, except, of course, where franchise requirements make it necessary. I believe that if the engineering associations of the country bear on this matter strongly enough such requirements can be overcome. With the restrictions that city governments are constantly placing upon street railways, careful consideration should justifiably be given by the city officers to the life of rail.

As shown in your article both by statements and by the sketches, it is very apparent that as great life cannot be obtained from a tram rail as from a T-rail section. It is my opinion that when wheels begin to ride the tram of a rail, this rail has practically reached its limit. When cars ride on the wheel flanges, naturally there is more danger of derailments, which in a great many cities is a question that comes into play when rail renewals are considered.

A street railway is hardly in the same position as a steam road because it can very seldom take rail for relaying on a street of lighter traffic. Public policy frequently demands that this should not be done. I was once connected with a steam railroad where curves constituted a greater per cent of the track than tangents. The traffic was very heavy and rail wear was correspondingly heavy. I note that the Boston Elevated shows a

40 per cent wear on a 70-lb. section used on a curve. On this particular steam railroad we permitted even greater wear than that, so that the allowable limits of the Boston Elevated are not as great as those permitted on a heavy trunk line. I suppose that the Boston Elevated adopted this limit because, being on elevated structure, it could not safely afford to allow a greater head reduction. By the same token the allowable wear of rail in subways may be something different from that on surface tracks or on an elevated structure. It therefore appears there should be four classes of rail wear considered, namely, open track, paved track, elevated track and subway track.

As stated in the article, grooved rail should have sufficient depth to permit maximum headwear before wheel flanges ride the floor. Where a great many interurban cars operate over city tracks and the wheels have deeper flanges than wheels on city cars, it is my opinion that the standard grooved rail will not permit the maximum rail wear to be obtained. The cross-section of girder-groove rail is such as to prove unstable usually before a reasonable life has been obtained from the rail. By this I mean that one hardly obtains the value from the track structure before the grooved rail is worn out. I will admit that tram and girder-groove rail may possibly give a better general condition of paving, but this has been largely overcome by the use of granite nose blocks on the gage side of T-rails.

In my opinion, due consideration has not been given in the past to the character of foundation supporting the track superstructure. If a foundation fails because it has not sufficient strength to carry the superstructure, just that soon does the rail become the part of the structure that takes the brunt of the rolling weight. It is my belief that with a good foundation, T-rail will last at least thirty years. With pavement properly laid around the track superstructure the paving can well be renewed two, three or even four times before any attention need be given to the general surface of the rail. Therefore, I believe that all rail should be laid 3/8 in. above the top of paving. If the average life of paving is about seven to ten years, it can hardly be possible that rail will be worn down 3/8 in. in that length of time. As the article states where there is much car traffic, the team traffic is usually correspondingly great, consequently the paving wears down faster.

As an argument with some engineers regarding the different types of construction, it is my opinion, always has been and always will be, that the track must have a certain resiliency to give a maximum wear. The article states that indications are that rail wear is less in ballasted open track construction than in paved streets and a conclusion is drawn that the resilient construction shows less wear than rigid construction. It hardly seems unreasonable that this conclusion was reached. Even though the rate of rail wear was not so great, when the time comes to renew, even when the street grade is not changed, it is necessary to destroy the subfoundation to get to the ties incased in it. This seems an unnecessary waste of money, particularly when a foundation sufficiently strong may be provided in which track structure rests upon a cushion of ballast. This type of foundation makes destruction unnecessary and provides resiliency. The foundation may be used again for the track structure.

The article states "mere sentiment should not govern the final decision" when the paving is to be renewed and it is economical to leave the rail in place. In a great many cases "mere sentiment" is a big factor in preventing adverse criticism from those who reside on the street. Adverse criticism is one thing that neither engineers nor anyone else can readily overcome.

A. SWARTZ, Vice-President.

UNITED RAILWAYS COMPANY OF ST. LOUIS

ST. LOUIS, MO., Aug. 26, 1915.

To the Editors:

Referring to the article entitled "Girder and High T-Rail Renewals" in the July 31 issue of the ELECTRIC RAILWAY JOURNAL, I believe that there are comparatively few cases where the head wear on the longer sections of track is the determining factor in connection with rail renewals.

When the rails become so badly worn that the wheel flanges have cut from 1/16 in. to 1/8 in. into the flangeway, the rails generally become loose on account of the improper position of the load upon the head. The resulting vibration under the wheels makes it very difficult to maintain a satisfactory paving along the rails. When the rails are worn to such an extent they are usually corrugated, surface bent or cupped at the joints, or the paving or foundation is in bad condition, so that it is advisable to renew the rail some time before the head-wear limit has been reached.

If it was possible for street railway companies to wear out the rails regardless of the noise or the condition of the pavement along the rails and without damage to the track foundation, by simply keeping the track in safe condition for the operation of cars at a speed of approximately 10 m.p.h., the question would be very much simplified. But with the present public demand for smooth pavements for automobiles and with the ordinary objections to unnecessary noise, it is not often economical to maintain joints, foundation and pavement until the rail head has been entirely worn out. There will, of course, be some pieces of rail in a long section of track where the head wear will exceed 50 per cent, and it will be necessary to renew these rails because the wear limit has been reached. For such work worn rails that are taken from other tracks laid with the same section can be used. Practically all worn rails can be relaid in this manner, or in carhouse tracks, temporary tracks or yards.

While there has been some improvement in joint life due to the use of the newer types of rails and greater care in placing joints, the old adage, "The life of the joint is the life of the rail" will probably continue to hold. Our experience with excessive rail corrosion has been that it is always found in poorly drained, level grade streets.

C. L. HAWKINS,
Engineer Maintenance of Way.

Starting Resistance of Electric Cars

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

EAST PITTSBURGH, PA., Aug. 28, 1915.

To the Editors:

Referring to recent articles and editorials in the ELECTRIC RAILWAY JOURNAL on the above subject, further consideration may be of some value.

Train resistance depends upon so many variables that it is always more or less an uncertain quantity so far as calculations are concerned. Fortunately, however, in determining energy consumption and motor heating, a number of existing formulas and curves give satisfactory results. In most cases of electric operation, the amount of work done by an equipment in overcoming train resistance is a very small part of the entire duty on the equipment, and the excessive resistance found at the instant of starting lasts for such a short time that the effect on energy consumption and heating is exceedingly small.

In calculating performance from motor curves and train resistance curves it is customary to assume that, from the instant of starting until full voltage is applied to the motors, the train resistance is constant at the value which obtains at the speed corresponding to full voltage and accelerating current. This practice makes some compensation for neglecting the high initial starting resistance and, by the results of tests compared with calculations, has been proved satisfactory in determining equipment performance and making equipment selections.

The energy consumed by a car depends to a very great extent upon the way in which the motorman handles the car. By improper acceleration and braking, the motorman can easily waste several times as much energy as is required for the sole purpose of overcoming train resistance. Devices used to induce energy saving, such as coasting clocks, depend upon this fact for their effectiveness which is secured by promoting correct acceleration and braking.

While the preceding paragraphs indicate that the starting resistance of cars is relatively unimportant in its effect on heating and energy consumption, yet it must be considered in the application and adjustment of the apparatus composing an equipment. On passenger cars with hand-controlled acceleration, in case a start is not made on the first notch, it is, of course, possible to get under way by going to the second or a higher notch on the controller. With automatic equipments, the conditions of voltage variation, track profile and alignment must be considered in determining the setting of the limit switch in order to secure starting under all normal conditions. For emergencies it is sometimes found advisable to provide a limit cut-out which permits progression of the control until a start is secured.

Locomotives, even of the passenger class, employ acceleration rates which are low in comparison with those of single cars or multiple-unit trains. Consequently, high starting resistance is a more serious proposition on locomotives. Practically all electric locomotives are equipped for hand-controlled acceleration and it is essential that their controllers be provided with a sufficient number of steps to permit smaller variations in the torque developed by the motors during acceleration than is usually found on cars. This serves to insure a smooth start even with a stiff train where the starting resistance is abnormal.

The starting of high-speed passenger locomotives does not in general require the full adhesion of the drivers. Therefore, the maximum starting torque for a given weight of passenger train becomes purely a matter of track characteristics, rate of acceleration and train resistance, and the electrical equipment may be adequate without being powerful enough to slip the drivers. On the other hand freight locomotives, in normal starting, are frequently required to work very close to the slipping point of the wheels. Hence, excessive starting resistance appears more important and apparently should be cared for, not only in the capacity of the equipment, but also by providing sufficient weight on drivers. However, to offset this, it is often feasible, in starting an extra heavy or stiff freight train, to get under way by first bunching the slack; then the application of power serves to start the cars successively rather than simultaneously. On this account, it is rarely necessary to consider the high starting resistance in determining the necessary weight on the drivers of a freight locomotive.

The conclusion from the above considerations is that, while the resistance of cars is undoubtedly high in starting and must be kept in mind particularly when considering automatic equipments, yet the instances where it is a determining factor in equipment selection, locomotive weight determination or energy consumption are relatively few.

F. E. WYNNE,
Engineer Railway Section General Engineering Division.

The Ultra-Light-Weight Car

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
EAST PITTSBURGH, PA., Aug. 19, 1915.

To the Editors:

The communication appearing in the ELECTRIC RAILWAY JOURNAL for Aug. 7, page 234, on the subject of ultra-light-weight cars is timely and attracts attention to a very important question. All railway men, as a rule, appreciate the great value of caution signals in any form, and I am quite sure that others entertain the same views as the writer of the article referred to.

When the wave toward lighter cars swept over the country several years ago, great reductions in the weight of cars were introduced, and unquestionably durability was sacrificed in some instances although these instances were the exception, not the rule. A timely caution should, therefore, preclude such errors in the design of the ultra-light cars.

Of course, it is always more desirable, from the manufacturer's standpoint, to make haste slowly in the matter of new and untried designs and materials. Nevertheless, while these ultra-light cars, together with the electric equipment, materially reduce selling value and volume of work compared with larger and heavier cars, the manufacturers have shown their readiness, even in dull business times, to co-operate with the railways in developing an electric car that could be operated far more economically than the heavier types and thus would enable the railways at least to attempt a solution for the jitney problem.

Under these circumstances, the writer is of the opinion, owing to the great amount of experience in car and equipment design gathered during the past several years together with the close co-operation that exists between manufacturers and the high-grade, well-seasoned engineering talent now employed by many railway companies, that none of the established car builders or equipment manufacturers will be very apt to put out designs that are not consistently durable.

M. B. LAMBERT, Assistant Manager
Railway and Lighting Department.

Track on Concrete Stringers

RAILWAY TRACKWORK COMPANY
PHILADELPHIA, PA., Aug. 27, 1915.

To the Editors:

I noted with considerable interest the article on page 324 of the Aug. 21 issue of the ELECTRIC RAILWAY JOURNAL describing standard paved track construction of the Southern Public Utilities Company as used in Anderson, S. C., also your editorial comments on same. In this editorial you state that the "old style" beam type of track foundation has been abandoned by most street railway companies but that improvements therein may effect its revival. According to Mr. Horton's description, the fundamental requirement to success is recognized. It is an absolute requirement in this type of construction that the rail be held down rigidly upon the concrete beam, and this is the keynote of the whole proposition. If the rail is bolted down to an absolute bearing on the concrete, with provision made for taking up for concrete shrinkage during setting, the beam type of construction is successful, and it is this holding down and taking up for shrinkage that marks the difference between success and failure.

This point was recognized and taken into account more than twelve years ago in the construction of the track system in the city of Philadelphia. Its unqualified success in this city is shown by the following facts.

Subsequently the whole of the downtown business section of Philadelphia has been constructed according to this plan. On Fourth Street and Germantown Avenue nearly 7000 ft. of track was laid in August, 1903, and has been in continuous service since. No repairs whatever have been made on these streets to date. I mention this line in particular, because it was the earliest line so built. The only repairs made on any of this type of construction in Philadelphia have been due to two causes: first, at the outset, anchoring bolts of too small diameter were used and heavier bolts were substituted; second, a short stretch of track was laid on fresh filling over subway excavations and settlement thereby affected the whole street foundation. The fault developed by the light holding-down bolts proves conclusively our contention as to the need for holding down the rail against the cold-rolling action of the wheels and unequal expansion of the rails and preventing the resultant pulverizing and disintegration of the concrete stringer.

I think I may pardonably point to the Philadelphia system as an example of successful concrete beam track construction, and I may further say that its success has been contingent on the observance of the principle that the rail must be held down rigidly against the concrete base, provision also being made for taking up the shrinkage of the concrete in setting.

It is sometimes stated that the cost of this type of track is excessive, but my experience has shown it to be no more costly than the plan of using wooden ties embedded in concrete, and its great advantage (with respect to cost) over the ties embedded in concrete is that the foundation becomes, in this case, a permanent investment and its cost may be in part written off against capital account; because it has been abundantly demonstrated experimentally that new rails may be laid on the old foundation without substantial disturbance to the latter when the adjustable holding-down bolts are employed.

H. B. NICHOLS.

Outjitneying the Jitney

BOSTON, MASS., Aug. 30, 1915.

To the Editors:

The writer has been much interested in the various comments on the jitney which have appeared in your columns, pro and con, chiefly the latter. There seems to be no doubt at all that the swarm of jitneys with irresponsible drivers which has swooped down upon some of our cities with rather disastrous results is going to be considerably thinned out in the future. Nevertheless, it is not altogether clear that, to dignify the thing by its right name, the motor bus, with low fare, is not in the long run going to be a useful addition to means of public transportation. Every street railway man appreciates, when he can forget the sore spots produced by wildcat competition, that there are many places to which, for lack of suitably paying traffic, he would not extend his tracks if he could, and that there are many others to which he cannot gain access on account of the objections of the abuttors. Now the jitney, if it succeeds at all, succeeds in virtue of a short haul and if not legislated out of existence is likely to do some very useful feeding for electric railway lines, perhaps in this way, if properly regulated, helping more than it hurts by direct stealing of passengers. Again, there is much territory rich in passengers for two or three months per year and at other times hopeless. In such places a motor-bus line may succeed where an electric railway, by reason of its overhead charges, would inevitably fail. Opposition to such traffic is going to be futile to say nothing of being foolish.

Left to itself with even a moderate amount of sane regulation the jitney will very soon find its level, abandon much of its direct competition and settle down into doing what may prove to be an extremely useful auxiliary service. And if such is to be the case the electric railways themselves, as custodians of general transportation interests, should go into the jitney game, as they already have successfully in some instances. If the scheme can be made to pay reliably at all it is in working territory which is not directly or at all served by tramways and, in particular, taking advantage of the shifting of traffic from place to place with the seasons or local requirements.

The writer happens to be consulting engineer for a small electric railway, and he has thoroughly made up his mind that if the jitney danger threatens he is going to apply David Harum's golden rule, "Do unto the other fellow as he would do unto you, and do it fust." A watering place not far beyond the end of the line, for example, looks good as a jitney proposition, while it certainly would not pay for all the year round electric service, and the dear city fathers are usually not inclined to permit discontinuing electric cars once they are settled into use. It may be that the bus line will have to be put through by the co-operation of a wicked partner, but it certainly will get busy before the Philistines have a chance to make merry with it.

ENGINEER.

Wants Tramway Catalogs

COMPAÑIA ELECTRICA DE CONCEPCION
CASILLA 99F,
CONCEPCION, CHILE, July 28, 1915.

To the Editors:

Will you please make a note in your (or perhaps I ought to say our) valuable paper that we shall be in the market for supplies for our tramway concern shortly? I shall be pleased to receive catalogs and lists from manufacturers in the States.

HARRY S. THOMAS, Engineer.

Graphite and Asbestos

Two products of increasing importance, particularly in power plants, are graphite and asbestos. The former is useful in preventing the formation of boiler scale and the latter in pipe coverings, packings, etc.

According to Edson S. Bastin of the United States Geological Survey, the production of natural graphite in 1914 in the United States amounted to 4336 short tons, valued at $324,118. Of this quantity, 1725 tons were amorphous, valued at $38,750, and 2611 tons were crystalline, valued at $285,368. The greater part of the crystalline graphite—all the "flake" variety—was produced in New York, Pennsylvania and Alabama. A small quantity of crystalline graphite was produced in Montana.

The entire output of natural graphite in 1914 showed an increase in value as compared with that of 1913 but a slight decrease in quantity. The lessened production was due to the fact that the output of low-grade amorphous graphite did not reach the figures for 1913. The production of manufactured graphite in 1914 by the International Acheson Graphite Company, of Niagara Falls, was 10,455,139 lb. or 5228 short tons. valued at $698,800. This is an average price of $6.68 per ton.

In 1914 the United States produced 1247 tons of asbestos, valued at $16,810, according to the annual report on the production of asbestos just issued by the United States Geological Survey. Copies of the report are now available for distribution.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 to 8, 1915

American Association News

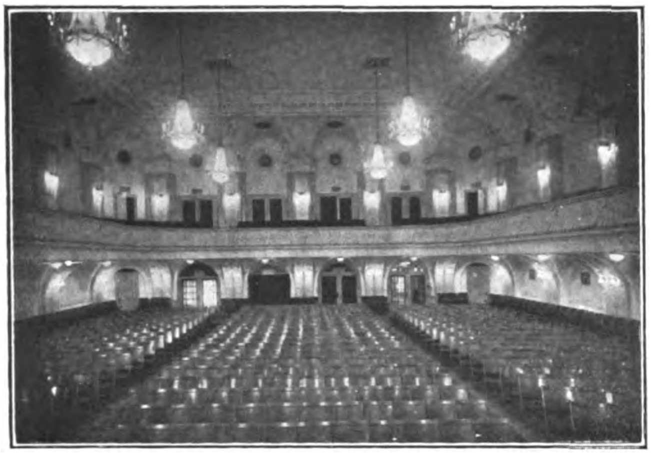
ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

Changes in the Convention Program Are Announced—Director McConnaughy Gives Further Details Concerning Special Trains—Annual Meeting of Manufacturers' Association—Manila Company Section

CHANGES IN THE PROGRAM FOR THE CONVENTION

The official program of the San Francisco Convention of the American Electric Railway Association and its affiliated associations has now been completed. It will show a few changes from the tentative program published in the last issue of this paper. The principal changes are as follows:

In the Accountants' session on Monday, following the report of the committee on education, there will be an award of a prize of $50 in gold to the author of the best paper submitted on the eighth lecture in the accountants' course. Following the report on passenger, freight and express accounting, there will be an address on "Electric Railway Accounting, a Review," by P. V. Burington, secretary Columbus Railway, Power & Light Company, Columbus, Ohio. The title of the paper to be presented by Prof. H. R. Hatfield of the University of California is, "Some Neglected Problems in Electric Railway Accounting." This paper will be presented on Wednesday afternoon. The paper by Prof. Carl C. Plehn, University of California, is on "Taxation of Electric Railways," and will be presented Tuesday afternoon instead of Wednesday afternoon. Two other papers have been added to the program. One of these is on "Value of Statistics to Executives and Accounting Departments," and will be presented on Tuesday afternoon by George C. Willcutt, secretary United Railroads of San Francisco. The other paper is on "The Importance of Accrued and Accruing Accounts from the Standpoint of the Certified Public Accountant," and will be presented by John F. Forbes, C.P.A., representing Haskins & Sells in San Francisco.



MAIN ASSEMBLY HALL, NATIVE SONS OF THE GOLDEN WEST BUILDING, SAN FRANCISCO

In the convention of the Claims Association the paper scheduled to be presented by S. B. Hare on Monday afternoon will have the title "Prevention of Motor-Vehicle Accidents." On Thursday four written discussions are scheduled to follow the presentation of the paper on "Safety and Its Relation to Conservation," by B. F. Boynton. These written discussions are as follows:

"Financial Benefits Resulting from the Safety-First Movement," by J. S. Harrison, claim agent Jacksonville (Fla.) Traction Company.

"Justification of the Safety-First Movement from a Humanitarian Standpoint," by Alves Dixon, claim agent El Paso (Tex.) Railway.

"Uses and Benefits of Illustrated Lectures," by H. K. Bennett, claim agent Fitchburg & Leominster Street Railway, Fitchburg, Mass.

"Should a Moving Picture Film Exchange Be Established by the American Electric Railway Association?" by F. J. Warnock, chief claim agent of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

In the program of the American Association the title of the address to be presented by ex-United States Senator Jonathan Bourne, Jr., has been changed to read "Evils of Government Ownership."

TRANSPORTATION AND REGISTRATION

H. G. McConnaughy, director of transportation, announces that the "Red Special" will be oversubscribed and that the prospects are excellent for a full train out of Chicago for the "White Special." As the special train equipment is limited it is most important that the members who contemplate taking any of the tours notify the director of transportation at once regarding their wishes in the matter. From advance registration and requests for hotel accommodations a large attendance for the convention is assured.

Owing to the many details in connection with reservations on the "Red Special," such as baggage arrangements, printing the train directory, etc., members who have not notified the committee of their intention of joining the party should do so at once. Members who have made reservations on the special trains will receive tags for their baggage as well as all information covering the details in connection with special train movements.

The registration of members and guests will be the same as last year, and all badges must be paid for. Member companies of the Manufacturers' Association must have paid their dues before their representatives can secure badges. Representatives of member companies of the Manufacturers' Association who are individual members must have paid their dues to the American Association and must have received from Secretary Burritt numbered cards as receipts. These are white cards printed in brown ink, with brown corners. Individual members must be representatives of company members of the Manufacturers' Association before they can secure badges. Representatives of manufacturers who have not attended previous conventions will be required to pay $5 each for badges at the convention registration office.

The Railway and Manufacturers' Associations have contracts with the Palace, Fairmount and St. Francis Hotels for rooms. Members who contemplate attending the convention should make their reservations through the two associations to protect these contracts. All reservations will be made through Thomas Finigan, vice-president Pierson, Roeding & Company, 118 New Montgomery Street, San Francisco.

Following is a partial list of members who are booked for the "Red Special," tour de luxe, New York Central Railroad, leaving New York on Sept. 23, en route to the San Francisco convention:

C. Loomis Allen
Mrs. Allen
W. K. Archbold
Mrs. Archbold
Thomas Addison
Mrs. Addison
Edwin H. Baker
Mrs. Baker
H. W. Blake
Mrs. Blake
Howard D. Briggs
C. W. Bender
George A. Barnes
Mrs. Barnes
M. C. Brush
C. P. Billings
Mrs. Billings
E. B. Burritt
John Benham
W. H. Collins
Mrs. Collins
W. J. Clark
Mrs. Clark
Thomas Cooper
H. L. Cooper
L. P. Crecelius
Mrs. Crecelius
Joseph Crawford
Mrs. Crawford
T. S. Dayton
Fred C. J. Dell
Miss Ida M. E. Dell
Warren Dyer
Horton Edmunds
Mrs. Edmunds
George C. Ewing
Mrs. Ewing
F. A. Elmquist
Mrs. Elmquist
Harrison R. Fehr
Mrs. Fehr
A. H. Ford
E. S. Goodrich
Mrs. J. R. Goodrich
Mrs. G. H. Gilman
Frank H. Gale
Miss Lucille Hurd
Howard A. Hartzell
Mrs. Hartzell
William F. Ham
Mrs. Ham
John M. High
Charles L. Henry
E. S. S. Keith
Mrs. Keith
James P. Kineon
Eugene V. Kaplan
Mrs. William B. Lane
John Lindall
Mrs. Lindall
J. C. Meixell
Mrs. Meixell
J. G. McMichael
H. G. McConnaughy
Mrs. McConnaughy
C. S. Mitchell
H. L. Monroe
Mrs. Monroe
C. J. Munton
Mrs. Munton
R. E. Moore
E. H. Martindale
Harry Neal
Mrs. Neal
E. D. Priest
Mrs. Priest
Charles C. Peirce
C. R. Phenicie
Mrs. Phenicie
J. I. Quigley
Mrs. Quigley
Frank Petura
John J. Reynolds
Capt. W. B. Rockwell
Mrs. Rockwell
R. C. Smith
Mrs. Smith
C. W. Stocks
S. B. Severson
J. N. Shanahan
Mrs. Shanahan
Daniel W. Smith
Mrs. Smith
Master Smith
Miss Smith
Elmer Smith
R. M. Sparks
Russell A. Sears
S. E. Sprague
Mrs. Sprague
C. S. Sergeant
Charles H. Thomas
Mrs. Thomas
A. J. Thornley
Mrs. Thornley
Howard Thornley
Miss Alice Thornley
S. W. Trawick
G. S. Vail
W. O. Wood
Mrs. Wood
Martin White
Charles J. Zell

ANNUAL MEETING OF MANUFACTURERS' ASSOCIATION

Secretary H. G. McConnaughy has announced that the annual meeting of the association will occur at the convention headquarters, in Yosemite Hall, Native Sons of the Golden West Building, at noon on Wednesday, Oct. 6.

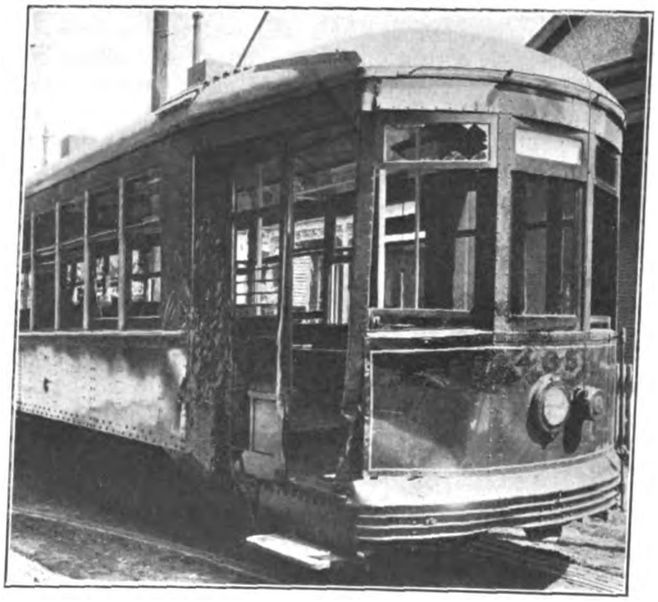
MANILA COMPANY SECTION

The seventh meeting of the Manila joint company section was held on July 6. The paper of the evening was by J. N. Weaver, superintendent of power installations, on "Electric Motors versus All Comers." He described the different kinds of motor drive which are in use and discussed the advantages of electric drive with central station service under local conditions. The paper was discussed by the following: R. Lopez, superintendent of electrical distribution; W. B. Calfee, night carhouse foreman; W. A. Smith, purchasing agent; I. C. Hartigan, city electrician; B. H. Blaisdell, chief engineer of power plant; J. C. Rockwell, manager electric department; E. I. Jeffery, assistant chief engineer of power plant; L. S. Cairns, assistant general manager; C. E. Haywood, superintendent of track; L. L. Vincent, superintendent of electric testing, and C. N. Duffy, vice-president. In addition to the topic of the paper the discussion covered other live topics. Considerable interest centered in the effect of the induction motor on power house operation and the relation of the cost of coal to that of generating energy. Steam railroad electrification was also taken up, and Mr. Duffy pointed out that the controlling factor is the financial one. Were it not for the fact that steam railroads are not in a position to borrow the large sums of money that would be necessary in order to electrify the roads, and also because the railroads do not feel that they can afford to discard the present steam equipment notwithstanding the result in economies and advantages of electricity over steam, it would be only a question of a few years until the electric locomotive would supplant the steam locomotive just as the electric car has replaced the horse car. Referring to the cost of coal, Mr. Duffy said that the largest item of expense the company had was its payroll and next to that was the coal bill, aggregating 400,000 pesos (Spanish dollars) per annum exclusive of the emergency coal tax of 1 peso per ton. Without the emergency tax the coal cost 80 per cent of the bare production cost of energy, and with this tax the cost was 88 per cent.

Steel Cars in City Service

One of the many arguments put forward in favor of all-steel city cars is that the damage to vestibules due to collisions with heavy trucks is much less with steel construction than with wood. The accompanying illustration demonstrates this theory in a rather striking manner, as the car in question withstood an impact at about 7 m.p.h. with a loaded motor truck weighing more than 16,000 lb. and with most of the weight concentrated in the plane of the heavy truck frame. The blow was sufficiently severe to knock the front car-truck off the rails.

The car in question, which was built by the Southern Car Company, has vestibule posts that are made of pressed steel throughout, the two center posts being made in one section of No. 16 gage steel and the corner vestibule posts in two sections of No. 12 gage steel riveted together. These posts are anchored to an angle-iron sprung to the proper radius and fastened to the 7-in., channel-shaped anti-climber which serves in place of the usual crown pieces. The vestibule sheathing is made of No. 16 gage steel bolted to the outside of the vestibule posts, and there is also a lining plate on the inside of the vestibule which provides pockets into which the sash may lower.



ALL-STEEL CITY CAR AFTER COLLISION WITH MOTOR TRUCK

It will be seen from the illustration that the only real damage was caused by the tearing loose of one vestibule corner post from its anchorage to the anti-climber and that the platform knees and car-body corner post were only superficially injured. The platform knee is made of a flat plate of No. 10 gage steel reinforced by 2½-in. x 2½-in. and 3½-in. x 2½-in. angles. The car-body corner post is included in a pressed steel header of the deep "U" shape sheathed with No. 16 gage steel.

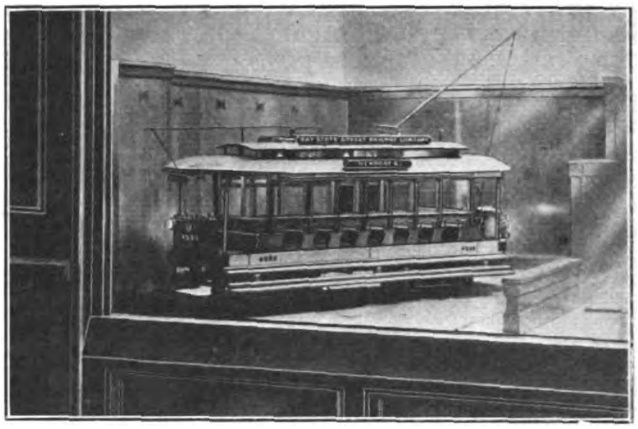
Aside from the necessity for straightening and reriveting the vestibule post the only repairs were those made necessary by the tearing of the wooden exit door and the breaking of a couple of panes of glass, and the patching of one tear in the side sheathing at the bulkhead, and another further back due to a heavy blow from the hub of the auto truck as it was skidded around after hitting the car. The anti-climber was also bent slightly at one point. However, as the frame of the car was not injured in any way, the wiring and control were not affected and the car was brought to the carhouse on its own wheels. Not a single passenger was injured, although several men on the front platform were thrown from their feet by the violence and suddenness of the impact, and only one of the women in the car fainted.

Bay State Passenger Department Moves

New Office Opened in Boston—Animated Sign a Novel Publicity Feature—Model of Bay State Open Car in Window

On April 1, 1915, the passenger department of the Bay State Street Railway moved its headquarters from 309 Washington Street to 15 Milk Street, Boston, Mass., the new offices being on the street floor and on the exact site of the house in which Benjamin Franklin was born on Jan. 17, 1706. The former offices of the department were located on the second floor of a building with inadequate elevator service, and while visited by many tourists yearly, were not on the same plane of accessibility as most of the other railway ticket offices in the district. Since their removal to the new site, within 150 ft. of the old headquarters, the offices have been visited by from two to four times as many persons each week.

The company shares the new offices with a dealer in hardwood floors, the department having about half the display window space and an area immediately behind which is about 16 ft. wide by 45 ft. deep. The office proper includes a counter for the sale of tickets, with time-table rack and grill with two doors, file safe and desks. The staff consists of Ralph M. Sparks, general passenger agent, a chief clerk, two assistant clerks, a stenographer and an office boy, five outside solicitors of passenger traffic also reporting to the head of the department. Henry E. Reynolds, assistant general manager of the company, has general executive charge of the solicitation of traffic. One cash and ticket drawer is assigned to each clerk and each drawer is provided with an independent lock and key for the use of the clerk responsible for its contents. The drawers are removed at night from the counter to the safe.

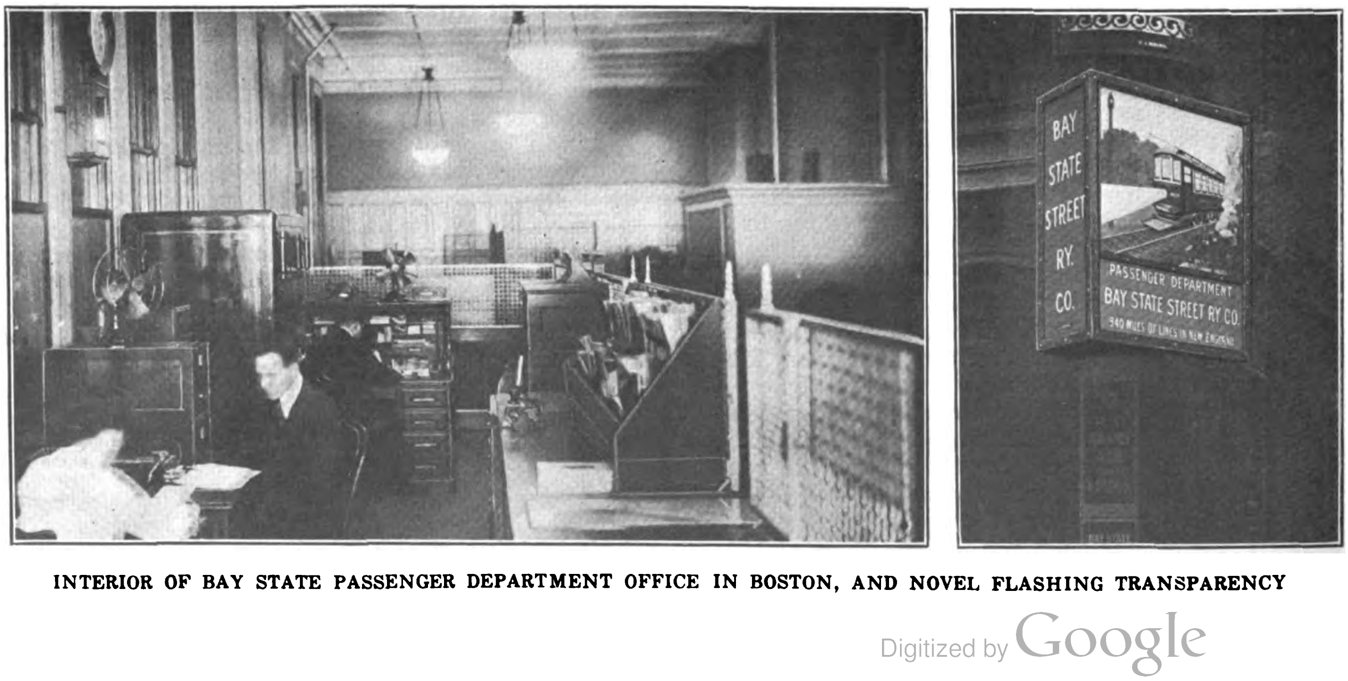


MODEL CAR SHOWN IN WINDOW

A novel electric sign has recently been placed in service at the door, which is only a few steps from Washington Street, the busiest thoroughfare in New England. The sign is about 8 ft. long, 6 ft. wide and 2 ft. deep and is equipped with a motor-driven flasher wired to lamps behind a transparency simulating a moving car and operating automatic block signal system. In operation the signal in the panel shows a white light and flashes the word "Proceed" on the sky. The wheels then appear to revolve on a fast-passing track, the words "Safety First" appearing in the headlight beam. After a moment the signal displays a red light, and the word "Stop" appears. The wheels cease to turn, the track darkens and the headlight is cut off. The repetition of the clear signal begins the cycle anew. The sign was designed by Mr. Sparks and Howard W. Irwin, inspecting engineer of the company.

In the window is displayed a model Bay State open car 65 in. long, 23 in. high, 14½ in. wide and weighing 186 lb. The car is equipped with miniature head, tail and inside lights and full hand brake system and is wired for single-motor operation. It was recently borrowed for front window display and filled with dolls by a prominent Boston department store, and in this way the company received considerable extra publicity. A model of one of the first horse cars used on the system is now being completed for exhibition in contrast with the open type.

By co-operation with the Boston Historical Society, the company photographed a drawing of Franklin's birthplace and gave away more than 900 lithographs within three weeks after it was finished. Framed views of the house are being posted in fifteen of the principal waiting rooms, and a model 3 ft. high, in wood, has been placed in the office window. The department has good storage facilities for office supplies on an upper floor.



INTERIOR OF BAY STATE PASSENGER DEPARTMENT OFFICE IN BOSTON, AND NOVEL FLASHING TRANSPARENCY

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Card Records of Los Angeles Track Work

BY G. E. CAMPBELL, CHIEF DRAFTSMAN LOS ANGELES (CAL.) RAILWAY CORPORATION

Realizing that engineering records are of value only when available for immediate use, and that availability is entirely a matter of proper indexing, the Los Angeles Railway in 1908 began to use the card index system in its drafting department.

Prior to 1908 all records of drawings were kept on loose sheets on an ordinary letter file hung on to the end of the chief draftsman's desk. These sheets were divided into the general heads of special work, buildings and maps. There were no subdivisions.

As might have been expected, sheets were continually being lost and a great deal of inconvenience resulted. Consequently the start was made here.

All records of special work drawings are kept in a separate index. Each intersection is indexed and cross-indexed under the name of each street appearing on the tracing. Should there be any part or parts that are detailed and likely to be of use at any other time they are indexed separately under a proper heading. Each intersection has a card or cards (Fig. 1) showing all work ordered for that location from time to time.

The company drawing number, a description of the work and the date are given on one line. This is followed by the file number for the key plan and the maker's name. When new work is ordered a new entry is made, leaving a blank line to separate the new and the old.

To avoid error due to lost cards, each one is numbered. When a new one is made a line is drawn under the number on the old one. The three cards (Fig. 1) marked Main and First Streets illustrate this.

All flat drawings other than special work are kept in a so-called "Miscellaneous Index." This is divided into such heads as bridges, buildings, cars, culverts, maps, rails and fastenings, special work (details), tables, etc.

Some subjects have an alphabetical index, culverts is an instance; in this case all culverts are indexed according to street location.

Maps of a large division are subdivided into such subheads as assessment, ballast, circuit breakers, joint track, opening and widening (of streets), right-of-way, etc. Buildings are subdivided according to use, amusement, carhouses, administration, power houses, stables, etc. Rails and fastenings, another large division, has such subheads as chairs, compromise plates, drillings, paving blocks, etc. Compromise joints are further divided according to make and section.

The special work head in this index does not apply to layouts but to material. Crossings are noted according to angle; switches and mates by radii and sections, frogs by angle, radii and section.

A little use confirmed the belief that cards were the proper medium and the system was applied to other records.

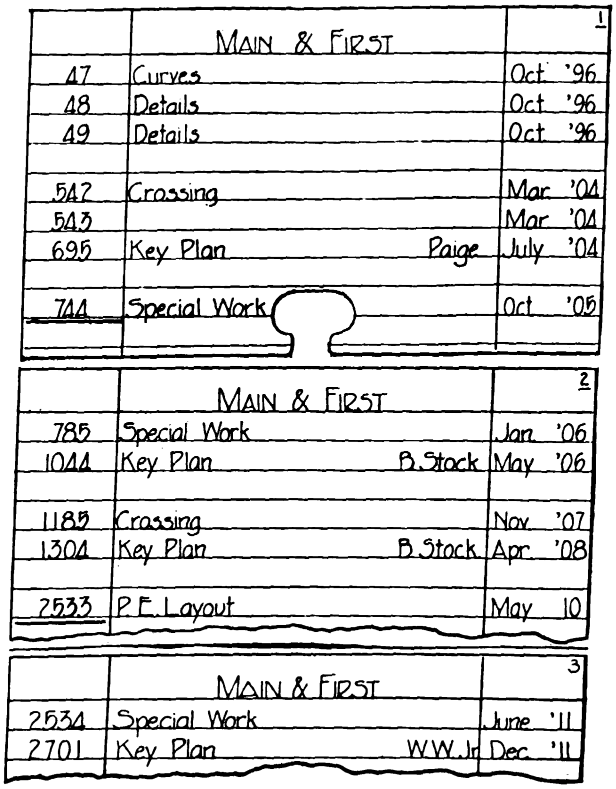
The railway system is composed of seventy-one construction divisions, six carhouses, four yards and a gravel pit.

Each division has its profiles and track maps made on white mounted paper to a scale of 30 ft. to 1 in. There are separate drawers, with a separate system of numbers, for each of these. These are shown graphically on wall maps, where the numbers and limits of each piece are shown. For current maps and profiles this is more quickly used than the index.

Each day's field work is recorded in a journal. From this journal two sets of cards are made, one for field and one for level notes. These are filed under divisions and give a description of the work with the book and page.

Each field and level book contains a card on which is recorded the date and by whom taken and the date of return. In this way it is possible to know where each book is.

All deeds, leases and agreements, to and from the company are indexed under the name of the division or the property, and under the name of the other party, whether grantor or grantee.



	MAIN & FIRST		1
47	Curves		Oct '96
48	Details		Oct '96
49	Details		Oct '96
542	Crossing		Mar '04
543			Mar '04
695	Key Plan	Paige	July '04
744	Special Work		Oct '05

	MAIN & FIRST		2
785	Special Work		Jan '06
1044	Key Plan	B. Stock	May '06
1185	Crossing		Nov '07
1304	Key Plan	B. Stock	Apr '08
2533	P. E. Layout		May 10

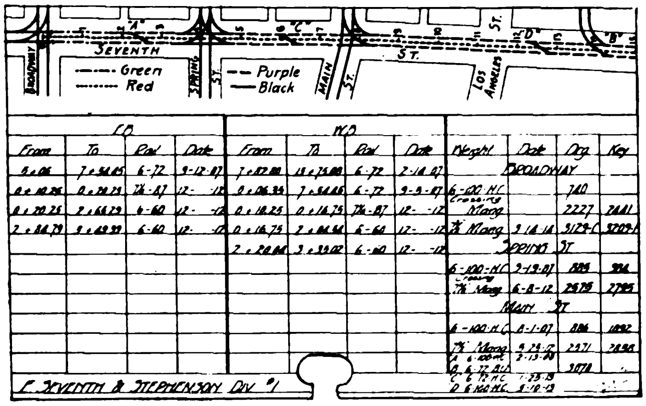
	MAIN & FIRST		3
2534	Special Work		June '11
2701	Key Plan	W.W.Jr	Dec '11

Actual size of card 3 in. x 5 in.

LOS ANGELES TRACK RECORDS—FIG. 1—DATA ON SERIES OF CARDS TO SHOW ALL WORK ORDERED FOR A PARTICULAR LOCATION

The company carries mail to and from the various branch post-offices. The name, letter or number of these substations, their location and the distances from the main loading points are indexed in a separate drawer.

Street names are being changed continually. Unless some record of these is kept it is impossible to follow out the routes of old franchises, etc. An alphabetical


Seventh
St.
Broadway
Spring St.
Main St.
Los Angeles St.
Green
Red
Purple
Black
From
To
Rail
Date
Weight
Drg.
Key
Broadway
Spring St
Main St
E. Seventh & Stephenson Div. #1

Actual size of card 5 in. x 8 in.

LOS ANGELES TRACK RECORDS—FIG. 2—DETAIL RECORD OF RAIL AND SPECIAL WORK LAID AT A GIVEN LOCATION

list of old names with the new one opposite is therefore kept on cards.

All trade catalogs are indexed under the firm name and the goods listed therein. Daily building reports, United States topographical sheets, county record maps for revising our wall maps, are also kept in this way.

Records of all rails laid, section and date, and of all paving were kept on the mounted paper track map. It was found impossible to keep these posted without injuring the maps, consequently 5 in. x 8 in. cards (Fig. 2) were bought.

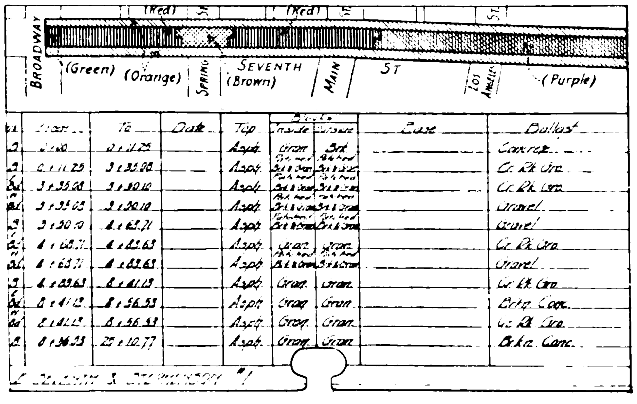
Using the red top line as the center line between tracks, a miniature track map is made on a scale of 200 ft. per inch. The widths are exaggerated to allow more working room. There are two sets of these, one for rail, the other for ballast and paving. Each rail section is shown by a proper color while below is a record of the stations to and from, rail section and date of the report.

On the paving cards parallel lines of wash color are used, the inner one for ballast, the outer one for top paving. The same record of location, date, etc., is kept below as for the rails. On the rail card a record is also kept of the special work at each location, the type and drawing number of the railway's drawing and of the key plan being given.

The cards (Figs. 2 and 3) for the East Seventh and Stephenson divisions are typical.

Wall maps show this graphically for the entire system, a separate map being used for each.

The company is satisfied that it has an index system capable of being enlarged to meet almost any needs, and until some much better system is devised it will continue to use cards.


(Red)
(Red)
Broadway
(Green)
(Orange)
Spring
Seventh
(Brown)
Main
St
Los Angeles
(Purple)
From
To
Date
Top
Base
Ballast

Actual size of card 5 in. x 8 in.

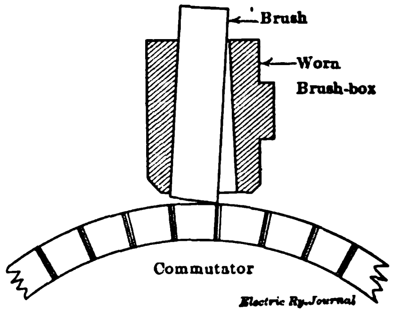
LOS ANGELES TRACK RECORDS—FIG. 3—DETAIL RECORD OF PAVING LAID AT A PARTICULAR LOCATION

Brush-Holder Practice for Single-Phase Motors

BY R. R. POTTER, SUPERINTENDENT OF EQUIPMENT NEW YORK, WESTCHESTER & BOSTON RAILWAY

Brush-holders for railway motors constitute one of the most vital parts of the equipment, as they must be in nearly perfect condition at all times in order to perform their duty, notwithstanding the fact that they are subjected to very severe wear and to exceedingly difficult operating conditions. When it is starting the motor armature requires an excessive amount of current which must be delivered to it through the brush-holders and brushes, and this is often greatly in excess of the capacity of the brush. The result is a relatively rapid electrical erosion as well as mechanical wear on the brush-holder boxes, or guides for the brushes, and also on the pressure fingers. This is especially true of single-phase a.c. motors as they require very large currents on account of the low voltage for which they are generally wound. Also, since the brushes are required to be as thin as possible the current per unit of brush area is very great.

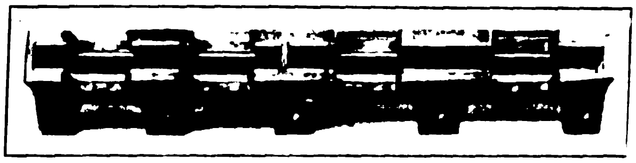
These troubles were in evidence during the early operations of the New York, Westchester & Boston Railway, and tests were made with shunts on the brushes to remedy the difficulty. But while the excessive wear or burning of the brush-holder was thus prevented, it was difficult to develop a shunt attachment to the brush which would stand the load, and the great additional cost of the brushes with the shunts made them uneconomical. The rapid wear was, therefore, accepted as inevitable, and from observations that were made on the motors it was determined that the permissible limit of the wear for the brush-holders was reached when the box or guide had become 1/32 in. larger than the brush, which was 3/8 in. thick.



BRUSH RUNNING ON EDGE BECAUSE OF WORN BRUSH BOX

Practically all of the wear occurs at the lower portion of the box, or that which is nearest the commutator. When the box is badly worn the conditions are such, as will be seen from the sketch, that when the motor reverses after running a considerable time in one direction, the brush moves so that only a line of contact instead of a surface is presented to the commutator. Naturally, such a reduction of contact area causes a very rapid wear of the brush, and sometimes induces the flashing over of the motor, so that the above wear limit had to be established and rigidly maintained. However, with twelve brush-holders per car a heavy expense was involved by maintaining the wear limit in case the brush-holders were scrapped as soon as the slots became worn 1/32 in. large, and in order to minimize the cost the following method of repairing the old holders was devised:

A substantial frame or jig for the brush-holder was made in such form as to support the three sides of the brush box and to hold this casting in shape regardless of the pressure put upon it. A broach having the same length as the slot in the brush box and 1/8 in. greater width than the original size was also constructed. To repair a brush-box the broach is forced through the slots in the brush box, the wheel press being



BRUSH-HOLDER WITH WEAR PLATES IN BRUSH SLOTS

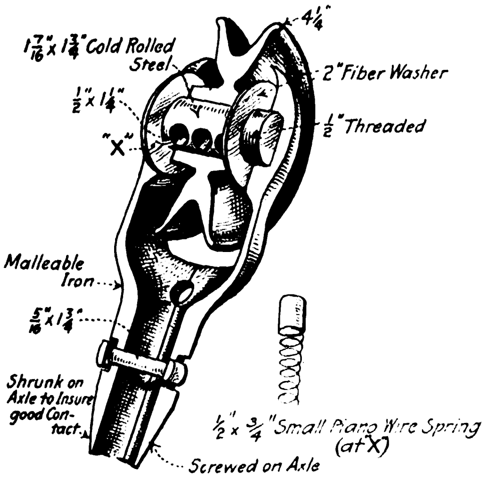
used to apply pressure. Pieces of hard brass of the same length as the slots and 1/16-in. thick are then riveted to each side of the slot, a steel block being inserted in place of the brushes while riveting so that the rivets are headed on the inside. This block also insures that the proper shape of the slot will be maintained. The copper rivets used for the operation are, of course, countersunk on the inside of the slot, each strip of brass being held with four rivets, as this number has been found to be ample.

This work can be accomplished for about 50 per cent of the cost of a new brush-holder, and when the brass wear plates are worn down in turn to the wear limit of 1/32 in. they may be replaced for a very small percentage of the first cost, because no broaching operation will be necessary in renewals of the wear plates.

A Split Self-Lubricating Trolley Harp

BY C. M. FEIST, MASTER MECHANIC SIOUX CITY (IOWA) SERVICE COMPANY

Self-lubrication, perfect contact and an average life of 10,000 miles have been obtained from a trolley harp which is used by the Sioux City (Iowa) Service Company. Essentially this harp is made of malleable iron and in two sections, one of which is shrunk on the axle to insure perfect contact, the other of which is screwed on the axle. This harp is clamped on the trolley pole by a 5/16-in. x 1¾-in. bolt. The axle is made of cold-rolled steel, 1 7/16 in. x 1¾ in. in size with three ½-in. x 1¼-in. holes drilled along one side. In these holes three small piano-wire springs and two ½-in. x ¾-in. graphite lubricating plugs are placed. This combination of the springs and the plugs insures continuous pressing of the graphite against the bearing of the trolley wheel. Fiber washers are interposed between the trolley wheel hubs and the harp to reduce friction at this point and to prevent excessive wear.


4¼"
1 7/16" x 1¾" Cold Rolled Steel
2" Fiber Washer
½" x 1¼"
½" Threaded
"X"
Malleable Iron
5/16" x 1¾"
Shrunk on Axle to Insure good Contact.
½" x ¾" Small Piano Wire Spring (at X)
Screwed on Axle

SIOUX CITY SELF-LUBRICATING TROLLEY HARP

Equipped with a 4½-in. trolley wheel which is used in city service, this harp and wheel complete weigh 6 lb. The company does its own machine work in connection with the manufacture of these harps and wheels. The castings, however, are made outside, but their design is furnished by the company. This type of trolley harp has been used on the Sioux City cars for more than ten years, and a number of the axles have been in service four years. As a rule the fiber washers are only applied to take up wear when wheel renewals are made. The graphite plugs provide such perfect lubrication that oiling is never necessary, hence the car roof is always clean. Experience has been that these wheels need no attention so far as lubrication is concerned until a wheel is renewed. At that time new graphite lubricating plugs are provided. This, of course, makes inspection of the bearings unnecessary while the wheels are in service. A sketch of one of these harps is shown in the accompanying illustration.

Helical Springs

BY "VULCAN," A.M.I.C.E., A.M.I.E.E., ENGLAND

On many street railway systems the large helical compression springs have given little trouble, whereas on others frequent failures have been experienced; the latter has been the case in many parts of Great Britain where additional weight, caused by covering over the upper decks has been imposed upon the original trucks.

Besides increasing the weight of the car body, the top deck covers raise the height of the car center of gravity, especially when loaded, because the upper decks of such cars commonly attract more passengers than do the lower decks; consequently they are more subject to rolling from side to side than are other cars. Such cars impose a somewhat severe duty on the supporting springs.

On one system which came under the writer's notice this subject had attained considerable importance owing to the excessive number of springs which had been fractured. These were of the usual helical type which support the trucks from the journal boxes. The breakages had reached the figure of many hundreds per annum, and although this meant considerable expense for replacements, of more importance was the fact that broken journal-box springs caused top-covered cars to lean over to an alarming extent.

Of course, the state of the track, which was undoubtedly in extraordinarily bad condition, was blamed, but the real cause of the trouble was that the design of the springs was at fault, which was proved to be the case when new springs of different dimensions were substituted; experience showed these latter to be satisfactory in every way.

The compression of a spiral spring is directly proportional to the load it carries; the stress in the material of the spring is also proportional to the deflection. Consequently when the compression is at a maximum, i.e., when the spring is closed up, the greatest possible stress that the material will ever have to withstand in use will be reached, and the value of this figure should be well within the breaking stress.

It is, of course, an easy matter to keep on the safe side by adopting an excessively strong spring, but in this case the effect on the riding qualities of the car would be equivalent to having no springs at all; the same effect will be produced if the springs are too weak to support the car when stationary, for in that case the coils will close up and rest on each other.

In getting out a new design the object must be to provide a spring which will remain open under ordinary conditions, but which if absolutely closed up by abnormal circumstances will not break under the maximum material stresses then obtaining.

For body or journal-box springs the over-all dimensions are usually not difficult to settle; the diameter of the material of the spring and the spacing of the coils best suited to the situation is not so easy to define. In many cases the latter dimensions are obtained by trial and error methods. However, this is not a satisfactory process compared with the system of calculation to which the subject is well suited.

The following formula (A) will enable the shear stress in the material of a spiral spring to be found when the steady axial load is known; this, of course, only obtains when the coils remain separated under load:

$$f = \frac{16WR}{\pi d^3} \text{ or } \frac{5.1WR}{d^3} \qquad \text{(A)}$$

Where

f = material stress in pounds per square inch maximum working values for which use 70,000 lb. for ¾-in. diameter material, and 65,000 lb. for 1-in. diameter material,
W = steady load on spring in pounds,
R = mean radius of spring in inches,
d = diameter of rod in inches.

To find the compression of the spring under steady load the formula (B) can be used.

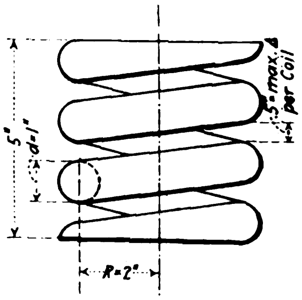
$$\Delta = \frac{4\pi f R^2}{Nd} \qquad \text{(B)}$$

Where

Δ = deflection per coil,
f = stress in material, pounds per square inch,
R = mean radius of spring in inches,
N = torsional modulus = 11,000,000 lb. for steel,
d = diameter of road in inches.

In designing a new spring the coil spacing should, of course, be greater than the deflection per coil under a steady load.

We have as yet only dealt with the condition of steady loading, but owing to bad track or to obstructions on the rails, the springs may at times be compressed an amount greatly in excess of the normal, and as the material stress is proportional to the compression, the latter must be limited in some way so that the stress shall under no circumstances reach the breaking point. This is best done by so arranging the spacing of the coils that when the limiting stress is reached, the spring shall be closed up. The maximum allowable compression per coil, or the maximum coil spacing, can be ascertained by substituting for f in formula (B), the limiting stress, which for good steel can be taken as 110,000 lb. per square inch.



HELICAL SPRING

In the accompanying figure is shown a successful journal-box spring for which the following calculations are made by way of illustration. The steady load W on the spring is 2 tons.

By (A)—Steady load stress,

$$f = \frac{5.1 \times 2 \times 2240 \times 2}{1} = 45{,}700 \text{ lb. per square inch.}$$

By (B)—Compression per coil under steady load,

$$\Delta = \frac{4 \times 3.1416 \times 45{,}700 \times 4}{11{,}000{,}000 \times 1} = 0.209 \text{ in.}$$

By (B)—Ultimate material stress when spring is closed,

$$f = \frac{\Delta N d}{4\pi R^2} = \frac{0.5 \times 11{,}000{,}000 + 1}{4 \times 3.1416 \times 4} = 109{,}000 \text{ lb. per}$$

square inch.

Box-Frame Motor Practice

In last week's issue of the Electric Railway Journal, page 367, R. R. Potter, superintendent of equipment New York, Westchester & Boston Railway, described the methods used in the shops of that company for removing armatures from box-type motor frames. The September issue of the *General Electric Review* contains an article on the same subject by J. L. Booth of the railway motor engineering department. Mr. Booth states that the demand for box frames has increased until at the present time they have almost entirely superseded the split frame, from 80 to 90 per cent of railway motors now being made being of this type. He gives the following advantages of the box frame as compared with the split frame: For a given space and weight a larger output can be obtained. It possesses greater structural strength and durability. The lower half of malleable iron gear cases can be supported more substantially. The elimination of the joint gives an unbroken magnetic circuit and prevents oil from working into the interior of the motor. A greater freedom of design is generally obtained for armature, pole pieces, coils and axle-bearing housings. With a ventilated motor a greater space is available for the passage of the cooling air around the field coils. Better protection is afforded to the field-coil connections, which are inside the frame. The removal of the motor from the truck for repairs results in these being made under favorable conditions. There are fewer parts liable to work upon each other. The greater reliability reduces maintenance costs.

Experience has shown that the removal of the motor from the truck for repairs is not objectionable and repairs upon box-frame motors are to-day being executed just as rapidly as those upon split-frame motors. Some users consider that less time is necessary due to the superior working conditions which exist when the motor is off the truck. The removal of box-frame motors from single-truck cars presents no difficulty. The axle caps and bolts are first removed and the gear case taken down. The motor is then supported from the pit by a jack bearing against the center of the motor frame. The suspension bolts are next taken out (if the suspension is of the bolted-bar type) and the suspension bar is unbolted from the truck. The motor may then be raised by the jack and moved away from the axle sufficiently far to allow the portion of the axle-bearing housing that projects over the axle to clear it. The motor may then be lowered into the pit. If preferred the axle may be used as a fulcrum and the motor swung around the axle until the bearing housings are clear.

No elaborate equipment is required for removing a truck from a double-truck car. In most carhouses two pairs of chain blocks can be arranged to lift one end of the car while the truck is being removed. On a large system in the Middle West, using motors weighing with gear, gear case, pinion and axle lining, approximately 3045 lb., the truck is run out from under the car and the suspension bolts, gear case, axle caps and linings are removed, the dust guard coming away with the axle caps. The motor is then lifted out by means of bails and an ordinary pair of chain swings. The four bolts securing the pinion-end framehead are next removed and the head is started by jack screws. A lever, having a collar at one end which fits over and is clamped to the pinion, is used to support one end of the armature, which is then pulled out sufficiently far to enable a wide lifting strap to be placed in position. The length of the bearing at the commutator end is sufficient to support that end of the armature until the lifting strap is in place. By bearing down on the end of the lever, the weight of the armature can be balanced while it is being removed from the frame. By this method the time necessary to remove and replace an armature after the truck has been taken out from under the car body is as follows: Removing the axle caps and suspension bolts, and raising the motor frame from the truck, fifteen minutes; removing the framehead bolts, forcing off the frameheads, clamping the lever to the pinion, placing the lifting staff in position, removing the armature and lowering it upon the floor, twenty minutes; picking up the armature, replacing it in the shell, bolting up the frameheads, lifting the motor and placing it on the truck ready for service, twenty-five minutes; time from that at which the truck is taken from under the car until the motor is remounted and the truck ready to be replaced, one hour, which period can, if necessary, be reduced to forty-five minutes.

The method used by another road for removing the armatures from GE-222 motors, which weigh complete 4260 lb., is as follows: The motor is turned on end by slings in the usual manner, the air intake pipe being first removed and a sling with hooks being attached to one of the bails on the motor frame and to an eyebolt screwed into one of the axle-cap bolt holes. For removing the armature the chain swings are replaced by scissors-like clamps which fit under the pinion teeth. The armature is then withdrawn and stood vertically on blocks while the clamps are replaced by a light chain before the armature is laid flat on the ground.

A road operating a large number of GE-200 box-frame motors is using an extension of the armature shaft to support one end of the armature while it is being dismounted. The pinion-end framehead is removed and the head at the commutator end is replaced by a malleable-iron bracket which fits the bore of the frame and is held in place by two tap bolts. This bracket carries a machined roller of such a diameter that the extension of the armature shaft is kept in the center of the frame. This extension is a steel tube, machined on the inside to just slip over the armature shaft. The shaft at the other end is supported by an oak pole 3 in. in diameter, having a steel tube at one end of it that fits over the armature shaft. The armature is moved out horizontally and is supported at one end by the roller until it is clear of the frame.

In another road a somewhat similar method is used, an iron pipe, having one end bushed with brass to avoid injuries to the armature shaft, being used to support one end of the shaft. The armature is lifted by slings and moved out of the frame horizontally by an overhead traveler. On still another road the armature is held stationary and the frame is moved. The armature is supported by jacks, a bushed pipe being used at one end, as previously described. The frame is carried on a truck rolling on rails which is moved along until the armature is clear.

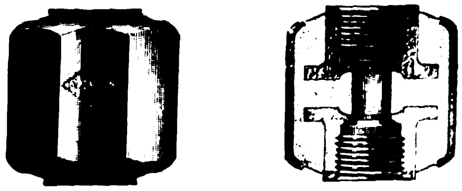
In concluding his article Mr. Booth also described the special machine with centers mounted on a base plate, which was mentioned also in Mr. Potter's article.

Application of Different Welding Processes

As an example of the fact that welding by the electric arc, by electrical resistance and by the oxy-acetylene flame each has a distinct field to which it is most suitable, it may be said that an English corporation which manufactures steel wheels and also specialties in autogenous welding processes makes use of all three methods. The longitudinal joints in the barrels are made by arc welding and the resistance process is used for attaching the heads to the drums. Oxy-acetylene welding is not used in connection with the barrels, but is used for making articles of a more complex character, which are required only in small quantities, the flexibility of the process making it especially valuable in such cases.

Insulating Pipe Joints

The MacAllen Company, Boston, Mass., has recently brought out an improved type of insulating joint to prevent the flow of stray electric current through pipes, conduits or rods. The joint is octagonal in shape, the shell being made of seamless drawn steel and the nipples into which the pipe ends are screwed being machined from steel rods. The insulating material is a vulcanite compound that is not affected by heat or oil and is, in fact, practically indestructible. This surrounds the nipples and is inclosed in the steel shell so that ample physical strength is provided.

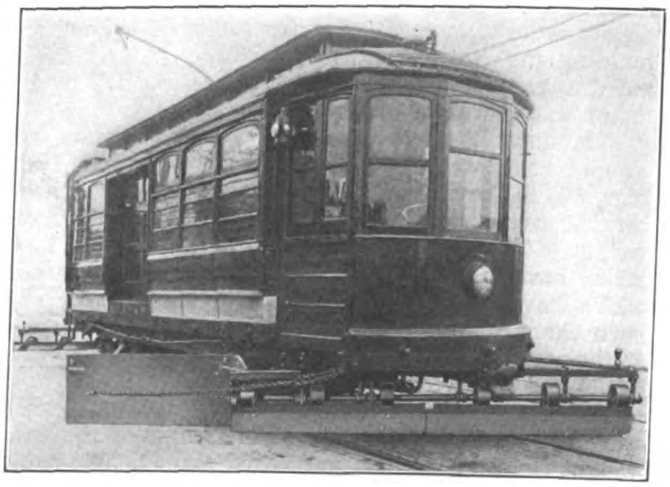


EXTERIOR AND SECTION OF INSULATING PIPE JOINT

These joints have already been used to a large extent by the manufacturers of air-brake equipment as a part of their standard insulation, and recently, they have come into use for insulating steam pipes and rods that are subject to electrolytic influence. The joints are made in standard gas pipe sizes, from ¼ in. to 2 in., all of them being tested to 150 lb. air pressure. High-pressure joints are made to order and these can be tested to any specified pressure, so that they can be used for hydraulic and steam mains as well. The joint that is intended for insertion in lever, stay and brace rods when it is necessary to insulate one part of the rod from the other is, of course, tapped for machine-screw threads and this type is made in standard sizes for rods ranging from ½ in. to 1 in. in diameter.

New Track Scraper

The snow-fighting equipment illustrated in the accompanying engraving is the latest development of the Root Spring Scraper Company, Kalamazoo, Mich., and is known as the No. 6 scraper. It is 12 ft. long and is designed for mounting under the ends of service cars at an angle of 45 deg. to the rails, and to be used in connection with wings. The projection of 3 ft. outside the rails cleans the devil strip, and the blades are made in two sections so that they will accommodate them-



NO. 6 SCRAPER WITH WINGS, ATTACHED TO SERVICE CAR

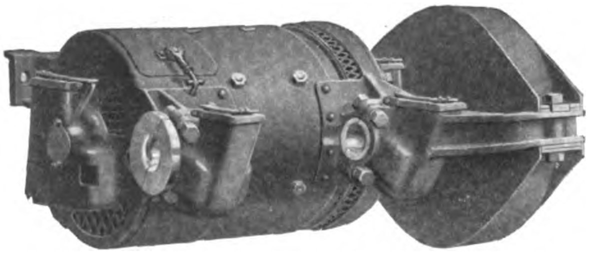
selves to the crown of the pavement. The same scraper is also designed for use on interurban cars, and for this service blades 9 ft. long are recommended.

The scraper is designed to replace revolving broom sweepers, and several important railways which tried this equipment last winter report that the new scraper is much more effective than sweepers. The advantages claimed for it by the manufacturer are that a car so equipped will do much more work than a sweeper because it can be run faster with safety. The scraper will handle wet, packed snow that would be overridden by a sweeper. It can be run at normal car speeds without frightening horses in the street. The blades are so designed that they will adapt themselves to the contour of the pavement and will permit backing up when the blades are down. It is possible to keep the level of packed snow below the level of the motor shells, and thus a good practical job is done from a railway track standpoint. At the same time the scraper does not clean the pavement as thoroughly as a sweeper and therefore does not leave so good a path for the jitneys. The first cost and the operating cost of the scraper are much less than that of sweepers. The maintenance cost is claimed to be 75 per cent less than that for sweepers.

The height of the scraper above the track is regulated by a staff and wheel on the front platform, or, if desired, lever regulation is provided.

New Motor for One-Man Cars

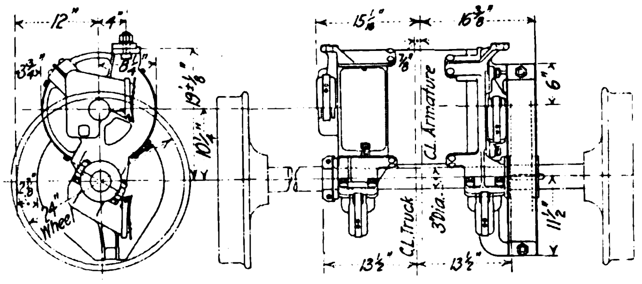
The Westinghouse Electric & Manufacturing Company, realizing the necessity for a motor to fulfill the requirements of light-weight car operation, has made a thorough investigation of the requirements which would have to be met under the varying conditions and has developed an entirely new motor of extremely light weight but of sufficiently rugged construction to perform such service. It would have been possible to modify existing designs of industrial or electric vehicle motors for this service, but the company believed that small-car operation had come to stay and would be successful only if a motor designed to meet the specific conditions could be applied. The expense of developing and building the No. 505 railway motor, popularly designated as the "Wee" (Westinghouse Electric Efficiency) motor was therefore undertaken.



NEW MOTOR FOR ONE-MAN CARS

This motor has a rating of 17.5 hp. at 600 volts, and weighs, complete with gears, gear case and axle bearings, 800 lb., so that it is the lightest motor for railway service ever placed on the market. The motor alone weighs 660 lb. The design includes all of those features which have proved so successful in larger sized motors which have been on the market for some years, only such changes being made as are necessary to adapt it to the service requirements. Gear ratios range between 14:68 and 20:62.

The Corpus Christi (Tex.) Street Railway, which was the pioneer in working out this phase of the light-weight car problem, has purchased eight double equipments of this motor for immediate delivery to operate on a city line 3 miles long, with cars weighing 14,000 lb. and making eight stops per mile with a maximum speed of 30 m.p.h. The Albuquerque (N. M.) Traction Company also purchased seven double equipments for city service, the cars weighing 11,800 lb., seating twenty-eight people, and making a schedule speed of 9 m.p.h. with eight stops per mile. The Rio Grande Railway Company, Brownsville, Tex., has adapted two single equipments of No. 505 motors for use on its cars. The existing road is operated by mules and it will be noted that one of the "Wee" motors will satisfactorily perform the service requirements, a special economy being effected through the elimination of the mule's kick.



GENERAL DIMENSIONS OF NEW MOTOR

Universal Armature Machine

The Electric Service Supplies Company, as exclusive selling agent, has placed on the market a new tool called the Peerless heavy-duty armature machine. This is universal in character, consisting of a banding machine for handling the lightest or the heaviest railway motor or locomotive armature with a self-contained tension carriage for band wire, a commutator slotting machine with independent motor, a commutator truing or grinding attachment with independent motor and a field and armature coil plate mounted on the main spindle suitable for all classes of form coil winding. It may be furnished either complete, or else as a heavy-duty banding machine only.

After an armature has had the coils placed in the slots and the leads soldered to the commutator, it may be placed in this machine and the work completed without removing the armature from the machine. As a banding machine the tool is capable of extremely heavy duty, the speed of rotation being under perfect control of the operator, and when the machine is stopped it automatically locks and absolutely prevents slack accumulating on the band wire by any backing motion of the armature. An even and uniform tension on the band wire is secured by means of a portable type tension machine mounted on a carriage, which is adjusted along rails provided back of the machine, so that it may be readily brought into position by changing from one band to another.

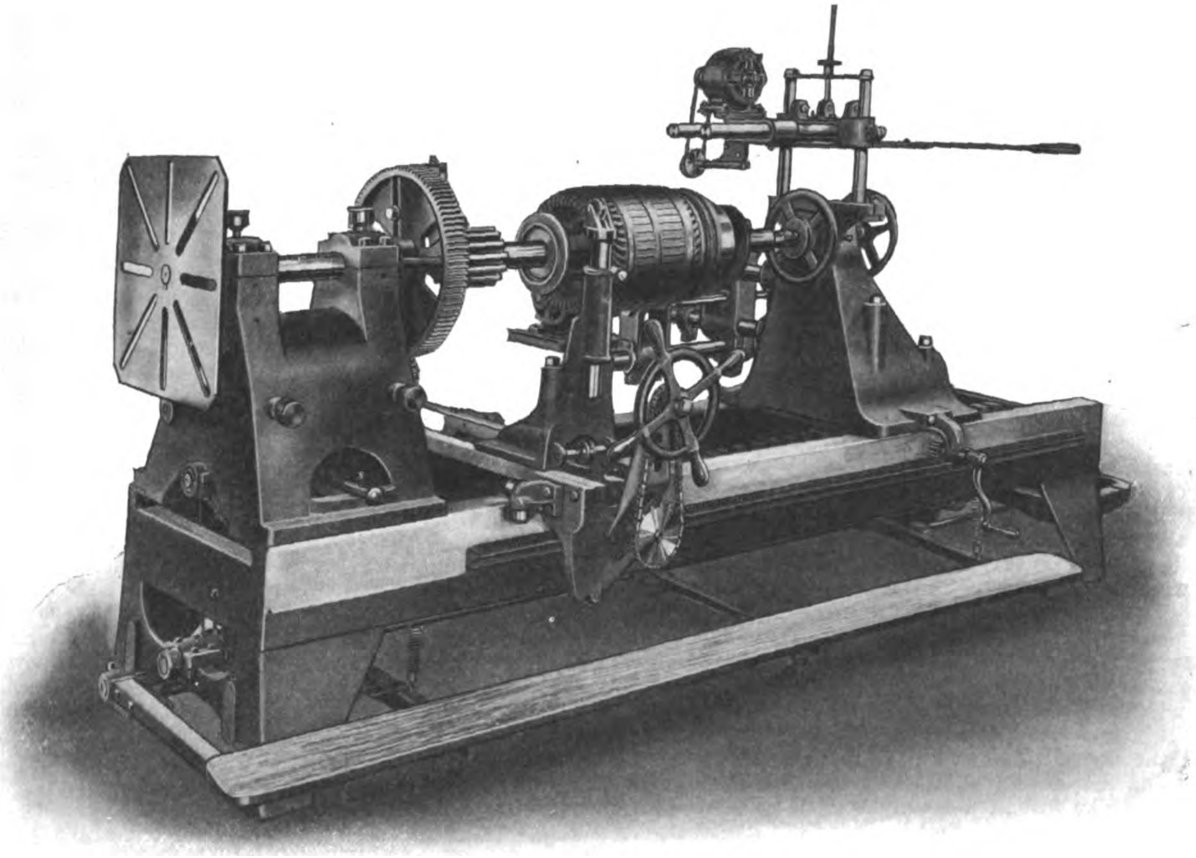
The commutator slotting attachment is supported from a bracket on the tailstock and is removed by loosening two cap screws. Two vertical rods support a casting, from which two rods project over the commutator. These two rods carry a sliding head on which is bolted the bearing for the milling saw arbor, and on top of the sliding head a ⅛-hp. motor is mounted for driving the saw. The casting supporting the projecting rods is adjustable vertically to suit different diameters of commutator and to regulate the depth ot the saw. Provision is made to skew the travel of the saw in order to follow the mica slots when the latter are out of line. The sliding head carrying the saw is moved across the commutator by means of a lever, which can be adjusted to suit the convenience of the operator.

The commutator truing or grinding attachment consists of a traveling grinding wheel, supported by the tailstock and direct motor driven. Two steel rods project backward from the tailstock, and sliding on these rods is a casting which supports two other rods parallel with the face of the commutator which carry a ½-hp. motor and the grinding wheel. These rods are adjustable in or out to suit the length and location of the commutator. The grinding wheel is moved along the rods by means of a screw and handwheel and is fed against the commutator by a screw. Cutting is done in both directions of travel of the wheel. When this attachment is not in use it is simply moved back out of the way and no part is disturbed. The rods and all other parts are made heavy to prevent springing and chatter.

A coil-winding plate is mounted on the outer end of the spindle and this is arranged to take all standard sizes of armature and field coil forms. As its speed is under instant control of the operator, it is suitable for all classes of work from the lightest to the heaviest.

The machine is heavily built throughout, all castings being thoroughly ribbed, and the bed consisting of a heavy steel section, planed true on the bearing surface and mounted on legs which support the main drive shaft. The machine is stopped and started by foot treadle which runs the full length of the machine, so that control is possible from any location. When the treadle is depressed to stop the machine, a locking brake is automatically applied to the drive shaft. The treadle is connected to an automobile-type, leather-lined cone clutch for controlling the machine by connecting to the main drive shaft. This type of clutch is simple and will positively not jerk when engaging, a smoothly operating clutch being absolutely necessary for successful banding or coil winding. The exterior part of the clutch is free to revolve upon the shaft and is crowned ready to receive a belt from the line shaft direct, no countershaft being necessary. For direct motor drive, a gear is bolted to the loose member of the clutch and the motor is placed upon a suitable support at the proper height to suit the pinion used with the motor. The motor capacity required is 1½ hp., 900 to 1200 r.p.m.

The headstock is a massive casting and contains all the reduction gears, which are thus thoroughly protected. Power is transmitted from the lower driving shaft by a steel chain to a double set of gears of different diameters in the headstock, either one of which may be thrown into engagement by a lever. This lever may also be thrown into a neutral position, in which case the main spindle is free to revolve independently, a valuable feature in coil winding or in case any special work is to be done on the armature.



HEAVY DUTY UNIVERSAL ARMATURE MACHINE

The two gears on the first shaft above mentioned engage with two corresponding gears on a second shaft, giving two instantaneous changes of speed while the machine is running. This second shaft on the outside of the headstock carries a driving pinion which engages the face-plate gear. Self-contained with this gear is the driving dog, which is clutched between the teeth of the pinion on the armature, all extra attachments for this purpose being eliminated.

The *Mechanical World* states that the Swiss Federal Railway authorities have decided on the construction of a large new hydro-electric station at Massaboden, near Brigue, to supply energy for the trains operating through the Simplon tunnel. The station will replace the temporary power station now established at the north end of the tunnel.

LONDON LETTER

Petrol-Electric Car for Dublin—Service on Electrified London & South-Western Lines—Problems Presented by Depletion of Ranks of Tramwaymen

(From Our Regular Correspondent)

A novel combination of the petrol-electric principle is being applied to the Dublin-Blessington Tramway, which runs for 20 miles in the environs of Dublin. The road traverses an interesting residential, resort and scenic district. For certain reasons the overhead trolley, which has been adopted on a part of the line, could not be used throughout its length. The cars are so designed that they may be self-propelled by the combination of petrol-electric power when on parts of the line not equipped with overhead trolley. On the lines where the trolley can be used the petrol engine will be cut out. Double-deck cars mounted on double trucks will be employed. The bodies will be divided inside into two compartments, for first-class and third-class passengers respectively. The entrance will be in the center of the car. The driving axle of each truck will carry a 65-hp. Westinghouse motor. The self-contained power unit will be a 65-kw., 500-volt, compound wound direct-current generator, direct driven by a six-cylinder petrol engine developing about 105 b.-hp. This generating set will be mounted in a compartment at one end of the car. The control apparatus will be in duplicate so that the car can be run from either end.

The self-propelled car for Dublin is much the same type of car as that supplied by the British Westinghouse Company to the London & North-Western Railway for its branch line from Penygross to Nantlle. In the North-Western car the petrol motor is of 90 hp., connected direct to a 600-volt dynamo. A battery is provided and charged from the dynamo for lighting purposes, and also to drive the electric starter for the petrol engine, which is kept running while the car is at rest at the stopping places.

In connection with the electrification of the suburban section of the London & South-Western Railway it is announced that the circular route by Kingston will be put in service this month. As soon as the trains are running on this section the others will be completed in quick succession. These are the Barnes to Twickenham (via Hounslow), Thames Valley line to Shepperton, Malden to Hampton Court, and Hampton Court Junction to Claygate. The Kingston loop line includes all stations from Waterloo to Kingston via Wimbledon, and back to Waterloo through Richmond, Mortlake, Barnes, etc. Direct current at 600 volts will be supplied to the trains from a third-rail at the side of the track. The power station is near Earlsfield Station, and the current will be distributed at 11,000 volts to substations by insulated cable, of which 76½ miles have been laid on the section now in hand. Altogether, 140 single-line miles of track will be electrified. Each train will consist of units of three coaches permanently coupled together, the trains to comprise three, six or nine coaches, according to traffic requirements. Each unit is fitted with four motors, mounted in pairs on the bogie beneath the driving compartment. The coaches will be heated by electricity.

The details of a light railway scheme, intended as a first step toward the planning of a new seaside resort for Lancashire, were recently inquired into by the Light Railways Commission sitting at Formby. The proposal is to carry a line of electrified railway to Formby headland, the most seaward point of West Lancashire, and to make that district, which comprises an unusual stretch of firm beach backed by undulating sandhills, accessible to Lancashire holiday-makers. The Lancashire & Yorkshire Railway has been induced to take the matter up. The proposed Formby Light Railway is to be constructed by the addition of a loop to the existing electric line running between Liverpool and Southport. The new line at its most southerly point will join the existing line at Hightown Station, and branching to the west will skirt the Altcar Rifle Range and War Office new encampment, and thence follow the contour of the coast line, coming round in a loop and rejoining the present line almost on the Southport borough boundary. Its total length will be nearly 7 miles, and the estimated cost is £62,650.

The annual conference of the Tramways & Light Railways Association discussed the growing difficulty which tramway undertakings throughout the country are experiencing owing to the increasing number of men who are leaving for war service. The reduction in the number of drivers and conductors can be met by running fewer cars or by employing women conductors, but the steady departure of skilled workmen from the repair shops for the army and for munition factories presents a more serious problem. J. Devonshire, managing director of the London United Tramways and the Metropolitan Electric Tramways, said that the council of the association had come to the conclusion that the companies must try to get for the men employed in the repair shops the special form provided for munition workers. This form would be stamped with the words "public utility service." The council had succeeded in arranging with the Minister of Munitions that if this arrangement was carried out these men would be regarded as sacrosanct. The conference decided not to take any steps to secure exemption for drivers and conductors. It was announced that the Board of Trade had agreed to the inclusion in one Parliamentary bill of all applications for extension of time for the completion of authorized lines. This should be a considerable advantage, because under the present war restrictions a great deal of new work is being delayed.

At the same conference a paper was read by J. W. Dugdale, general manager and engineer of the Oldham Corporation Tramways, in which he said:

"Workshops, railways and motor cars appear to have been paced to the uttermost limit, but the military authorities have never once thought of taking into their confidence any principal connected with any of our undertakings, except, of course, for free riding upon tramcars. There is, in my opinion, plenty of scope to which our vehicles could have been put. The transport of the wounded, for instance, the removal of convalescent soldiers from various hospitals to convalescent homes, and the carrying of munitions in their various stages of production from one firm to another. The number of tramway employees who have given their services for the war reaches a total of 18,057 men, which is about 30 per cent of the total number of men employed on tramway undertakings. The cost to the departments mentioned for allowances or grants per week at the present time is very high. For the London County Council it is £1,568; Glasgow, £1,000; Liverpool, £520, and Manchester, £1,360."

As regards present and future prices of materials, Mr. Dugdale pointed out that "tramway concerns are now handicapped in obtaining quick deliveries of material, such as car wheels, axles, tires, etc., and this has been brought about by the makers not being able to execute orders promptly on account of pressing Government work." He said:

"There is no doubt that tramway concerns will be called upon to pay inflated prices for materials of every description. There will be a great rush for tram rails in the very near future, as the life of those laid on many systems in the year 1900 will become exhausted. This is a very important factor, which will have to be closely watched, as the prices per ton will increase considerably. Already tram rails have advanced in price to £9 5s. a ton."

The Birmingham Corporation tramways committee has engaged about twenty women to act as conductors on the Pershore Road route. A letter has been received by the committee from the Tramwaymen's union stating that the men are willing to work with the women and to render them every possible assistance.

Some interesting figures are contained in the report of the London County Council tramways for the year ended March 31, last. The length of lines in operation was 145¾ miles, of which 5¾ miles was worked by horse traction. The total revenue was £2,400,847, and the working expenses, £1,658,362, leaving a surplus on working of £741,485. The number of car miles run was 58,978,792, and the number of passengers carried 550,497,993, and the average fare per passenger was, for electric traction, 1.02d., and horse traction, 0.76d. The average number of cars was 1384, and the average car miles per day per car was, for electric, 117, and horse, 77. The average speed of the electric cars was 8.95 m.p.h. and of the horse cars 5.85 m.p.h. The total debt incurred up to March 31 was £13,744,806. Allowing for debt repaid and sinking fund balances and for surplus land valued at £122,216, the net debt on March 31 was £9,836,186. A. C. S.

News of Electric Railways

RAPID TRANSIT EQUIPMENT CONTRACTS

More Than $1,800,000 of Track Material Contracted for in New York

The Public Service Commission for the First District of New York has awarded the following contracts for track materials to be used upon various lines of the dual rapid transit system:

Untreated ties and timber—J. H. Burton & Company, $1,273,856.
Treated ties and timber—Long Leaf Pine Company, Inc., $100,362.
Special work, Order No. 3—Ramapo Iron Works, $54,960.
Special work, Order No. 4—William Wharton, Jr., & Company, $41,907.
Cast iron—American Brake Shoe & Foundry Company, $10,528.
Screw spikes—American Iron & Steel Manufacturing Company, $25,741.
Felt pads—Q & C Company, $9,957.
Malleable iron—Foran Foundry & Manufacturing Company, $36,118.
Tie plates, Type "A"—Herbert W. Lockwood, $123,975.
Tie plates, Type "B"—L. D. Rockwell, $13,267.
Tie plates, Type "C"—L. D. Rockwell, $5,140.
Tie plates, Type "D"—Herbert W. Lockwood, $8,239.
Tie plates, Types "E," "F," "G" and "H"—Herbert W. Lockwood, $17,139.
Tie plates, Types "E-2," "W" and "X"—Ramapo Iron Works, $2,901.
Bolts and nuts—Oliver Iron & Steel Company, $117,910.
Cut track spikes—Herbert W. Lockwood, $34,338.

The differences between the Public Service Commission for the First District of New York and the Board of Estimate & Apportionment in regard to the terms of construction contracts, which threatened to involve delay in the completion of the Broadway subway in Manhattan, have been settled and the work will proceed. The point in question was a clause in the contract for the construction of that portion of the Broadway subway between Thirty-eighth and Fifty-first Streets, which permitted the chief engineer of the commission to agree with the contractor either upon unit prices or a lump sum for extra work not provided for in the schedule of unit prices upon which the contractor made his bid. This contract was awarded to the Holbrook, Cabot & Rollins Corporation, the lowest bidder, for $3,740,913. The law requires that the Board of Estimate & Apportionment consent to such contracts and appropriate the money to pay for them.

In this case the board consented to the contract on condition that the lump sum clause for extra work be stricken out. The contractors objected and the commission, under advice from its counsel, declined to amend the contract to comply with the Board of Estimate's condition, holding that it had no right to alter the terms of the contract and that its action in consenting to the contract with conditions amounted to disapproval. Holbrook, Cabot & Rollins applied to the Supreme Court for a writ of mandamus to compel the Board of Estimate to give its consent without conditions. This application was allowed by Justice Clarence J. Shearn, who issued a writ during the week. His decision sustained the position taken by the Public Service Commission. At its meeting following the decision by Justice Shearn, the Board of Estimate acted in accordance with the decision of the court and gave unconditional approval to the contract upon the understanding that the commission will confer with the Board of Estimate as to any lump sum extra allowance in excess of 5 per cent of the value of the contract before allowing the same. This understanding was in conformity with a suggestion made by Chairman Edward E. McCall of the commission to the Board of Estimate. That board is still of the opinion that it has the power to alter the terms of contracts made by the commission and expressed its intention of testing the question in the future. Not wishing to delay the construction of the dual system, however, it yielded the point as to this contract and two contracts in Brooklyn having similar clauses. This action clears up the situation and the Public Service Commission will now proceed to execute all the contracts as to which the Board of Estimate made objection so that work may begin at once.

PHILADELPHIA COMMISSIONER REPORTS

An Outline of Some Features of the Report Issued by Transit Director Taylor for 1914

Transit Director Taylor of the City of Philadelphia, Pa., has issued the annual report of his department for 1914. In his letter submitting the report to the Mayor, Director Taylor reviews his recommendations and the work accomplished by his department, paying particular attention to the relocation of sewers. He goes at length into the legislative and legal features of transit work. All the aspects of the transit plans, constructive, legal and financial, are explained in detail. The report contains exhaustive tables giving the expense of the undertaking and the estimated returns to the city and the operator. The entire transit program as outlined at the conferences between Director Taylor and the officials of the Philadelphia Rapid Transit Company is included.

A feature of the report is the director's description of the methods employed in conducting his investigations into the transit problem. In the first place, he made a detailed study of the population and of its location. From the records of the County Commissioners was obtained the number of assessed voters in each ward for December, 1909, and December, 1911. Then the increase in population by dwellings was obtained. Next came the problem of determining how the population traveled, and a traffic survey was conducted. Passengers on every car out of five were counted on about four lines each day. Two men were placed on each car, one handing an identification slip to each passenger, the second collecting it and asking the passenger's destination.

The survey extended over a period of five weeks, from Oct. 14, 1912, to Nov. 18, 1912. Information was thus obtained of the volume of traffic flowing to all sections and the capacity of existing facilities to move it. This information, together with the probable increase of population, showed the general channels which require relief by high-speed transit. Following these calculations came the selection of routes, the estimation of the number of cars which would be required to move the population, the time which would be saved and the cost of the work.

After the selection of routes, profiles and detail drawings were made on which to base estimates of the cost of the work. A large number of estimates were then prepared, a general design was adopted, a time was set for construction, and unit prices of construction cost were taken from bids on similar classes of work in other cities. Estimates of earnings and operating costs were then made in great detail.

In submitting his report to the Mayor, Director Porter reviews and emphasizes the importance of the recommended subway delivery loop. In effect, he holds such a loop to be necessary to the commercial success of the Broad Street subway, because, he contends, the North and South Broad Street line will collect traffic from twenty-seven stations outside the business district. Without the loop, virtually all of this traffic would have to be handled in two stations, while with the loop seven additional stations would be provided. The director estimates the number of persons who will use the Broad Street line at 500,000.

In reference to the much discussed tube under the Delaware River, the director says:

"In any arrangement made by the city with a private corporation for operating the city-built rapid transit lines it should be required that such corporation secure the construction of and equipment of a tube under the Delaware River to Camden, connecting with either or both the existing Market Street subway and the recommended Chestnut Street subway."

RHODE ISLAND ARBITRATION HEARINGS

Hearings are being continued at Providence, R. I., in connection with the wages arbitration on the system of the Rhode Island Company. W. D. Wright, superintendent of equipment and maintenance, a recent witness, testified as to working conditions in the shops. Differences in the work of machine hands were responsible for variations in the hourly rate of pay, and in the cases of two shop foremen the different rates were due to the increased responsibility in one case as compared with the other. Painters who got 23 cents an hour did no varnishing, while those who were paid 25.5 cents performed this work. The maximum number of men in the department was 225. At present only 159 were at work. Relative to work in the paint shop, Mr. Wright said that while apparently the men were performing the volume of work previously handled by a larger force fancy lettering and certain other refinements had been eliminated. Counsel Swift for the company brought out the point that a recent layoff for eighteen weeks of a number of men was ordered by the management and, in his opinion, was caused by jitney competition.

During the hearings in the week ended Sept. 4 the point was brought out that in certain cases men for whom no work was available at the rate of $2.25 a day were given the opportunity to work for $1.75 rather than to be laid off entirely. The work of switchboard operators was again reviewed. A witness contended that the duties of a lineman in the company's service were more severe than on the system of the Narragansett Electric Lighting Company, Providence. Under cross-examination, the point was brought out that a first-class man could learn to do the witness's work in two or three days. The compensation for this work was 30 cents an hour. Evidence bearing upon the cost of living was presented on Sept. 1 on behalf of the union by Arthur Sturgis, Boston, an electric railway engineer formerly employed by the Bay State Street Railway. The witness cited the well-known views of Prof. Irving Fisher of Yale University, relative to the purchasing power of the dollar and contended that while wages had increased 14 to 15 per cent in the last fifteen years on the Rhode Island system, the cost of living had risen to a degree which made wages lag 19 per cent behind purchasing power. Mr. Sturgis contended that a minimum wage of about $1,000 a year should be established in order to enable employees to maintain a proper standard of living.

ANOTHER STRIKE AT HOLYOKE

Employees of the Holyoke (Mass.) Street Railway went on strike for the second time within a month on Aug. 27. The strike followed a conference with officials of the company upon the establishment of a working agreement defining the duration of the period to be covered by a previously arranged arbitration of differences in dispute. The men desired a working agreement to expire June 1, 1916. The company called for a three-year agreement. At a conference prior to the strike vote, the company offered first to submit this difference to the board of arbitration recently appointed, with a second proposition that if this were unsatisfactory to the men to submit to the arbitration committee the question whether the time-limit of the working agreement was a proper one to be handled by this committee. Representatives of the union stated that the objection to signing an agreement extending beyond the date named previously arises from the fact that the wages and conditions in Holyoke have for years been governed by those prevailing at Springfield, Mass., where a new scale will be brought up for consideration on June 1, 1916. It was stated that the union has no objection to Attorney James E. Cotter, of Boston, who was recently appointed by Governor Walsh as the third member of the arbitration board. L. D. Pellissier, president of the Holyoke Street Railway, said that the agreement of Aug. 15, which was prepared just prior to the end of the last strike, provided that matters in dispute were to be submitted to the arbitration board. The company desired a three-year agreement to avoid a yearly discussion of working conditions, but was willing to submit the question to arbitration.

Soon after the stoppage of cars jitney service was inaugurated between points in Holyoke and the Brightside district, reducing the rate from 25 cents as applied in the previous strike, to 10 and 15 cents. Extra car service was also run on the suburban line of the Boston & Maine Railroad out of Springfield to Connecticut Valley points north. After spasmodic efforts in various quarters to establish a basis for a settlement, Governor Walsh proffered his good offices in the case, and an informal conference was held on Wednesday to enable the facts and viewpoints to be presented to the chief executive of the commonwealth.

CLEVELAND COUNCIL MEETING

A Summary of Action Taken on Important Railway Matters Recently

By unanimous vote the City Council at Cleveland, Ohio, has agreed to submit the franchises granted the Cleveland & Youngstown Railroad and the Cleveland, Akron & Canton Terminal Railroad to a referendum vote on Nov. 2, the regular election date. Previous to the Council meeting Peter Witt, street railway commissioner, had expressed his purpose of opposing the Cleveland & Youngstown Railroad grant on the ground that the New York Central Railroad was heavily interested in it. Mr. Witt said he favored the improvements this company wished to make, but believed the railroads should agree to build a union station before a proposition was accepted by the city in which any or all of the companies were interested.

The Council has passed the long-pending ordinance giving the Cleveland Railway the right to build a line on 123rd and 125th Streets, connecting the Superior and St. Clair Avenue lines. This will furnish partial cross-town service in the extreme east end of the city and at the same time serve thirty-one streets that are remote from any of the present lines. Construction work on this line will probably be begun at once.

Councilman Meyers offered an amendment to the city traffic code which would limit the speed of street cars to 20 m.p.h. Mr. Witt opposed this, but offered to reduce the speed of cars in Mr. Meyers' ward to 20 m.p.h. if he desired the change. The offer was not accepted.

Councilman Moylan asked for a rearrangement of the schedules on Lorain Avenue on the ground that many of the motormen and conductors were compelled to be at the carhouses most of the day in order to secure a few hours' work. Mr. Witt also opposed this step.

Because of the opposition of Mayor Baker and Mr. Witt to the plan of requiring the Cleveland Railway to pay rent for the use of the proposed subways to the Superior Avenue bridge across the Cuyahoga River, the County Commissioners have agreed to enter into a contract with the company that it shall have the use of the subways free of rent as long as the Tayler grant with its municipal control provisions and 6 per cent dividend clauses are in effect. At a recent conference Mr. Witt contended that the patrons of the street railway would be paying this rental and that they are under no more obligation to do so than those who cross the bridge in carriages, automobiles and taxicabs.

TOLEDO FRANCHISE NOT TO BE INITIATED

Negotiations With the City Are Not to Be Resumed at the Present Time

After the special franchise committee of the City Council at Toledo, Ohio, makes a report of its work during the past year on Sept. 20, it will be discharged. This was agreed upon at a meeting of Council on Aug. 23. Several members opposed delay in discharging the committee and argued that no report is needed.

Councilman Dotson, a member of the committee, told the Council that the committee had done good work and had taken the only course that will ever result in municipal ownership of the street railways. This work might have proved very valuable, as a draft of a franchise had been formed, when negotiations were finally broken by Henry L. Doherty, who would not agree to the plan unless the committee would recommend that action be taken by Council on the draft. Mr. Dotson said that reports that negotiations had been conducted for the purpose of defeating municipal ownership of the road were false.

When Mr. Doherty was in Toledo on Aug. 26 to attend the farewell dinner to F. G. Berge, manager of the light and power department, he told the newspapers that no franchise would be initiated at once by the Toledo Railways & Light Company and that there was no intention of resuming negotiations with the City Council. Further than this he gave no details of plans for the future. Mr. Berge has been appointed chief engineer of the Doherty interests with headquarters in New York.

WASHINGTON POWER HEARING CONCLUDED

Hearings were held before the Public Service Commission of the District of Columbia on Aug. 26 and 27 to inquire into the intercorporate relations of the Washington Railway & Electric Company and the Potomac Electric Company with respect particularly to the terms under which the Potomac Electric Company furnishes power to the railway. Among the witnesses were Clarence P. King, president of the Washington Railway & Electric Company; William F. Ham, vice-president of that company, and L. E. Sinclair, superintendent of the Potomac Electric Company. A previous contract between the companies is said to have provided that the railway pay the power company 6 per cent interest on the value of the plant used in the production of power for railway service and a profit on such power as was used by the railway. Extension of the plant of the electric company being deemed advisable, the railway guaranteed the interest on certain improvement bonds of the electric company, and the power contract between the companies was accordingly modified. The railway load had enabled the power company to generate on a large scale and the cost of production had as a result been reduced more than half, while the number of consumers had increased from about 6000 to 20,000. The commission has taken the case under advisement.

As previously stated in the ELECTRIC RAILWAY JOURNAL E. W. Bemis is now engaged in appraising the public utility properties in the district. This work it is expected will be completed in November.

THE NEED FOR PUBLICITY

In an editorial, "Good-Will and the Public Utility," in a recent issue, *Printers' Ink* said in part:

"The position of a public service corporation has sometimes been characterized as 'between the devil and the deep sea'—with the Public Service Commission restricting its profits on the one hand, and on the other the pressing need to secure private capital for plant extension and betterments. But how often is the consuming public told those facts? How often is the man in the street taken to one side and shown in the spirit of reasonableness that the service he gets for his nickel or his dime or his dollar depends upon the ability of the company to find purchasers for its bonds? How often is he shown that there is a direct relationship between the good will the public bears to the company and the service the company is able to give the public? Not so often as might be.

"The railroads which serve the towns in Westchester County, New York, have spent in the last three years many thousands of dollars to fight a rate reduction ordered by the Public Service Commission. The Court of Appeals has finally declared that the order is unreasonable, and it shall not stand. The railroads won their case—but at what cost in counsel fees, rebate slips, contingent liability funds, and all the rest! That sort of drama is being enacted over and over again. Sometimes it is necessary. More often it is not.

"One-tenth of the cost of such a legal struggle invested in an advertising campaign of education (before, not after public opinion has been adversely aroused), would often obviate the necessity of spending the other nine-tenths. The public is not unreasonable; it is not hopelessly biased against the railroads or any public utility whatsoever; it is only ignorantly devoted to what it conceives to be its own interests. What the public needs is to be shown the facts, and the best way, and the only effective way, is through advertising. And there never was a better time than right now, while the public mind is beginning to react from its over-indulgence in corporation-baiting."

Amalgamated Convention in Rochester.—The Amalgamated Association of Street & Electric Railway Employees of America will hold its annual convention, beginning Sept. 13, 1915, at Convention Hall, South Clinton and Monroe Streets, Rochester, N. Y. The hotel headquarters will be Hotel Eggleston and the headquarters of the executive committee in the Reynolds Arcade, Rochester.

New Haven Authorizes $600,000 Signal Expenditure.—The New York, New Haven & Hartford Railroad has authorized an expenditure of $600,000 for the installation of automatic block signals on its line, four-track, from Stamford, Conn., westward to the New York Central connections at Woodlawn, New York City, 20 miles. The controlled manual block system is now in use on this part of the road.

Ottumwa Company Praised.—In an editorial in the issue of Aug. 25, the Ottumwa *Daily Review* said: "Ottumwa has a great street railway service. There is none that can compare with the Ottumwa convenience of street transportation in cities of this size and not entered by interurbans. Ottumwa is justly proud of the Byllesby Company (Ottumwa Railway & Light Company) and its traction identity with our people."

Water Power Bill and Land Leasing Recommended.—Passage of a general water-power bill and a measure to create a national leasing system for coal, oil and other resources on public lands will be recommended to Congress in the annual report of Secretary Lane of the Interior. Mr. Lane announced on Aug. 31 that he expected both measures would be enacted. They were passed by the House in the last Congress, but the Senate failed to act upon favorable reports of the bills.

West Penn Division Strike.—The West Penn Traction Company, Pittsburgh, Pa., is operating its Allegheny Valley Division, the trainmen on which went on strike recently. The officers of the company are reported to have told Patrick Gilday of the State Board of Arbitration that the company had nothing to offer the men and nothing to arbitrate, as the contract in force was understood by both the company and the men. Arrests have been made promptly following the recent isolated cases of disorder.

Restoring Service in Galveston.—The first street car service in Galveston, Tex., after the storm of Aug. 17 was resumed on Aug. 26 on several lines of the Galveston Electric Company. The power plant was ready for operation several days prior to that time but owing to the fire hazard the current was not turned on until the water main under the bay, which brings the city's supply from the mainland, could be repaired. Damaged motors is now the most serious obstacle to the rapid restoration of normal service. As fast as the cars can be repaired they are put into service.

City Engineer to Value Minneapolis Street Railway.—The City Council of Minneapolis, Minn., has instructed the city engineer to begin the valuation of the Minneapolis Street Railway as a step preliminary to negotiations for a renewal of franchise. The present franchise still has eight years to run. In general outline the plan proposed for renewal closely resembles the one which has been in operation in Cleveland for four years and is known as the "transportation at cost" plan. An outline of the proposal was contained in the ELECTRIC RAILWAY JOURNAL of July 24, page 161.

Bus Service to Tie Isolated Municipal Lines.—The public utilities committee of the City Council of Seattle, Wash., has recommended for passage by the Council, the bill authorizing the Board of Public Works to enter into a contract with F. M. Peterson for the operation of an automobile bus service between Thirteenth Avenue West and Nickerson Street, the north terminus of Division "A" of the Municipal Street Railway, and Ballard Avenue and Market Street. Mr. Peterson proposes to operate buses to connect with all the cars on the municipal line, and to receive 3 cents for each adult, and 1½ cents for each school child that he carries.

Services for Mr. Graham. — Funeral services over the remains of the late John R. Graham, president of the Bangor Railway & Electric Company, Bangor, Me., were held at Mr. Graham's late residence in Bangor on the afternoon of Aug. 26. As a mark of respect to the memory of the dead man, all electric cars on the system were stopped for five minutes. The burial was from Christ Episcopal

Church, Quincy, Mass., on Friday afternoon, where a large and representative attendance of public utility men expressed the desire of many workers within the electric railway and central station industries to pay their last respects to their distinguished friend and co-laborer.

Los Angeles Board to Urge Track Elevation.—The Los Angeles Public Utilities Commission has ordered the Pacific Electric Railway to show cause why it has not complied with the terms of a franchise granted more than a year ago for the construction of elevated tracks to San Pedro Street to minimize traffic congestion in the business district of Los Angeles. The franchise provided for the extension of the company's elevated tracks from the rear of the depot at Sixth and Main Streets to San Pedro Street, and the operation of all the cars of the company over these tracks. The franchise specified that construction should begin one year from the date of its approval, July 10, 1914. The company has three years in which to complete the work. The hearing was set for Sept. 2, 1915.

The Quarter-Century Span of the Electrical Industry.—The first annual outing of the Quarter Century Club of the General Electric Company factory at Schenectady, N. Y., to Lake George, Aug. 28, emphasized the fact that many of the members of the company have been connected with the company since the very beginning of the period of rapid development of the electrical industry, that is, in 1890. Two hundred and six of the 500 members of the Quarter Century Club made the excursion to Lake George. The average age of the members of the party was fifty-two years, the youngest member was thirty-eight and the oldest seventy-four. G. E. Emmons held the record for longest continuous service, thirty-four years. C. A. Coffin, chairman of the board, and President E. W. Rice, Jr., are both members of the Quarter Century Club.

Railway Mail Pay Facts.—Business men in every state are asked in a bulletin, "Railway Mail Pay and Public Opinion," to study the question and take it up with senators and congressmen. The document is published by the Railway Business Association, the national organization of manufacturing, mercantile and engineering concerns dealing with the railroads. The "space method" advocated by the Post-office Department is vigorously opposed. In ten years, according to this bulletin, the post-office receipts increased 100.5 per cent and total railway mail pay only 27.7 per cent. George A. Post, president of the association, says: "It is our earnest hope that the government which requires that rates of transportation to private shippers shall be reasonable and that practices of commercial corporations shall be fair, shall free its own procedure from all suspicion of unreasonableness and unfairness." The association urges that mail pay shall not again be made a rider on an appropriation bill or dealt with at the crowded end of a session.

PROGRAMS OF ASSOCIATION MEETINGS

Mississippi Electric Association

At a meeting of the executive committee of the Mississippi Electric Association, held in Jackson on Aug. 25, the tentative dates set for the Hattiesburg convention were Nov. 11 and 12. It was definitely decided that there would be no papers at the convention. The meeting will be given over to discussions of subjects to be of interest to all, as it is thought that by the elimination of long papers the convention could be made of much more general interest.

American Institute of Electrical Engineers

The Panama-Pacific Convention of the American Institute of Electrical Engineers will be held in San Francisco, Cal., on Sept. 16, 17 and 18. The hotel headquarters of the Institute will be at the St. Francis. The convention sessions will be held in the Native Sons of the Golden West Building. The papers of perhaps the most direct interest to the electric railway industry will be presented at the session devoted to the valuation of public utilities. There will be a symposium on inventories and appraisals of properties, Part I by C. L. Cary, Part II by W. G. Vincent and Part III by W. J. Norton. These papers will be supplemented at the session by contributions from other members of the committee on inventories and appraisals of properties.

Financial and Corporate

MILD OPTIMISM PERMISSIBLE

Electric Railways Have Felt Nation's Depression, but Present Improvement and Wider Appreciation of Utility Problems Cause Brighter Outlook

The record of 950.2 miles of track built or put in operation during 1912, 1018.9 miles in 1913 and 946.38 miles in 1914, and of 6001 cars purchased in 1912, 5514 cars in 1913 and 3010 cars in 1914 tends on close analysis of the details involved to confirm the general impression that the electric railway industry is not keeping so much abreast of the growth of the country as it did in preceding years. Without a doubt electric railways have felt the depressing influence of the nation-wide curtailment of business that has been evidenced with increasing force since the middle of 1913. Yet indications are not lacking that this condition will be mitigated in the future.

We cannot here make a composite analysis of all the factors involved in the present electric railway business situation, but a few points are worthy of note. Electric railway earnings for 1913 and 1914 as compared with steam railroad earnings, building permits, bank clearings, steel and iron production, agricultural products and the cotton crop, show the highest relative stability, and it is to be expected that under normal circumstances they would respond most quickly to the business rejuvenation that is now presaged by the increasingly favorable foreign trade balance, the lack of a marked tendency toward prohibitive prices for capital and the exceedingly propitious crop reports. The full response of electric railway earnings to these influences, however, is likely to be retarded by the factors peculiar to this industry, such as the special problems of rates, wages, regulation and now jitney competition.

While such special factors as these have a certain effect upon the relative stability of electric railway earnings, they influence more the relative profitableness of the industry and are the more dangerous thereby. In spite of the stability of earnings, the problem of furnishing continually more and better service under constantly increasing costs at a depreciated rate of fare has in recent years become one of serious moment, but we believe that daily there is now growing a wider appreciation of the economic service performed by electric railways, their right to protection against unfair and unregulated competition of jitneys and their needs for successful operation. Various decisions, such as those in the Schenectady Railway, Manchester Street Railway, Middlesex & Boston Railway, Blue Hill Street Railway, and Eastern and Western rate cases, indicate that at last the courts, the commissioners and even the public seem to be taking a more rational view of the urgency of relief to common carriers.

In the present, therefore, we find a promise of improvement in regard to the special problems of electric railways. When this is considered in connection with the present propitiousness of general conditions there is warranted a letting up of pessimism and even a mild optimism in the electric railway field. The prospect should encourage purchasers, for in the shadow of the receding depression prices should be low, construction work cheap and long-time loans fairly moderate-priced.

DEPRECIATION ACCOUNTING POSTPONED

The California Railroad Commission in a supplemental opinion has ordered the United Railroads of San Francisco to begin the accumulation of its depreciation account as of July 1, 1915, and to continue it until $1,650,000 is accumulated by June 30, 1918, this amount being the same as originally directed. This order virtually postpones the time for beginning the account by a year. The original order provided that the depreciation account should be established so as to show an appropriation from earnings of $550,000 not later than June 30, 1915. This amount was to accrue in equal monthly installments of $45,833. The company applied for a rehearing and directed the attention of the commission to various matters concerning its accounts. The commission now finds no merit in the contentions.

ANNUAL REPORTS

Brazilian Traction, Light & Power Company, Ltd.

The statement of income, profit and loss of the Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont., for the year ended Dec. 31, 1914, follows:

Revenue from securities owned and under contracts with subsidiary companies	$7,523,696
Interest on advances to subsidiary companies	535,117
	$8,058,813
General and legal expenses, administration charges and interest on loans	392,281
Surplus available for dividends	$7,666,532
Dividends on 6 per cent preference shares at 1½ per cent each	$600,000
Dividends on common shares at 1¼ per cent each	6,257,119
	$6,857,119
Surplus carried to profit and loss	$809,413

The year's operations of this company, which includes among its controlled properties the Rio de Janeiro Tramway, Light & Power Company, Ltd., Rio de Janeiro, Brazil, and the Sao Paulo Tramway, Light & Power Company, Ltd., Sao Paulo, Brazil, were not so satisfactory as anticipated. As a result of the monetary stringency and other adverse conditions in Brazil, the factories began to run on short time or suspended business completely, and with the large number of employees thrown out of work, the earnings of the tramway systems were seriously affected. Notwithstanding such bad business conditions, however, the gross income of the combined companies in Brazilian currency showed an increase over the previous year, but the revenue in gold was unfavorably affected by the drop in exchange.

After payment of the regular dividend of 6 per cent per annum on the ordinary shares, a credit balance of $3,822,410 was carried forward to the profit and loss account. In view of the serious financial conditions developing in Brazil, and later the much more serious financial situation throughout the world, all possible expenditures on capital account in connection with the development of the property were suspended, but there was a large amount of work under way which it was necessary for the different subsidiary companies to complete. A considerable amount of construction work had also to be carried out in order to comply with the obligations of the different concessions. The different companies performed all such necessary work, both for capital account and as regards maintenance and renewals.

One interesting practice during the year arose in connection with the effect of the European war in stopping the usual method of remittances by means of bills of exchange. For several months it was practically impossible to remit money from Brazil for the purpose of the payment of coupons and dividends, and as this situation did not improve, the board decided in October to remit its funds—which by that time had accumulated to a very large amount—in coffee. As the Rio de Janeiro company has under charter a fleet of steamers for transporting coal and other required materials, the board employed such steamers on their return journeys for freighting the coffee to the New York and European markets. Up to the end of the year there had been purchased and shipped from Rio de Janeiro and Santos 278,400 bags of coffee, all of which have since been disposed of in New York at prices materially in excess of the average exchange prices obtainable during the same period. The company now carries in its balance sheet coffee in store and in transit valued at $2,810,215.

During the year a few of the outstanding shares of the Rio de Janeiro Tramway, Light & Power Company, Ltd., and the Sao Paulo Tramway, Light & Power Company, Ltd., were acquired, and a large controlling interest was secured in the Companthia Rede Telephonica Bragantina, a telephone company carrying on business throughout the State of Sao Paulo. This is said to be a very desirable acquisition, in view of the telephone business carried on by the Rio de Janeiro company.

According to a report for 1914 prepared by F. S. Pearson, the late president of the company, the only department of the Rio de Janeiro division which failed to show an increase of earnings in Brazilian currency was the tramways. There was little extension of the tramway lines, but during the year thirty-two cars were completed and put into operation. The total passengers carried in 1914 were 192,103,645 as compared to 195,783,634 in 1913, while the car-miles totaled 24,815,078 in 1914 and 24,814,760 in 1913. In Sao Paulo a small trackage of 1.72 miles and four freight cars were added. The passenger total in 1914 was 53,732,292 as compared to 56,776,702 in 1913, with a car-mile record of 9,496,091 in 1914 and 9,344,880 in 1913.

General Gas & Electric Company

On account of the acquisition of the properties of the Atlantic Gas & Electric Company on April 29, 1915, the General Gas & Electric Company, New York, N. Y., has issued a comparative interim report showing the combined earnings of all controlled companies for the twelve months ended May 31, 1914, as follows:

	1915	1914	Percentage Increase
Operating revenues	$2,260,171	$2,132,422	6.0
Operating expenses and taxes	1,462,246	1,361,120	7.4
Operating income	$797,925	$771,302	3.5
Other income	18,338	16,977	8.0
Gross income	$816,263	$788,279	3.5

This increase in income was produced in spite of extraordinary expenses necessarily attending a change of management, widespread business depression and, during last winter, exceptionally unsatisfactory conditions for the water-powers of the company, caused by an unprecedented drought now thoroughly broken.

The General Gas & Electric Company controls the Rutland Railway, Light & Power Company, Rutland, Vt., and the Northwestern Ohio Railway & Power Company, Toledo, Ohio, while the Atlantic Gas & Electric Company properties include no street railways. The proportion of street railway earnings to the total earnings has been reduced by the extension of control from 34½ per cent to less than 16 per cent.

During 1914 the cars of the Rutland Railway, Light & Power Company ran 610,388 car-miles and carried 2,877,235 passengers, these figures comparing with 551,855 car-miles and 2,976,692 passengers in 1913. The Northwestern Ohio Railway & Power Company carried 834,107 passengers in 1914 and 849,989 in 1913, while the car-miles operated in 1914 were 742,609 as compared to 735,771 in 1913.

Commonwealth Power, Railway & Light Company

The condensed comparative statement of income, profit and loss of the Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., for the twelve months ended June 30, 1914 and 1915, follows:

	1915	1914
Earnings on stocks owned in subsidiary companies	$2,382,175	$2,463,861
Interest and other earnings	500,516	517,823
Gross earnings	$2,882,692	$2,981,684
Expenses and taxes	$104,317	$114,508
Interest charges	602,699	659,842
Total deductions	$707,016	$774,350
Net income available for dividends, replacements and depreciation	$2,175,676	$2,207,334
Dividends on preferred stock*	960,000	960,000
Balance	$1,215,676	$1,247,334

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*Includes dividend requirement since May 1, 1913, on the $10,000,000 of additional preferred stock issued as of that date.

During the last fiscal year the earnings on stocks decreased $81,686 and the interest and other earnings $17,306, giving a decrease of $98,992 in gross earnings. Expenses and taxes, however, decreased $10,192 and interest charges $57,143, so that the net income available for dividends, replacements and depreciation decreased only $31,657. Of the amounts standing to the credit of surplus accounts of subsidiary companies there are accruing to the holding company as of June 30, 1915, undistributed earnings of $2,695,672.

Bay State Street Railway, Boston, Mass.—The Massachusetts Public Service Commission has granted its permission for the Bay State Street Railway to issue $1,281,900 of 6 per cent cumulative first preferred stock at $112 to provide for the company's floating debt.

Binghamton (N. Y.) Railway.—The Public Service Commission for the Second District of New York has authorized the Binghamton Railway to issue $90,000 of equipment trust certificates, maturing serially in semi-annual periods and bearing 6 per cent interest. The proceeds will be used to purchase twenty new double-truck steel cars to cost $118,503, the company paying $28,503 in cash.

Birmingham, Ensley & Bessemer Railroad, Birmingham, Ala.—On Aug. 24 Judge W. I. Grubb at Birmingham ordered a foreclosure sale of the Birmingham, Ensley & Bessemer Railroad. The amount due for principal and interest on the company's bonds is said to be $2,831,230. Previous reference to the receivership of this company was made in the ELECTRIC RAILWAY JOURNAL of Sept. 19, 1914.

Boise Valley Traction Company, Boise, Idaho.—The Boise Valley Traction Company, recently incorporated in Maine with a capital stock of $1,000,000, is said to be the holding company of the Idaho Traction Company properties in Boise, Caldwell, Nampa and other cities in western Idaho. It is expected that as soon as possible all of the properties of this company will be transferred to the Boise Valley Traction Company.

Burlington County Transit Company, Hainesport, N. J.—The total passenger receipts of the Burlington County Transit Company for the year ended June 30, 1915, were $67,939 as compared to $64,905 in the preceding year, an increase of $3,034. Other income decreased from $5,839 in 1914 to $5,161 in 1915; while the expenses for operation, repairs and renewals were $66,940 in 1915 and $72,735 in 1915, a decrease of $5,794. The balance on hand June 30, 1915, was $7,284, of which $5,000 was for the depreciation and surplus account and $1,000 for tax reserve.

Cleveland (Ohio) Railway.—The operating report of the Cleveland Railway for July shows a deficit of $17,531, the first deficit since the penny charge for transfers has been in effect. This reduces the interest fund to $487,811. June, the first month that the company's increased operating allowance of 6 cents per car mile was in operation, showed a surplus of only $2,939.

Halifax (N. S.) Electric Tramway, Ltd.—The total earnings of the Halifax Electric Tramway, Ltd., for the calendar year 1914 were $645,241 as compared to $605,933 in 1913. Of these totals street railway receipts made up $319,880 in 1914 and $301,771 in 1913. The operating expenses and taxes were $375,123 in 1914 and $337,010 in 1913, with bond interest $30,000 each year, leaving net earnings applicable to dividends of $239,818 in 1914 and $238,924 in 1913. The number of passengers carried increased from 6,876,003 in 1913 to 7,316,727 in 1914, and the car-miles from 1,275,527 in 1913 to 1,370,430 in 1914. The expenditures for capital purposes during 1914 amounted to $41,864. Dividend payments totaled $112,000.

Interborough Rapid Transit Company, New York, N. Y.—The board of directors of the Interborough Rapid Transit Company has declared a quarterly dividend of 5 per cent, payable on Oct. 1, to stock of record on Sept. 22, making a total of 20 per cent for the fiscal year. This is equivalent to last year's payments, but in that year there were regular dividends of 10 per cent and two extra dividends of 5 per cent each. It is understood that the dividend hereafter will be on a regular 5 per cent quarterly basis. At the meeting of the board of the new Interborough Consolidated Corporation, the holding company for the subway corporation, a quarterly dividend of 1½ per cent on the preferred was declared, payable on Oct. 1 to stock of record on Sept. 10. This is the second quarterly dividend paid by the new company. The preferred stock of the old Interborough-Metropolitan Company still outstanding can share in the dividend.

Kansas City Railway & Light Company, Kansas City, Mo.—The managers of the Kansas City Railway & Light Company reorganization, noted in the ELECTRIC RAILWAY JOURNAL of Aug. 21, have issued a statement regarding the new street railway franchise and the valuation and the earnings of the street railway and lighting properties in Kansas City. This statement gives a report on the earnings of the Metropolitan Street Railway, the Kansas City Elevated Railway and the Kansas City & Westport Belt Railway, made by P. J. Kealy. The earnings of these railways for the fiscal year ended May 31, 1915, were $6,805,163 as compared to $6,974,815 for the preceding year. This decrease, less than 2.5 per cent, is said to be caused by the general industrial depression existing throughout the country, which affected all public utilities, and by the jitney competition. Such competition in Kansas City is rapidly disappearing and should affect the earnings slightly, if at all, during the remainder of the current year. Mr. Kealy says that the net earnings, after payment of operating expenses (including taxes, maintenance and renewals), will continue to be sufficient to pay 6 per cent on the capital value of the property, both in Missouri and Kansas, and leave a substantial surplus for the city under the new franchise.

Kentucky Traction & Terminal Company, Lexington, Ky.—The gross earnings of the Kentucky Traction & Terminal Company for the year ended June 30, 1915, were $811,628 as compared to $782,271 for the preceding year. Other figures of earnings follow: Net earnings—1915, $379,225; 1914, $369,762; other income—1915, $28,288; 1914, $32,022; bond interest—1915, $203,805; 1914, 201,934; sinking fund and taxes—1915, $33,424; 1914, $43,249; surplus—1915, $170,284; 1914, $156,600.

Macon Railway & Light Company, Macon, Ga.—The Georgia Railroad Commission on Aug. 24 denied the petition of the Macon Railway & Light Company to increase its rates for electric light and power service in Macon. The commission calculated a return of 6.32 per cent on the estimated value of the property and working capital after the deduction of depreciation.

New York (N. Y.) Railways.—The directors of the New York Railways have taken action on the semi-annual interest on the 5 per cent adjustment income bonds for the six months ended June 30. It has not been announced what the statement of income submitted to the board showed available for the income bonds, because the matter has been referred to an arbitration committee for final adjustment. The men appointed as arbitrators are H. H. Porter, of Sanderson & Porter; James Marwick, of Marwick, Mitchell, Peat & Company, and W. G. Ross, of Montreal. This is the third time that this matter has gone to a board of arbitration. In the corresponding six months last year, 1.288 per cent was paid. It is reported that the amount for the first six months of 1915 may be in the neighborhood of 1.75 per cent.

Otsego & Herkimer Railroad, Cooperstown, N. Y.—Judge G. W. Ray on Aug. 21 in the United States District Court at Norwich appointed C. H. Lewis, Syracuse, and James J. Bayard, Cooperstown, as receivers of the Otsego & Herkimer Railroad. The appointment was made on the application of Babcock & Wilcox, Philadelphia, Pa., creditors. This company operates 65.66 miles of single track connecting Oneonta, Cooperstown, Richfield Springs, Mohawk and Herkimer.

Philadelphia & Western Railway, Upper Darby, Pa.—It is reported that almost the entire holdings of the Sheldon-Kobusch interests in the Philadelphia & Western Railway have been taken over by a syndicate which believes the company has a promising future. These holdings included orignally all the $2,000,000 of preferred stock and $1,600,000 of the $4,000,000 of common stock, being a majority of the total $6,000,000 of stock issued. For some time there has been increased activity at advancing prices in the stock of this company. It is said that Edward B. Smith & Company and Brown Brothers & Company are interested.

Public Service Corporation of New Jersey, Newark, N. J.—The gross increase in total business of the Public Service Corporation of New Jersey for July was $119,972, or an increase of 4 per cent. The balance available—after payment of operating expenses, fixed charges, sinking fund requirements, etc.—for amortization, dividends and surplus was $267,201. The increase in surplus available for dividends over the corresponding period in 1914 was $37,150. For the seven months ended July 31 the gross increase in total business was $751,808, an increase of 3.7 per cent. The balance available for amortization, dividends and surplus was $1,864,643. The increase in surplus available for dividends was $186,746.

Winnipeg (Man.) Electric Railway.—The London Stock Exchange has listed an additional £400,000 of 4½ per cent perpetual consolidated debenture stock of the Winnipeg Electric Railway, making a total listed of £900,000.

DIVIDENDS DECLARED

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1½ per cent.

Connecticut Valley Street Railway, Greenfield, Mass., 3 per cent, preferred.

Frankford & Southwark Pasenger Railway, Philadelphia, Pa., quarterly, $4.50.

Second & Third Streets Passenger Railway, Philadelphia, Pa., quarterly, $3.

Washington Railway & Electric Company, Washington, D. C., quarterly, 1¼ per cent, preferred; quarterly, 1¾ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June,	'15	$15,409	*$8,766	$6,443	$2,169	$4,274
1 " "	'14	15,603	9,590	6,013	2,069	3,944
12 " "	'15	180,955	*110,823	70,132	25,226	44,906
12 " "	'14	175,937	*114,882	61,055	25,286	35,769

DALLAS (TEX.) ELECTRIC COMPANY

1m., June,	'15	$133,277	*$87,213	$45,364	$30,541	$14,823
1 " "	'14	177,620	*105,888	71,732	32,313	39,419
12 " "	'15	1,968,304	*1,145,474	822,830	366,608	456,222
12 " "	'14	2,279,271	*1,342,137	937,134	290,455	646,679

EASTERN TEXAS TRACTION COMPANY, DALLAS, TEX.

1m., June,	'15	$58,585	*$31,325	$27,260	$8,714	$18,546
1 " "	'14	58,251	*34,201	24,050	8,352	15,698
12 " "	'15	672,518	*385,290	287,228	104,567	182,661
12 " "	'14	602,879	*381,490	221,489	78,160	143,329

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m., June,	'15	$165,029	*$106,185	$58,844	$28,639	$30,205
1 " "	'14	221,694	*110,281	111,413	28,146	83,267
12 " "	'15	2,185,512	*1,241,232	944,280	346,519	597,761
12 " "	'14	2,457,051	*1,374,886	1,082,165	362,068	720,097

HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.

1m., June,	'15	$444,458	*$193,753	$250,705	$213,061	$37,644
1 " "	'14	456,181	*215,873	240,308	210,519	29,789
6 " "	'15	2,768,623	*1,165,495	1,603,128	1,269,690	333,438
6 " "	”14	2,841,111	*1,198,482	1,642,829	1,250,688	391,941

JACKSONVILLE (FLA.) TRACTION COMPANY

1m., June,	'15	$50,517	*$35,921	$14,596	$14,593	$3
1 " "	'14	59,531	*40,570	18,961	12,492	6,469
12 " "	'15	645,283	*444,568	197,715	166,043	31,672
12 " "	'14	730,804	*423,422	267,382	154,503	112,879

KEOKUK (IOWA) ELECTRIC COMPANY

1m., June,	'15	$18,957	*$12,854	$6,103	$1,824	$4,279
1 " "	'14	21,381	*13,549	7,832	2,185	5,647
12 " "	'15	241,219	*161,576	79,643	22,448	57,195
12 " "	'15	248,846	*154,123	94,723	31,391	63,332

KEY WEST (FLA.) ELECTRIC COMPANY

1m., June,	'15	$9,259	*$6,690	$2,569	$2,564	$5
1 " "	'14	10,837	*6,918	3,919	2,556	1,363
12 " "	'15	122,637	*87,223	35,414	30,711	4,703
12 " "	'14	139,808	*83,587	56,221	30,709	25,512

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., July,	'15	$371,736	$219,703	$152,032	$51,804	$100,228
1 " "	'14	351,658	206,169	145,489	50,848	94,640
7 " "	'15	2,128,387	1,321,350	807,037	360,269	446,768
7 " "	'14	2,073,359	1,265,804	807,554	352,683	454,871

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m., June,	'15	$134,484	*$89,537	$44,947	$24,868	$20,079
1 " "	'14	181,432	*97,551	83,881	23,179	60,702
12 " "	'15	1,819,725	*1,057,071	762,254	291,378	470,876
12 " "	'14	2,161,691	*1,211,551	950,140	276,002	674,138

REPUBLIC RAILWAY & LIGHTING COMPANY, NEW YORK, N. Y.

1m., June,	'15	$246,691	*$155,948	$90,743	$57,550	‡$33,634
1 " "	'14	247,828	*152,256	95,572	56,838	‡39,091
6 " "	'15	1,456,919	*916,303	540,616	341,836	‡199,545
6 " "	'14	1,495,732	*929,107	566,625	336,025	‡231,307

SAVANNAH (GA.) ELECTRIC COMPANY.

1m., June,	'15	$63,750	*$41,848	$21,902	$21,305	$597
1 " "	'14	73,014	*49,122	23,892	20,980	2,912
12 " "	'15	813,075	*526,557	286,518	257,344	29,174
12 " "	'14	848,180	*564,169	284,011	253,782	30,229

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*Includes taxes. ‡Includes non-operating income.

Traffic and Transportation

JITNEY JOTTINGS

Public Service Commission of the District of Columbia Decides Buses Are Common Carriers

In the matter of the jurisdiction of the Public Utilities Commission of the District of Columbia over motor-bus lines and similar common carriers the commission on Aug. 28 issued the following order:

"Under authority of the law and regulations relating to street traffic in the District of Columbia and of licenses duly issued by the commissioners of the District of Columbia, certain persons, firms and corporations have undertaken the operation of motor buses and other motor vehicles along certain defined routes in the District of Columbia for the transportation of persons for hire.

"It now appears to the commission that the motor bus and motor vehicle service has become established as an important means of transportation to the public. The Public Utilities Law defines the term common carrier as follows:

"'The term "common carrier" when used in this section includes express companies and every corporation, street railroad corporation, company, association, joint-stock company or association, partnership, and person, their lessees, trustees, or receivers, appointed by any court whatsoever, owning, operating, controlling, or managing any agency or agencies for public use for the conveyance of persons or property within the District of Columbia for hire.'

"The commission is of the opinion that this provision of law includes any person, firm or corporation operating any public motor-bus or motor vehicle for hire or for the transportation of passengers in the District of Columbia with sufficient regularity to enable the public to take passage therein at any point intermediate to the stable or stand of such vehicle or operating such vehicle over a route sufficiently definite to enable the public to ascertain the streets and avenues on which such vehicles can be found en route.

"In pursuance of this opinion and of all the facts developed the commission decides that the following named persons, firms or corporations, operating motor buses or motor vehicles over defined routes in the District of Columbia are engaged in the business of common carriers within the meaning of the Public Utilities Law and are therefore within the jurisdiction of the Public Utilities Commission: Arlington Barcroft Auto Company, Baltimore & Washington Boulevard Motor Company, Inc., Employees of Southern Railway at Potomac Yards, Va., Mrs. C. M. Singleton Jack, Jitney Bus Company, Inc., Thomas M. Nolan, Mrs. Agnes W. Maher, James M. Swain, Stein, Harris & Dulcan, Virginia Auto Service Company, Inc., and Selina M. Wright.

"It is therefore ordered:

"(1) That the above named individuals and corporations and such other individuals and corporations as now or may hereafter engage in the business of common carriers described above shall comply with all the requirements of the Public Utilities Law applicable to them.

"(2) On or before Sept. 10, 1915, the said persons shall submit the following reports: (a) A statement of the number of vehicles operated and the make, type and seating capacity of each vehicle so used. (b) A statement of the route or routes covered in each case. (c) A copy of the schedule on which the buses are operated.

"(3) That the said individuals and corporations shall submit such other reports, special or periodic, as may now or hereafter be required by law or by the orders of the Public Utilities Commission."

The first step in the new legal fight against the jitney ordinance in Philadelphia, Pa., was taken when counsel representing the South Philadelphia, the Philadelphia Jitney Associations and the Union Motor Bus Company filed a bill in Common Pleas Court No. 4 asking an injunction to restrain Director of Public Safety Porter and the Police Department from enforcing the jitney ordinance. If the jitney men succeed in getting a new injunction they will be able, they say, to furnish the $2500 bond to keep it in force. This they failed to do when Judge Sulzberger suspended enforcement of the ordinance until Sept. 20, resulting in the preliminary injunction being vacated by the court. City Solicitor Ryan has sent two opinions to Director of Public Safety Porter clearing up the legal status of two new matters the jitney situation has brought to light. These opinions, prepared at the request of the Department of Public Safety, established the following:

That motor companies which claim exemption from the requirements and restrictions of the July ordinance regulating the operation of jitneys, on the ground that they are running omnibuses and not jitneys, are subject to all the terms of the omnibus ordinance of 1907, and can be prosecuted for any violation thereof; that the operations of the Cottar Motor Bus Company, which runs four large cars in Germantown and other points, largely over routes not traversed by trolley or other transportation lines, are not in violation of any existing ordinances, and hence are not being favored, as some of the jitney men have charged.

The City Council of Camden, N. J., has received a communication from the granges at Moorestown, Medford and Marlton, N. J., protesting against conditions at the Pennsylvania Railroad ferries at Camden, due to the large number of jitneys that occupy the highways there. They say this congestion interferes with the teams on their way to Philadelphia markets. The communication has been referred to the Street Committee.

E. F. Seixas, general manager of the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., Can., with lines from the north to the sound end of Niagara Falls, Ont., has filed a protest with the city authorities against the jitney service inaugurated over the same route by private individuals. The City Council is now preparing a jitney ordinance to deal with this new form of transportation.

An ordinance regulating the use of jitneys in Emporia, Kan., has been passed by the City Commissioners. The ordinance gives the city power to revoke drivers' permits if any provision is violated. The ordinance prohibits the drivers from smoking when carrying women passengers, from excessive overloading of cars, and permits may be revoked for drunkenness or for any misconduct that in the judgment of the commissioners renders the drivers unfit to operate a car.

An interesting turn has been given to the jitney in Elwood, Ind., where some drivers of jitney buses petitioned the City Council to fix an annual license fee for all drivers of jitneys, taxicabs or other vehicles for hire, and for placing each driver under a $2,500 bond. This ordinance has been passed, with the support of the jitney operators, who, it is said, favored it because it will tend to lessen competition from farmers who come into town on Saturdays and hang jitney signs on their cars. Elwood is in Madison County, Indiana, on one of the electric railway lines.

Provisions of the city ordinances in pamphlet form as to operation of jitney buses are being distributed to jitney operators by the traffic police of Nashville, Tenn. A delegation of jitney owners which complained to Mayor Ewing was informed that the city could do nothing but enforce the law as it stood and that the owners should petition the city commission for such relief as they desired.

Jitney buses are on the decline in Louisville. One concern, which fitted up elaborate cars, appears to have quit operation as several of the cars have been hauling lumber. Louisville's Board of Public Safety has undertaken to determine whether such of the jitney buses as are in operation there are carrying more passengers than capacity. One provision of the ordinance which governs the operation of these carriers limits the number of passengers which may be carried to the seating accommodations. It is stated that the practice of overloading is common with the few machines still in the service.

E. W. Allen, Assistant Attorney General of the State of Washington, has ruled that a company which has written a bond for a jitney bus may be released from liability on the same terms and conditions as prescribed by law for the release of individual sureties upon any bond or undertaking. Should such bond be cancelled the permit of the jitney bus operator would be automatically revoked until a second bond has been filed.

INQUIRING INTO NIAGARA FALLS ACCIDENT

Nothing which would tend to show criminal negligence on the part of E. J. Dickson, vice-president of the International Railway Company, Buffalo, N. Y., was brought out on Sept. 1 at the first day's hearing before Magistrate Campbell in the Police Court at St. Catharines, Ont. Mr. Dickson is under bonds of $10,000 charged with criminal negligence as the result of the fatal accident at Queenstown, Ont., on July 7. Mr. Dickson was represented by M. J. McCarram, St. Catharines, Ont., and Frederick A. Chormann, Niagara Falls, N. Y., of counsel for the railway. The prosecution was presented by Crown Attorney Michael Drennan of the Province of Ontario, Canada.

On the first day of the hearing about a score of witnesses were called, among them being members of the car crew and other motormen and conductors, who testified that the brakes on the car were in good working order on the day of the disaster and that the accident was due to slippery rails caused by the heavy rain and the overcrowded condition of the car. E. H. Henning, superintendent of interurban lines of the company, identified certain drawings of the scene of the wreck and the fatal curve. He said the car had been in constant use on the day of the accident and never before gave any trouble on the steep incline leading from Queenstown Heights to the lower level of the Niagara Gorge. He was asked if there was any device which might have been placed on the track at the dangerous curve which would have tended to lessen the danger from disaster in case a car left the tracks. He replied in the negative and explained that probably nothing could be done to check the speed of the car or prevent it from leaving the tracks if the motorman in charge had lost control. Replying to the question if there was a safety switch at the point in question, Mr. Henning said that because of the great speed of the car the chances are that the accident would still have happened even if a derail had been installed. Other witnesses who were called testified that the roadbed was in perfect condition at the point of the accident and that there were no apparent defects in the rails.

It was expected the hearing would continue for several days. The court has no jurisdiction to punish the defendant, but merely to decide whether or not there is sufficient evidence to show criminal negligence to hold Mr. Dickson for the grand jury.

On Sept. 3 Mr. Dickson was absolved from blame for the Queenstown accident by Magistrate Campbell.

Fare Increase Petition Withdrawn.—The Berkshire Street Railway, Pittsfield, Mass., has withdrawn its petition to the Public Service Commission of Massachusetts for permission to increase the fares on its system. According to C. Q. Richmond, general manager, the company is studying various electric railway fare systems and will ultimately file another petition.

Railway in Safety-First Exhibit at State Fair.—The Columbus Railway, Power & Light Company, Columbus, Ohio, is well represented in the safety-first exhibit at the Ohio State Fair. Among other things the company has on display a series of photographs, showing how easily injuries may be received in boarding and alighting from cars, in crossing the tracks both before and behind cars and in many other ways.

Night Freight Service in Cleveland.—The Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, is planning to begin hauling freight next spring in a limited way, under an ordinance passed on Dec. 9, 1912, in Cleveland, which allows freight cars to pass over the streets between the hours of 10 p. m. and 3 a. m. The service has not been established heretofore because of the financial depression which followed shortly after the ordinance was enacted.

Accident Responsibility in Fort Wayne.—According to a report of the safety-first committee of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., 50 per cent of all accidents are due to the negligence of the persons injured. During the last five months eighty-two persons have been injured in automobile accidents on the lines of the company. In forty-two of these cases the automobiles ran into the street cars and in forty cases the street cars ran into the automobiles.

New Seattle Publication Christened.—The Puget Sound Traction, Light & Power Company, Seattle, Wash., has announced that *Electrogram* has been selected from thousands of names submitted in a contest recently closed, to supplant the original title, *What's Its Name*, adopted temporarily for the new weekly publication of the company. As stated in the ELECTRIC RAILWAY JOURNAL of Aug. 28, page 371, the paper will be devoted largely to street railway news and general items of interest to the travelling public.

One-Man Cars in New Albany.—Inroads made on the company's earnings by the jitney buses in New Albany, Ind., are assigned by the Louisville & Northern Railway & Lighting Company as the reason for taking off the conductors on the cars of the Main Street line. Fare boxes have been restored to the forward ends of the cars as they were before the Insull interests took over the local property. The company hopes to be able to continue the conductors on the other lines of the city. At least thirty jitneys are operating in New Albany, a town of about 25,000.

The Augusta-Aiken Fare Increased.—According to the decree of the Railroad Commission of South Carolina, the order authorizing an increased passenger rate on the line of the Augusta-Aiken Railway & Electric Corporation between Augusta and Aiken was to become effective on Sept. 1. The order, increasing the fare between Augusta and Aiken from 25 cents to 40 cents was granted in December, 1914, by the Railroad Commission, and it was to go into effect on Jan. 1, 1915. However, a postponement was granted until June 1 and at that time the Railroad Commission ordered that the new rates be further postponed for three months—making Sept. 1 the date on which the order was to become effective.

Safety First at Kentucky State Fair.—The safety-first propaganda will be carried directly to the Kentucky people who attend the Kentucky State Fair during the middle of September by the Louisville Railway. The company will erect a signboard adjoining the pay-as-you-enter inclosure. The signboard, 6 ft. x 10 ft. in dimensions, will be illuminated with reflectored lights which will make it and its contents useful night and day, an important feature inasmuch as there are night sessions at the fair grounds. At the top of the board will be painted the two words, "Safety First," and underneath will be tacked the various poster cards which the company has been making use of for a year or more in its cars and elsewhere.

Suppressing the Rowdy in New York.—Chief Inspector Max Schmittberger has reported to Police Commissioner Woods of New York City regarding the arrests this summer of rowdies on the street, elevated and subway trains. The report shows an increase in the number of arrests over last summer, but it is pointed out that this is really due to the increase in the number of policemen engaged in suppressing rowdies. During the summer, up to Aug. 30, 1071 arrests were made for disorder in public conveyances, against 622 in 1914. In every inspection district there are now at least four men assigned to plain clothes duty on days when travel is heavy, to arrest disorderly persons. Inspector Schmittberger says that in connection with the efforts to suppress the rowdy, the magistrates are giving every support and rarely are prisoners discharged without a fine.

Retaliation Threatened in Boise.—The separation of the lines of the Boise Railroad and the Idaho Traction Company and the refusal of the Boise Railroad to honor transfers of the other company have resulted in complications which may be followed by resort to the courts. According to an opinion handed down by the assistant attorney general of the State there is no authority in the act creating the Public Utilities Commission for that body to compel the companies which have been segregated to honor transfers issued by each other. Despite this the chairman of the commission announced that he would entertain a complaint on behalf of the city. As a consequence the city officials have entered a complaint with the commission. Mayor Robinson is even reported to have said that if the city fails by this measure to secure the transfer privileges which it is set on exacting from the companies the city will as a last resort modify the stringent jitney ordinance passed some time ago and throw the city open to the jitney operators on a basis so liberal as to insure competition by jitneys with both companies.

Personal Mention

Mr. O. A. Waller has been appointed to succeed Mr. James L. Adams as superintendent of the North and East divisions of the Denver (Col.) Tramway.

Mr. U. E. Coons has succeeded Mr. A. E. Anderson as chief engineer of the power station of the Oskaloosa Traction & Light Company, Oskaloosa, Ia.

Mr. K. R. Hobbe has been elected secretary of the Centralia & Central City Traction Company, Centralia, Ill., to succeed Mr. John Langenfeld, who continues with the company as treasurer.

Mr. John C. Mac Bean, Philadelphia, Pa., has been elected president of the St. Petersburg & Gulf Railway, St. Petersburg, Pa., to succeed Mr. William C. McClure, Peoria, Ill., who has been elected vice-president.

Mr. A. C. Flint has been appointed superintendent of transportation of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, to succeed the late J. C. Espy. Mr. Flint was formerly superintendent of the eastern division of the company, which office will probably be discontinued.

Mr. M. F. Flatley, formerly with the Empire United Railways, Inc., at Newark, N. Y., was recently appointed master mechanic of the Northwestern, Martinsville and Crawfordsville divisions of the Terre Haute, Indianapolis & Eastern Traction Company to succeed Mr. L. W. Hayes, now connected with the Mesaba Railway, Virginia, Minn.

Mr. John Fleming, storekeeper of the Capital Traction Company, Washington, D. C., since January, 1909, has been appointed purchasing agent of the company. Mr. Fleming was born in Reading, Pa., on Nov. 10, 1876. He attended the public schools in Philadelphia, Pa., and Washington, D. C., and entered the machine shop of the Capital Traction Company, then the Washington & Georgetown Railroad, in 1893. A year later he was transferred to the general offices as stenographer and clerk. In January, 1909, he was appointed storekeeper of the company.

Mr. Howard A. Loeb, chairman of the executive committee of the Pennsylvania Lighting Company, Shamokin, Pa., and of the Kentucky Traction & Terminal Company, Lexington, Ky., has been elected to the presidency of the Tradesmen's National Bank, Philadelphia, Pa., succeeding his father, the late August B. Loeb. The new president is only forty years old. After his graduation from the engineering department of the University of Pennsylvania, Mr. Loeb accepted a position with a contracting engineering firm. In 1907 he went to the Tradesmen's National Bank as vice-president.

Mr. James L. Adams, superintendent of the North and East divisions of the Denver (Col.) Tramway, has resigned to assume the vice-presidency and management of the Crown Hill Cemetery Association, which includes the Denver & Crown Hill Railway. Mr. Adams entered the employ of the Denver Tramway on June 15, 1890, as a clerk under Mr. John C. Curtis, then auditor. In 1893 he was appointed to a clerkship under the North division superintendent. From there he was transferred to the South division and thence to the West division. He then took charge of the clerical work at the East division carhouse. After spending some months at the East division, he was called to the auditing department, and became general timekeeper. Here he remained for three years, and until he was appointed superintendent of the West division. From December, 1900, to October, 1901, he continued in this capacity, when he was placed in charge of the East division. In November, 1902, Mr. Adams was transferred to the North division.

OBITUARY

Dr. Joseph J. Higgins, attending surgeon of Fordham Hospital and former surgeon of the Metropolitan Street Railway, New York, N. Y., is dead. Dr. Higgins was born in Terryville, Conn., in 1868.

Jacob G. Metcalfe, former president of the Mexican International Railway, a director of the London Underground Railway, London, England, and recently consulting railway expert for Speyer & Company, bankers, New York, died on Aug. 31 at Pocono Summit, Pa., in his sixty-seventh year.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Nashville & Eastern Electric Railway, Nashville, Tenn.—Incorporated in Tennessee to construct a line from Lebanon to Smithville, via Watertown, Alexandria and Liberty, about 35 miles. It is reported that the Nashville, Chattanooga & St. Louis Railway will build the line. Capital stock, $10,000. Incorporators: Charles Edwards, Dibrell Dinges, Guy Davis, G. C. Puckett and T. W. Wade. [Aug. 28, '15.]

FRANCHISES

Los Angeles, Cal.—A franchise for electric railway lines on San Pedro Street from Thirtieth Street to South Park Avenue, on South Park Avenue to Slauson Avenue and on South Park Avenue to Manchester Avenue will be offered for sale by the Council on Sept. 8.

Los Angeles, Cal.—The Pacific Electric Railway has asked the Council for a franchise to construct and operate a single-track line on certain portions of Figueroa Street, Denver Avenue, Hoover Street, Menlo Avenue and Vermont Avenue. The sale of this franchise has been advertised for Sept. 8.

Forest Park, Ill.—The village of Forest Park, Ill., acting under the commission form of government, has granted a franchise to the Chicago & West Towns Railway, subject to the approval of the voters at a special election to be held on Sept. 7. The franchise covers the streets which are in use by the company with the addition of Harlem Avenue between Madison and Sixteenth Streets. The franchise includes the usual paving requirements, and all new poles must be of iron and steel. No provision is made for a 5-cent fare beyond the limits of the company's own lines. A bond of $50,000 is required of the company for its faithful execution of the franchise.

Lincoln, Ill.—The Council has set Sept. 21 as the date for a special election to submit to the voters the franchise for the Lincoln Railway & Heating Company.

Peoria, Ill.—The Peoria Railway has received a franchise from the Council to lay a double track on Frye Avenue from Wisconsin Street to Pacific Street, Peoria.

Shreveport, La.—The Shreveport Railways has received a franchise from the Council to double-track its Highland Avenue-Fair Grounds line from Marshall to Creswell Streets on Stoner Avenue and from Stoner Avenue to the end of the present double track on Herndon Avenue, Shreveport.

New Bedford, Mass.—The Board of Aldermen of New Bedford has adopted an order to revoke the franchise of the Union Street Railway to construct a railway on Union Street from Second Street to Front Street, New Bedford, on account of the failure of the company to construct and operate such railway. A public hearing on the revocation of the franchise will be held on Sept. 22.

Westfield, Mass.—The Springfield Street Railway has asked the Council for a franchise to relocate its tracks on Mill Street, Westfield, from West Silver Street to Court Street.

Buffalo, N. Y.—The Public Service Commission of the Second District has approved the franchise of the International Railway granting permission to lay tracks on Michigan Avenue and Ohio Street, Buffalo.

Columbus, N. Y.—The Columbus & Mayville Railroad has received a franchise from the Council to construct a railway through Columbus Township. This is part of a plan to build a line from Jamestown to Clymer. C. P. Northup, Corry, Pa., president. [May 1, '15.]

Linnton, Ore.—O. M. Clark and associates have received a franchise from the Council to operate electric passenger trains between Portland and Linnton on the St. Helen's road. [June 19, '15.]

TRACK AND ROADWAY

***Jasper, Ala.**—Plans are being considered to construct an interurban railway from Jasper to Birmingham, via Ensley, about 35 miles. L. B. Musgrove, Jasper, is interested.

Argenta (Ark.) Railway.—A notice of the surrender of its charter has been filed by this company in the office of the Secretary of State. The company has been consolidated with the Inter-City Terminal Railway, the incorporation of which was noted in the ELECTRIC RAILWAY JOURNAL of July 10. C. C. Kavanaugh, president.

Pacific Electric Railway, Los Angeles, Cal.—Plans are being considered by this company to build a loop line in Upland. According to the plans, the line would start from the Mountain Avenue crossing of the San Bernardino-Los Angeles line extending north on Mountain Avenue to the San Antonio Park line.

Marin County Electric Railway, Mill Valley, Cal.—This company has filed with the California Railroad Commission an application for a supplementary order extending the time in which it may sell its stock until April 1, 1916. [July 17, '15.]

Connecticut Company, New Britain, Conn.—Work will be begun at once by this company on the construction of an extension through the northwest section of New Britain. All material for the construction has been ordered. The company will pave between the rails and 2 ft. outside with amiesite, except in Myrtle Street, which will be permanently paved next year.

Boise Valley Traction Company, Boise, Idaho.—The Boise Valley Traction Company, for which articles of incorporation were filed with the Secretary of State of Maine showing a capital stock of $1,000,000 is reported to have been organized to be the holding company of the Idaho Traction Company properties in Boise, Caldwell, Nampa and other cities in western Idaho. Franklin B. Ferguson, Brooklyn, N. Y., president. [Aug. 28, '15.]

Alton, Granite & St. Louis Traction Company, Alton, Ill.—New ties and rails will be laid by this company on the south end of its Second Street line and new rails on the north end of the line, following the repairing and repaving of the street.

Lee County Electric Railway, Amboy, Ill.—This company plans to change the location of its tracks in Amboy and abandon its line on Main Street in favor of a line from Binghamton to Blackstone Street parallel to the tracks of the Burlington Railway & Light Company. This new line will give the company direct connection with both the Illinois Central Electric Railway and the Burlington Railway & Light Company.

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company has been ordered by the Council of Belleville to raise its tracks on East B Street, North Charles Street and North Illinois Street and to replace its rails on West Main Street, Belleville.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company is repairing its track on Columbia Street, Fort Wayne, between Clinton and Calhoun Streets. Cars are being routed on other streets while this work is in progress.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—This company has asked the supervisors of Wayne County, Ind., to allow it the responsibility of building a temporary bridge at Main Street, Richmond, which will cost approximately $6,500, the company to pay one-third of this amount.

Tri-City Railway, Davenport, Iowa.—Residents of Colona Avenue, Moline, Ill., have asked for an extension for that thoroughfare. A committee has been appointed to take up the matter with the railway company.

Cumberland Traction Company, Edmonton, Ky.—Cars which will operate on the line of this company, on which construction has been begun in Metcalfe County, Ky., will be of the motor-driven type, each generating its own electricity by means of an oil engine and a dynamo to supply the motors. The track, for a portion of the distance in Metcalfe County, will be laid in the center of the

Glasgow and Edmonton road, conditional rights-of-way having been granted by county officials, pending action of the Fiscal Court. The line will be of standard gage throughout and will connect Edmonton with one of the lines reaching down into that section. Though work has been begun, the definite route has not been determined for the whole distance and will, it is stated, depend upon the amount of stock subscribed by the sections through which various routes are projected. An engineer has been engaged to direct the operations which are being begun under L. J. Metcalfe, Elizabethtown, president. George H. Greenup, Elizabethtown, is vice-president and L. L. Greenup, secretary and treasurer. [Aug. 28, '15.]

New Orleans Railway & Light Company, New Orleans, La.—Residents of upper South Claiborne Avenue have presented a petition to the Council asking that the New Orleans Railway & Light Company be permitted to proceed with the extension of the South Claiborne Avenue line from Broadway Street to Carrollton Avenue, New Orleans.

Bay State Street Railway, Boston, Mass.—The Massachusetts Highway Commission has issued an order approving the new location and relocation of the tracks of the company in Washington Street, from Hanover Street to Lloyd Street, Lynn, and the relocation of the tracks of the company in Myrtle Street at Parker's turnout, Winter Street at Willis Street and Howard Street at Penny's turnout, Saugus.

Boston & Worcester Street Railway, Boston, Mass.—Work has been begun by this company relaying rails and ties on Mechanic Street, Marlboro. The present 60-lb. rail is being replaced with 75-lb. rail.

Massachusetts Northeastern Street Railway, Haverhill, Mass.—Work has been begun by this company repairing its tracks on Plum Island.

Worcester (Mass.) Consolidated Street Railway—This company is repairing its roadbed on Cameron Street, Clinton. The company is replacing its ties and installing new rail joints.

Detroit, Almont & Northern Railway, Detroit, Mich.—A meeting has been held by Yale and Sandusky business men to urge the extension of this company's lines to these two cities.

Twin City Rapid Transit Company, Minneapolis, Minn.—Work has been begun on the construction of this company's extension of the Snelling-Minnehaha line to the new Twin City motor speedway.

St. Paul Southern Electric Railway, St. Paul, Minn.—Operation has been begun by this company from Hastings through the business district of St. Paul. The cars run over the lines of the St. Paul City Railway inside the city limits of St. Paul.

Springfield (Mo.) Traction Company.—This company has ordered 176 tons of 60-lb. rail to be used on the relaying of its track on Booneville Street. An additional order provides for the installation of new joints. It is stated that the new track will cost approximately $60,000. The company expects to have the track laid by Oct. 1.

Public Service Railway, Newark, N. J.—Work has been begun by this company on the construction of a 1½-mile extension to Carteret. The American Bridge Company has received a contract for a 700-ft. viaduct in connection with this work.

Salem-Pennsgrove Traction Company, Salem, N. J.—It is expected that the necessary funds to build this proposed electric railway between Salem and Pennsgrove will be obtained within a short time and work begun at once. While the du Pont Powder Company will not build the road, a number of the individual members of the company will take stock in the concern and it will be controlled by these men and merchants and business people in Salem. It is believed that the line, which will be 13 miles long, will carry considerable freight. Arthur B. Smith, Salem, is interested. [Aug. 28, '15.]

International Railway, Buffalo, N. Y.—E. G. Connette, president of this company, announces that the directors of the system have decided to provide trolley service along Bailey Avenue on the east side. Tracks will be laid for part of the distance next year. The company has a franchise in the street and a year's extension was granted by the last Legislature.

Jamestown, Westfield & Northwestern Traction Company, Jamestown, N. Y.—This company has been ordered to remove the tracks on West Eighth Street across Fairmount Avenue, Jamestown. This track was laid by the Chautauqua Lake Railroad Company twenty-three years ago for temporary purposes to obtain materials for constructing that line.

Interborough Rapid Transit Company, New York, N. Y.—The contract for the construction of Section No. 2 of Route 29, the Nostrand Avenue branch of the Eastern Parkway subway in Brooklyn, has been awarded to the Dock Contractor Company, New York, for $1,692,371.

Durham (N. C.) Traction Company.—This company's extension on Halloway Street, Durham, has been practically completed and it is expected that cars will soon be operating on the new line.

Goldsboro (N. C.) Street Railway.—Plans are under consideration by this company for the extension of its line from Goldsboro to Seven Springs.

South Fork-Portage Railway, Johnstown, Pa.—Work has been begun on the construction of this company's line from South Fork to Portage, 7 miles. The road has been graded almost the entire distance, rails are being laid at several places along the line and the work of constructing bridges at various points along the right-of-way is now in progress. Robert Pearce, Portage, president. [May 15, '15.]

Shenandoah, Frackville & Pottsville Railway, Pottsville, Pa.—Considerable progress has been made on this company's line to connect St. Clair and Frackville. Over half of the line has been graded and the largest part of it has been completed with the exception of building several concrete bridges. It is expected that the road will be completed this fall. [Aug. 7, '15.]

***Brownsville, Tex.**—It is reported that upon the subscription and guarantee of a bonus of $75,000 by Brownsville citizens, A. A. Browne, president, and J. A. Browne, vice-president, Rio Grande Railway Company, have agreed to standard-gage its line from Brownsville to Point Isabel, 22 miles. It is also planned to connect the Brownsville Street Railway with this interurban railway.

Houston, Richmond & Western Traction Company, Houston, Tex.—The board of directors of the San Antonio Chamber of Commerce has indorsed a proposition for the construction of an interurban railway between San Antonio and Houston, Tex. The proposition was laid before the Chamber of Commerce by E. Kennedy, president of the Houston, Richmond & Western Traction Company on Aug. 26, asking for the indorsement of that body. The existing charter of the company, Mr. Kennedy said, would be amended to include San Antonio and the capital stock increased to $250,000. [Aug. 28, '15.]

Lynchburg Traction & Light Company, Lynchburg, Va.—Construction has been practically completed on this company's extension from the Fair Grounds to Fort Hill and it is expected that cars will soon be placed in operation.

Seattle-Tacoma Short Line, Seattle, Wash.—Owing to the failure of the promoters to complete this line, for which a franchise was granted to Merle J. Wightman and C. E. Muckler in 1907, the city of Seattle may attempt to forfeit three deposits, aggregating $13,500, made by the promoters. Some work was done on the proposed line several years ago but the promoters have not complied with the provision that the line be completed within a certain time. The franchise covers Fourth Avenue and Fourth Avenue South from Jefferson Street to Spokane Street, Seattle.

SHOPS AND BUILDINGS

Pekin (Ill.) Municipal Railway.—The City Council has awarded the contract for the erection of the new carhouse at Glenwood Avenue in the Rosedale addition to Pekin to Fred Helfenstein for $1,796, and work will be begun at once.

New York, N. Y.—The contract for the construction of station finish on Section 2 of Routes Nos. 36 and 37, the Astoria elevated railroad in Queens, has been awarded by the Public Service Commission for the First District of New York to Charles Meads & Company, New York.

Manufactures and Supplies

ROLLING STOCK

City Railway, Pekin, Ill., just received three new cars which will soon be placed in service.

Cleveland (Ohio) Railway has submitted a request to the City Council for authority to purchase eighty cars of the front-entrance, center exit type.

Interborough Rapid Transit Company, New York, N. Y., has been authorized by the Public Service Commission of the First District of New York to use on its elevated lines the 478 composite car bodies ordered by the commission to be withdrawn from service in the subway. The car bodies with new trucks and electrical equipment will be placed in service on the Second and Third Avenue lines of the elevated system, now being third-tracked and reinforced.

TRADE NOTES

M. B. Chase, formerly New York manager of the Sangamo Electric Company, will represent the Stuart-Howland Company, Boston, in the New England territory.

Cincinnati (Ohio) Car Company writes that the weight of 16,800 lb., given for the Marshall (Tex.) steel car in the issue of July 10, pages 72-73, is for the car without electrical equipment. With electrical equipment the weight is 23,885 lb.

Westinghouse Electric & Manufacturing Company, Westinghouse Machine Company and Westinghouse Lamp Company announce the removal of their Chicago offices to the twenty-first floor of the Conway Building, Clark and Washington streets.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" headlights, has received an order for sixteen SE-95 "Golden Glow" headlights from the Granite City Railway Company, St. Cloud, Minn., which makes a complete equipment for the cars on this property.

Hoeschen Manufacturing Company, Omaha, Neb., maker of highway crossing alarms, has recently been reorganized and has moved its factory and office into larger quarters with the Paxton & Vierling Iron Works, at Seventeenth Street and Union Pacific tracks. This change has greatly increased the capacity of the factory and will facilitate the handling of future orders. F. K. Davis, until recently office engineer in the signal department of the Grand Trunk at Montreal, has been appointed general manager, with headquarters at Omaha.

Fibre Conduit Company, Orangeburg, N. Y., has recently received through its New England representatives, S. B. Condit, Jr., & Company, Boston, Mass., orders for the following conduit installations: Worcester (Mass.) Consolidated Street Railway, 150,000 ft. of 3½-in. socket joint; Manchester (N. H.) Traction Company, 210,000 ft. of 3½-in. Harrington joint; Hartford Electric Light Company, Dutch Point, Hartford, Conn., for feeders and interior work, 20,000 ft. of 3½-in. Harrington joint; Charlestown Gas & Electric Company, Charlestown, Mass., for underground service, 20,000 ft. of 3½-in. Harrington joint, and Bangor Railway & Electric Company, Bangor, Me., 3200 ft. of 3-in. Harrington joint.

ADVERTISING LITERATURE

General Electric Company, Schenectady, N. Y., has issued "Novalux Street Lighting Units for Mazda Series Lamps" and "Constant Current Transformers for Mazda Street Lighting Systems."

Trussed Concrete Steel Company, Youngstown, Ohio, has issued a folder describing its line of products, including Hy-Rib, Rib lath, Diamond lath, pressed steel studs, corner beads and base screeds, for roof sidings, partitions, ceilings, interior and exterior plastering, stucco, etc.

Hubbard & Company, Pittsburgh, Pa., have issued a folder describing and illustrating their new product, the Peirce "presteel" bracket. The company announces that the entire line of Peirce channel steel brackets will be duplicated in the "presteel" construction as soon as the dies can be produced.

General Bakelite Company, New York, N. Y., has issued a booklet, "Oxybenzylmethylenglycolanhydride, or Modern Magic," dealing with the production of Bakelite. The publication is 6 in. wide by 3 in. high and halftones are used to illustrate some of the many uses to which Bakelite is being put, among them for electrical instrument covers, terminal blocks, commutators and armatures.

NEW PUBLICATIONS

Purchasing. By C. S. Rindfoos. McGraw-Hill Book Company, New York, N. Y. 165 pages. Cloth, $2.

Electric railway purchasing agents should find in this volume a store of valuable and useful information. While the examples cited and the forms exhibited do not often apply with much force to electric carriers, the principles underlying all are clear and are applicable to purchasing in this field. Important chapters deal with the questions of how to obtain the right article, the lowest price, prompt delivery and favorable terms, and with the subjects of personal qualifications, strategy and departmental organization. Of particular value is the chapter on the legal aspects of purchasing, for it outlines lucidly and succinctly the fundamental legal principles with which all purchasing agents should be familiar, but which for lack of legal training they too often know only in a haphazard way. The author has not done wisely in omitting or treating only briefly the allied subjects of advertising, accounting, traffic and stockroom management. The importance of these subjects in modern purchasing certainly makes them rank far above the question of a separate company for purchasing, on which subject we suspect the writer has an ax to grind. Still the book has a good feature in its being the first extended work in the field, if one can make himself oblivious to the overweening egotism of the author.

Public Utilities—Their Fair Present Value and Return. By Hammond V. Hayes. D. Van Nostrand Company, New York, N. Y. 207 pages. Cloth, $2.

This valuable and comprehensive treatise is a companion to the author's "Public Utilities—Their Cost New and Depreciation," which deals with the methods to be used in appraisals and the general principles underlying the determination of fair present value as enunciated by courts and commissions. The present volume takes up the question of rates, fair value and fair return, and discusses the relation that should exist between public utilities and their patrons. Mr. Hayes states that the mutual obligations of these two parties have been recognized only during recent years, but that it is time for the radicals of each side to give way for a settlement of valuation controversies.

The most general conclusion that Mr. Hayes draws is to the effect that the fair present value must be measured, as far as is possible, by the actual investment made in good faith in property useful to the public. He notes, however, that the ascertainment of this fair present value is complicated by the necessity of finding such a value at the present time for new as well as for old enterprises. When he first suggests in the case of the old companies a compromise value established by investigation as a basis for the future, he seems to be avoiding the real obstacle in finding a suitable valuation method, for only in the case of the old companies now being first considered is there great difficulty in making valuations satisfactory to both parties. Yet later he explains fully the problems that arise in connection with the application of clear-cut methods of valuation to old enterprises of various types, and one of the chief merits of the book is the earnest and impartial effort to show how rigid valuation methods must be reconciled in some details to particular cases in order fairly to satisfy the mutuality of interests concerned.

Besides the discussions on the above-mentioned topics, Mr. Hayes presents two valuable chapters—one on going value, in which he explains an interesting method of calculation and argues for the grouping of preliminary or promotion expenses, costs connected with the physical property and going value, instead of simply using percentages of physical costs; and the other on depreciation, in which he presents a critical discussion of the need of annual reserves for renewals with the best accounting methods therefor. The book is readable and thorough—a sane analysis of existing theory in a vexatious field.

Electric Railway Journal

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SIGNIFICANT MASSACHUSETTS FARE CASE

Although the action of the Bay State Street Railway in seeking to establish a 6-cent fare unit with some modification, on its system of nearly 1000 miles of track in eastern New England was foreshadowed at the close of the arbitration proceedings last June, resulting as they did in a substantial increase in wages, the conduct of the case before the Massachusetts Public Service Commission will be followed with special interest. The system is one of the largest in the world under a single management, in point of mileage of track, perhaps the largest outside of the Chicago surface lines, but more than this, it is headed by one of the foremost authorities in the industry on electric railway economics. This means that the company's case will be presented in a way which will leave little to be desired in breadth, thoroughness and insight. The form of the notification to the Public Service Commission is an earnest of this. In filing its intention to increase fares the company presented a complete tabulation of the existing and proposed rates in different portions of its territory, with complete computations of the resulting cost of transportation per mile for the distances involved, for every part of the system. The growth of the system from many smaller roads has necessarily created inequalities in fares and transfer arrangements which the company now desires so far as possible to equalize in seeking an approach to a fair return on its investment. It ought to be encouraging to the company that since the memorable Lexington & Boston decision of last year, the commission has shown itself disposed to grant some measure of relief in every case where a street railway has demonstrated its need of additional revenue and the soundness of its management.

WHEEL DIAMETER AND MOTOR HEATING

A very interesting and profitable discussion of the subject of the effects of difference in wheel diameter on motor heating has been going on in our columns for some time. The contributions to this discussion have brought out clearly the fundamental principles involved and have indicated the conditions under which overheating from this cause may be expected. While each article published has added something either from theory or practice, or both, the editors felt that if the data necessary for estimating approximately the heating to be expected in any practical case could be put into form for rapid use they would be appreciated. Accordingly W. A. Broomall, who has made an extended theoretical and practical study of the subject, and who is the author of the article published in the issue of the Electric Railway Journal for July 10, page 70, was asked to extend the calculations upon which the earlier article was based. He has done so, and the results are given elsewhere in this issue. By plotting the results of numerous calculations in the form of percentage curves Mr. Broomall has made it possible quickly to estimate the effects of any difference in diameter of wheels of any diameter, both within the range of practice. This has been done by assuming average characteristic curves which fit all motors with sufficient exactness for practical purposes. It is obviously impossible to make a simple set of curves which will show the average heating with different schedule speeds, because a given schedule speed can be produced by a great variety in method of handling motors with consequent variety in heating effects. The best that can be done is to furnish information as to the inter-relation of the directly dependent variables as has been done in this case. That is to say, heating depends upon core loss and copper loss which, in turn, depend upon current and speed. Speed and current are, of course, closely related at a given line voltage. Then if the increased heating due to difference in wheel diameter at any speed can be estimated quickly, it is a simple process to calculate the average increase for the varying speeds involved in an actual speed schedule.

CITY SERVICE FOR VILLAGE TRAFFIC

A correspondent, in commenting upon the difficulties which beset the street railway that tries to operate profitably in a small city and to please the public at the same time, cites a case wherein a ten-minute headway was established in a town of 35,000 inhabitants. Obviously enough, this resulted in earnings of only 15 cents per car-mile, for the city was by no means sufficiently large to support the service. But when the headway was increased to a point more nearly commensurate with the needs of the community a perfect cyclone of opposition arose, notwithstanding the fact that adjacent cities of very much greater size were satisfied with a service that was no more frequent. Of course, the case is not at all unusual. The fact that a community is small does not necessarily deprive it of metropolitan ideals, and unfortunately, these ideals are quite often put into effect only to the extent of hounding the local railway into providing a city service for a village traffic. However, it should not be difficult for the officials of small cities to see that a frequent service cannot be maintained in the face of insufficient receipts, and the fact that they do not seem to see it leads inevitably to the conclusion that much of the trouble stirred up in cities that have just outgrown villagehood originates through motives that are not altogether straightforward. Certainly, earnings of only 15 cents per car-mile will involve a loss for anyone except a miracle worker, and where such conditions exist it would even seem advisable to publish a detailed list of operating expenses, including in each item the proper proportion of the overhead charges of rent, taxes and interest, as is done in machine-shop accounting. This would at least make some hard questions for peanut politicians to answer, for after all, the general public at heart is essentially fair-minded.

ASSESSING BY COMMISSIONS?

Mr. Fletcher in his recent address before the National Tax Association convention, abstracted elsewhere in this issue, raised a taxation question that should be of interest to electric railways—namely, should public utilities be assessed for taxation by public service commissions? Mr. Fletcher feels that as rate and tax problems both require expert analysis of facts and the same set of facts must be used for both rate and tax purposes, the same expert body could well determine both issues. We do not favor such a proposal, for various reasons.

In the first place, although both rate and tax questions require expert analysis of about the same facts, the valuations determined for the two purposes are not equal. Rates are largely based upon the fair value of the property, while taxes are assessed on what is taken out as income. As Mr. Fletcher wisely points out, one is an investment value and the other an income or market value. The theory and practice of making valuations for rate-making purposes, however, are not sufficiently clarified and standardized for public service commissions yet to be burdened with the task of finding distinct rate and tax valuations. In the press of work the too likely tendency would be to use one valuation figure for both purposes, to the detriment of each.

Furthermore, utilities would be unfairly taxed as compared to other properties, unless the entire assessing power of the state were placed in the commission's hands. In most cases, however, the volume of work would make this impossible. There might be two commissions, one the public service body to assess utilities and the other a state tax commission to accept the former's valuations and itself to assess all non-utility property, but such a division of labor with work piled on the public service commission outside its real field would not be advantageous. Aside from the undesirability of having the public service commission attempt to make separate rate and tax valuations, there would be the difficulty of getting the state tax commission to adjust the assessed values of non-utility property to the returns of the public service commission, without being acquainted with the data upon which the latter's tax valuations would be based.

What is really needed for equitable taxation is not the loading of assessment work on already laboring public service commissions, but rather the appointment of a centralized state board that will fix the assessed valuations of all classes of property after careful and impartial scientific investigation. If public service commissions have useful data, such can easily be secured and the tax and rate issues thus kept from clouding each other. If any reform is needed, it is in leading public service commissions more adequately to recognize taxes in rates, as they are reluctant to do now, and in securing higher non-utility taxation. Complete and adequate valuation of general property, on as strict a basis as in the case of utility property, is needed—not merely assessment of lands and town lots, but assessment of goods, merchandise and other forms of personal property, of manufacturing establishments and of natural resource companies. More particularly, in the local transportation field, all jitneys, automobiles and the like should be assessed according to their use of the highways and required to pay proportionate parts of all paving and similar taxes.

Whenever any statement is made concerning the unwarranted increase in utility taxes, the plea is generally made that if certain forms of taxation are discontinued, not enough funds will be secured to conduct the public business. What such pleaders fail to realize is that utilities are as willing to contribute to public revenues as are other corporations and individuals, but they object to paying more than their share. All they desire is an equitable division of the tax burden, and all their opponents wish, evidently, is to keep from under their proper portion as long as it is possible for them to do so.

MODERN CLAIM WORK SUCCEEDS

It has been said that the modern business man is a true heir to the old magician, for everything he touches seems to increase tenfold or a hundredfold in value and usefulness. One would have to go far in the electric railway field to find a more striking proof of this statement than the development of the claim department of the Pittsburgh Railways under Cecil G. Rice, described in the issue of July 24 and also in the present issue.

The first article was useful as showing how under Mr. Rice's guiding hand the department with its five bureaus had taken on the most modern form of organization, the co-operatively-functional type, but the present one is just as worthy in view of its delineation of practical business psychology and personal efficiency ideals in claim work. The thoroughness with which the management has analyzed and developed the routine work of the bureaus is fully equaled by the assiduity with which special psychological and efficiency methods have been utilized to bring the department to newer and wider horizons of activity and success. The specific organization and methods employed in Pittsburgh may not be susceptible of exact duplication by many other companies, particularly as regards the matters of size and detail, but the fundamental principles underlying the development of the Pittsburgh department can and should be applied by every claim official in the electric railway field.

Probably, we are sorry to say, there are some claim agents and company officials who will look upon the joining of business organization and psychology with claim work as utter nonsense, for the old "strong-arm" concept of claim agents has not altogether been destroyed. Where modern theory and practice have failed to convince, however, perhaps results will succeed. A decrease of 50 per cent in suits pending, a drop of $2,168,866 in the amounts sued for in suits pending, the settlement in one case of ninety-six injuries and in another of ninety-two injuries without the entrance of a single suit, and the decrease of $140,000 during the last year in all expenditures properly chargeable to the injuries and damages account—these are the results of the application of modern business principles to the work of settling claims. They cannot be secured by the old rough-and-ready methods, and the sooner all claim agents realize this the better.

CULTIVATING PERSPECTIVE IN ROLLING-STOCK MAINTENANCE

The technical graduate entering the repair shop or starting in carhouse pit work this autumn is not likely to suffer from insufficient opportunity to master equipment details. He is more likely to be overwhelmed with these than otherwise. If, however, he cultivates a sense of perspective which differentiates tasks of vital importance, when considered from the standpoint of operating safety, from those of less consequence to the traveling public, he will gain much. In every profession the ability to grasp important matters and concentrate attention upon these is something worth seeking with hard labor, and the man who has much to do with the complex equipment of street railroading must learn to separate the essential from the incidental before he can market his judgment most effectively.

Without advising new men to neglect any opportunities to learn the details of rolling stock which come before them, we believe that the extreme importance of putting forth every possible effort to master the lessons of accidents may be emphasized. Often the man fresh from the engineering school goes into the shop with little realization of the part accident prevention work is playing to-day in the industry. He knows, doubtless, that "safety first" has become the slogan of progressive concerns from Maine to California, but his interest in the scientific principles underlying the design and operation of equipment has been so highly stimulated by his college course that to a large extent the tasks before him seem of equal significance. Such a man is likely, when noting a passing car, to observe peculiarities of its truck design or of its lighting arrangements, while perhaps failing entirely to appreciate its passenger load or the lack of it or to think about the relation of vestibule width and step heights to facility of handling traffic. He should not be blamed for overlooking what might be called the transportation side of car equipment through his interest in its physical structure thus early in his career, but with experience and well-directed thought the broader outlook can be cultivated.

All the work of the shop is naturally important in relation to the service of the road, but it is worth unusual effort to take a specialized interest in the defects and failures of wheels, axles, brake rigging, the results of collisions, ability of equipment parts to withstand derailment shocks and lessons of accidents in which step arrangements play a part, as well as in the methods used to put rolling stock through the shop as quickly as possible after accidents. Few people outside the mechanical department realize the interest such studies inspire in the men responsible for the condition of the equipment to prevent the occurrence of like difficulties in the future. The practice of collecting photographs and sketches of equipment injured in various ways on the road is a good one for the young engineer. To the man of keen insight and broad judgment the repair shop becomes a sort of mechanical clinic, and by putting forth his utmost endeavors to learn everything possible about maintenance problems directly associated with the safety of the service, he can acquire a sort of mental set which is bound to be a factor in his success as a genuinely qualified railroad man.

THE FUTURE FOR ELECTRIC RAILWAYS

Of late the remark has been frequently heard—generally from the proponents of the motor bus—that the electric railway has reached its maximum of efficiency. Presumably, this means that further progress is an impossibility, and we are expected to believe that the cost of passenger transportation by electricity is never going to be less than it is to-day. In view of the fact that the unit revenue is certainly not increasing because of fare limitations, the outlook would be hardly encouraging if one accepted the doctrine of present perfection. However, we rather incline to the belief that electric railway operation is just about as subject to improvements in the way of better economy now as it was ten years ago. In the transportation department alone, for example, the field of opportunity for economy seems constantly to broaden, as we consider the possibilities.

It is only yesterday that such opportunities for saving as better popular education in accident prevention, the use of power consumption recorders and scientific fare collection have come to be generally accepted, and even along these lines there remains much untilled ground. Indeed, the matter of increasing the schedule speed without increasing the maximum speed—one of the most important considerations in economical operation—has never yet received any attention that is really worthy of the name, with the result that 8 m.p.h. is an almost universal figure, although the practicability of 10 m.p.h. and over has been demonstrated by a few shining examples. Such an increase, if made by cutting out stops, would alone mean a reduction in operating expenses of some 15 per cent, and until this and the numerous other possible economies have been thoroughly exploited it seems rather futile to accuse the electric railway business of being ready to succumb to the competition of the bus merely because this is alleged to offer such glittering possibilities of future improvement.

Chicago Elevated First-Aid System

In His Third and Concluding Article the Author Describes the Organization and Equipment of a Complete First-Aid System, and the Method of Maintaining It.

BY H. E. FISHER, M.D., SURGEON ELEVATED RAILROADS OF CHICAGO, ILL.

Two years' experience with a completely equipped and organized first-aid system on the Elevated Railroads of Chicago has demonstrated, beyond doubt, that the installation was warranted and fulfills a purpose much needed on transportation systems. Regardless of the safety-first measures which may be adopted, transportation lines are certain to have accidents in which either the public or the employees are injured. To meet these emergencies in a competent manner when they occur, it is essential that suitable medical and physical equipment be provided and that intelligent first-aid to the injured be administered promptly.

The results obtained by the Elevated Railroads of Chicago show that the installation of a hundred of these first-aid stations was more than justified. This number provides complete first-aid outfits at sufficiently frequent intervals over the entire property to make them convenient for all purposes. It has been found particularly desirable that all transfer stations, shops, towers, yards, junction points, terminals and substations be supplied with this first-aid equipment.

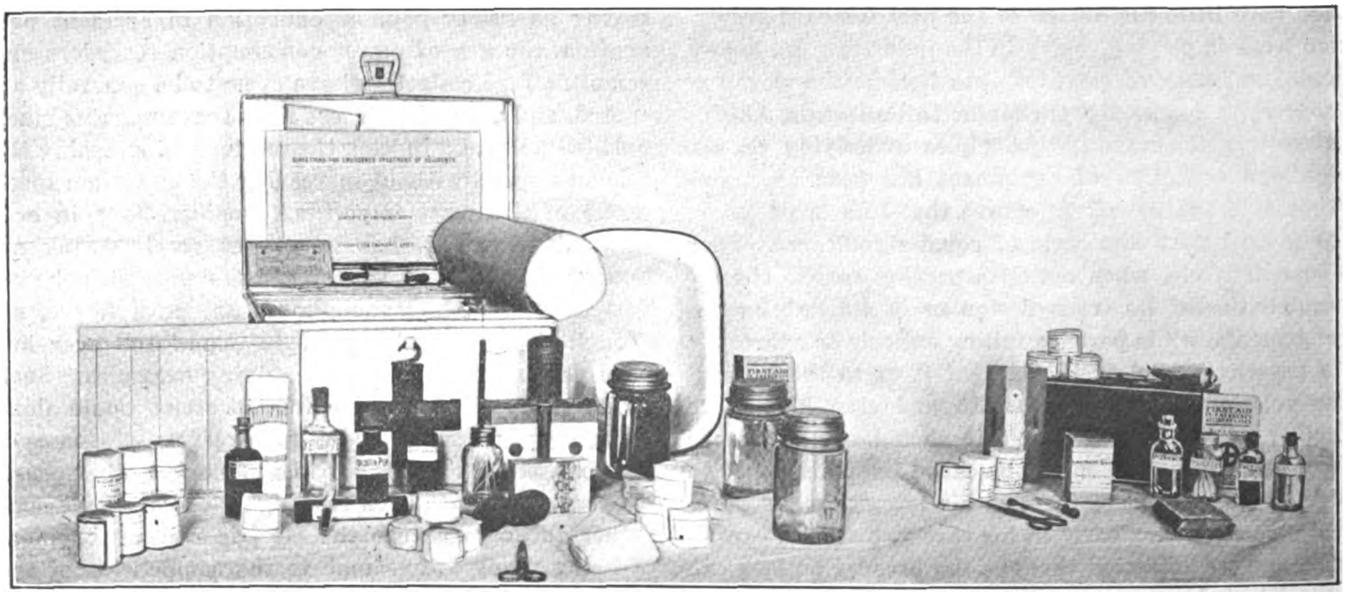
Each first-aid station is designated by a large red cross on a white background, placed in a prominent place on the sides of the towers and shops and at the ends of station platforms, the object being to make them visible from all directions on the elevated structure. These markers indicate to the employees that they can find medical and surgical aid for injuries and sickness. One of these first-aid outfits is shown in an accompanying illustration. Employees are required to memorize the locations of the first-aid stations which they may have occasion to use, so that when an accident occurs little or no time will be lost in securing first-aid material. Each of these stations is in charge of a man who is competent to render intelligent first-aid treatment, and he performs this service in addition to his regular railroad duties. To fit these men for this work the company surgeon instructs them from time to time so that with the two years' experience most of them have become very proficient in this line of work.

First-Aid Station Equipment

All first-aid stations are equipped with regulation United States army stretchers which, on account of their simplicity of construction and ease of portability, have been found to be the most practical for railroad use. With the patient on this stretcher it can be so manipulated that it may be carried up and down stairs without discomfort to the injured person. Moreover, it is readily handled by two men and can be conveniently taken into the cars through the windows or doors without disturbing the patient. Aside from these advantages the stretchers cost nothing to maintain and are easily kept clean, and the brown canvas does not show stains or grease marks. The leg rests enable the stretchers to be quickly converted into cots, thus rendering it unnecessary to lay the patient on the ground. For this reason, also, injured people who are transported in the cars do not complain of the vibration of the train, with its accompanying pain to the injured parts. Each stretcher is folded when not in use and hung on brackets on the walls of the first-aid stations.

At all first-aid stations are located the elevated railroad standard white-enameled first-aid boxes, 3½ in. x 9½ in. x 9 in. in size, and fitted with racks to hold the bottles of drugs and solutions. A set of first-aid rules is pasted on the inside of the cover of each box. The contents of one of these forms is reproduced in the illustrations. Posters showing the method of performing artificial respiration are also prominently displayed at the first-aid stations in all shops, yards, terminals and trainrooms.

The contents of one of these first-aid boxes comprises the following articles: One large, sanitary, white por-



CHICAGO ELEVATED—VIEW OF STANDARD FIRST-AID BOX, SMALL BOX AND CONTENTS OF EACH

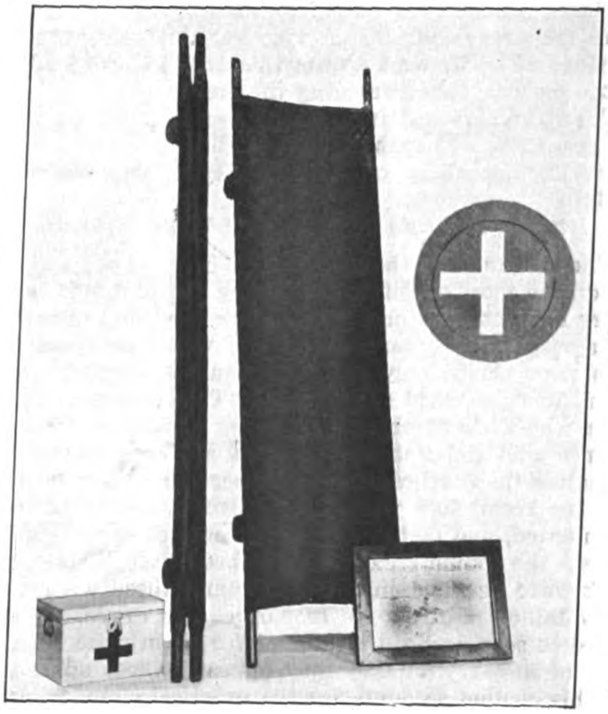
[Editor's Note. For preceding articles in this series see issues of June 26 and Aug. 7.]

celain dish, 7 in. x 10 in. x 2 in. in size, which is used to wash the hands of the employee giving first aid or to prepare the solution for treating burns; one pair of surgical scissors, 5 in. long; one medicine dropper for injecting eye drops into eyes injured by electrical flashes or burns or to allay eye irritation due to foreign matter; one small bottle containing sanitary tooth picks with cotton wrapped on one end, used in the application of iodine to cuts. Formerly camel's air brushes were used for this purpose, but they were found too expensive. They become easily soiled and are liable to carry infection into the wound when used more than once. The brushes also were misplaced and the bristles soon became stiff. The tooth-pick applicators are cheap and after being used are thrown away. The remainder of the equipment includes one yard of 1-in. tape used as tourniquet in case of bleeding; one reel of adhesive plaster, ½ in. wide and 5 yd. long; one bar of germicidal soap used to wash the hands of those giving aid; one tube of vaseline used for burns on the face; 2 yd. of sterile gauze in a sanitary carton for wounds and burn dressings, two 2-ounce cartons of sterile cotton; ½ lb. of cotton for reinforcing burn dressings; four each of 1-in., 2-in. and 3-in. gauze bandages; a 2-oz. bottle of tincture of iodine which is applied to all cuts or lacerations; 2 ounces of aromatic spirits of ammonia used in stimulating patients in shocks, unconscious or fainting attacks; 2 ounces of boracic acid eye drops; one pint glass jar each of raw linseed oil and lime water, and one empty pint glass jar used in mixing equal parts of lime water and linseed oil to make carron oil for burns.

Carron oil has often been criticised by the medical profession because it is greasy and unsterile and because it becomes rancid, but it is successfully used by the Elevated Railroads of Chicago for treating burns. Hundreds of burn cases have been treated, and we have not yet encountered infection from its use. Carron oil is made fresh each time it is needed and in sufficient amounts to treat the case at hand. No mixed portions of carron oil are left in the first-aid boxes, consequently we have not experienced the disadvantages claimed for this drug by others. Iodine also will give some trouble unless properly handled. The bottle should have a rubber cork because iodine will cause an ordinary cork to deteriorate. This is usually followed by escaping fumes which cause the metal of the first-aid box and scissors to corrode. As an extra precaution in this respect all lost or broken scissors have been replaced with new ones with painted handles which iodine will not attack.

A first-aid manual is placed in each box as an additional guide and ready reference to the employees in giving treatment. Supplies removed from the boxes in treating injuries are replaced by new material immediately so that the outfit is always complete. A card is placed in each box upon which is recorded the date the box was used, the injury necessitating .it and the supplies used from it. One of the cards containing a record of one of the first-air stations is illustrated. It will be noted that each employee having occasion to use the first-aid box gives his name, occupation, the kind of injury and the character of surgical treatment. From these record cards the efficiency of each box is determined. These first-aid stations are regularly examined by a medical department inspector who records the date and his name on the inspection label on the lid of the box.

Experience has shown that the secret of an efficient first-aid system is to lay down a set of rules to govern the system and to see that they are closely observed. If at the time of inspection any box is found in a dirty or neglected condition and with supplies missing, the man in charge is reprimanded and warned that a second occurrence will merit severe measures. At the time the first-aid boxes were installed the movement was not taken seriously by some of the employees. After a brief experience with these equipments in time of injury, however, their great value was demonstrated and the movement soon won the hearty support of every employee.



CHICAGO ELEVATED—EQUIPMENT OF EACH FIRST-AID STATION

A small cedarwood first-aid kit for use where the larger kit is not desired is shown in one of the accompanying illustrations. This box contains 1 ounce of iodine, 1 ounce of spirits of ammonia, one tube of vaseline, one first-aid package of sterile gauze and triangular bandages, one pair of scissors, one bottle of cotton applicators, one 3-in. bandage, one 2-in. bandage, one 1-in. bandage and one box of sterile absorbent cotton. This small kit is for use in various departments of the shop in addition to the larger first-aid box. In the shops and substations wall cabinets are also used to accommodate

CHICAGO ELEVATED—DEMONSTRATION SQUAD AT WORK the larger quantity of supplies necessary on account of more frequent injuries. A tin first-aid box has been provided at all first-aid stations because it can be taken to the patient, thus hastening the treatment.

The stretchers cost from $4 to $6 each, the large first-aid boxes $4 to $5 each and the small first-aid kits from $2 to $3, depending on the quantity of supplies they contain.

RESULTS OF FIRST-AID WORK

The results from the use of these first-aid equipments have been most gratifying. During the past two years there has not been one fatality due to wound infection as against two before the outfits were installed. In this same period only one case required hospital treatment of an infected shop wound. This case was a new man who did not think his injury was of any consequence and did not use the first-aid treatment. He remained in the hospital five days. Time lost by employees from shop wound infections has been entirely eliminated, and of the numerous cases of shop injuries where the iodine treatment has been used, only 1 per cent have resulted in infections, and these were of a very minor nature. All employees are urged and advised to seek first-aid treatment for all injuries regardless of how trivial they may appear. Close adherence to this custom accounts for the practical eliminating of infections from shop wounds.

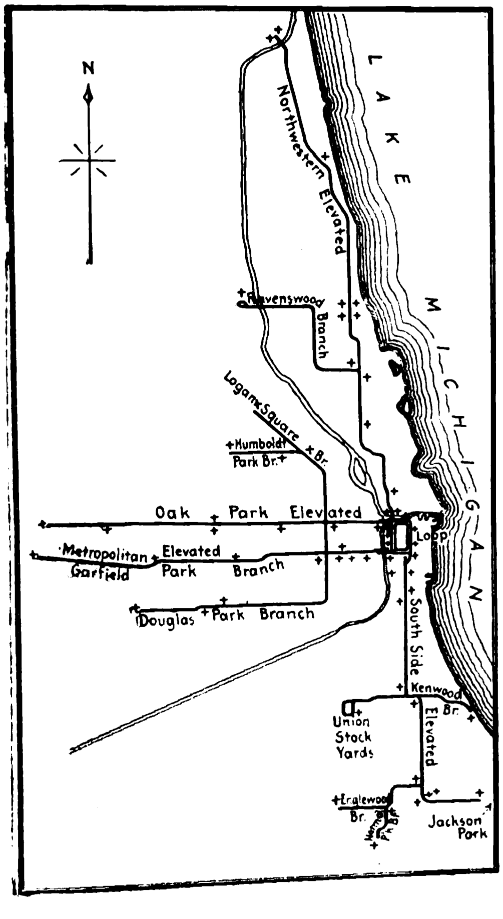
Besides being of service to the employees these first-aid equipments have been a wonderful help in ministering to passengers of the elevated railroad. Scarcely a day passes that some box is not used for treating fainting or sick passengers. It seems that women passengers who are inclined to faint, know just where these stations are located, or at least the stations have been happily selected because women invariably faint near them. Aromatic spirits of ammonia serve in cases of this kind. The author has equipped several other street railways with these first-aid outfits and has advised and superintended the organization of their first-aid systems. Reports from these companies indicate results equal to those experienced on the Elevated Railroads of Chicago.

ORGANIZATION OF FIRST-AID INSTRUCTION

After the first-aid equipment is installed it is very important to instruct the employees how and when to use it. If a means of educating the employees regarding the method of rendering first aid is not afforded, the installation is quite certain to prove a failure. An inexperienced man would not be asked to operate a delicate piece of electrical machinery without first being instructed. Lack of instruction in first-aid work is certain to produce just as harmful results, consequently it is vitally important that when these equipments are put into the employees' hands careful instruction is given. Officials of several outside companies have asked how such excellent results in first-aid work were secured on the elevated railroads when their employees would not use the first-aid equipments nor could the employees be interested in the merits of the plan. Inquiry revealed that these companies had installed good first-aid equipment but had failed to instruct their employees how to use them. As a result the employees thought the first-aid outfits were only ornamental and were afraid to use the supplies because they did not know how to go about giving first aid.

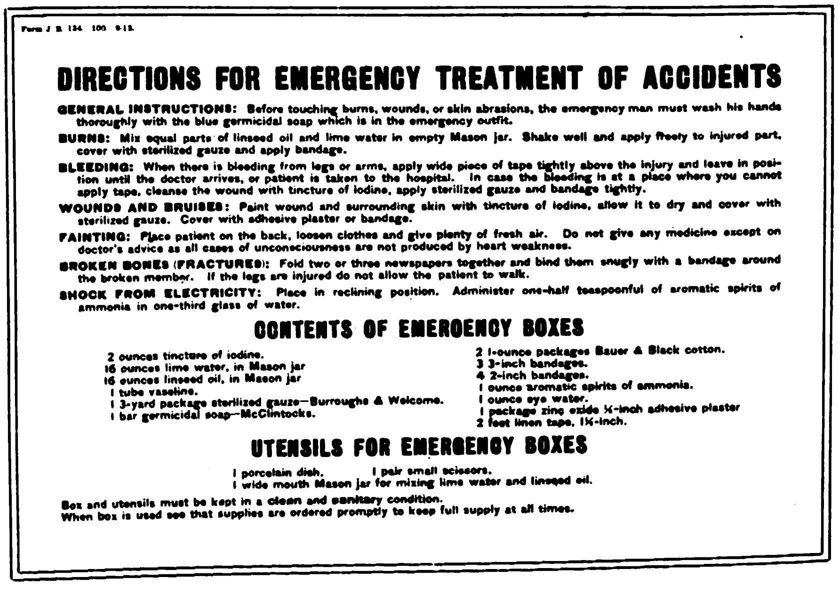
The plan of procedure developed for instructing employees has proved entirely satisfactory and will assure success to any other railroad that follows the same system. Owing to the large number of employees it was considered impractical to instruct all of them in a thorough manner, hence the medical department selected six extra trainmen, because they could devote time to the training course without interfering with their regular work. These six men were paid regular wages and received a course of instruction in rendering first aid to the injured. This instruction lasted two hours a day for a period of six weeks. The employees received personal instruction and training under the company surgeon, and when they had become proficient in the work they were called the first-aid demonstration squad. This squad in turn demonstrated first-aid work and instructed other employees in the art. This demonstration squad is shown at work in one of the accompanying illustrations.

Emergency squads of seven men each were then selected by the various heads of departments, and one squad was placed at each terminal, yard and shop on all branches of the elevated railroads. Five of the men selected for each squad were day men and the other



CHICAGO ELEVATED—LOCATIONS OF ALL FIRST-AID STATIONS

FIRST-AID RULES POSTED IN EACH STATION



Form J B 134 100 9-12.

DIRECTIONS FOR EMERGENCY TREATMENT OF ACCIDENTS

GENERAL INSTRUCTIONS: Before touching burns, wounds, or skin abrasions, the emergency man must wash his hands thoroughly with the blue germicidal soap which is in the emergency outfit.

BURNS: Mix equal parts of linseed oil and lime water in empty Mason jar. Shake well and apply freely to injured part, cover with sterilized gauze and apply bandage.

BLEEDING: When there is bleeding from legs or arms, apply wide piece of tape tightly above the injury and leave in position until the doctor arrives, or patient is taken to the hospital. In case the bleeding is at a place where you cannot apply tape, cleanse the wound with tincture of iodine, apply sterilized gauze and bandage tightly.

WOUNDS AND BRUISES: Paint wound and surrounding skin with tincture of iodine, allow it to dry and cover with sterilized gauze. Cover with adhesive plaster or bandage.

FAINTING: Place patient on the back, loosen clothes and give plenty of fresh air. Do not give any medicine except on doctor's advice as all cases of unconsciousness are not produced by heart weakness.

BROKEN BONES (FRACTURES): Fold two or three newspapers together and bind them snugly with a bandage around the broken member. If the legs are injured do not allow the patient to walk.

SHOCK FROM ELECTRICITY: Place in reclining position. Administer one-half teaspoonful of aromatic spirits of ammonia in one-third glass of water.

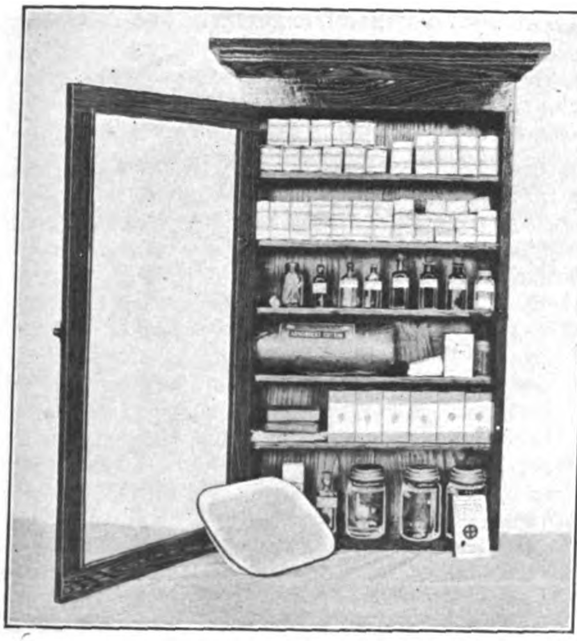
CONTENTS OF EMERGENCY BOXES

2 ounces tincture of iodine.
16 ounces lime water, in Mason jar
16 ounces linseed oil, in Mason jar
1 tube vaseline.
1 3-yard package sterilized gauze—Burroughs & Welcome.
1 bar germicidal soap—McClintocks.
2 1-ounce packages Bauer & Black cotton.
3 3-inch bandages.
4 2-inch bandages.
1 ounce aromatic spirits of ammonia.
1 ounce eye water.
1 package zinc oxide ½-inch adhesive plaster
2 feet linen tape, 1½-inch.

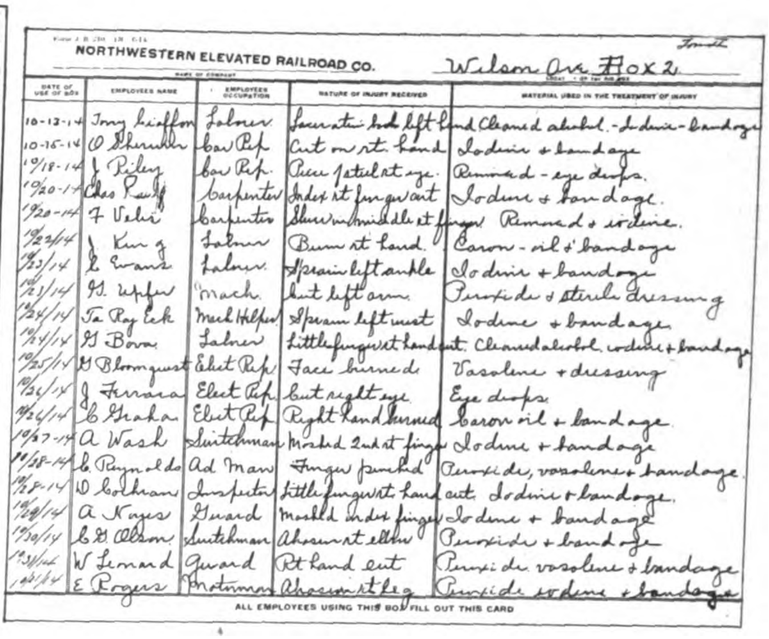
UTENSILS FOR EMERGENCY BOXES

1 porcelain dish.
1 pair small scissors.
1 wide mouth Mason jar for mixing lime water and linseed oil.

Box and utensils must be kept in a clean and sanitary condition.
When box is used see that supplies are ordered promptly to keep full supply at all times.



CHICAGO ELEVATED—FIRST-AID CABINET FOR SHOPS AND SUBSTATIONS



NORTHWESTERN ELEVATED RAILROAD CO. Wilson Ave Box 2

DATE OF USE OF BOX	EMPLOYEES NAME	EMPLOYEES OCCUPATION	NATURE OF INJURY RECEIVED	MATERIAL USED IN THE TREATMENT OF INJURY
10-13-14	Tony Liaffon	Labor	Laceration back left hand	Cleaned alcohol - Iodine - bandage
10-15-14	O Sherubler	Car Rep	Cut on rt. hand	Iodine + bandage
10/18-14	J. Riley	Car Rep.	Piece of steel rt eye.	Removed - eye drops.
10/20-14	Chas Rauff	Carpenter	Index rt finger cut	Iodine + bandage.
10/20-14	F Vali	Carpenter	Sliver in middle rt finger	Removed + iodine.
10/22/14	J. King	Labor	Burn rt hand.	Caron-oil & bandage
10/23/14	E. Evans	Labor.	Sprain left ankle	Iodine + bandage
10/21/14	G. Upfer	Mach.	Cut left arm.	Peroxide & sterile dressing
10/24/14	Ta Ray Eck	Mech Helper	Sprain left wrist	Iodine + bandage.
10/24/14	G Bova	Labor	Little finger rt hand cut.	Cleaned alcohol, iodine + bandage
10/25/14	G Bloomquist	Elect Rep	Face burned	Vasoline + dressing
10/26/14	J Ferrara	Elect Rep.	Cut right eye	Eye drops.
10/26/14	C Graham	Elect Rep	Right hand burned	Caron oil + bandage
10/27-14	A Wash	Switchman	Mashed 2nd rt finger	Iodine + bandage
10/28-14	C. Reynolds	Ad Man	Finger pinched	Peroxide, vasoline + bandage
10/28-14	D Colhran	Inspector	Little finger rt hand cut.	Iodine + bandage.
10/29/14	A Noyes	Guard	Mashed index finger	Iodine + bandage
10/30/14	C.G. Olson	Switchman	Abrasion rt elbow	Peroxide + bandage
10/31/14	W Leonard	Guard	Rt hand cut	Peroxide vasoline + bandage
10/31/14	E Rogers	Motorman	Abrasion rt leg	Peroxide iodine + bandage

ALL EMPLOYEES USING THIS BOX FILL OUT THIS CARD

CHICAGO ELEVATED—RECORD CARD OF FIRST-AID STATION, SHOWING ASSISTANCE RENDERED BY STATION EMPLOYEES

two were night men, so that at least one or two men of each squad would always be present at these various locations and could competently render first aid. These emergency squads were made up of shop foremen, yard foremen, dispatchers, switchmen and other men who had been in the service for a number of years, hence could be relied upon at all times. Moreover, the selection of men of this caliber assured intelligent work and the greatest efficiency.

The company surgeon, with the aid of the demonstration squad, instructed by lecture and demonstration these emergency squads until they in turn were able to administer intelligent first-aid treatment. During the period of instruction these men received their regular pay and accordingly were interested and supported the work. These emergency squads were taught how to bandage wounds, dress lacerations and burns, treat unconscious and fainting cases, perform artificial respiration in cases of electrical shock, give emergency treatment for broken legs or arms, treat heat prostration cases, apply tourniquets in cases of bleeding and give competent surgical service in the case of many other forms of injuries that might occur. The employees comprising these teams entered into the work with much enthusiasm. Their support of the movement and their good work have been instrumental in saving the lives and allaying pain in time of accident of many of their brother employees. To the efforts of these squads also may be attributed the great decrease in the number of infections and the reduction of the period of convalescence of injured employees.

As a text and reference for employees' use in time of injury, a small first-aid manual was compiled. This was written devoid of all technical and medical words so that it could be easily understood. Each employee of the elevated railroad received one of these booklets and was urged to study it. The value of the booklet has since been made evident by the great demand for it by other railroads, manufacturing companies, physicians and the public. A large number of these booklets have been distributed gratis to all who have asked for them.

Mass or group lectures and demonstrations in first-aid work were also conducted, and employees were assembled in classes of twenty or thirty and lectured for two hours. These lectures met with a hearty response from all the employees, and at the meetings many valuable suggestions were received from them. More than 480 employees of the elevated railroads have received this course of first-aid instruction. When one stops to think what this means in time of accident it will be readily seen what great good is being accomplished. The traveling public is appreciative of this humanitarian work, particularly when, as injured passengers, they receive the benefit of the ministrations of these trained employees.

All the demonstrations are made as nearly as possible like the conditions obtaining at the time of an injury, so that the drill team can give realistic portrayals of the various injuries and the method of caring for them. Some of the supplementary instructions are illustrated by lantern slides, posters and charts. In the first-aid demonstration work the employees are taught how to render first aid for the most common injuries with surgical equipment and ideal surroundings, and also when there is nothing to be had but their own clothing. Considerable publicity has been obtained through the work of this department. The lectures by the company surgeon and demonstrations by the drill team have been given during the past year at private clubs, church societies and public meetings. In one or two instances the drill team has been used to instruct the employees on other electric railways. Beginning last May, the same course of instructions in first-aid work was extended to the old employees as well as the new men entering the service. These courses take the form of quizzes and illustrated lectures.

EXAMPLES OF FIRST-AID TREATMENT

To illustrate some of the benefits derived from this work a few examples of where lives were saved by employees' first aid are given. Many employees have had occasion to apply their knowledge of first-aid work in injuries to members of their own household. In one case an employee, following the knowledge imparted to him, saved the life of a member of his family who was bleeding to death from a severed artery. A conspicuous example of what good can be accomplished by properly instructed employees is shown in the following: An employee fell across the live third rail and was shocked to unconsciousness. His heart had practically stopped beating, no pulse beats could be detected, all respiration had ceased and the man was apparently dead. The emergency squad at the yard where this accident occurred quickly released him from the electric circuit and resorted at once to artificial respiration. After an hour's unceasing work the squad was repaid for its efforts when the victim began to breathe. The squad then intelligently dressed the burns on his face and arms, and after a brief period in the hospital the injured employee returned to his regular duties in first-class physical condition. It is easy to see in this case what would have been the result if the squad had not been versed in rendering first aid.

Another illustration is a case where a man who had a leg cut off under the wheels of a car received first-aid treatment by employees. They applied emergency tourniquets to stop the bleeding and removed him to a comfortable position four and one-half minutes after the leg was cut off. The surgeon who responded in this case wrote a letter complimenting the employees who gave the first aid, and credited them with prolonging the man's life by the efficient manner in which they applied the tourniquet. Many other examples of the results of this work could be cited, but suffice it to say that the employees have received indorsements from many physicians and surgeons who have seen the results of their first-aid work.

Nothing is more distressing than first-aid given by a man who has not been trained in the work. His efforts frequently cause more infections than cures. Some of the bungling first-aid work done by untrained employees has caused prominent surgeons to discourage the use of first-aid equipment. On the other hand, the medical profession is quick to realize the good to be derived from first aid when the employees have been properly trained.

In closing, I will say that while this work is in its infancy in this country, there will come a time when it will receive greater consideration. The humanitarian nature of first aid to the injured appeals to every man, because every man owes to his fellow men a duty to perfect himself in methods of rendering first aid in time of injury. There is nothing more deplorable, nor a sight more pitiful, than to see a man seriously injured lying prostrate on the ground surrounded by a group of big, strong men who are helpless to aid the sufferer because they do not know what to do or are afraid to give aid for fear it might be wrong. Therefore, I say educate and train your employees in rendering first aid, and the time and money invested in the work will be returned a hundredfold.

Meeting of Public Service Association of Virginia

The annual meeting of the Public Service Association of Virginia, which includes in its membership the principal street railway, the electric light and power and the gas and water companies of Virginia, was held at Natural Bridge, Va., on Thursday, Aug. 19. Two-thirds of the member companies of the association were represented, and the usual routine business of the association was conducted. No formal papers were read, but topics of interest to the association were presented and discussed.

The officers elected for the ensuing year are as follows: President, E. M. Funkhouser, Roanoke, Va.; first vice-president, J. F. Rison, Danville, Va.; second vice-president, W. G. Matthews, Clifton Forge, Va.; third vice-president, Thomas S. Wheelwright, Richmond, Va.; secretary and treasurer, W. J. Kehl, Richmond, Va.

Operation by Signals on Baltimore & Ohio

This Line Is Successfully Operating Mixed Traffic Over Single Track Without Train Orders, a Manual Check on Signal Operation Being Provided

During the past year the Baltimore & Ohio Railroad has had in operation a 23.5-mile section of main-line single track wherein the traffic is controlled by signal indication alone. This section, which lies between La Paz Junction and Milford Junction in Indiana, couples double-track sections of the main line, but has not been double-tracked itself because of topographical difficulties. Acting, as it has, as a "neck of the bottle" for a frequent and heavy train service, the operation of this section by signal indication only has been a most important step, and the installation has been stated by F. P. Patenall, signal engineer, Baltimore & Ohio Railroad, to have effected the saving of much delay through the elimination of the necessity for issuing train orders.

The single-track section in question is divided into three parts by two passing sidings located at the intermediate stations of Bremen and Napanee, and at each of these points is an electro-mechanical interlocking machine with sixteen mechanical levers and sixteen power levers, thus providing for the operation of all switches at the station from a centralized point. At the stations at the ends of the single track section, La Paz and Milford, are interlocking plants that serve foreign railroad crossings as well as the needs of traffic from the double-tracked main line on to the single-track section and vice versa. Between passing sidings the single track is protected by three-position, Union Switch & Signal Company's style T automatic signals spaced at intervals of approximately 1¼ miles, these giving protection with stop and caution indications for following movements as in double-track operation. Normally these are in stop position, the signals for only one direction being cleared when a train is to be moved over the single-track section.

For opposing train movements protection is afforded by the use of a traffic-directional scheme whereby opposing signals cannot be cleared simultaneously and under which there is imposed the necessity for simultaneous action on the part of the operators at the stations at each end of the opposing block before a train can be advanced into it. The arrangement may be explained in brief by reference to the accompanying partial diagram of the locking circuit between Milford and Napanee, the operation in this case being typical of that of the other parts of the single-track section. In the interlocking machines at each of these two stations there is installed a traffic-direction lever, whose locking circuit is controlled by a push button at the opposite station, and the controlling relays for the intermediate signals obtain energy only when one of these two levers is in normal position and the other one is reversed. When both levers are in normal position or when both of them are in reversed position the circuits in both directions will be open and all signals will indicate stop.

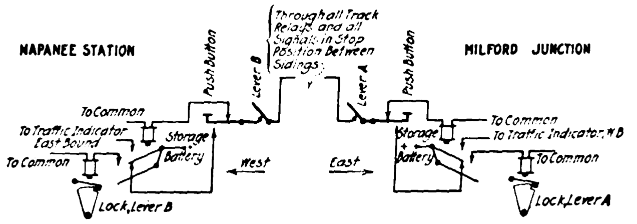
Both levers are held in normal position by locks whose locking wire is controlled by the above-mentioned push buttons, as well as by all intermediate track-circuit relays, by all signals, both east-bound and west-bound, and by the traffic-direction levers themselves (both levers must be in normal position before current can be given to unlock either one). The locking between signals 27 and 29 east of Milford Junction and signals 16 and 18 just west of Napanee, for example, is effective through traffic control levers *A* and *B* in the interlocking machines, respectively, at each of the two towns named. Each of these levers is locked in normal position only, and the locking circuit governing them for a train movement from Napanee to Milford may be traced as follows: From battery at Milford through back contact of a traffic-direction relay (which is in series with the lock for lever *A* but which is not energized in this operation); through push button at Milford (when this is depressed by the operator upon telephone advice from Napanee); through lever *A*, normal; through lightning arrester, etc.; thence breaking through all track relays and through all signals (in the stop position only) and then into the interlocking tower at Napanee. In the tower the circuit continues through various relays to traffic lever *B*, normal; thence through push button (which is not depressed); through coils of lock relay for traffic lever *B* and to the common return wire.

The energizing of this lock relay permits traffic lever *B* to be reversed, and this in turn permits the semi-automatic signals 16 or 18 east of Napanee to be cleared, allowing the train to enter the block. On the other hand, in case it is desired to run a train west-bound from Milford, the operator at Napanee must (upon advice from Milford) push the button at his station to complete the circuit that unlocks lever *A* at Milford, and this permits signals 27 or 29 to be cleared.

The levers *A* and *B* serve to release the mechanical locking in their respective machines, thus permitting the reversal of signal levers to cause proceed indications for the signals which govern movements to the single-track between stations. They serve also as controlling levers for all signals governing into or through the block in an assigned direction. For example, when it is desired to cause signal 18 to indicate proceed for an east-bound train at Napanee, the operator at Milford must give release by pressing a push button that unlocks lever *B* at Napanee, as previously outlined, and the operator at Napanee must accept the release by unlocking and reversing lever *B* at the same time. A simple combination of signal controlling circuits through lever *A* normal at Milford and *B* reversed at Napanee completes a series of line relays which are located at each of the intermediate west-bound signals 20-26 together with one in the tower at Napanee.

When the relays at intermediate signals are energized they cause the respective signals to indicate proceed, and the series relay in Napanee tower likewise controls signals 16 or 18 when the respective levers of those signals are reversed. Notwithstanding the fact that either of these levers may be reversed whenever lever *B* is reversed, signals 16 or 18 will not clear unless the controlling circuits are effective through the combinations above mentioned.

Throughout the installation the passing sidings are track-circuited, so that when a passing siding is occupied by a train nothing but the low-speed permissive signal can be used to advance a following train into the siding at the interlocking plant entrances. The low-speed signals and take-siding indicators are not semi-automatic and consequently can be used to transmit instructions to trains even though the tracks are occupied.


NAPANEE STATION
MILFORD JUNCTION
Push Button
Lever B
Through all Track Relays and all Signals in Stop Position Between Sidings
Lever A
Push Button
To Common
To Traffic Indicator East Bound
Storage Battery
To Common
Lock, Lever B
West
East
To Common
To Traffic Indicator, W B
Storage Battery
To Common
Lock, Lever A

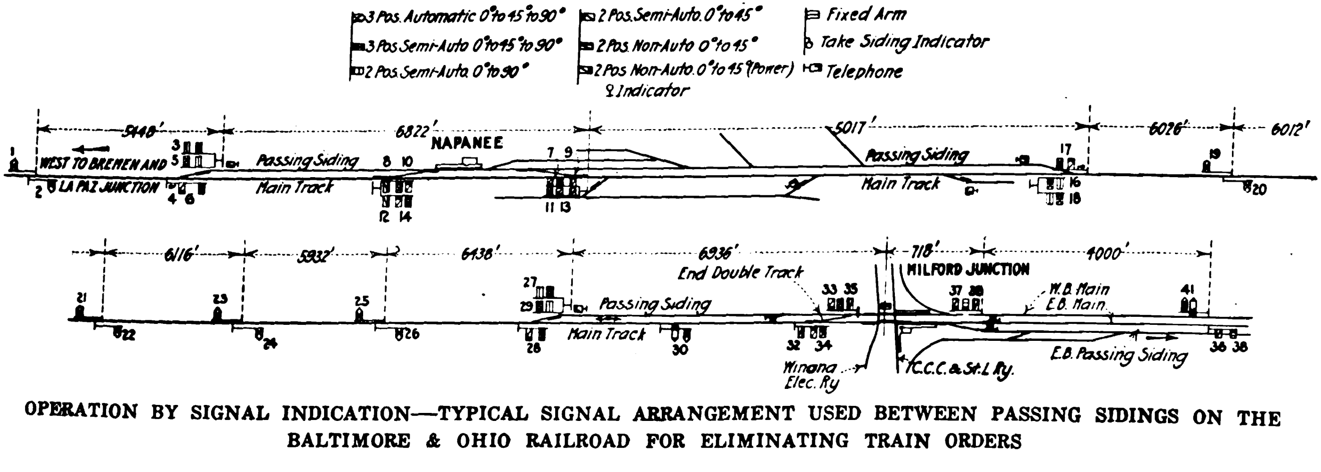
OPERATION BY SIGNAL INDICATION—PARTIAL DIAGRAM OF LOCKING CIRCUIT

Take-siding indicators are installed on the rear home block signal masts for both east-bound and west-bound movements at Napanee and at Bremen. With the exception of these and the above-mentioned low-speed signals all signals are semi-automatic in their operation and assume the stop position in the rear of the train.

Intercommunication between the stations is established by means of the telegraph and a combination circuit for telephone and tap bells, both of these being used over the same wire. Telephones for the use of trainmen are located at the outer ends of passing sidings and at the facing switches which are not within convenient distance of the offices. Trains leaving outer ends of passing sidings first obtain permission to move by telephone, and when taking the sidings, report themselves in the clear.

A notable feature in this territory is the absence of separate train order signals, these having been eliminated in accordance with the company's standard practice because of their tendency to produce complex signal indications. If it should become necessary to issue instructions to trainmen at a station, the home interlocking signals are retained in the stop position and a red flag by day and a red lamp at night are displayed. This system of signaling, it may be said, is quite similar to that installed in 1912 between Germantown and Washington Junction, Md., on the Baltimore & Ohio Railroad, the trains being operated entirely under signal indication in both territories. The cost of the more recent installation was approximately $2,700 per mile, of which about $500 was for labor. The cost per signal, including interlocking, was roughly $1,000.

A Swiss journalist says the streets of Belgrade are practically deserted, the city looking as if visited by a plague. Street car tracks are rusting away, the parks ruined, shops and houses deserted, and the university building and king's palace almost wrecked by shells.


3 Pos. Automatic 0° to 45° to 90°
3 Pos. Semi-Auto 0° to 45° to 90°
2 Pos. Semi-Auto. 0° to 90°
2 Pos. Semi-Auto. 0° to 45°
2 Pos. Non-Auto 0° to 45°
2 Pos Non-Auto. 0° to 45° (Power)
Indicator
Fixed Arm
Take Siding Indicator
Telephone
5448'
6822'
5017'
6026'
6012'
NAPANEE
WEST TO BREMEN AND LA PAZ JUNCTION
Passing Siding
Main Track
Passing Siding
Main Track
1
2
3
5
4
6
8
10
12
14
7
9
11
13
17
16
18
19
20
6116'
5932'
6438'
6936'
718'
4000'
End Double Track
MILFORD JUNCTION
21
22
23
24
25
26
27
29
28
30
Passing Siding
Main Track
33
35
32
34
37
39
41
36
38
W.B. Main
E.B. Main
E.B. Passing Siding
Winona Elec. Ry
C.C.C. & St. L Ry.

OPERATION BY SIGNAL INDICATION—TYPICAL SIGNAL ARRANGEMENT USED BETWEEN PASSING SIDINGS ON THE BALTIMORE & OHIO RAILROAD FOR ELIMINATING TRAIN ORDERS

Pittsburgh Railways Claim Department

Description of Application of Psychological Principles and Personal Efficiency Ideals to the Work of Handling Claim Employees and Settling Claims—General Results of Pittsburgh System

As stated in the ELECTRIC RAILWAY JOURNAL of July 24 in a descriptive article on the claim department of the Pittsburgh (Pa.) Railways, that organization merits description on account of its employment of the most modern type of organization and its recognition of the value of psychology, fixed principles, definite policies and unit efficiency in every-day claim work. The particular form of organization used, the co-operatively functional, was described in the issue just mentioned, while the psychological and similar features will be discussed in this article.

NAME OF DEPARTMENT CHANGED

Before proceeding with a discussion of these features, however, it will be well to call attention to a change in the name of the claim department that occurred after the first article was published. With the appointment of Cecil G. Rice as assistant to the president, as published in the ELECTRIC RAILWAY JOURNAL of Aug. 14, his former position of superintendent of the claim department was abolished, and the work theretofore handled by the claim department was divided among the "Associated Bureaus," comprising the five bureaus described in the previous article—clerical, inspection, medical, adjustment and litigation. The chief of each one of these bureaus handles his work under his own name and title, but uses Mr. Rice's letterhead. Mr. Rice directs the work of all the bureaus in addition to looking after such other matters as are assigned to him by the president. With this organization the bureaus can handle any problem, whether arising in connection with claims, accidents, workmen's compensation, welfare, prevention or any other line.

CHOICE OF EMPLOYEES

To take up now the points covered by this article, the first subject is the choice of employees. To show how thoroughly at present the principles of psychology and personal efficiency are used in connection with this work, it may be said that as a result of study into the factors that should be considered in the selection of the staff, the types of acceptable men have been divided into the motive, the mental and the vital. In considering these types or in choosing between them for particular kinds of work, attention is paid to nine fundamentals with various subdivisions, as shown by the analysis in the accompanying table.

METHODS OF CONTROL AND DEVELOPMENT

Reference was made in the preceding article to the methods used in compensating, promoting and developing the employees. Looking along this same line but rather from the psychological point of view, the management has analyzed the methods to be followed in the control and development of the employees into nine divisions, as follows: Imitation, competition, compensation, stimulation, commendation, relaxation, education, loyalty and love of the business. All of these are important by virtue of their influence on the minds of the employees.

1. To train the men through imitation, a new employee, for example, is sent out with the best men in the bureau to which he is assigned and learns from these the correct procedure to be followed. The men are taught that imitation of a worthy subject is commendable.

2. Competition is used as a spur to greater efficiency. No publication is made regarding the salaries of particular men, on account of possible jealousy, but the employees are kept informed in the abstract as to whether other men are doing more units of work.

3. The compensation method, of course, is the unit system of payment, which, as stated above, forms the basis also for competitive work. This system was described in the preceding article.

4. By stimulation is meant the direct personal efforts of the management to spur the employees on to better work. Each man in the associated bureaus is paid by check. Each month Mr. Rice calls them in one by one on pay day, hands out the checks and asks them how the work is going. These friendly talks are encouraging to the men and also enable the management to touch quickly upon any dissatisfaction that may have arisen.

TABLE SHOWING NINE FUNDAMENTALS USED IN CHOOSING TYPES OF EMPLOYEES

1—Health	*a*—Body *b*—Mind	
2—Appearance	*a*—Pleasing *b*—Dignified *c*—Confident	
3—Education	*a*—Mental	1—General 2—Special
	b—Moral	
4—Honesty	*a*—Thought *b*—Speech *c*—Action *d*—Conduct	
5—Sobriety	*a*—Habitually temperate *b*—Dispassionate *c*—Self-controlled *d*—Unprejudiced	
6—Environment	*a*—Surrounding conditions (home) *b*—Surrounding conditions (society) *c*—Surrounding forces (business)	
7—Loyalty	*a*—Faithful *b*—True *c*—Sincere	to 1—Persons 2—Principles
8—Judgment	*a*—Tact *b*—Decision *c*—Discernment *d*—Discrimination *e*—Intelligence *f*—"Common sense"	
9—Capacity	*a*—Ability	1—Initiative 2—Reasoning 3—Energy 4—Application 5—Experience
	b—Power	1—Intuition 2—Determination 3—Resourcefulness 4—Enthusiasm 5—Confidence
	c—Character	1—Quality 2—Character 3—Temperament 4—Ambition 5—Pride

5. In applying the commendatory method, the management follows the general rule that every employee who does a good piece of work should be made to know this fact has come to the attention of Mr. Rice. For example, a note of thanks is often sent to the chief of the bureau for the man who accomplishes any unusual or especially commendatory act.

6. As to relaxation, the company attempts to have the men work as little as possible in the evening. During the summer they are granted a two weeks' vacation with pay, according to a definitely prearranged schedule. In this connection the management has developed a novel "vacation award" voucher, whose purpose is to show definitely the date allotted, to state in dollars and cents

the actual cost of the vacation to the company and to suggest the management's appreciation for services rendered rather than the mere regarding of the vacations as a matter of routine. The employee indorses this voucher and upon his return delivers it to the superintendent in exchange for the payroll voucher. If any employee happens to be going to some place where he can do work for the department, the company pays part of the expenses.

7. The point of education is covered by the meeting papers, the library and the like. The employees are encouraged to read different books, such as the efficiency books of Walter Dill Scott, and various inspirational books, and they are all required to read the newspapers in order to keep informed on current events. They must, however, avoid the subjects of religion, politics and the war in their conversation with others.

8. The management makes a special effort to inspire loyalty in all the employees and to create a spirit of steadfast allegiance to Mr. Rice as an officer and as an individual, to the chief of the bureau, to the bureau, to all the associated bureaus and to the company. The honor system is applied in handling the men, they being assured of opportunity to prove their worth as men without distasteful espionage. They are assured a fair hearing and the support of the management.

9. In order to create a love for the business, the men are not allowed to do secret service work but must always use their own names and titles. Each one bears a finely lithographed card, stating that he is a duly accredited representative of the associated bureaus. This card is signed by the president as well as by Mr. Rice, and also by the director of the Pittsburgh department of public safety, granting the bearer the courtesy of that department. The care taken in these matters places the calling upon a higher plane in the minds of the men and those with whom they come into contact. The management guarantees to fulfill any promises made by employees, but they are especially taught that the old "strong-arm" claim agent is extinct and that in every act they must be so dignified, honorable, polite and above-board that no act of theirs will cast discredit upon the modern form of claim representative, their own officers or the department. They are made to see that the work is perfectly honorable and dignified, a feeling which is a necessary and most important foundation for the inculcation of a similar feeling on the part of the public. The theory that confidence and fairness beget confidence and fairness is developed.

EMPHASIS ON FIXED PRINCIPLES

As stated in the preceding article, the management has made up six fixed principles to govern the work of the employees. These are as follows:

1. *Maximum Accuracy*—Incontrovertible facts unearthed from all available sources.
2. *Utmost Expediency*—The promptest action in accord with propriety and correctness.
3. *Absolute Fairness*—A fixed, irrevocable policy of dealing with justice to all concerned.
4. *Persistent Courtesy*—Constant politeness combined with kindliness.
5. *Minimum Consistent Expenditures*—Disbursements proportionate to all the facts.
6. *Perfected Co-operation and Efficiency*—Working in harmony to produce the most satisfactory results with the least expenditure of time and effort.

The management takes great care to impress these principles upon the employees on account of the benefit to be derived by the employees and by the department if they are always kept in mind. In each office of the bureaus all the principles are printed, framed and posted. When a new man comes into the office, he is made to understand that there are high ideals in claim work, and both he and the old men are constantly reminded that these principles are the fundamental rules that must guide their every act.

Moreover, each outside man has a black leather pocket case which on one-half inside contains his lithographed identification card and on the other his name and a list of the six principles, with this statement: "Issued as official instructions for your guidance." This has a beneficial effect not only upon the bearer but also upon all to whom the identification case is presented for inspection.

FUNDAMENTAL PSYCHOLOGICAL PRINCIPLES

In developing the use of psychology in claim work, the management has analyzed for the convenience of employees the various methods of arriving at decisions and essentials governing the procedure, as follows:

1. How decision is arrived at:
   - *a*—Reasoning pro and con by elimination.
   - *b*—Reasoning and choosing by result of effect on mind.
   - *c*—Intuition.
   - *d*—Hazard.
   - *e*—Suggestion.
2. Essentials governing procedure:
   - *a*—Overcome prejudice:
     Show by logical argument and analogy that which is true and right and thus conciliate those who prejudge without knowledge of the facts.
   - *b*—Inspire confidence:
     Give life to trust and reliance, causing others to believe in you and to realize that you are sincere, honest and desirous of dealing equitably.
   - *c*—Analyze and reduce to a business basis:
     Separate into component parts and prove by calculation and weight of the evidence the value of what is being purchased.
   - *d*—Create a desire:
     Bring into existence a longing for the possession of that which will reasonably compensate for the loss sustained, considering the degree of responsibility for such loss.
   - *e*—Cause a determination:
     Bring about a condition of mind that will result in the principal resolving to end the matter at once by exchanging that which he controls for that which you as a representative of the company possess.
   - *f*—Satisfactorily close the transaction:
     When you have relieved the mind of doubt and animus and created a feeling of gratification by having set aright and made amends for possible wrong or injury done, then only have you most satisfactorily terminated the matter in hand.

These six psychological essentials have been thoroughly explained with particular reference to their application to the work of adjusting a claim. Adjusters in particular clearly recognize the worth of psychology in their daily work and tend more and more to develop their cases along correct psychological lines. It has been proved that these essentials are the successive steps taken in effecting a settlement, whether consciously or unconsciously.

APPLICATION OF PSYCHOLOGY

The fundamental facts underlying the Pittsburgh Railways' application of psychology to claim work are:

1. The department does not settle the "claim" but "with the claimant," his personality often being more

important than the facts and circumstances surrounding the accident.

2. Results are achieved by either logical argument or suggestion, or both.

3. A statement must of necessity be accepted as true unless a negative thought arises in the mind.

4. To inhibit a negative idea a positive one must be developed, and *vice-versa* to develop a positive idea the negative must be inhibited.

With these fundamental facts and the further explanation that psychology is the science of the mind and science is but the orderly arrangement of relative facts, the application of psychological principles is simplified for the employee by such elementary illustrations as the following:

For a "claim agent" to address a person injured in an accident as a "claimant" suggests a claim, but to approach him as a "safety inspector" and refer to him as the "principal" inhibits the idea of a "claim."

To attempt to secure a "statement" from a principal suggests an act associated with law or litigation. To ask him for a "description of the occurrence" avoids any suspicion before it is aroused. Similarly, it is better to call witnesses "observers." To say "just write your name here, please" will bring a compliance (particularly if it is accompanied by a tender of the principal's own pen casually picked up from his desk) more often than to request him to "sign" his name.

To ask a principal to "allow," "submit" or "undergo" an examination immediately suggests the principal's right to refuse and brings to his mind the embarrassment and possible irrelevant discoveries from an inspection by a doctor. Merely saying, "Our doctor will arrange with your physician for an examination at your convenience" not only inhibits the negative idea but prevents any thought of embarrassment.

To say "It is more dignified and safer to face forward when alighting" will appeal to a woman more readily than the command "Don't alight from a car backward."

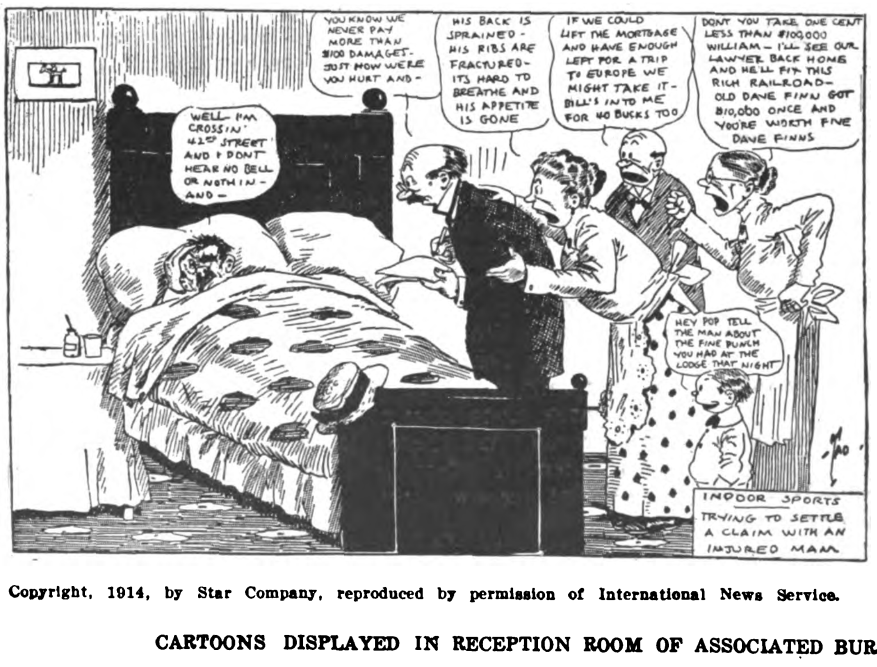
As an extreme example of the negative idea, the following incident of the boy who applied for a position is related to the employees. The boy approached the prospective employer with the words, "I don't suppose you don't know about no man that don't want to hire no kid to do no work for nothing fer him, do you, or don't you?" "Yes," answered the man thus eloquently addressed, "I don't."

SUGGESTION BY FRAMED CARTOONS

That suggestion may be by inanimate objects as well as by words or acts is strongly developed in the reception room. On the wall between the entrance door and the desk of the reception clerk are hung various enlarged, colored and framed cartoons clipped from the daily newspapers. These cartoons, some of which are shown in the accompanying illustrations, all refer to street railway operation. The first ones include cartoons showing "Mutt and Jeff" consulting a lawyer; an outburst by "Everett True," who becomes incensed at a teamster holding the track; a couple trying to convince the conductor that their 150-lb. son is under five years of age; the chronic complainer airing his views to the helpless conductor, and the result of an automobile driver failing to heed a danger sign. All of these possess that inimitable and striking humor so cleverly expressed in cartoons. Farther along and arranged to catch the eye of the caller at the psychological moment, are other cartoons showing an injured man, with the assistance of all the members of his family, telling his story to a claim agent and having the whole fabric of it spoiled by his talkative son; the claimant who sued the "company" but found himself indebted to his attorney even after recovering damages; the well-known portrayal of the "lawsuit," wherein the litigants are pulling at the head and the tail of a cow while the attorney does the milking; the red tape attending litigation, and other subjects.

There are also displayed pictures of ex-President Taft and other notables at a local ball game before and after a home run by Wagner was declared a two-base hit on account of ground rules, and photographic illustrations of the advance in electric railway equipment. To add a fine touch of mutuality a caricature of Mr. Rice is also exhibited. Unless the visitor to the reception room is a "shyster" lawyer, these silent arguments never fail to make a good impression. The fact that cartoonists are seeing the humorous futility of "suing the company" rather than acting as any sane business man would do in properly presenting any evi-

:-: **INDOOR SPORTS--By Tad** :-:


WELL I'M CROSSIN' 42ND STREET AND I DONT HEAR NO BELL OR NOTHIN - AND -
YOU KNOW WE NEVER PAY MORE THAN $100 DAMAGES - JUST HOW WERE YOU HURT AND -
HIS BACK IS SPRAINED - HIS RIBS ARE FRACTURED - ITS HARD TO BREATHE AND HIS APPETITE IS GONE
IF WE COULD LIFT THE MORTGAGE AND HAVE ENOUGH LEFT FOR A TRIP TO EUROPE WE MIGHT TAKE IT - BILL'S INTO ME FOR 40 BUCKS TOO
DONT YOU TAKE ONE CENT LESS THAN $100,000 WILLIAM - I'LL SEE OUR LAWYER BACK HOME AND HE'LL FIX THIS RICH RAILROAD - OLD DAVE FINN GOT $10,000 ONCE AND YOU'RE WORTH FIVE DAVE FINNS
HEY POP TELL THE MAN ABOUT THE FINE PUNCH YOU HAD AT THE LODGE THAT NIGHT
TAD
INDOOR SPORTS
TRYING TO SETTLE A CLAIM WITH AN INJURED MAN

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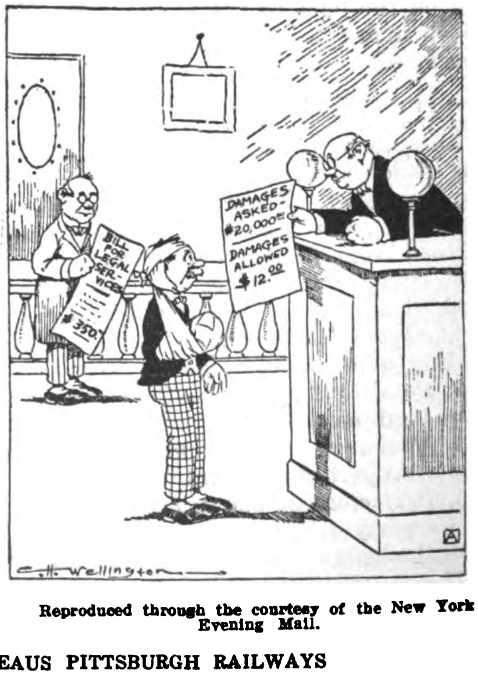
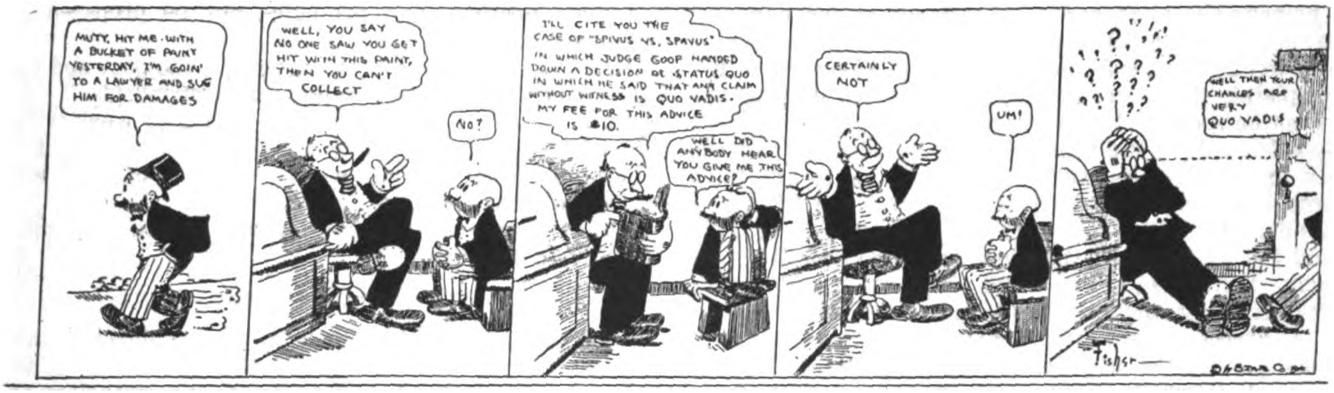
—and the Worst Is Yet to Come


BILL FOR LEGAL SERVICES
$350.00
DAMAGES ASKED - $20,000.00
DAMAGES ALLOWED $12.00
C. H. Wellington

Reproduced through the courtesy of the New York Evening Mail.

CARTOONS DISPLAYED IN RECEPTION ROOM OF ASSOCIATED BUREAUS PITTSBURGH RAILWAYS

Mutt and Jeff--The Little Fellow Also Knows Some Law and Proves It By "Bud" Fisher


MUTT, HIT ME WITH A BUCKET OF PAINT YESTERDAY, I'M GOIN' TO A LAWYER AND SUE HIM FOR DAMAGES
WELL, YOU SAY NO ONE SAW YOU GET HIT WITH THIS PAINT, THEN YOU CAN'T COLLECT
NO?
I'LL CITE YOU THE CASE OF "SPIVUS VS. SPAVUS" IN WHICH JUDGE GOOP HANDED DOWN A DECISION OF STATUS QUO IN WHICH HE SAID THAT ANY CLAIM WITHOUT WITNESS IS QUO VADIS. MY FEE FOR THIS ADVICE IS $10.
WELL DID ANYBODY HEAR YOU GIVE ME THIS ADVICE?
CERTAINLY NOT
UM!
WELL THEN YOUR CHANCES ARE VERY QUO VADIS
Fisher

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CARTOON DISPLAYED IN RECEPTION ROOM OF ASSOCIATED BUREAUS PITTSBURGH RAILWAYS

dence of indebtedness, is in the opinion of the management an evidence of the trend of public opinion.

DEFINITE POLICIES

As a matter of fact, the six fixed principles summarize the policy of all the bureaus. In dealing with attorneys, doctors and the public, however, still more specific positions are outlined.

It has come to be understood by the profession that any reputable attorney who properly represents a legitimate claimant will be received with all due regard for the ethics of his profession. If an attorney enters suit after having given the department an opportunity to adjust the claim and if the claim was not solicited by or for him, no settlement will be made directly with the plaintiff. If, however, suit is entered without any attempt to effect an adjustment or if the case was solicited, the management openly declares its right to deal directly with the principal if it so desires.

Doctors are made to understand that in any case the department is interested in the injured person receiving such treatment as will result in the best possible recovery from the injuries sustained. If the doctor gives the department a report, a reasonable first attention fee will be paid. If later a settlement is made, the doctor's bill for subsequent treatment, if reasonable, will be included in the amount of the settlement but paid directly to the doctor by the company. It is made plain that the doctor is expected to be fair and neutral in his attitude and must not act as an adjuster. If he believes that the department is fair in its dealings with principals and that his patient can secure what is due him without the expense of litigation, the doctor is asked to suggest to his patient, if the opportunity affords, the advisability of dealing directly with the company. The doctor is also told that the payment of his bill directly to him is a courtesy and not a necessary cancellation of a debt. Out of a list of 3000 doctors less than fifty are openly antagonistic to the department, and most of them without being requested will make reports of any cases treated by them. At a recent meeting of the local medical society the speakers on the subject of the "medical witness in court" voluntarily stated that in all their experience they had never been asked to report or testify to anything except what they thought to be the facts or to do any other thing which was not wholly proper.

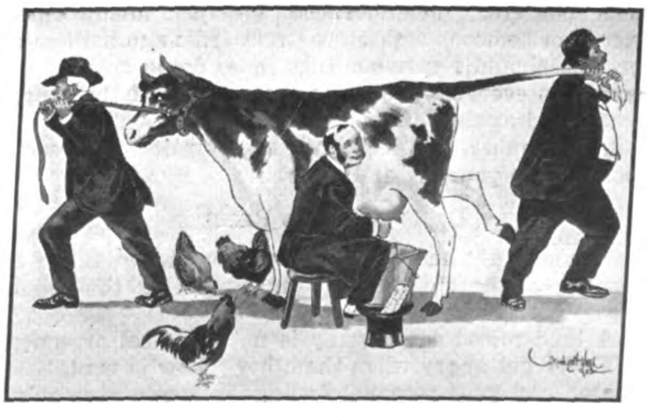
The public is told that the company never seeks to evade any responsibility resulting from an accident, that it uses all honorable means to prevent litigation, that injured persons are received as friends and not as enemies, and that claimants are dealt with in an open, honorable way without any underhanded or sleuthing methods being used. The point is made clear, however, that if any claimant seeks to defraud the company, its entire resources are used to defend its best interests. The public is told that an inquiry regarding an occurrence is not made on a claim basis always but in connection with a very sincere endeavor to prevent accidents, that such inquiry is merely for the purpose of securing the facts in the case and that in seeking facts the company is asking only for that to which any person is entitled.

A committee of the staff is now at work on the complete standardization of all arguments to be used by representatives of the bureaus. All such arguments are censored by Mr. Rice and his staff members with a view of educating the public to a proper understanding, of preventing harmful and incorrect statements, of gaining believers, of securing the most desirable results, both present and future, and above all of preventing any act or omission that might result in encouraging the filing of claims. This latter point is never lost to sight.

At present Mr. Rice and his staff are working on an analysis of the essential points to cover in each class of accidents, the compilation of company economics, an organization chart with a standardization of clerical and routine matters and also a concrete "code of ethics" to govern bureau employees, similar to that long since adopted by doctors and lawyers.

"DESIRABLE PUBLICITY FACTS"

It is assumed that any prejudice or mistrust on the part of the public against a claim department is the result of unfair acts on the part of others or an inherited



Copyright by Joseph Hoover & Sons Company, Philadelphia.

CARTOON DISPLAYED IN RECEPTION ROOM OF ASSOCIATED BUREAUS PITTSBURGH RAILWAYS erroneous conception of the business of adjusting claims. Furthermore, it is taken for granted that when a principal calls at any of the offices of the bureaus, he is a probable "claimant." In order to prepare him properly for a logical consideration and discussion of his complaint, therefore, he is greeted at the desk in the reception room and later in any office of the department by a framed printed placard which contains not only the six fixed principles, which are applicable to any business, but also eight additional paragraphs of "desirable publicity facts." The placard is signed by Mr. Rice and the president of the company. The desirable publicity facts, which are dwelt upon by outside representatives, particularly No. 6, are as follows:

1. Street railway transportation companies do not insure passengers or pedestrians against injury or damage. It is wholly unreasonable to suppose that all persons injured in connection with a street car are entitled to damages.

2. If an accident occurs, the principal should not depend solely upon the conductor to make a report but should secure the number of the motorman or conductor, the exact location and the exact time.

3. If any personal injury or property damage results for which the principal was not to blame and feels justified in making a claim, he should frankly report the details of the occurrence to the associated bureaus, together with the names of the witnesses, and give every possible assistance in making an unprejudiced investigation of all the facts and circumstances. Only dishonest claimants object to a thorough inquiry being made to corroborate the facts.

4. A claim is purely a business proposition, not a matter of law, and should be presented and handled on the same basis as any other allegation of indebtedness. Proving a claim is the same as proving a bill for work done or goods furnished.

5. Any legitimate claimant making a reasonable request for reimbursement can secure a satisfactory disposition of his claim without the expense of assistance. Since a claim is the same as a bill, it is bad judgment for a claimant to employ an attorney or enter into the embarrassment, delay and uncertainty of a suit without first presenting his proof of indebtedness direct to those he believes owe him.

6. Only three classes of people bring suits for damages against these companies, viz.:

a—Prejudiced persons unacquainted with our principles governing the handling of claims.

b—Persons entitled to something but who want more than they are entitled to.

c—Persons entitled to nothing but who want something regardless of their right to it.

7. Citizens who encourage litigation, whether "ambulance chasers," neighborhood gossips, misinformed friends or someone seeking to profit from another's misfortune, should remember that in so doing they add a burden to every taxpayer, as the expense of the courts is assessed against them.

8. Remember, we seek your co-operation to prevent accidents to yourself and others.

BASIS FOR GOOD RESULTS

Members of the bureaus have been shown that best results can be obtained by understanding the following:

A loud-voiced controversy is not a logical argument.

Never get angry when the other fellow is mad.

Don't let your personal feelings influence your official acts.

Try to see the other fellow's point of view. Put yourself in his place. Be sympathetic.

Make it easy for the other fellow to change his decision.

Expect hostility and prejudice but be prepared to overcome it.

Be more considerate of the ignorant, the poor and the dependent than the well-to-do and independent.

Success is obtained by the one who does what is assigned him better than anyone else has ever done it.

Reason; learn not only what is desired, but also why it is the most desirable.

Study the forms of expression that arouse resentment and avoid their use.

EPIGRAMS USED

The management has made up some epigrams which are furnished in copies to all the employees. These give concrete and pithy expression to the psychology and efficiency basis underlying all the departmental work. They are expressed in the following way:

1.—Criticism unreserved and appreciation unfailing is assured.
2.—Liability depends upon the circumstances.
3.—A cure for hard luck is hard work.
4.—Imitation of a worthy subject is commendable.
5.—Mastery of details eventually brings achievement.
6.—Science is but an orderly arrangement of relative facts.

1.—Freedom from personal prejudice favors fairness.
2.—Assiduous application assures accomplishment.
3.—Concentration consists of continuous contemplation of facts.
4.—To-morrow is too late to record facts of to-day.
5.—Some facts are better than none, but all the facts are best.

1.—System lessens work.
2.—Your work is honorable—honor it with system.
3.—Systematic accuracy produces profitable proficiency.
4.—Troublesome details disappear before system.
5.—Efficiency demands a systematic elimination of non-essentials.
6.—Manifestly, then, system becomes a necessity. This is a fact.

SAFETY WORK

The associated bureaus participate in the safety work that is carried on by the company to the extent of having safety lectures delivered by the officers. The men in the medical bureau are particularly active in this respect. Last year at the Pittsburgh exposition a game invented by a member of the department called "Pla-Safe" was widely distributed, and this same policy was pursued in the schools this year. This game is cleverly devised to show the dangers of and the penalties for carelessness that may arise between leaving home and returning at night. Special blotters are also sent out with every inquiry blank about accidents. These blotters play up various safety slogans, and all lay particular stress upon the last plank of the associated bureaus public platform. Other conservative and fundamentally educational plans are systematically used.

GENERAL RESULTS

A few years ago the company received less than 12 per cent of replies to inquiry blanks relating to accidents. To-day 65 per cent are returned with more or less detailed information, many of them carrying suggestions which are acknowledged by a personal letter from the "safety always" inspection bureau. This is accepted as proving the increased respect of the public toward claim department work.

Despite the fact that a county, or small claims court, has been in operation for two years, in which court a claimant may bring a suit up to $1,500 with or without the services of an attorney and with or without a jury trial, there has been a decrease of exactly 50 per cent in suits pending against the Pittsburgh Railways. Moreover, out of ninety cases heard in the county court during 1914, forty-five of them resulted in verdicts for the defendant.

By far the largest accident in the history of the company occurred on Oct. 3, 1912, when a car ran wild on a heavy grade, derailed and was destroyed. One man was killed and ninety-five other persons were severely injury. This occurred at 8 a. m. By 11 a. m. each bureau was handling its end of the problem and twenty adjusters had been assigned. By 11 p. m. that night every injured person or some of his relatives had been seen by a representative of the claim department. During the day numerous solicitors for attorneys had sought to secure the claims of the injured. Notwithstanding the almost unbelievable activity of these solicitors, some of whom continued their efforts until the last claim was settled a year and nine months later, not a suit was entered. This record was duplicated during 1914, when ninety-two claims arising from one accident were similarly handled on the Beaver Valley line. Other collisions and derailments involving fifty or more persons have been disposed of in the same way.

During the fiscal year ended in March, 1915, the total expenditures of the Pittsburgh Railways covering disbursements of every kind properly chargeable to the injuries and damages account were less by $140,000 than the amount for the corresponding previous year. In addition there was a decrease of $2,168,866 in the amount sued for in suits pending, the number of suits being lower than at any time during the last ten years.

A Simple Work-Order System

The System Described Is Particularly Adapted to Roads with Revenues of Less than $1,000,000 a Year

BY M. W. GLOVER, SECRETARY AND AUDITOR MOBILE LIGHT & RAILROAD COMPANY

The principal trouble with accounting systems devised for keeping accurate cost records is the expense necessary to produce the desired results. This is a problem especially interesting to lines whose gross revenues are less than $500,000 per year. Of 382 lines reported in 1914, 259, or 68 per cent, represented companies with gross revenues under $500,000 per year.

A complete work-order system, such as has been so admirably described by G. W. Kalweit, auditor Milwaukee Electric Railway & Light Company, in a paper presented at the 1913 Accountants' Association Convention, and published in the ELECTRIC RAILWAY JOURNAL for Oct. 15, 1913, may be used by any company, but many smaller companies have not found it possible to use this system on account of the expense necessary to carry it out in detail. Other "A. F. E." "job order" or "work-order" systems have been described from time to time, but most of them have been devised for the use of large companies, and the smaller lines have been getting along without any definite system of cost accounts. This is an unfortunate condition, as the information regarding costs, which can be furnished through a satisfactory work-order system, cannot be overestimated.

The management of every property, however small, should be in a position to know the exact cost of each specific job undertaken. If three city blocks of track are to be reconstructed, it is important to know just what a similar job cost on some other property, or at some other time or place on the same property. The direct charges made to operating expenses or to road and equipment accounts do not represent the entire cost of the work, and if no cost accounting system is in use it is impossible to compare the cost of similar jobs. What contractor would build a structure conforming to certain specifications without having access to the cost statements of similar buildings, and he would revise such cost statements to meet any changes caused by altered conditions. Yet railway companies are extending their lines, improving existing properties and expending large sums without providing a proper record of the actual costs of the improvements and in many cases, even where records are kept, they fail to include charges which rightfully belong to the improvement. When the cost of these improvements are to be paid from the proceeds of a bond issue, or are charged to capital accounts, this failure to include all proper charges becomes a serious matter.

Many persons think that it is sufficient to keep accounts in accordance with classifications prescribed by the Interstate Commerce Commission or state railway commissions, to determine properly the cost of any work. This is an error, as a cost accounting system is entirely distinct from the regular system of accounts, but such system should be handled in connection with the regular system of accounts to prevent erroneous charges entering into the cost of any job, as well as to prevent the omission of proper charges from the cost statements.

It is generally admitted that no company is so small that it should not have some system of work orders to properly record the cost of improvements undertaken, as well as the cost of work of any magnitude chargeable to maintenance. It should be needless to add that a cost-accounting system should be kept by the accounting department and not by the department doing the work, as has sometimes been suggested. The principal reason for this is that overhead charges, which enter largely into the cost of all work, cannot be accurately determined except from the records of the accounting department.

A simple work-order system designed for the use of smaller companies, but which may be used by companies of any size, is briefly described below.

It is a matter of personal choice whether the name of the system used is "Authority for Expenditures" (A. F. E.), "Job Order" or "Work Order," but the name "Work-Order System" will be used here. This system can be used for work chargeable to additions and betterments, reserve funds or operating expenses, a separate series of numbers to be assigned to the different classes of work orders.

The only book needed is a journal with ten or more columns, according to the number of subdivisions desired for showing details of the work. If subdivisions are not designed, a separation of charges between labor and material only may be used. All work orders should be issued by the accounting office upon the request of the department interested, and they should be consecutively numbered; a separate series of numbers being used for work chargeable to additions and betterments, reserve funds or operating expenses, if desired.

Work orders may be divided into general and specific, or into any other subdivisions desired.

General work orders apply to charges for certain general work over a stated period of time.

Specific work orders cover the work on a specific job.

When a work order is requested, if the work is to be charged to additions and betterments or reserve funds, the authority for doing the work should be furnished;

if the work is chargeable to operating expenses it is not necessary that executive authority be furnished. In all cases the request for a work order should specify the exact nature and extent of the work, and the subdivisions which it is desired to keep of the charges.

When a work order is issued a copy should be furnished all officials interested and the accounts to be charged should be shown; the work-order number must be shown against each charge, in addition to the road and equipment or operating expense accounts chargeable. Thus, no matter where the charge originates, whether from the voucher record, payroll or material distribution, both the accounts and the work-order number should be shown. There are several reasons for this; one being to guard against errors; another, to familiarize all employees with the accounts chargeable for certain work. With other work-order systems it is customary to make all charges to the work order only, and at the end of the month, or when the work is completed, to clear the work-order account and distribute the charges to the proper road and equipment, reserve funds or operating expense accounts. This often results in an incorrect distribution of the charges, caused by the necessity of obtaining the figures before closing the accounts at the end of the month.

The following illustrations show how the system would be handled upon a request from the department preparing to do the work, the first work order being chargeable to road and equipment expenditures; the second being chargeable to operating expenses:

---

(1)

WORK-ORDER NO. 278.

Charge to the above work order all expenses in connection with the construction of 1 mile of track on Government Street, from Georgia Avenue to Houston Street.

Charge these expenses to the proper road and equipment accounts, and show the above work order number in addition against each charge.

Subdivide charges to this work order as follows:

A—Grading	$......
B—Ballast	......
C—Ties	......
D—Rails, fastenings and special work	......
E—Track and roadway labor	......
F—Paving	......
G—Poles and fixtures	......
H—Distribution system	......
J—Other direct expenses (inc. Eng. and Supt.)	......
Total	$......
K—Overhead charges	......
Grand total	$......

(2)

WORK-ORDER NO. 342.

Charge to the above work order all expenses in connection with repainting car No. 225.

Charge these expenses to operating expense account No. 30 "passenger and combination cars," and show the above work order number in addition against each charge.

Subdivide charges to this work order as follows:

A—Striping	$......
B—Sand blasting, cleaning and painting outside	......
C—Sand blasting, cleaning and painting inside	......
D—Trimming	......
E—Other direct expenses (inc. Supt.)	......
Total	$......
F—Overhead charges	......
Grand total	$......

Copies of these work-orders should be sent to each official interested. In turning in time for employees engaged on this work the ticket should show the road and equipment or operating expense accounts, and in addition the work-order number. The payroll distribution, requisitions for material, and all other charges for work covered by a work-order, should show the expense accounts as well as the work-order number. The work-order record is kept entirely separate and does not interfere in any way with the other records of the accounting department. During the continuance of the work, a statement may be prepared from the work-order record, showing the charges to date, and this information is of value to the management of the company, as well as to the department doing the work, as it shows just how the work is progressing. When the work is completed a statement should be made showing the entire cost of the work.

The overhead charges in each case should be added by the accounting department and they should be determined by a careful analysis of the work done, care being exercised to see that all proper overhead charges are included.

Where work is chargeable to road and equipment or reserve fund accounts, the amount of overhead charges should be debited to the proper accounts and operating expenses credited, by journal entry, in accordance with instructions contained in the classification prescribed by the Interstate Commerce Commission, but where the work is chargeable to operating expenses, the charges for overhead expenses will simply be shown on the work-order record for information only, and no journal entry made to cover.

A general work-order may be issued to cover the cost of renewing ties, or for any work extending over an entire year or a portion of a year when it is desired to arrive at the actual cost of such work; in fact, this system can be used to advantage in many ways for determining the cost of small jobs undertaken, as the additional work involved is negligible and can be handled without any additional clerical help.

If more information is desired the unit costs can be determined and additional statements analyzing the work undertaken can be prepared.

There is no statement furnished by the accounting department of more value to the management than statements of costs, and where this can be done without increase in expense there is no excuse for any company, however small, failing to keep such records as will enable the exact cost of work to be determined. In fact, the division of valuation of the Interstate Commerce Commission has already issued orders requiring carriers subject to its jurisdiction to adopt a uniform system of cost accounting for work chargeable to maintenance as well as for road and equipment expenditures, and it will not be long before all lines will be required to keep a cost-accounting system for determining the actual cost of work done, whether chargeable to maintenance or to capital accounts.

The system outlined above is simple, inexpensive and easily handled and can be made to furnish valuable information as to the cost of work undertaken. It is not intended to take the place of work-order systems devised for the use of lines whose revenues amount to more than $1,000,000 per year, and who can afford the expense necessary for an elaborate system of cost accounts, but a test of the system will prove that it can be used to advantage by all smaller lines.

Interurban Railway Co-operates with Fair Associations

The lines of the Louisville & Interurban Railway, Louisville, Ky., pass two county fair grounds, at both of which fairs have recently been held. One of these is the Fern Creek Fair of Jefferson County, and the other the Shelby County Fair, at Shelbyville. The company has made a practice for several years of assisting the fair associations in every manner possible in their advertising and in the way of transporting exhibits, supplies, etc. During the days that each of the fairs is under way special service is provided. Most of the traffic is from Louisville out, large numbers of Louisville residents having earlier been residents of the sections where the fairs are held. For both occasions also the company supplies special cars one day at each place to carry delegations representing Louisville commercial organizations.

Boston versus Glasgow

The September issue of *Concerning Municipal Ownership* contains an illuminating comparison, made by F. G. R. Gordon, the prominent labor man and advocate of private ownership for public utilities, on the subject of street railway operation in Boston and Glasgow, the two cities here and abroad whose local conditions most nearly approximate each other. According to Mr. Gordon, the unusually low cost of operation of the Glasgow municipal street railway system is largely caused by two factors—namely, low wages (the average wage rate being less than half that paid in Boston) and the lower overhead expenses, fewer cars being operated per thousand population. For each passenger fare paid on the privately owned railways of Boston, labor receives 2.04 cents; out of each passenger fare in Glasgow, under municipal ownership, labor receives about ½ cent.

The fact that labor is cheap, says Mr. Gordon, serves to reduce both the price of commodities and the cost of operation in Glasgow. For instance, the price of coal is $1 a ton less in Glasgow than in the average American city. Rents, too, are less, and the cost of building is much lower in Glasgow than in Boston. Thus in 1913* the cost of material and power on 196 miles of street railway in Glasgow was only $955,000. In 1914, similar charges in Boston amounted to $4,050,795.

For 1914 Boston received, directly and indirectly, $1,394,611 in taxes from the street railway system, or three-fifths as much as the 136 municipal street railway systems of the United Kingdom combined paid to their respective municipalities the year previous. In 1913 Glasgow received $336,000 in the way of general rates and taxes. Thus the entire sum received, directly and indirectly, from the municipal street railway system aggregated only $569,000 as compared to more than two and one-third times as much received by Boston from her privately owned street railway system.

Mr. Gordon questions whether the low fares in Glasgow in reality constitute a saving to the people. The British municipal street railways have adopted the so-called zone system. In 1913 the Glasgow street railways carried 311,000,000 passengers at an average fare of a little less than 2 cents. A ride which covers the first zone, a distance of 1.15 miles, costs 1 cent. Beyond this point another fare is paid and so on up to 14 cents, the entire length of the Glasgow tramway system being about 14 miles. In Boston one may ride 20 miles for 5 cents. Moreover, in Glasgow no transfers are given, while in Boston free transfers bring the average fare down to about 3.5 cents.

This system has helped greatly in the formation of the large suburban population around Boston. The zone system in Glasgow, on the contrary, has favored a concentration of the population within a very constricted area. In fact, 30 per cent of the working-class families in Glasgow live in one-room tenements. Only 2 per cent of Boston families occupy only one room.

When the street railway fare paid by Bostonians is measured by the ability of the average citizen to pay for such service, it is found that the average workingman in Boston receives more than twice the pay of the workingman engaged in a similar occupation in Glasgow. In fact a 5-cent fare in Boston assumes the proportions of a 2-cent fare in Glasgow.

Other features mentioned by Mr. Gordon include the following: The Glasgow system has 1 mile of track to each 7000 of population. The Boston system has 1 mile of track to each 2000 of population. Under municipal ownership the employees of the Glasgow street railway system are not allowed to organize a union, but the employees of the privately-owned street railway system of Boston are allowed to unionize. To Mr. Gordon's mind, all these facts demonstrate, as far as a comparison of street railways in different countries can, the tremendous superiority of private over public ownership of street railways.

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* In view of present conditions in Europe, the report for 1913 is taken as offering a fairer comparison.

Copper Zones for Shore Line Electric Railway

A Novel Form of Duplex Receipt Provides for Stations Numbered in Accordance with the Fares Charged Between Them, and Is Used for a Transfer to Branch Lines

A change of rates has just been put into effect on the Saybrook and East Lyme divisions of the Shore Line Electric Railway, Norwich, Conn., by which the copper zone system of fares is established on the company's trackage between New Haven and New London. In connection with this the company has developed a cash receipt and transfer which is distinctly novel and which has been made the subject of an application for patent. The illustration on the following page shows the form that this ticket takes.

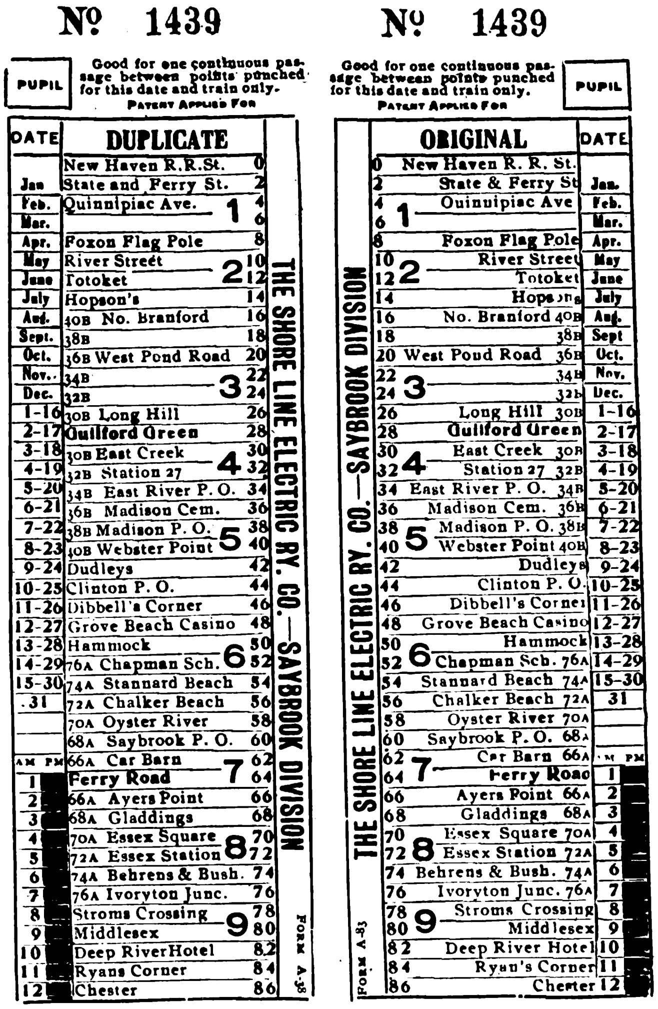
There are two forms, the one shown in the illustration on page 444 being used for what is called the main line, between Chester and New Haven. This division includes a branch line from Guilford to Stony Creek, and a certain number of stations out on the East Lyme division to which transfer is made at the station known as Ferry Road, No. 64.

METHOD OF APPLICATION

An examination of this ticket will show numbers opposite the names of the stations, beginning with New Haven at 0. These represent the exact amount of fare from New Haven. Guilford is station No. 28, and consequently the fare from New Haven to Guilford is 28 cents. Chester is station No. 86, and the fare from New Haven to Chester is 86 cents, the fare between any two stations is arrived at by subtracting the number opposite one station from the number opposite the other. A conductor who is not quick at figures may place the 0 of one ticket against the station from which he takes on a passenger and the exact fare may then be read to any other point on the line. For instance, place New Haven, 0, against Guilford Green, 28, and opposite Ferry Road, station 64, appears the number 36. The fare then from Guilford Green to Ferry Road is 36 cents. This figure may also be arrived at by the means described on the ticket, namely, to subtract 28 from 64. The result is the same, 36 cents.

The large figures from 1 to 9 that appear on the ticket have really no special relation to the system except that when a conductor arrives at station 22, going out from New Haven, the large figure 3 calls his attention to the fact that he should collect his Guilford Green checks between stations 22 and 24. Going west, that is from Chester to New Haven, the figure 4 warns him that he should collect his Guilford Green checks between stations 32 and 30. As a large number of people travel back and forth between the Saybrook carhouse, station 62, where steam road connection is made, and Ferry Road, the company's own junction, the figure 7 is placed between these two stations (62 and 64) as the conductor collects there in both directions.

The company is also providing a little clip to attach to the seat or pilaster of the car into which the destination check can be readily placed when folded, and these large figures seen through an opening in the clip. In other words, a conductor going out from New Haven



No 1439

PUPIL

Good for one continuous passage between points punched for this date and train only.

PATENT APPLIED FOR

DATE	DUPLICATE		
	New Haven R.R.St.		0
Jan	State and Ferry St.		2
Feb.	Quinnipiac Ave.	1	4
Mar.			6
Apr.	Foxon Flag Pole		8
May	River Street	2	10
June	Totoket		12
July	Hopson's		14
Aug.	40B No. Branford		16
Sept.	38B		18
Oct.	36B West Pond Road		20
Nov.	34B	3	22
Dec.	32B		24
1-16	30B Long Hill		26
2-17	Guilford Green		28
3-18	30B East Creek	4	30
4-19	32B Station 27		32
5-20	34B East River P. O.		34
6-21	36B Madison Cem.		36
7-22	38B Madison P. O.	5	38
8-23	40B Webster Point		40
9-24	Dudleys		42
10-25	Clinton P. O.		44
11-26	Dibbell's Corner		46
12-27	Grove Beach Casino		48
13-28	Hammock	6	50
14-29	76A Chapman Sch.		52
15-30	74A Stannard Beach		54
.31	72A Chalker Beach		56
	70A Oyster River		58
	68A Saybrook P. O.		60
AM PM	66A Car Barn	7	62
1	Ferry Road		64
2	66A Ayers Point		66
3	68A Gladdings		68
4	70A Essex Square	8	70
5	72A Essex Station		72
6	74A Behrens & Bush.		74
7	76A Ivoryton Junc.		76
8	Stroms Crossing	9	78
9	Middlesex		80
10	Deep River Hotel		82
11	Ryans Corner		84
12	Chester		86

THE SHORE LINE ELECTRIC RY. CO.—SAYBROOK DIVISION

FORM A-38

No 1439

Good for one continuous passage between points punched for this date and train only.

PATENT APPLIED FOR

PUPIL

		ORIGINAL	DATE
0		New Haven R. R. St.	
2		State & Ferry St	Jan.
4	1	Quinnipiac Ave	Feb.
6			Mar.
8		Foxon Flag Pole	Apr.
10	2	River Street	May
12		Totoket	June
14		Hopsons	July
16		No. Branford 40B	Aug.
18		38B	Sept
20		West Pond Road 36B	Oct.
22	3	34B	Nov.
24		32B	Dec.
26		Long Hill 30B	1-16
28		Guilford Green	2-17
30	4	East Creek 30B	3-18
32		Station 27 32B	4-19
34		East River P. O. 34B	5-20
36		Madison Cem. 36B	6-21
38	5	Madison P. O. 38B	7-22
40		Webster Point 40B	8-23
42		Dudleys	9-24
44		Clinton P. O.	10-25
46		Dibbell's Corner	11-26
48		Grove Beach Casino	12-27
50	6	Hammock	13-28
52		Chapman Sch. 76A	14-29
54		Stannard Beach 74A	15-30
56		Chalker Beach 72A	31
58		Oyster River 70A	
60		Saybrook P. O. 68A	
62	7	Car Barn 66A	AM PM
64		Ferry Road	1
66		Ayers Point 66A	2
68		Gladdings 68A	3
70	8	Essex Square 70A	4
72		Essex Station 72A	5
74		Behrens & Bush. 74A	6
76		Ivoryton Junc. 76A	7
78	9	Stroms Crossing	8
80		Middlesex	9
82		Deep River Hotel	10
84		Ryan's Corner	11
86		Chester	12

THE SHORE LINE ELECTRIC RY. CO.—SAYBROOK DIVISION

FORM A-83

NEW FORM OF PASSENGERS' FARE RECEIPT FOR COPPER ZONE SYSTEM

would fold his Guilford Green checks so that the figure 3 would show through the clip, and, coming in from Chester, he would fold his Guilford Green checks so that the figure 4 would show through the opening in the clip. Whether this feature will be of great value depends upon experience, but it is believed that conductors will make considerable use of it.

There are no overlapping zones, and the zones are somewhat in excess of 1 mile each, depending upon the location of little settlements or groups of houses, as terminals of the zones have been worked out to accommodate the largest number of people and have taken into consideration the direction in which these people most frequently travel. There is a minimum charge of 5 cents, which covers a ride in any part of two zones. A rider passing into the third zone is charged 6 cents; the fourth zone 8 cents, an additional charge of 2 cents being made for each zone.

USE AS TRANSFER

The use of this ticket as a transfer is also novel. The branch line stations are numbered and lettered, although the names do not appear on the ticket. Guilford is the first junction out from New Haven, and it will be noticed in the lines each side of 28, first toward Chester, 30B opposite 30, 32B opposite 32 and so on up to 40B. The station that is indicated by 40B is the end of this branch line, and this is a station that is called Stony Creek. The fare from New Haven to Stony Creek is 40 cents. That is to say, this station 40B appears in the line against 40, and the difference between punched holes governs the rate. A passenger bound from New Haven to Stony Creek would receive an original destination check, or cash receipt, punched opposite 0 and on the other side of the ticket in the line 40.

If the passenger was going from Chester, or any point between Chester and Guilford, to Stony Creek, he would receive a ticket punched against the station from which he departed, and the 40B that will be found in line 16 would be punched. The number 16 subtracted from the number of the station at which he takes the car gives the rate that he must pay. When used as a transfer the date and hour are punched in order to cover a continuous ride.

OTHER USES

The details of the application of this ticket to the transportation of employees, trackmen and so forth are of interest. All of the company's officers and employees (except trackmen) carry passes, and the conductor punches the two stations between which the employee is traveling, the holder of the pass writing at the top of the ticket, his name and number of the pass. This avoids the use of employees' tickets, of which the company had formerly used a very large number. In the case of trackmen, the conductor punches as before and fills out the number of the men, on the back of the ticket, and the foreman of the gang signs on the front. If no foreman accompanies the gang, and they are not able to write (as is sometimes the case) the conductor, himself, signs on the front so that, in sorting these slips, those used for non-revenue passengers can be instantly thrown to one side.

School tickets are sold in $3 books, with each ticket representing 1 cent. These are collected at the rate of one for each zone, with a minimum charge of 3 cents. That is, it costs a pupil 3 cents to ride in any part of one or two zones, and the same in three zones, 4 cents in four zones, 5 cents in five zones and so on. In other words, half rate is charged except in the case of a minimum ride, when the charge is 3 cents from a pupil and 5 cents from an adult. These tickets must be purchased through the use of an application blank fully identifying the pupil. The destination check, when used in recognition of a school ticket, is punched in the block "Pupil."

The conductor's daily report is simple. All minimum fares are rung up on the register and the register is not turned back until the end of the trip. The reading of the register each time it is changed is extended in his report, in the zone in which the change takes place, and is thrown back to zero at the end of the trip. Against each trip he sets down the opening and closing number of his destination checks and the other information that is necessary to complete the office records.

It is of interest to note that, some months ago, the company planned to change the rates on the two divisions in question by increasing the zone fares to 6 cents and leaving the zones just as they were, of unequal length and overlapping, in the way common to street railways. However, after serious consideration, it was felt that an increase to 6 cents simply emphasized the faults of the existing fixed unit of fare and varying units of service, and the company has been studying since on the plan that has now been adopted. This, it is believed, will prove to be much fairer, both to the public and to the company. It has the great advantage over an increase to 6 cents in that it effects a saving to at least a portion of the company's patrons who are certain to help make the change go through without serious opposition. Naturally, a flat increase to 6 cents for the old zones would meet with no support from any quarter.

An elaborate public announcement regarding the change has been published in the local newspapers, but the plan was discussed in the papers for some little time previous, and a number of interviews were held with people along the line who were interested. The company has begun the sale of strip tickets in books of $2 and $5, each ticket representing 1 cent, similar to the form of a strip mileage ticket. In this way, a passenger can pay with his ticket for a minimum fare, or any other amount, without the use of pennies.

Should Utilities Be Assessed by Public Service Commissions?*

BY F. N. FLETCHER, RENO, NEV., FORMER MEMBER STATE TAX COMMISSION

When a commission has the rights and duties of an inquisitorial body for the investigation of all the books, papers and inside information of a public utility for the purpose of determining the reasonableness of its rates and its service, is it proper and fair for such a commission with the information thus obtained for a particular purpose to turn about and, assuming an official character quite distinct, make use of the information for a purpose altogether different? Closely related to the question itself are two co-ordinate questions that will first be briefly discussed.

First the mooted question: Shall public utilities be taxed at all? In the case of those utilities which still exist unregulated by public service commissions, governed in their service and rates only by the faint menace of competition should service become too poor or rates too high, managed largely if not solely for the benefits of the stockholders and charging all the traffic will bear, there is no question that such utilities should be taxed with as near approach to intelligent valuation as the conditions allow. In the quite different case of utilities under the intelligent and continuous regulation of public service commissions it really makes little difference to the utilities whether they are taxed or not. If taxed, the amount of the taxes is added to the expense account, and rates are allowed to cover expenses. In practice it may not work out so exactly as it does in theory, but in general it may be fairly claimed that it matters little to a public utility corporation whether it pays taxes or not provided its rates are fairly and intelligently regulated by a public service commission. The incidence of its taxation is, properly enough, passed on to the consumer.

Yet aside from the interests of the utility, what interest has the public in its taxation? Plainly, the exemption from taxation of a utility properly resulting in decreased rates for service makes to the advantage of those served at the cost of all taxpayers within the taxing unit who are not served. For example, it might easily happen that the property of a power, light and water company might equal 5 per cent of the entire value of a county while it served but one-half the inhabitants. If such property were exempted from taxation and the rates to consumers correspondingly decreased the entire benefit would accrue to the consumers while the entire loss in county taxes would fall on the taxpayers outside the community served by the corporation. The same would be true of the loss of state taxes in the ratio which the value of the exempted property bore to the state's valuation.

On the assumption, therefore, that public utilities should be taxed it becomes a matter of interest to consider whether the valuation used for the determination of rates should also be used for the assessment of taxes. While trained minds versed in the science of taxation find no difficulty in ascribing different values for different purposes to the same property, it is not so simple to the layman. Rates, however, are largely based on what is put into the property as investment, while taxes are assessed on what is taken out as income. The one is an investment value, the other an income or market value. Under constant and proper regulation of rates, however, the difference in valuation for the two purposes should be slight, and in fact should ultimately disappear, for it is evident that the fixing of the rates is the determining factor in the market value of the utility.

It is clear, then, that if utilities are to be taxed justice to all concerned demaonds that the assessment shall be based on knowledge derived from expert investigation. It is also clear that whether the rate-making value differs from the taxation value or not, the essential facts on which both are based are the same. In other words, while the rate-making and the assessing powers may, indeed must, use the facts for different purposes, both must use the same set of facts. From the public standpoint, then, in the important matter of investigation there is not only no argument against a public service commission fixing the assessment value of a public utility but strong economic reasons for it.

What shall be said of this procedure from the standpoint of the utilities? In those states where the rate making and the assessing powers are lodged in the same commission there will come moments of grim humor when arguments favoring high rates for a certain utility based on its high cost are compared with arguments for low tax assessment based on its low market value. There seems to be no valid objection to the same commission hearing both arguments and deciding both issues. Indeed, from the standpoint of the utilities, to have valuation for rate making and for taxation determined by one expert commission is theoretically ideal. In practice, however, where utilities are assessed by public service commissions and other property by local assessors, it is almost certain to result in a considerable increase in the assessed value of the utilities without a corresponding increase in the assessed value of other property. This manifestly works injustice either to the utilities or to that portion of the public which they serve. The cure for this injustice lies in placing the entire control of the assessing power in the hands of a single commission, which would either be the public service commission or which would accept the value fixed on utility property by this commission, and would proceed to raise the assessed value of other property to the same basis. Whether a public service commission could perform the duties of a tax commission efficiently depends on local conditions. In a small state a single commission might accomplish the twofold task, but in most states it would be impossible. But in no state should the important work of rate making or of tax assessing be left to ex-officio commissions, which are notoriously inefficient.

Finally, then, it appears that public utilities should be assessed for taxation by public service commissions. Even in states where local assessors are compelled by law to accept the valuations on utilities as fixed by the public service commissions, the method is a big improvement over the old way. It would be a still better method for the public service commission to have the power to assess for taxation all classes of property or to act with a tax commission having such power, which in most states would be the only practical plan. A centralized power which would fix the assessed valuation of all classes of property on the results of careful and scientific investigation offers the only practical solution of the problem of equitable assessment.

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*Address delivered before the ninth conference of the National Tax Association, held in San Francisco, Cal., on Aug. 10-14, 1915.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 to 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

Southern California Committees Arrange for Entertainment of Convention Attendants Who Visit Los Angeles and San Diego—Hotel Reservation Committee Organized in San Francisco—Membership Pin

PROGRAM IN LOS ANGELES AND SAN DIEGO

The southern California committees of entertainment to the American Electric Railway Association and American Electric Railway Manufacturers' Association have arranged a most attractive program for the attendants at the convention and their families when they arrive in southern California. The dates of this program are Oct. 13, 14, 15 and 16, 1915, and the following has been arranged and will be carried out, with possibly some slight changes:

WEDNESDAY, OCT. 13. TRANSPORTATION DAY AT UNIVERSAL CITY

The guests will be taken from special Southern Pacific trains at San Fernando, transferred to Pacific Electric cars and then taken to Universal City, where a special program has been planned by the Universal Film Company. The party will arrive at Universal City about 11 a. m. In addition to these guests, invitations have been extended to the city officials of Los Angeles, including the Mayor and members of the City Council, representatives of the Chamber of Commerce and prominent electric railway officials of southern California. There will be an augmented band of seventy men, composed of the Pacific Electric Railway and Los Angeles Railway employees' bands, to escort the party through the Universal Film Company's grounds. The Universal Film Company's cowboys will also act as an escort and give their usual Wild West salute. Interesting scenes from important picture plays will be in progress of making, so that those present may get a true and accurate idea of how picture work is conducted. Some of the very best artists will take part in these scenes. The Zoo will be visited and there will be an exhibition of wild animals and jungle scenes.

Following this the party will partake of an elaborate Spanish barbecue under the direction of the famous Joe Romero. There will be about 350 guests in all at the barbecue. During the luncheon addresses will be made by prominent members of the association. The entertainment at Universal City, outside of the barbecue, will be directly in charge of H. McRae, general manager of the Universal Film Company, and M. G. Jonas, publicity manager of the Universal Film Company.

The evening entertainment will consist of a reception and dance at the Hotel Maryland in Pasadena, where the party will be taken by special electric trains.

THURSDAY, OCT. 14. SANTA CATALINA ISLAND DAY

At eight o'clock in the morning special Pacific Electric trains will leave Hotel Maryland, Pasadena, for San Pedro. Such guests as have headquarters in Los Angeles will leave on special Pacific Electric trains at 8.30 a. m. from the Sixth and Main Street station for San Pedro. Special boats will be provided by the Banning Company, owners of the Wilmington Transportation Company, conveying the party from San Pedro to Santa Catalina Island, where luncheon will be served with famous Catalina Island sea food as a specialty. In addition to this the committee will provide glass bottom boats for viewing the greatest submarine gardens in the world. Members will be accorded the privilege of the Golf Club on the Catalina links, if desired. The return trip through Los Angeles to the Hotel Maryland in Pasadena will be made in time for dinner in the evening.

FRIDAY, OCT. 15. TRANSPORTATION DAY AT PANAMA-CALIFORNIA EXPOSITION

Special electric cars of the San Diego Electric Railway will meet the train at 7 a. m. at the Santa Fé station and convey the guests to the Coronado Ferry and from the ferry to the Hotel del Coronado. Special events will be featured at the exposition during the day, including an address of welcome by the president of the exposition, a special drill by the United States Cavalry and a special musical program on the famous out-door pipe organ. An informal reception and dansant for the ladies of the party will be held at the Southern California Counties Building.

In the evening a visit will be made to the "Isthmus" which is known over the entire world and is one of the most elaborate features at the San Diego exposition. Numerous forms of amusement will be provided, and the party will be entertained at the very interesting attractions that are conducted on the Isthmus.

SATURDAY, OCT. 16. AVIATION DAY—SAN DIEGO

On Saturday special cars will leave Hotel del Coronado at 9.20 a. m. for the ferry, where they will be met by special launches which will convey the guests to the United States Aviation Field on North Island to witness a special movement of hydroplanes and aeroplanes by the United States Army aviators. Guests will be permitted to visit the hangars and inspect the machines. Following the exhibition they will be taken for a ride over San Diego Bay, returning to Hotel del Coronado at 12.30 p. m. for luncheon. At 2 p. m. a special train will leave Hotel del Coronado for Tia Juana, Mexico, returning at 6 p. m. In the evening a ball will be given in honor of the visitors at Hotel del Coronado, and after the ball they will be conveyed in special cars to the Santa Fé station, where they will board their train.

CONVENTION HOTEL RESERVATIONS

A local hotel reservation committee has been organized at San Francisco for the convenience of those who will attend the convention of the American Electric Railway Manufacturers' Association. All that is necessary is to send in a request specifying the accommodations desired and the committee will see that suitable reservations are made immediately. Application for reservations may be made either to H. G. McConnaughy, 165 Broadway, New York, N. Y., or to Carl Heise, care of Westinghouse Electrical & Manufacturing Company, San Francisco, Cal.

MEMBERSHIP PIN

Secretary Burritt is making a campaign to induce members to wear the association pin. He recently sent out an attractive order card with some interesting statements bearing upon the wearing of the pin. It appears that nearly 1300 members are already wearing it, and Mr. Burritt gives as a salient reason for doing so the fact that it is likely to afford the opportunity of individual explanation of the problems which the electric railways have to solve.

COMMUNICATIONS

Cars at Less than Cost

EMPIRE UNITED RAILWAYS AND ASSOCIATED LINES
SYRACUSE, N. Y., Sept. 8, 1915.

To the Editors:

Your editorial entitled "Cars at Less than Cost" is a temptation, and I am taking the liberty of "coming back." I have just finished sopping up the tears which have been falling from my eyes in commiseration of the "poor, feeble-minded car builder," mentioned in your editorial, who has been cajoled into accepting orders for cars under ruinous competition. The illustration used, of the selling of transportation in the electric railway business at less than cost, is really hilarious when compared to the selling of electric cars by the car builder. To be sure, all of us complain, with more or less vehemence, as to the burdens we bear and the goods we sell at less than cost, but there is a difference, as pointed out by you in your editorial—only you do not go far enough. You recite the fact that the price at which we sell our goods is stipulated by law, but you fail to mention the fact that the manufacturing cost of the article which we sell to the public, namely, transportation, is dictated to us by outside sources. In the matter of power, the margin of efficiency is rather narrow, and in the matter of wages, the largest item entering into our cost, we are practically in the hands of outsiders. Taxes, paving and other imposts and burdens imposed on electric railways are beyond the control of the management, so the electric railway is not only restricted in selling price but its production cost is practically dictated by persons and circumstances over which the railways have no control.

Take, now, the case of the "poor, feeble-minded car builder," who deserves our commiseration and sympathy. The matter of manufacturing cost with him is principally one of organization, an item even more important than the cost of raw materials. The manufacturer in selling a car body at $3,000 or $4,000 no doubt is not making a profit on it, but any automobile manufacturer will give him lessons in how to turn out that body at half the cost and make a good profit. The difference is that the automobile manufacturer has organized and standardized; the electric railway manufacturer has not. As a matter of fact, it will take a 42-centimeter gun to jar the electric railway industry out of the smug complacence of its accustomed methods, and that 42-centimeter gun has actually been fired, and it has been fired by the automobile manufacturers with their organization and standardization. The electric railway industry is really at the dawn of a new era. Why not let the car-body manufacturers and the manufacturers of electrical equipment and accessories get together and borrow a leaf from the book of the automobile manufacturers? Let them produce a standard car at a standard price, based on an output of 100,000 cars a year, or something like that. The individual railway engineer who has such violent prejudices that he cannot accept the standard article is at perfect liberty to purchase some of the old designs or new designs of his own, always assuming the cost of the special design, of course, but if a standard car is put on the market at a price which compares favorably with automobile prices, there will be an immediate and tremendous demand for it. As a matter of fact, the electric car to-day is really what in automobile circles is referred to as an "assembled" car, and in that line of business an assembled car is looked at askance and with suspicion. Why not standardize? For instance, can anybody give any rational or tangible reason why the electric control and the air control of a car should be segregated and consist of two separate and distinct functions, or why one handle cannot be used to apply the power, and when turning off the power in the reverse direction apply the air brakes? Not only would this simplify apparatus and save weight, but it would make the control practically foolproof. But, because air-brake manufacturers and electric manufacturers have been two distinct breeds, no one has apparently ever thought of combining the two functions. There are a dozen other points in electric car construction which could be similarly combined if the various manufacturers could be properly harmonized. Then the car will cease to be an "assembled" car.

The "poor, feeble-minded manufacturer" who sells his car at less than cost does so of his own free will and accord. He is not forced to do it by anybody or any circumstances over which he has no control. If his overhead charges made the cost of car building prohibitive, it is clearly neither the function nor the duty of his customers to absorb those charges. He is his own master when fixing his selling price, and, unlike his customers, he is largely the architect of his own costs. The car manufacturers have been helpful in building up the electric railway industry, they are individually and collectively a fine lot of men, it is a pleasure to know them and to do business with them, and it is to be regretted that competition among them is so keen as to be ruinous to themselves and harmful to the industry they have helped build up. But, let them haul their own chestnuts out of the fire and let the present crisis in car building be the starting point of a new era in their business as well as in that of their customers.

ERNEST GONZENBACH,
General Manager.

Transmission Line Progress

ARCHBOLD-BRADY COMPANY, ENGINEERS
AND CONTRACTORS
SYRACUSE, N. Y., Aug. 26, 1915.

To the Editors:

I have noted with interest the editorial on transmission line progress which appeared in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 21, page 300. The experience of this company is in line with the statements made in the editorial, but this experience would lead us to utter a word of caution in regard to the use of excessively small sizes of wire. We do not like to recommend the use of No. 2 wire on spans greater than 400 ft. in length unless the occurrence of sleet is a practical impossibilty. No. 4 copper wire should rarely be used on spans of more than 300 ft. length, although under certain circumstances spans as long as 350 ft. are permissible.

Long spans are necessary, of course, with fabricated steel structures, for these must necessarily be reasonably substantial, and as a consequence the cost per unit is too high to permit their use with short spans. Even when certain light types of steel poles are used they must be set in concrete, and the high field cost offsets the saving in pole cost. We have found that it is not wise to ship fabricated steel which can be easily damaged in handling, and we therefore adhere closely to 7-in. channels as the minimum size for the main members of A-frame or laced channel poles.

In regard to the relation of the size of wire to the strength of the towers and insulators, I do not think that there is as much difference permissible in the strength of the towers and insulators as the differences in sizes of wire might seem to indicate. That is the towers and insulators cannot be made much lighter if

No. 2 rather than No. 00 wire is used. It is easily possible to get the design of the line out of proportion by having the wires too small. Bimetallic wires of great tensile strength may become available for transmission lines so that smaller wires can be used on longer spans, but they have not yet been introduced on a scale that their advantages warrant. W. K. ARCHBOLD,
President.

Information for Railway Employees

GALESBURG RAILWAY & LIGHT COMPANY
GALESBURG, ILL., Sept. 2, 1915.

To the Editors:

I have noted in the columns of the ELECTRIC RAILWAY JOURNAL from time to time references to efforts which are being made to enhance the value of public libraries to employees of electric railways by having on their shelves and tables books which should be of interest and value to such employees.

In Galesburg, at the request of the company, the free public library has purchased a number of practical books on street railway work and has subscribed for a number of periodicals.

We have posted in our carhouse a list of these and also a record of calls for different books. This notice is signed by the writer.

So far the record is somewhat discouraging, there being practically no interest in those books which deal with specific topics relating to railway work.

In the line of instruction classes for employees we have been inviting the salesmen who call upon us to give informal talks to those employees interested in the particular parts of the equipment regarding which they are informed. We hope to go into this matter farther during the coming fall and will be pleased to report the results to you. FOSTER HANNAFORD,
General Superintendent.

Express and Skip-Stop Service in Denver

THE DENVER TRAMWAY COMPANY
DENVER, COL., Aug. 31, 1915.

To the Editors:

Your editorials on the skip-stop call to mind our experience with this method of operation in Denver. On lines running east and west the stops are very close together. From property line to property line the blocks are 266 ft. long. Adding the width of street, about 60 ft., we have stops 320 ft. apart.

During the period when we were demonstrating the skip-stop plan, we stopped at every other street. Our method was devised so that if a street was missed on the out-bound trip, it was made a stopping place on the in-bound trip. We also managed to sandwich in an express service, stopping at four-block intervals along the same tracks and in the territory of the local cars, without interference from the latter.

The service proved one of the best I ever saw on a city street. Every day we hear people bemoaning the fact that they no longer have this splendid accommodation. In Denver there were no less than 100 of my neighbors who lived along another line three long blocks from the Colfax Avenue line, and about 3 miles out from the business center, who gladly walked the extra distance for the pleasure of riding upon the line having express and skip-stop service.

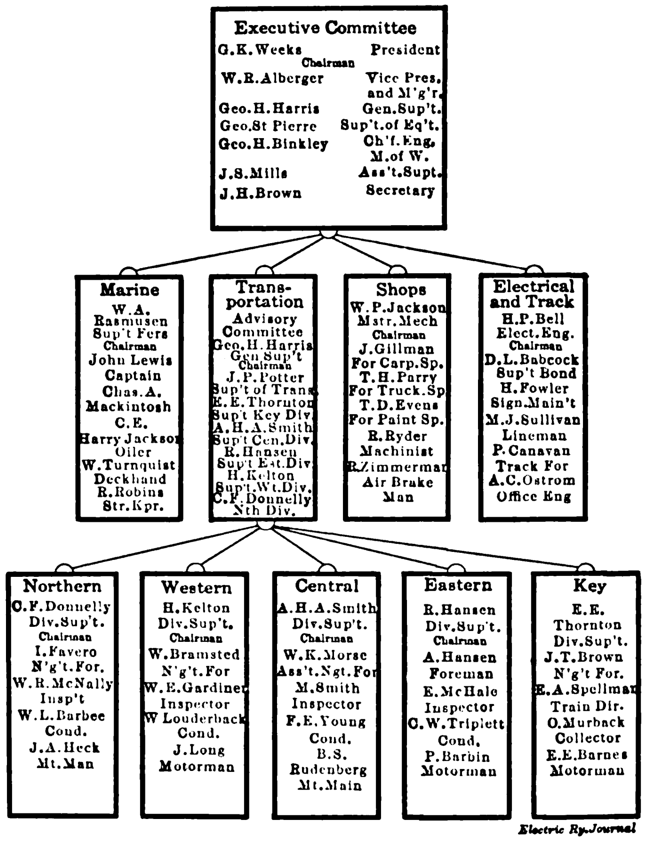
There is much to be said in favor of the skip-stop plan. It brings us nearer to competition with the faster automobile, and it is also a great boon to residents of outlying districts. Having one-half of the stops between his home and place of business eliminated is an obvious advantage to the man living 3 or 4 miles out.

Until one has seen the skip-stop in operation, it is difficult to realize how much pleasanter and smoother the riding is, and how great is the saving in time. Express and skip-stop service along city streets has to be seen to be appreciated. Like the coasting art, we do not recognize all of its many desirable features until we actually give it a trial. From my experience, I believe it to be a prime factor in the solution of the transportation problem. It certainly permits the operation of cars and trains to an infinitely better advantage.

C. B. WELLS,
Assistant to the General Manager.

A Safety-First Organization Chart

The San Francisco-Oakland Terminal Railways was among the first electric railways to form safety committees in co-operation with its employees. Changes in committee membership are made semi-annually, but enough holdovers are left to maintain the continuity of committee work. To make the safety organization with its system of sub-committees and divisional committees clearer to all concerned, an organization chart was prepared some time ago. This is probably the first chart of its kind, and is of special interest in showing how the safety movement has brought in all grades of employees. The titles are self-explanatory, except perhaps for "collector," which refers to the fare collectors who assist the conductor of a train.


Executive Committee
G.K.Weeks President
Chairman
W.R.Alberger Vice Pres. and M'g'r.
Geo.H.Harris Gen.Sup't.
Geo.St Pierre Sup't.of Eq't.
Geo.H.Binkley Ch'f.Eng. M.of W.
J.S.Mills Ass't.Supt.
J.H.Brown Secretary
Marine
W.A. Rasmusen Sup't Fers
Chairman
John Lewis Captain
Chas.A. Mackintosh C.E.
Harry Jackson Oiler
W.Turnquist Deckhand
R.Robins Str.Kpr.
Trans-portation
Advisory Committee
Geo.H.Harris Gen Sup't
Chairman
J.P.Potter Sup't of Trans.
E.E.Thornton Sup't Key Div.
A.H.A.Smith Sup't Cen.Div.
R.Hansen Sup't Est.Div.
H.Kelton Sup't.Wt.Div.
C.F.Donnelly Nth Div.
Shops
W.P.Jackson Mstr.Mech
Chairman
J.Gillman For Carp.Sp.
T.H.Parry For Truck.Sp.
T.D.Evens For Paint Sp.
R.Ryder Machinist
R.Zimmerman Air Brake Man
Electrical and Track
H.P.Bell Elect.Eng.
Chairman
D.L.Babcock Sup't Bond
H.Fowler Sign.Main't
M.J.Sullivan Lineman
P.Canavan Track For
A.C.Ostrom Office Eng
Northern
C.F.Donnelly Div.Sup't.
Chairman
I.Favero N'g't.For.
W.R.McNally Insp't
W.L.Barbee Cond.
J.A.Heck Mt.Man
Western
H.Kelton Div.Sup't.
Chairman
W.Bramsted N'g't.For
W.E.Gardiner Inspector
W Louderback Cond.
J.Long Motorman
Central
A.H.A.Smith Div.Sup't.
Chairman
W.K.Morse Ass't.Ngt.For
M.Smith Inspector
F.E.Young Cond.
B.S. Rudenberg Mt.Main
Eastern
R.Hansen Div.Sup't.
Chairman
A.Hansen Foreman
E.McHale Inspector
C.W.Triplett Cond.
P.Barbin Motorman
Key
E.E. Thornton Div.Sup't.
J.T.Brown N'g't For.
E.A.Spellman Train Dir.
O.Murback Collector
E.E.Barnes Motorman

Electric Ry.Journal

OAKLAND SAFETY ORGANIZATION CHART

A number of gasoline-electric cars are being built for the Dublin & Blessington Steam Tramways Company, Dublin, Ireland. They will each accommodate seventy-five passengers, besides hauling one of the existing steam cars as a trailer. With a view to running over the system of the Dublin United Tramways, the gasoline-electric cars will be so fitted that the two motors can obtain current from the trolley wire.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Change of Trolley Wheel Design and Trolley Lubrication

BY W. P. JACKSON, MASTER MECHANIC SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS, OAKLAND, CAL.

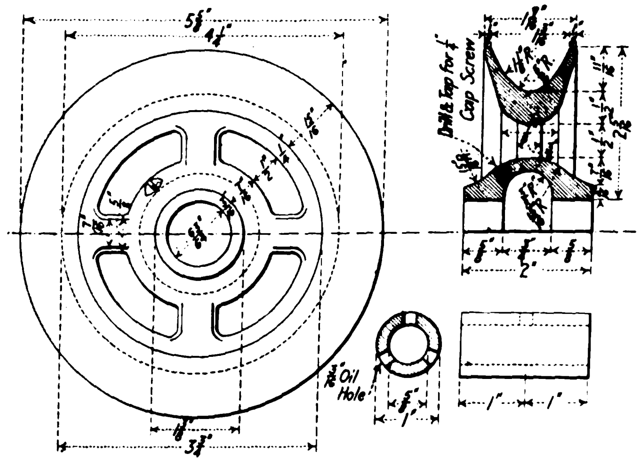
In an effort to keep the roofs and fronts of cars free from oil and more presentable in appearance, considerable success has been achieved through the substitution of solidified oil and petrolatum for oil in lubricating trolley wheels and pantograph rollers. At the same time there has been effected quite a reduction in lubrication labor and material costs.

On the Key Division, where the pantograph rollers make about 215,000 miles per month, 30 gal. of oil were required monthly for rollers. The lubrication of these rollers is now taken care of with 10 lb. of petrolatum per month, and the roofs and sides of cars are absolutely free from oil spots.

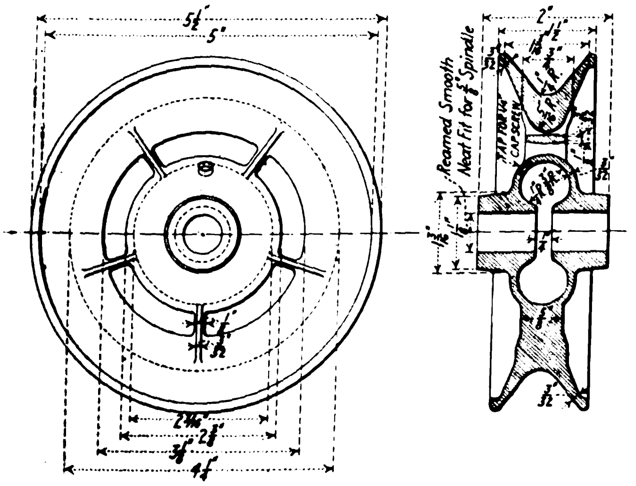
In order to lower the first cost of trolley wheels, and also to secure an oil reservoir more suitable for the use of solidified oil as a lubricant, the design of the trolley wheels was recently changed, as shown in the accompanying illustrations. The old type of wheel weighed 4½ lb. out of the sand, required ½ lb. of brass for the bushing and weighed 4¼ lb. finished. The average cost of manufacture in the company shops was 73 cents each. The new type of wheel has no bushing, weighs 3 lb. 14 oz. out of the sand, and 3¼ lb. when finished. While the new type has not yet been manufactured in sufficient quantities to secure accurate data on costs, it is estimated that the reduction in material and labor will enable the shops to turn out these wheels for 57 cents each.

A five-spoke pattern was adopted on account of the additional support which would be given to the rims which wore thin or were almost worn through at the bottom.

The large grease reservoir and the ¼-in. lubricating slot which runs all around the pin enable this type of wheel to run 1000 miles between lubrications.



SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS—OBSOLETE TYPE OF TROLLEY WHEEL



SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS—NEW TYPE OF TROLLEY WHEEL

Bolts and Screws

BY "VULCAN," A.M.I.C.E., A.M.I.E.E., ENGLAND

In street railway practice one often finds a difficulty in getting the average maintenance hand to appreciate the importance of paying proper attention to what superficially appear to be small details, and particularly is this the case with the men engaged in overhauling the mechanical parts. The reason for this neglect is probably that such workmen are often of the unapprenticed class, and also because the work is of rough appearance and dirty.

For instance, in the use of bolts and screws, lubrication of the threads with oil or grease is not usually carried out except by the skilled mechanics, who rarely fail in this particular matter. In such instances as in certain truck parts which will probably not be taken apart for many years, the use of dry screws or bolts which quickly rust is perhaps advantageous because the lack of lubrication assists in preventing loosening by vibration. The case is, however, totally different where periodical unbolting or unscrewing is required, because the lack of oil on the bolt or screw causes seizing of the threads to occur; this and rusting cause difficulty in loosening, which in the case of the smaller sizes often results in breakages by twisting off.

To the workman concerned in such fractures, the matter may appear a small one, but nevertheless it is often due to such seemingly small causes that much damage indirectly results, as the following instance will show.

On one system where the writer occupied the position of rolling stock superintendent, the number of faulty field coils and armatures which came to the shops for repair was considerably more than ought to have been the case, and investigation showed that the windings had at some time been wet. A night visit to the various depots and an inspection of the motors from the pits disclosed the fact that a considerable proportion of the motors were without inspection hole covers, which by causing the windings to be exposed to the splash from the car wheels in wet weather, explained the reason for the excessive number of motor failures. For inspection purposes and for taking armature clearances these covers are removed at frequent intervals, and their replacement is forgotten now and again by careless workmen; but in this case an appreciable number had evidently been left off because one or both of the ½-in. screws which ordinarily hold these covers in position had been twisted off. This had probably been done in the operation of removing the covers by means of a spanner.

Seizing of the screws in the tapped holes of the motor cases of course caused the trouble, and as a broken screw on the underside of an installed motor is somewhat difficult to remove it is not surprising, perhaps, that, when discovery was unlikely to occur, the job was shirked in many cases and the covers left off. Failure to oil the screws when they were being installed was, however, the reason for the seizing or rusting fast of the screws.

Street railway car equipment often suffers unnecessarily, and many car defects are brought about by the only too common practice of neglecting thread lubrication. The men responsible for this are generally of the "anti-oil-can" class, and in such cases a sharp lesson or two appears to be the most effective cure.

Repairing Broken Tubular Iron Poles

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

Various methods of repairing broken tubular iron poles have been brought out but the same old method which was in vogue twenty years ago still prevails in San Francisco.

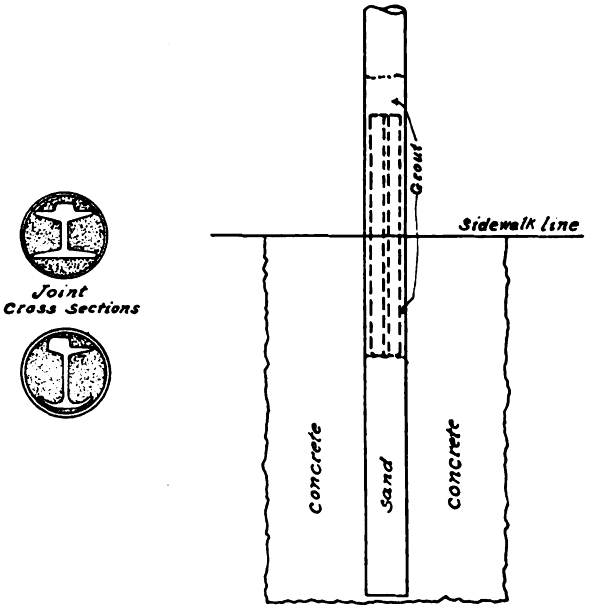
A plan for strengthening such poles that had become weakened at the ground line by corrosion was adopted in an Eastern city, whereby a short iron tube was slipped over the top of the pole, buried a foot or two below the level of the pavement and left projecting a foot or so above it. This tube thus surrounded the pole for about 1 ft. above and below the sidewalk level, and the narrow, angular space between tube and pole was filled in with sulphur, pitch or cement. This plan necessitated stripping the pole before the tube could be threaded over it and was more popular in the city where it was invented, as the feeders were very generally underground there, than in cities where the poles were burdened with feed-wire cross-arms.

In these other cities two methods were brought out that provided reinforcement without disturbance of the wires, cross-arms, etc., attached to the poles. In one the sleeve was simply supplied in two interlocking halves. This, like the original solid sleeve plan, necessitated digging up the sidewalk, and left the pole base covered with a short length of pipe of a diameter larger than the rest of the pole, giving the pole a patched appearance.

In another plan a long skeleton, springy arrangement of reinforcing rods was inserted in the top of the pole, dropped to the bottom, and then fixed in place by immersion in a liquid mixture of cement and sand pumped into the top of the pole by some form of portable mixer and pump combined. This was not cheaply convenient in cases where single poles broke off and called for prompt attention.

The method used in San Francisco was the result of a house-moving past the location of an iron pole. Instead of digging out the pole and then replacing it after the house had passed the pole was cut off flush with the top of the sidewalk. After the house had passed, the part of the pole in the concrete setting was filled with sand to within 2 ft. of the top. A 4-ft. piece of 70-lb. center-bearing rail that fitted the interior of the pole closely was inserted and the voids between the rail and pole were filled with a mixture of cement and sand. The upper part of the pole that had been cut off was then set down over the 2 ft. of rail sticking up above the sidewalk, the joint between the upper and lower parts of the pole was sealed by a few wraps of tape or burlap; and a bucket of liquid cement and sand, or "grout" poured into the top of the pole to fill the space between the rail and the surrounding pole at the lower end. After the cement had been allowed to set for a day or two this pole was as strong or stronger than before it was cut off. It looked no different than it did before it was spliced, it had cost only a small sum to repair and the ordinary crew of emergency linemen had done all of the work without the use of any unusual appliances beyond a pail in which to mix the cement and sand, and a funnel to guide the mixture into the top of the pole.

This idea has been applied in many ways since then. For example: After the great fire of 1906 we recovered many iron poles, or rather pieces of iron poles, that looked like a lot of junk. They had been broken off or flattened at the ground line or above it by dropping building material that had been thrown down by dynamite or had fallen during the progress of the fire. Equipped with the pole-splicing idea described, a supply of short pieces of old rail of suitable sizes, an assortment of new pipe lengths and some Portland cement, several hundred of these poles were rejuvenated at small cost to look as good as new and be stronger than when new. The splices came not only at the ground line, but in many cases above the ground line, in fact, where the first truly circular cross-section of pipe was to be found.



SAN FRANCISCO METHOD OF REPAIRING BROKEN OR CORRODED TUBULAR POLES

One more case is worth recounting. In the earliest trolley construction when No. 0 trolley wire was used some rather weak poles were used, being built up of sections of thin boiler tubing fastened at the joint insertions with rivets and "rust-joint" cementing. On a certain 82.5-ft. street with 19-ft. sidewalks, the size of the trolley wire had been increased to No. 00, and it was proposed to reduce the width of the walks to 15 ft. These 1890, 28-ft. tubing poles clearly would never stand this strain, and the expense of moving back

4 ft. the mile or so of double side poles and their concrete settings appeared likely to prove unpleasantly large. The San Francisco pole-splicing idea simplified this job greatly. An 8-ft. length of old rail was set in a block of concrete at the new pole location, leaving 2 ft. projecting above the sidewalk. The pole was cut off at the ground line, the lower part with its inclosing concrete abandoned and the upper part set down over the 2-ft. stump of rail and cemented in place.

As completed the pole was stronger in 1915 than when new—twenty-five years before—the cost of gadding the old pole out of its concrete bed or of trenching the 4 ft. and transporting the pole and setting across this 4 ft. of move was saved at little cost for old rail. These poles were taken up in alternate spans, thus leaving the spans slack on the new construction until the cement hardened.

Of course, in applying this idea the rail should always be set so as to get the best effect from it, considered as an I-beam. The cement will take care of the compression strain, and the part of the rail having the greatest amount of metal should be located in the line of the resultant strain to take care of the tension strain. Generally the head of the rail should be located at the back of the pole. In selecting old rail, also, the rail of greatest height permitted by the pole interior diameter should be selected.

The advantages claimed for this simple, foolproof method of splicing tubular iron poles is that it increases the strength of the pole without altering its external diameter or appearance; that it permits the utilization of very cheap scrap metal, a small amount of cement and the usual simple emergency crew appliances; that the materials for repairs are invariably quickly obtainable; that it necessitates no disturbance or re-establishment of the sidewalk paving; that it is fireproof and that the reinforcing is protected against oxidation inside the pole by the tubular covering of the pole and by the cement filling.

If there had been any iron poles in San Francisco during the great 1906 fire repaired by the outside tube method with the intervening space occupied by sulphur, the sulphur would surely have been ignited and the strength of the pole splice ruined.

In some sizes of poles, in order to get maximum strength in the rail insert or to make the nearest size rail section have a close fit, it was found advisable to heat and bend inward the bottom flanges of the piece of rail used in the splice, the calculated moment of inertia of the rail insert and concrete filling being greater than that of the tubular pole alone when new.

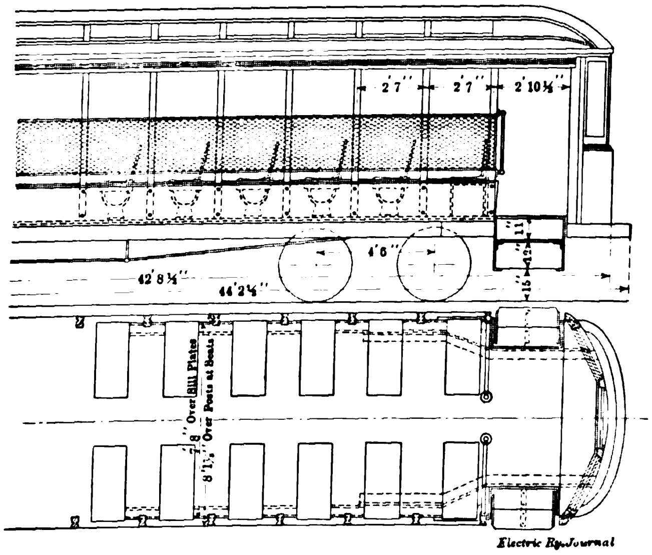
Converting Open Cars Into the End-Entrance Type

BY A. C. COLBY, MASTER MECHANIC BERKSHIRE STREET RAILWAY

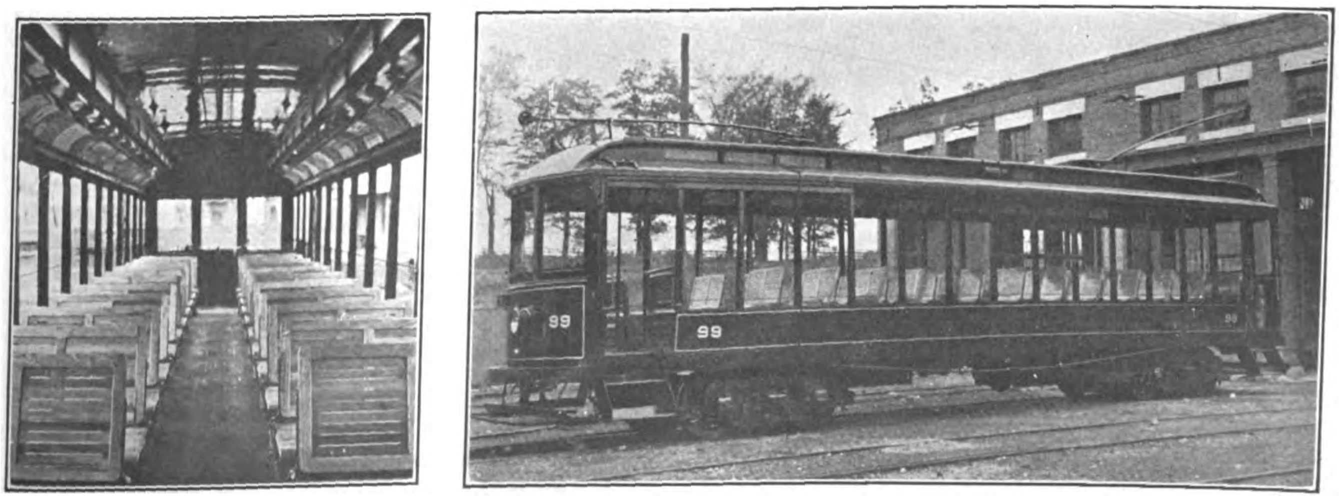
The Berkshire Street Railway, Pittsfield, Mass., has undertaken the work of converting its open cars to the end-entrance type. Ten out of the fifty-three double-truck open cars operated by the company have already been changed over, and it is expected that the new arrangement will greatly reduce the number of accidents that are inevitable with ordinary open cars in high-speed interurban service. At the same time the change will enable the company to meet the requirement of the new regulation inaugurated by the State of Massachusetts which limits the height of open-car steps and thus involves the installation of double running boards. Extensive changes in the clearances along the right-of-way also affected the decision to convert the cars.

The work of conversion has consisted in the removal of the running boards and the inclosure of the car sides with steel plates and screen window guards. The cross benches have been removed and new seats with a center aisle have been provided. An aisle was provided by removing the bulkhead from the ends of the cars, and platform steps on either side of the vestibules installed.

The cars are of the usual fourteen-bench open type, and in place of the benches wood-slab reversible



PLAN AND ELEVATION OF CONVERTED OPEN CAR



INTERIOR AND EXTERIOR VIEWS OF CONVERTED OPEN CARS seats of standard dimensions have been substituted, there being thirteen seats on each side of the aisle with the new arrangement, giving a total seating capacity of fifty-two. The side sills were cut at the four corners of the car body to provide for the stepways, and two angles extending from the bolster along the inside of the sills to the bumpers were installed with an off-set to accommodate the steps. The step-way construction was reinforced by a ½-in. x 8-in. plate outside of the sills, bending in around the stepway and bolting to the head block.

The construction provides for two steps below the car floor with treads 9 in. wide and 34½ in. long. The first tread is 15 in. from the rail, the second and third being respectively 12 in. and 11 in. high. The car sides have been inclosed with a steel plate 8 in. wide, which is bolted to the posts and overlaps the sills ½ in. This has a cap of oak that forms a window ledge for the curtain, and above it is a 22-in. guard of steel mesh. It is expected that incidentally the reconstruction of the cars will add materially to their life, although the main reason for their conversion was a desire to reduce boarding and alighting accidents.

Effect of Car-Wheel Diameter on Motor Heating

BY A. L. BROOMALL, RAILWAY ENGINEERING DEPARTMENT, WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, EAST PITTSBURGH, PA.

A number of articles have appeared in the ELECTRIC RAILWAY JOURNAL within the last year on the effect of car wheel diameter on motor heating,* but none of these has given specific rules by means of which the operating man can determine, even approximately, what increase in heating is to be expected from a difference in wheel diameter.

The following method may be used to analyze accurately any specific case, and the accompanying curves give the results on an average motor under varying conditions. They may be used to determine quickly the approximate difference in heating for any case.

Curve *A*, Fig. 1, is the familiar speed-current curve of a car equipped with electric motors. This curve shows the car speed in miles per hour for varying amperes drawn by the motor with a given gear ratio and wheel diameter and with a definite voltage at the motor terminals. Suppose, however, that the wheels on the car were 10 per cent smaller in diameter than on the car for which curve *A* holds, then a similar curve for this car would be as shown at *B*, with speeds 10 per cent less than for the same amperes in curve *A*. Curve *A*, Fig. 1, is made up for 33-in. wheels, and curve *B* shows the car speeds for wheels 29.7 in. in diameter. If wheels of these two sizes are under the same car, of course, the car speed for the two wheels will be the same and the amperes drawn by the two motors will be different, as shown on the two curves for the same car speed. As an example, assume the car speed to be 10 m.p.h., then the motor mounted on the 33-in. wheels (see curve *A*) will draw 100 amp. and the motor mounted on the 29.7-in. wheels (see curve *B*) will draw 75.5 amp. or 24.5 per cent less. At 8 m.p.h., the motor mounted on 33-in. wheels will draw 190 amp. and the motor mounted on 29.7-in. wheels will draw 132 amp., or 30.5 per cent less than the motor on 33-in. wheels.

The difference in the currents drawn by the two motors depends on the shape of the speed curve. At light loads where the curve is steep, the percentage difference in amperes is small, but where the curve flattens out at heavy loads the percentage difference in amperes becomes much larger.

Having obtained for any given car speed the amperes drawn by the two motors on wheels of different size, the core loss and I^2R loss for each of the motors may be calculated and the difference in the armature heating obtained. The difference in heating for different loads on two motors of the same type varies somewhat with the design. The I^2R loss, of course, varies as the square of the current and the core loss varies only slightly with the current.

The shape of the speed curve and the distribution of losses varies with different designs, so that if accurate results are required, the difference in current drawn and the difference in heating must be worked out for each type of motor. An example of an indivi-

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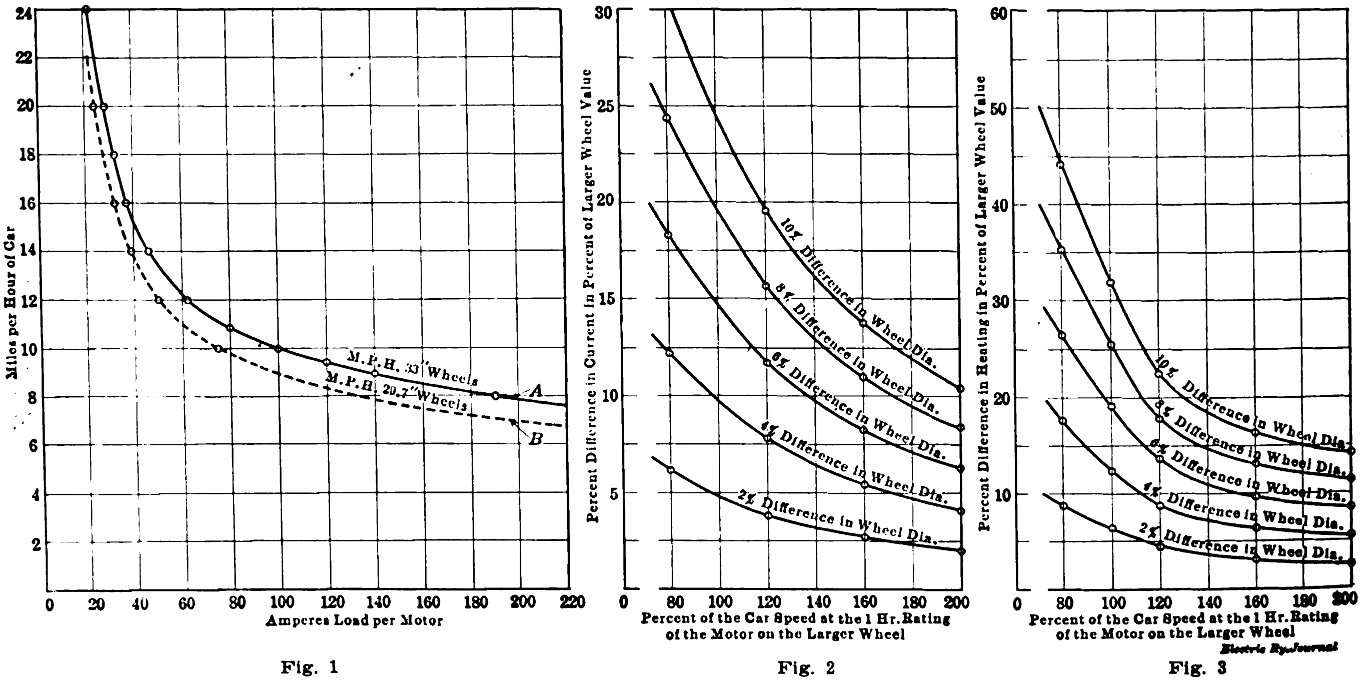
*See issues for Oct. 3, 1914, page 622; Oct. 31, 1914, page 1014; Nov. 28, 1914, page 1203; Dec. 19, 1914, page 1344; July 10, 1915, page 70.



Electric Ry. Journal

Fig. 1 Fig. 2 Fig. 3

FIG. 1—CHARACTERISTIC CURVES; FIG. 2—DIFFERENCES IN CURRENT DUE TO DIFFERENCES IN WHEEL DIAMETER; FIG. 3—DIFFERENCES IN HEATING DUE TO DIFFERENCES IN WHEEL DIAMETER

dual case was that for which results were given in the issue of the ELECTRIC RAILWAY JOURNAL for July 10, 1915, page 70.

To determine the difference in heating as outlined above would often require more information than the operating man has available, and, therefore, the writer has taken an average speed curve from many railway motors and has worked out the percentage difference in current in per cent of the larger wheel value for car speeds ranging from 70 to 200 per cent of the speed at the one-hour rating of the motor on the larger wheel, and for wheel diameters which vary as much as 10 per cent. These results are given in Fig. 2.

Likewise, by taking the average variation of losses in a number of railway motors, curves were obtained giving the per cent difference in heating in per cent of the larger wheel value in terms of the one-hour rated car speed. These results are given in Fig. 3.

While the results as shown in Figs. 2 and 3 are worked up for a motor of average characteristics the error in applying them to any case will not be large and they may be used very quickly to determine the difference in heating which may be expected for a difference in wheel diameter.

As a practical example, suppose that we have a quadruple equipment of 40-hp. motors whose rated speed is 525 r.p.m. at 500 volts. These motors have a sixty-nine-tooth gear and a fifteen-tooth pinion. Assuming that three of the motors are mounted on 33-in. wheels and the fourth motor on 31-in. wheels. The difference in wheel diameter is 6 per cent of the larger wheel value. When the motors on the larger wheels are operating at the one-hour rating of the motors, the car speed is approximately 11.2 m.p.h. and, therefore, for a car speed of 11.2 m.p.h. there will be approximately 14.7 per cent difference between the amperes taken by the motor on the 31-in. wheels and the motors on the 33-in. wheels. The difference in the heating in the armatures will be approximately 19 per cent. When the car speed has increased to, say, 22.4 m.p.h. or 200 per cent of the car speed at the one-hour rating of the motor, the difference in amperes will be 6.3 per cent, and the difference in heating in the armatures will be 8.6 per cent.

It will be seen from the shape of these curves that the total difference in the heating in the armature in the two motors depends largely upon the speed at which the greater part of the operating is being done. When a large part of the running is at high speed, the difference in heating will be less than where the motors are operating at speeds nearer the one-hour rating speed.

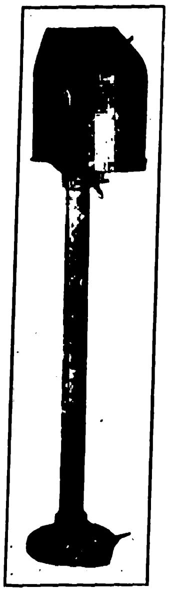
Novelty in Indirect Lighting

The Eli Lilly Company, near Greenfield, Ind., one of the largest manufacturers of antitoxins and serums in this country, recently built a new laboratory in which two main buildings are connected by a long pergola with an impressive tower in the center: This faces the National Highway over which thousands of automobiles travel each year. Numerous attempts made to illuminate the building front in a manner that would provide a general lighting effect were found to be ineffective. Finally, however, the success of the Terre Haute, Indianapolis & Eastern Railway, which supplies power to the company, with "Golden Glow" interurban incandescent headlights led to the suggestion to try "Golden Glow" harbor range lights, manufactured by the Esterline Company of Indianapolis, and the result was so satisfactory that an entire equipment was purchased and permanently installed.

The lamps are mounted on concrete bases and are so close to the ground as to be unnoticeable in day time, and at night it is hardly possible, from the road, to tell where the sources of light are. The fact that no maintenance is necessary with the mirrored reflectors in the "Golden Glow" lamps, and the long life of the bulbs, makes the installation an ideal one.

Transfer Issuing Machine

For some time there has been a demand from electric railway men for a practical device to print and issue transfers. The advantages of such apparatus have long been acknowledged, but the expense and the mechanical difficulties involved in its manufacture have heretofore prevented its actual production. However, the Ohmer Fare Register Company, Dayton, Ohio, has made use of its unusual facilities to plan and perfect a transfer machine that is designed in accordance with the ideas of some of the most prominent electric railway men in the country, and it is with full confidence in the success of the device that the makers now offer it to the industry.

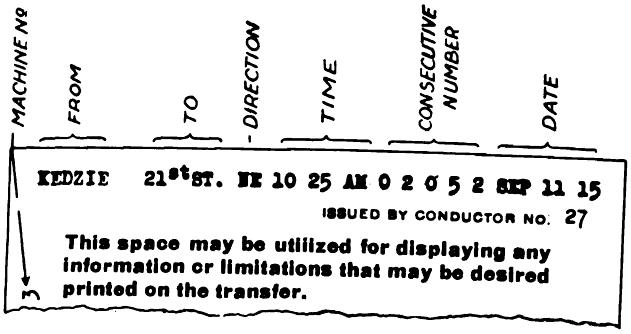


TRANSFER MACHINE

A transfer issued by this machine bears all the necessary data in plain bold type which any passenger can read at a glance. There are no punch holes. The date, the time, the direction, the consecutive number and the line to and from which the transfer is issued are printed, together with the conductor's identification number and the number of the machine. It is a transfer in fact and not a stop-over privilege. Time limitations are accurately and easily maintained because the time is printed mechanically when the transfer is issued.

The machine, unlike a human agency, is never confused by rush-hour traffic. The receiving conductor is never in doubt and the passenger knows what his transfer calls for. Any transfer can be immediately traced to its source through the conductor's identification number and by the number of the issuing machine. Transfer abuses on the part of the public and traffic in transfers by trainmen are eliminated. The conductor's transfer record for the day is secured simply by having him issue a transfer to himself when he goes on duty and another when he quits work. He pins them together and turns them in. The intervening numbers are the transfers issued.

Ohmer's transfer machine reduces the cost of transfers to the cost of the plain paper upon which they are printed, the expense of handling stocks of transfers and checking them out being eliminated. Not only is the machine efficient and economical, but it has that other most important qualification—speed. It is so rapid in



KEDZIE 21st ST. NE 10 25 AM 0 2 0 5 2 SEP 11 15

ISSUED BY CONDUCTOR NO. 27

3 This space may be utilized for displaying any information or limitations that may be desired printed on the transfer.

TYPICAL TRANSFER ISSUED BY MACHINE

its operation that large crowds can be handled quickly. Careful tests show about eighty transfers per minute can be issued without difficulty.

The machine is operated by a pedal, and both hands are for the most part free for receiving and registering fares and attending to other duties. The date is simply set when the conductor goes to work, the time is set at the proper intervals, and the names of the connecting lines are set by a quick movement of the hand. The conductor's identification number is printed from his numbered identification key which remains in the machine, it being necessary for the key to be in position before any transfers can be issued.

Altogether, the device appears to be a very satisfactory release from the well-known limitations of transfer pads and the hand punch. It is very economical of space in the car, standing on a pedestal fastened to the floor and it is so arranged that either the machine itself can be removed from the pedestal and placed upon the pedestal at the other end of the car, or else can be moved, pedestal and all, and clamped in place by means of specially designed floor plates. The machine on its pedestal stands about 4 ft. high. Without the pedestal its dimensions are as follows: 7 in. wide, 7⅝ in. deep and 12 in. high. It has been built to meet the most trying conditions of city traffic, where the abuse of transfers has made such a machine a real necessity.

Novel Tests for Rail Steel

The Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has brought out in Bulletin No. 8 of its series entitled "Rail Reports" comparisons of standard and titanium-treated open-hearth rails which are based upon two types of tests of unusual character. The first of these depends upon the fact that the carbon content in steel rails as rolled is not uniform all over the cross-section, a condition that is, of course, anything but desirable owing to its effect upon the structural condition of the rail and upon the hardness of the wearing surface. The investigation covered the examination of samples from ingots from 111 heats of standard open-hearth rails and from 101 heats of titanium-treated open-hearth rails, in all of the latter 0.10 per cent of titanium being used. As these heats averaged more than 50 tons each, the investigation covers samples from every heat of over 5000 tons of each kind of steel, or more than 10,000 tons in all.

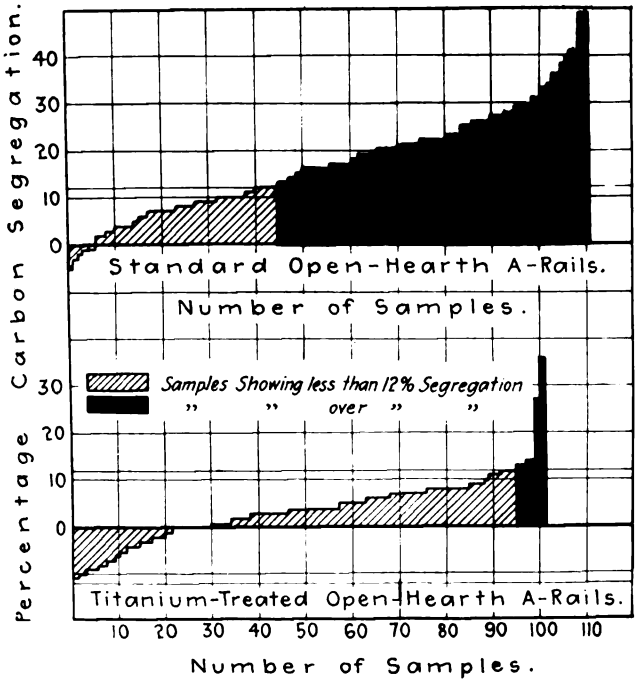


FIG. 1—DIAGRAM SHOWING EXCESS OF CARBON AT THROAT OF RAIL OVER THAT AT TOP OF HEAD

The investigation was carried out by taking samples with a ⅝-in. drill at two points in each rail, one of these being located at the upper corner of the head, and the other being taken at the throat or where the head and web join. The results are indicated graphically in an accompanying diagram (Fig. 1) which shows in solid black the number of samples that had more than 12 per cent segregation or difference in carbon between the two points.

In general, the sample taken at the throat of each rail showed a higher carbon content than that taken at the upper corner of the head, but this condition was reversed in some cases, as is shown by the negative percentages at the right-hand side of the two diagrams. Summed up, the titanium-treated rails showed ninety-five out of 101 samples, with less than 12 per cent segregation, while the standard rail had but forty-five samples out of 111 that showed less than 12 per cent, the majority showing between 15 per cent and 30 per cent of segregation.

The bulletin also shows a "merit comparison" of samples taken from the centers of heads and from the flanges of twenty-five standard rails and twenty-five titanium-treated open-hearth rails. This comparison is based upon the fact that the strength of steel may be expressed by a formula, as indicated by M. H. Wickhorst in a report presented before the American Railway Engineering Association in 1914. The accuracy of the formula naturally depends upon the elimination of impurities in the steel, and also upon the soundness of the metal in general. As shown by the diagram, Fig. 2, the tests of actual strength indicated an order of merit that was generally below the theoretical strength that should have been developed in accordance with the formula, although in some cases the actual strength materially exceeded the theoretical strength. However, in the main, the titanium-treated rail showed an actual strength that did not fall below 60 per cent of theoretical figure in any case, while the standard open-hearth rail ran as low as 20 per cent at the center of the head, and as low as 50 per cent at the flanges.

In general, the titanium treatment effected the following improvements in the rail heads: The number of samples showing more than 80 per cent merit were increased by nearly two-thirds over the number found with standard rail, and all samples showing less than 60 per cent merit were eliminated, although 20 per cent of such samples were found in the standard steel. In the flanges, the samples that showed more than 80 per cent merit were increased by 5 per cent, and the samples showing less than 60 per cent merit were eliminated, these amounting to 8 per cent of the total number of standard samples.

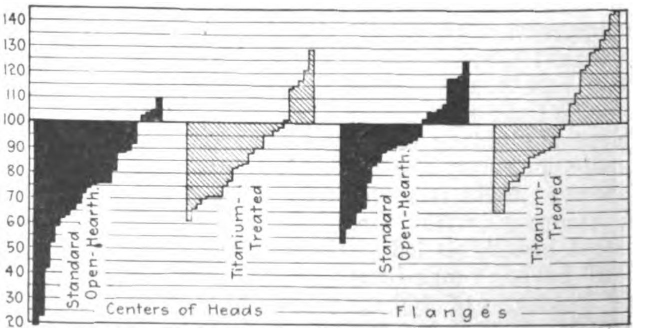


FIG. 2—DIAGRAM SHOWING RELATION OF ACTUAL STRENGTH TO THEORETICAL STRENGTH BY FORMULA

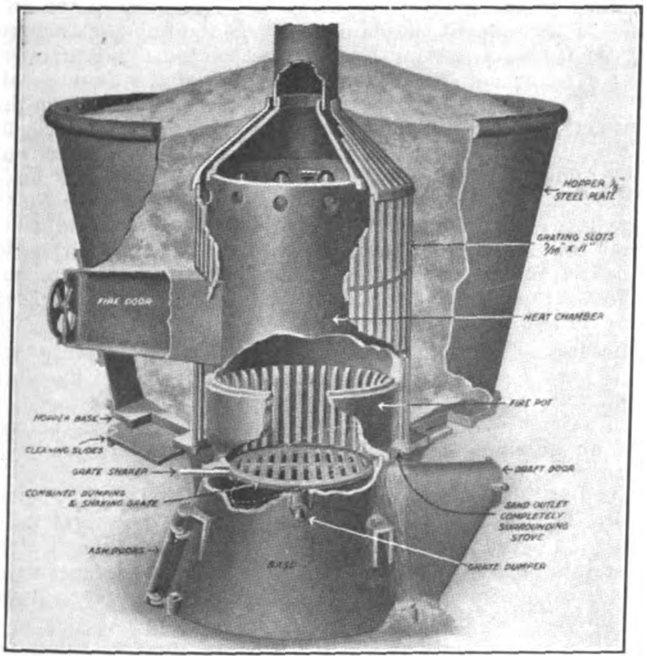
Des Moines Locomotive Weighs 37 Tons

In the issue of Aug. 11, 1915, on page 274 an article was published describing the severe test to which one of the locomotives of the Inter Urban Railway of Des Moines, Iowa, was subjected in transporting 3500 Iowa troops over a section of its line. This transportation test is made all the more remarkable when the corrected weight of the locomotive is given as 37 tons instead of 55 tons.

Automatic Sand Dryer

The "Viloco" sand dryer, which is manufactured by Harry Vissering & Company, Chicago, operates upon the logical principle that as soon as sand is dry it should be free to escape, and the ability to dry sand without burning it has resulted in its adoption by a number of electric railways. Among them is the San Antonio (Tex.) Traction Company, where it has been found that the saving which is brought about by an initial investment of $175 amounts to no less than $36 per month.

The results have been attained by an automatic action that is made possible by a cast-iron grating located between the body of sand and the stove.



AUTOMATIC SAND DRYER

Through this grating the sand runs freely as fast as it dries, so that wet sand is prevented from coming in contact with the stove, and the vapor from the drying sand is permitted to escape freely between the grating and the body of the stove, passing into the stack through holes at the top of the heat chamber. With home-made sand dryers as usually constructed the stove is surrounded by a hopper of wire netting, and the sand which comes in contact with the stove dries first, having no means of escape until all the sand within the hopper is sufficiently dry to start running through the wire netting. In the meantime the sand that is actually in contact with the stove becomes so hot as to be thoroughly burned and to assist materially in burning out the stove itself. Of course, sand which has been burned loses its value, but with the new form of dryer the sand does not come in contact with the stove at all and all possibility of burning the stove or the sand is removed.

As shown in the accompanying illustration, the device is simple in construction. Ample cleaning slides are provided around the entire hopper base to facilitate ready removal of any material that will not pass through the openings in the cast-iron grating. The grate is a combined shaking and dumping arrangement and it can be replaced through the large ash doors, thereby making it unnecessary to dismantle the dryer in order to renew the grate.

Brazed Bonds on the Pacific Electric and Los Angeles Railways

Among the Pacific Coast railways which are using the cars and brazed bonds of the Electric Railway Improvement Company are the Pacific Electric Railway, Los Angeles and vicinity, and the Los Angeles Railway.

The former has six cars, two 1200-volt and four 600-volt, the two being used in bonding new lines and the four for maintenance and reconstruction work. During the month of May, 1915, 3547 bonds were placed with the 600-volt cars, of which 2859 were 6½-in. ET-3, 300,000 circ. mil bonds brazed on the ball of the rail, and 472 were 14-in. EC-15, 300,000 circ. mil bonds concealed beneath the joints in street work. The total number of bonds placed during this month is probably less than the average and the proportion of cable bonds used is unusually large.

The brazed bond is the company's standard for bonding joints, although special soldered bonds are still used to some extent. In block signal work connection of the reactance bond and other cables to the rails also is made by brazing.

About 300,000 brazed bonds are now in use on the Pacific Electric lines. In maintenance work old wire bonds and others are replaced with brazed bonds, as the company found the short brazed bonds to be practically free from theft and to have a much lower contact resistance.

The Los Angeles Railway uses combination gage cars made by the same manufacturer. The standard practice of this railway on city lines is to braze on the bonds in such a position that they are covered by the plates.

New Electric Locomotive for Italian Railways

The Italian State Railways are introducing a new type of electric locomotive, designed as 2-C-2, for high-speed service on lines with many curves, such as those in the Ligurean Riviera. Twenty-four of these locomotives have been ordered, eighteen of them from the Tecnomasio Italiano Brown-Boveri of Milan, with the mechanical parts partly from the Officine Meccanische of Milan and partly from the Stabilimento Breda, near Milan. The other six will be supplied by the Construzioni Meccaniche di Sarrono, with electrical equipment by the Maschinenfabrik Oerlikon, Switzerland. Both are designed by the State Railway Department, and the construction is substantially identical in both lots in order to meet the requirements of the electric traction services.

Recent statistics show that the total number of English soldier tramway men who have been killed in action, died from wounds, lost from ships of the navy, or who have died from other causes since joining the forces, is 214, of whom 186 were municipal employees and 28 were private company employees. The number of tramway employees who have given their services for the war reaches a total of 18,057, which is an average of about 30 per cent of the total number of men employed on English tramways.

Electric Railway Legal Decisions

CHARTERS, ORDINANCES, FRANCHISES

Alabama.—Demand by Passenger for Transfer in Exchange for Fare—Ejection—Right to Transfer.

Where a passenger on a street car offered to exchange his fare for a transfer and demanded that the conductor get his transfer ready before he would pay the fare, his ejection by the conductor was not wrongful, as the right to demand a transfer does not exist until the fare is paid. (Willoughby v. Birmingham Railway, Light & Power Co., 66 Southern Rep., 888.)

Arkansas.—Assessments of Street Railway Tracks as "Real Estate" for Cost of Bridge.

In the absence of legislation to the contrary, the tracks of a street railroad are not "real estate," so as to be subject to a local improvement tax for construction of a bridge, it owning no right-of-way. (Fort Smith Light & Traction Co. v. McDonough, 177 Southwestern Rep., 926.)

California.—Fares in Cities of 100,000 Inhabitants.

Statutes 1877-78, page 18, sec. 1, declare that no street railroad in any city or town with more than 100,000 inhabitants shall be allowed to charge more than 5 cents fare for each passenger for a trip of any distance, and that a violation shall expose the owner to a forfeiture of $250 in favor of the person so unlawfully charged. Civil Code, sec. 501, adopted in 1872, was in 1903 (Statutes 1903, page 172) re-enacted so as to provide that the rates of fare should not exceed 10 cents for one fare for any distance under 3 miles, but that in municipalities of the first class they should not exceed 5 cents. Held that, while implied repeals are not favored, yet sec: 501, as re-enacted, is apparently a revision of the earlier statute, which was repealed by implication, and so the act of 1878 is not applicable to the city of Los Angeles, though it has a population of more than 100,000. (Suydam v. Los Angeles Railway, 140 Pacific Rep., 55.)

Indiana.—Side Track to Power Station Not a "Switch" or "Turnout."

Under an ordinance which granted a franchise to a street railway company, plaintiff's predecessor, providing that no extension of tracks should be made and no tracks should be laid in or over any street except those then occupied and that no double tracks, except turnouts and switches, should be laid without permission to do so by ordinance or resolution of the Common Council, the company had no right to construct a track at nearly right angles to its main track extending about 350 ft., running through one alley and intersecting another to reach its power plant, since such track was not a "switch" or "turn-out," as these terms, in relation to railroads, relate to tracks in the nature of sidetracks adjacent to and used in connection with another line of track; nor did the franchise carry with it, as an incident necessary for the operation of the road, the right to construct such branch or lateral; and the fact that the company's predecessor had constructed a power plant at a considerable expense at a point accessible only by such branch or lateral did not give the company the right to construct such lateral.

In such case the act of the city treasurer in accepting the tender of rental fixed by such contract did not estop the city from removing the track contemplated by the contract. (Indiana Railways & Light Co. v. City of Kokomo et al., 108 Northeastern Rep., 771.)

Louisiana.—Law of Eminent Domain Will be Strictly Construed.

Civil Code, Arts. 2626-2641, concerning the compulsory transfer of property, being special and exceptional in character, and in derogation of common right, must be strictly construed. (Orleans-Kenner Electric Railway v. Metairie Ridge Nursery Co., Ltd., 68 Southern Rep., 93.)

Maryland.—Early Ordinances on Speed of Railroad Trains Not Applicable to Electric Railways.

A city ordinance which provides that no passenger, burden or other cars shall be driven, hauled or propelled on any of the railroads or railways within the city limits at any faster speed than a walk, and at no time move without a brakeman, in addition to the driver, enacted in 1839 as supplementary to an ordinance of 1832, for the better regulation of railroad cars, does not apply to electric street cars. (State, to Use of Needles et al., v. Maryland Electric Railways, 92 Atlantic Rep., 962.)

Mississippi.—Crossings with Steam Railroad Tracks in Streets.

Although the right-of-way of a railroad company is its private property, and cannot, under the constitution of 1890, sec. 17, be taken for public use, except on compensation being made, it does not own city streets along or across which its tracks are laid, and cannot acquire, under Code 1906, sec. 3322, any exclusive right to the use of the streets. It can acquire in the streets only the right to locate its tracks, subject to the right of the public to continue the free use of the streets for travel, and to the right of the municipal authorities to grant similar easements. Hence a street railway company, receiving a permit from a city to lay its tracks in the streets, may extend its tracks across a railroad company's tracks in a street without first instituting condemnation proceedings and paying damages. (Mississippi Central Railroad v. Hattiesburg Traction Co., 67 Southern Rep., 897.)

Minnesota.—Conditions of Condemnation Proceedings Not Nullified by Appeal.

In proceedings to condemn a railroad right-of-way, the commissioners awarded to the land-owner a specific sum of money as damages, and, in addition thereto, imposed upon the company the obligation to construct a cattle pass and certain culverts for the use of the landowner. The company appealed, and by the notice thereof limited the issues raised thereby to the question of damages. The jury in the district court reduced the damages from the amount awarded by the commissioners, but the verdict contained no reference to the conditions imposed by the report of the commissioners. The company caused judgment to be entered upon the verdict, and the judgment made no reference to the conditions. The amount thereby awarded to the landowner was paid, and he formally satisfied the judgment. It is held: That the award of the commissioners imposing the conditions referred to was not nullified by the appeal, and, since that branch of the proceeding was not challenged on the trial of the appeal, the conditions remained in force and effect. (Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Co., 150 Northwestern Rep., 906.)

Missouri.—Interstate Commerce—Employers' Liability Act.

Where a street car was running wholly within the State and was carrying only intrastate passengers, the fact that it was part of a system which issued transfers for carriage in an adjoining State does not render those servants in charge subject to the federal employers' liability act of April 22, 1908, chap. 149, 35 Stat. 65 (U. S. Comp. St. 1913, secs. 8657-8665), and an action for their wrongful death may be maintained under the State law, even though, if interstate passengers had been on the car, the servants would have been engaged in interstate commerce. (Kiser v. Metropolitan Street Railway, 175 Southwestern Rep., 98.)

New York.—Points at which Transfers Must Be Given.

Where two street railway lines run substantially parallel and 1360 ft. apart for the greater part of their distance but one turns at right angles and crosses the other, a passenger on one of the lines is entitled to a transfer at the point of intersection to a car on the other line which will carry him back in the direction from which he came, under railroad law, sec. 181, providing that no corporation operating a street surface railroad shall charge any passenger more than 5 cents for one continuous ride from any point on its route to any other point thereof or any connecting branch thereof, within the limits of any city; it not appearing that there are any conditions of congestion or intricate connecting lines which render the giving of such transfers impracticable. (People ex rel. New York State Railways v. Public Service Commission, Second District, 153 New York Sup., 18.)

South Carolina.—Fenders Ordered North of Certain Meridian Line.

Civil Code 1912, sec. 3950, requiring cars operating north of a line 10 miles north of and parallel to the thirty-first meridian to be equipped with fenders, is not unconstitutional as denying the equal protection of the laws. (Thomas v. Spartanburg Railway, Gas & Electric Co., et al., 85 Southeastern Rep., 50.)

LIABILITY FOR NEGLIGENCE

Alabama.—Headlights.

It is negligence, as a matter of law, for a street railway to run a car in the night time with a headlight not having sufficient capacity to cast a light upon the track, so that the motorman may perceive objects for the distance within which the car can be stopped, or for a motorman to run his car at such a rate of speed as to be unable to stop the car with the aid of appliances which he has within the distance in which, by the aid of the headlight, he can see a man prone upon the track. (Montgomery Light & Traction Co. v. Baker, 67 Southern Rep., 269.)

Alabama.—Liability for Injuries to Traffic Policeman.

If a motorman saw a traffic policeman on the track or in dangerous proximity thereto, with his back to the car, he was guilty of negligence in failing to sound the gong or to give warning in some way of the car's approach, as he had no right to assume that the policeman was conscious of the approach of the car. (Mobile Light & Railroad v. Burch, 68 Southern Rep., 510.)

Arkansas.—Rights of Mail Wagons.

A city ordinance, which gives United States mail wagons when in use collecting mail a right-of-way, is a police regulation designed for the benefit of the public to insure the United States mail free course, and does not create a right of action in favor of mail collectors against a street railway company for a violation of the ordinance. (Bain v. Ft. Smith Light & Traction Co., 172 Southwestern Rep., 843.)

Indiana.—Employers' Liability Act—Construction.

The co-employers' liability act (Burns' Ann., St. 1908, Sec. 8017), declaring that every railroad or other corporation operating in the State shall be liable for personal injuries suffered by any employee in specified cases, being invalid so far as it applies to corporations other than railroad companies, because imposing upon them burdens not placed upon individuals and partnerships engaged in the same business, cannot, by virtue of the words "other corporations" be extended to street and interurban railway companies. (Hughes v. Indiana Union Traction Co., 105 Northeastern Rep., 537.)

Kentucky.—Frightening Horse by Track Blower.

A railway company is not responsible because a horse using the highway was frightened by the noise made by a blower used by the track gang. Although there is a right of action for such injuries, where an obstruction is placed in a highway so as to interfere with its use by travelers, or where an object is placed outside of the traveled portion of the highway by one having no lawful authority to do so, nevertheless where the object does not interfere with public travel, and there is a right to place it outside of the traveled part of the highway, irrespective of the shape and appearance or frightful qualities of the object to an ordinarily gentle horse, there is no liability. In the instant case the defendant corporation had a right to place its implements on the right-of-way in such a manner as not to interfere with public travel. (Miller v. Kentucky Traction & Terminal Co., 175 Southwestern Rep., 976.)

Massachusetts.—Injuries to Occupants of Unlicensed Automobile.

Occupants of an automobile which has not been registered according to law are trespassers on the highway and have no rights against other travelers, except to be protected from reckless or wanton injury.

The mere fact that the motorman in charge of an electric car did not see plaintiff's automobile as soon as he might have seen it and did not stop his car as soon as it might have been stopped, does not show that he was guilty of wanton negligence, warranting a recovery by plaintiffs, who were trespassers on the highway, because their machine was not registered. (Dean v. Boston Elevated Ry. Co., 105 Northeastern Rep., 616.)

New York.—Contributory Negligence of Passenger Hit on Platform by Train Going in Reverse Direction.

Where, in an action for wrongful death, it appeared that there had been a delay in running trains in a city subway for more than half an hour and that decedent, while waiting on an unguarded station platform and leaning slightly forward to watch for a train, was struck by an express train which came at high speed without warning, in the reverse way of the track, the question whether she was guilty of contributory negligence was for the jury. (D'Arcy v. Interborough Rapid Transit Co., 152 New York Sup., 500.)

New York.—Master and Servant—Action for Injury to Servant from Released Brakes.

Where it was not within the scope of reasonable prudence and foresight to have anticipated that a motorman would leave his car with the air brakes set, without setting the hand brakes, and that the car would start because of a leak in the air brakes and strike and kill him, negligence, if any, in not inspecting the air brakes was not the proximate cause of his death. (Larson v. Nassau Electric Railroad, 151 New York Sup., 694.)

North Carolina.—Contact with Live Wires Under Bridge.

An electric railway company, maintaining feed wires about 12 in. beneath a bridge, is not liable for injury to a boy of thirteen years getting down on his knees on the floor of the bridge and reaching his hand between the lower railing and flooring and touching a feed wire, for the company could not reasonably foresee the accident resulting from the boy's own independent act. (Parker v. Charlotte Electric Railway, 85 Southeastern Rep., 34.)

Oregon.—Injury to Passenger Rising Before Car Stops.

A street car passenger was not negligent as a matter of law in leaving her seat as the car approached her destination and going on the closed platform before the car stopped so as to bar her right to recover for injuries sustained by her being thrown from the vestibule and injured as the car suddenly rounded a curve. (Kemp v. Portland Ry., Light & Power Co., 145 Pacific Rep., 274.)

Pennsylvania.—Injury to Passenger on Running Board.

Where, in an action for the death of a street car passenger, there was evidence that the car was so crowded that deceased was compelled to ride on the running board, and that, as the car passed a wagon standing still in plain view of the motorman for upward of 100 ft. as the car approached, the hub of the wheel of such wagon protruded over the running boad and caused the accident, the court properly refused to direct a verdict for defendant. (Simkins v. Philadelphia Rapid Transit Co., 90 Atlantic Rep., 527.)

Pennsylvania.—Injury to Passenger on Platform.

The burden of proof is on a passenger on a trolley car injured in consequence of riding on a platform to show that the car was so crowded that he could not be accommodated within. (Frega v. Philadelphia Rapid Transit Co., 91 Atlantic Rep., 222.)

Rhode Island.—Starting Signal Given by Unauthorized Person.

Where a street car came to a full stop before plaintiff attempted to alight and, before she had safely alighted, was started by a signal given by some one not authorized thereto by defendant, and where the accident could not have been prevented after such signal by the exercise of due diligence on the part of the conductor or motorman, defendant was not liable. (Moore v. Woonsocket Street Railway, 92 Atlantic Rep., 980.)

Virginia.—Passenger Pushed from Car Step While Riding Thereon.

Where plaintiff was on the step of defendant's car when it was started and could have remained there in safety had not her hold been broken by two men who pushed past her, the act of the men was an intervening cause, and the carrier, if negligent, was not liable for injuries plaintiff received in a fall from the car. (Virginia Railway & Power Co. v. Godsey, 83 Southeastern Rep., 1072.)

West Virginia.—Knowledge by Agent of Incompetency of Fellow Servant.

Knowledge by an agent respecting the incompetency of employees over whom he has charge for the employer is knowledge of the employer. If a master knowingly employs or retains a careless and incompetent servant, he thereby impliedly authorizes or ratifies his negligent acts, committed in the course of his employment, and if the servant's negligence is wanton and willful or malicious, the master is liable for exemplary or punitive damages. (Hains v. Parkersburg, Marietta & Interurban Railway, 84 Southeastern Rep., 923.)

News of Electric Railways

B. C. ARBITRATION AWARD ACCEPTED

Agreement Made a War Measure—Letter of Manager Kidd to the Men

Between Aug. 26 and 29 meetings of the employees' unions of Vancouver, New Westminster and Victoria were held, at which the reports of the Conciliation Board in the British Columbia Electric Railway wage reduction arbitration were discussed. The men criticised the reports of the majority award, and as a result of the meetings it was decided to take a ballot on Aug. 30 as to the acceptance or rejection of the award. On Aug. 31 a committee from the union met George Kidd, general manager of the company, and stated that the result of the ballot was overwhelmingly against the acceptance of the majority report. Asked whether the company would put forward any concessions which might be placed before the men when the report as to the ballot was made, Mr. Kidd replied that the company had decided to accept the majority award in its entirety and would not consider any concessions in these terms. The committee from the union then retired and during the afternoon communicated with the international executives at Detroit asking their advice and opinion in view of the critical situation. On the evening of Aug. 31 a letter signed by Mr. Kidd was sent by mail to each employee of the company.

At midnight on Sept. 1 a mass meeting of the employees was called to receive the report of the international executive and to decide as to whether a strike should be called The committee of the employees presented a report to this meeting, in which, according to the press, it was stated that the international executive refused to indorse a strike and advised that the majority award be accepted under protest. This message was taken to mean that the international executive would not assist the men financially in the case of a strike.

The committee also reported that during the day the company had consented to an amendment of the majority award. This consisted in making the agreement a war measure, its term being until six months after the cessation of hostilities with a minimum of twelve months and a maximum of twenty-two months. With reference to recognition of the union the agreement was altered so as to provide that employees should become and remain members of the union. The fact, however, that an employee ceased to be a member of the union did not entitle its executive to demand that he should be dismissed from the company. In such cases the general manager should decide the point, and if this was not considered satisfactory the matter should be settled by arbitration. These arrangements were made as the result of mediation by H. H. Stevens, M.P., and Dominion Fair Wage Officer McNiven. As the result of the report as to the amendments and the reply from the international executive, the mass meeting adjourned without ordering a strike.

On Sept. 3 a ballot of the employees was taken as to the acceptance of the amended award. The result was favorable by a large majority. In accordance with the direction of this ballot representatives of the employees' union signed the new agreement with the company on Sept. 4 in accordance with the majority award of the conciliation board as to wages and working conditions, the only alterations being the amendments previously noted.

The letter sent by Mr. Kidd to each employee on Aug. 31, referred to previously, was as follows:

"I have to-day been informed by the committee representing yourself as a member of the Amalgamated Association of Street & Electric Railway Employees of America that the company's employees have decided to reject the award recently given by the majority of the members of the Board of Conciliation appointed to consider the dispute existing between this company and its employees. In order to avoid any possibility of misunderstanding I wish you fully to understand the company's final and considered position in the matter as conveyed to your committee this morning.

"The award of the majority of the board is anything but satisfactory to the company, as we contended and still contend that we are entitled to a reduction of 15 per cent on our total wage bill, and also to considerable relief from the onerous working conditions contained in the agreement which has now expired. Instead of obtaining the relief for which the company asked, a reduction of about 8 per cent on its total wage bill has been recommended, and the working conditions are practically unaltered.

"Under these circumstances the company would be justified in refusing to accept the award. Bearing in mind, however, the conditions prevailing in the Province, and fully realizing the necessity of avoiding any trouble which might still further prejudice the business interests and general welfare of the community, the company has decided to accept the recommendations of the majority of the board.

"The board recommended that the new wage schedule and working conditions should take effect on Sept. 1. Realizing, however, that the company has only to-day notified your committee of its intention to accept the award, it has been decided to continue the existing wage schedule and working conditions for one week. Should you finally decide not to accept service on the terms laid down by the majority of the board, which will, therefore, come into effect on Sept. 8, your decision will be received by the company with great regret, as we much prefer employees who have been for many years upon our payrolls to continue the operation of our system. At the same time your decision will not in any way affect the company's intention of adhering literally to the terms of the recommendation signed by the majority of the board. In the event of your refusing to continue the performance of your duties, the following course will be pursued by the company:

"A period of forty-eight hours will be given you in which to reconsider your decision. If during this time you should present yourself for duty, your services will be accepted at the rate and under the conditions laid down by the Board of Conciliation, but should you not during this time be willing to accept service, your name will be erased from the company's books. In the event of your deciding to leave our employ, you will be instructed to hand in, within the forty-eight hours referred to, your badge, pass, punch, change-fund, and any equipment which may be the property of the company. All seniority rights will expire within forty-eight hours of your failure to appear for duty, and any man afterward engaged to carry on the company's service will have a seniority standing dating from the acceptance of his application. All men so engaged will be treated as first-year men and paid accordingly. The company has arranged, as far as possible, to pay to all employees who present themselves within the forty-eight hours, for the purpose of returning their equipment, all monies which may be due to them.

"I place these matters before you clearly so that you may, before taking any steps which you may afterward regret, have no excuse for saying that you did not understand the true facts of the case, or the true intention of the company concerning this matter, and although, as I have said, the company much prefers, for the sake of peace, to operate under the award with its old employees, it cannot and will not under any circumstances deviate from the conditions herein described to you."

ORGANIZED LABOR OPPOSED TO MUNICIPAL OWNERSHIP

Organized labor will oppose the purchase by the city of Detroit, Mich., of the lines of the Detroit United Railway in the one fare zone. At a meeting of the Federation of Labor at night on Sept. 8 the report of a special committee recommending private operation was unanimously adopted. The report charges that the municipal ownership plan is undemocratic, un-American and smacks of despotism because it gives the Street Railway Commission complete power over the labor question in the event of the purchase. The report also says that adoption of the municipal ownership plan would nullify the arbitration between the commission and the street railway employees, thereby making it possible for the city to establish any kind of conditions it chooses for platform men. The action of the federation indicates an active campaign in opposition to the municipal ownership plan, particular opposition being shown by the members of the street car union.

HOLYOKE STRIKE DECLARED OFF

Responsibility for Continuation of Strike Placed on the Amalgamated Association

Following a visit of W. D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees of America, to Holyoke the strike was declared off and the men agreed to return to work on Friday morning, Sept. 10. The term of the agreement will be submitted to arbitration by the board recently named, consisting of W. H. Brooks for the company, John J. White for the union and James E. Carter as chairman.

The most conspicuous feature of the continued strike on the Holyoke (Mass.) Street Railway has been a report by the Massachusetts Board of Conciliation and Arbitration placing the burden of responsibility for the continuance of the strike on the local branch of the Amalgamated Association. In the opinion of the board the strike is unjustifiable, and the report holds that the men should return to work at once, leaving the issue between them and the company to arbitration. The points at issue as expressed in a communication to the company from the union, dated Aug 2, are as follows: (1) Agreement to have the present scale of wages based on the day system of payment, until June 1, 1916. The present scale is, on the day basis, $2.30 a day for the first six months, $2.45 for the second six months, $2.60 for the second year, $2.70 for the third year, and $2.85 for the fourth year and thereafter. (2) Agreement to make the schedule of runs in accordance with the so-called nine-hours-in-eleven law, and the following agreement: for all runs in excess of nine hours and not in excess of nine hours and fifteen minutes, the payment of one-half hour's extra time, and all runs in excess of nine hours and fifteen minutes and not over nine and one-half hours, payment for one hour of extra time, at the exact rate per hour divided by nine. (3) Payment for all extra work done by motormen and conductors other than regular runs, at the exact hourly rate as quoted above. (4) Establishment of a nine-hour day within ten consecutive hours for shops and carhouses, with an eight-hour day for Sundays and holidays, to be completed within nine consecutive hours, the present daily rate to be unchanged. (5) Agreement between union and company to expire on June 1, 1916.

On Aug. 15 it was agreed that the issues between the parties should be arbitrated by a board selected as previously described in these columns, and the employees returned to work. The board was selected, and subsequently objection was made to the form of the agreement by the employees in that it appeared to them that it would be within the scope of the powers of the arbitration board to fix a time-limit of the award beyond June 1, 1916, and they requested the company to amend the proposed submission to arbitration in this particular so as definitely to limit the award to the date given. The company refused to agree to this limitation and on Aug. 27 the men again struck. The report says:

"The strike still continues and up to this time neither party to the controversy has receded from its position. The company has not operated its cars since the last strike and great public inconvenience and injury to business have resulted from the continuance of the existing conditions. It may be that an element of doubt exists as to the scope of the powers of the board of arbitration chosen by the parties, but the letter of Aug. 2 and additions thereto agreed upon by the parties and the agreement of Aug. 15 were prepared and presented to the company by representatives of the employees. The company was required to execute the agreement of Aug. 15 as a condition precedent to the return of the employees then on strike, the starting of the cars and the arbitration of the existing controversy.

"The board is of opinion that the arbitration should have gone forward in accordance with the agreement of submission of Aug. 15 and that the strike of Aug. 27 should not have taken place. It is not within the province of the State board to define the limits of the powers conferred by the parties upon the arbitrators chosen. The board recommends that in view of the facts herein stated, of the great inconvenience, discomfort and hardship imposed upon the public, the injury to business and to the commercial prestige of the city occasioned by continuance of the strike, the employees should return to work, the company receive them without discrimination, and the arbitration of the matters in dispute proceed."

Following the reception of the report the employees voted to continue the strike and Mayor Woods telegraphed President Mahon of the Amalgamated Association, pointing out that after seventeen days without car service District Organizer Reardon refused to accept arbitration for the length of term of the agreement, stating that the company was willing to arbitrate this point, which was the only one in the way of car service for 100,000 people in the Holyoke district, and asking the personal attention of Mr. Mahon with decision by wire at the earliest possible moment.

Every owner of a jitney license was summoned to a session of the aldermen on Sept. 4 and when the drivers arrived they were informed that fares must be decreased. The license committee of the Board established various local fares ranging from 5 cents to 20 cents, a speed limit of 15 m.p.h., and ordered a close definition of routes to be followed by individual chauffeurs.

FOUR FRANCHISES FOR BROOKLYN

The New York City Board of Estimate & Apportionment has voted to surface companies in the Brooklyn Rapid Transit System four important trolley franchises. Applications for these franchises had been in three of the four cases before the board for several years and had been the subject of considerable controversy, as certain of the franchise terms for which influential members of the Board of Estimate had contended were wholly unacceptable to the companies. The franchises were finally granted on the basis of a compromise in which the city yielded several of the disputed points.

The most important of the franchises covers the so-called Atlantic Avenue route and provides for a trolley route on Atlantic Avenue in Brooklyn from the vicinity of the Long Island Railroad depot easterly to Sheppard Avenue in East New York, a distance of about 5 miles. The trolley rights on Atlantic Avenue had long been in dispute. The original railroad operation there was under a steam franchise of the old Atlantic Avenue Railroad, which subsequently was merged into the Nassau Electric Railroad of the Brooklyn Rapid Transit System, the rights being leased to the Long Island Railroad. The Atlantic Avenue Railroad owned in fee a somewhat circuitous right-of-way, partly within and partly outside of the boundaries of Atlantic Avenue, and in 1853 for the purpose of strengthening and widening the street, the city of Brooklyn, the Atlantic Avenue Railroad and the Long Island Railroad entered into an agreement whereby the Atlantic Avenue Railroad received a "perpetual and exclusive right" to use a 30-ft. strip in the middle of the street for railroad purposes in exchange for certain portions of its right-of-way to be used for highway purposes.

When the Long Island Railroad electrified its line into Brooklyn and in part elevated and in part depressed the tracks, an effort was made to inaugurate trolley operation on Atlantic Avenue. This was resisted by the city and ultimately denied in the courts, it being held that the perpetual and exclusive right to the 30-ft. strip in the center of Atlantic Avenue constituted an easement and not ownership in fee and that only one railroad could be operated thereon, it making no difference in the court's opinion whether this operation was upon the surface, below the surface or above the surface. A long deadlock followed, but ultimately the Long Island Railroad and the Nassau Company came to an agreement with respect to an application for a trolley franchise by the Nassau Company on the surface of the 30-ft. strip over the Long Island tunnel or under its elevated structure as the case might be. This is the application which has now finally been granted by the Board of Estimate and adds an important trolley line to the Brooklyn surface system. Atlantic Avenue has for a long time suffered from stagnation of business and property values. The new line, it is expected, will largely relieve the Fulton Street line and the Bergen Street line of transfer passengers now received from intersecting lines running north and south.

The other franchises are known as the Metropolitan Avenue, the Eighth Avenue and the Fresh Pond Road franchises. The Metropolitan Avenue franchise extends from

Dry Harbor Road to Jamaica Plank Road in the Borough of Queens and traverses a territory which has been without convenient trolley transportation. The route is largely undeveloped at present but it is hoped that the providing of transportation will be followed by a rapid upbuilding of the territory served.

The Eighth Avenue franchise extends from Thirty-ninth Street to Bay Ridge Avenue in the South Brooklyn territory. This is a franchise which has long been sought by the local interests and provides trolley transportation for a territory in which there has been much building.

The Fresh Pond Road franchise connects the new Lutheran elevated line of the Brooklyn Rapid Transit Company with Myrtle Avenue and gives to persons in Glendale and the Forest Park section of Queens a shorter connecting ride to the elevated railroad.

It is expected that work on all of these new extensions will be begun within the next few months.

ARBITRATION OF ALBANY STRIKE

Agreement to Arbitrate Reached on Sept. 10 After Strike Declared on Labor Day

The strike of the employees of the United Traction Company in Albany, Troy, Rensselaer, Watervliet, Cohoes and Green Island, in progress since Labor Day, was settled at 2 o'clock on the morning of Sept. 10. The men and the company agreed upon arbitration. The cars started running at 5 o'clock. Mayor Cornelius F. Burns of Troy and Judge William E. Wollard and Judge Lynn J. Arnold, Troy, are to be the arbitrators. They will convene on Oct. 1 to determine if the grievances of the employees are justified. In the meantime conditions of discipline obtaining prior to June 1 will be restored as desired by the strikers. The agreement to arbitrate follows:

> "The disagreement now existing between the United Traction Company and its employees of the Albany and Troy divisions, 148 and 132 respectively, is adjusted as follows: The principle that the company has the right to administer discipline to its employees is hereby affirmed. The question whether the present system of procedure now in use by the company in the disposition of discipline cases is a violation of subdivision 6 of the agreement and the question of its fairness shall be submitted to and determined by the following arbitrators: Mayor Cornelius F. Burns, Troy; Judge Lynn J. Arnold and Judge William E. Wollard, who shall meet on Oct. 1, 1915. If the arbitrators should decide after hearing both sides that the present system of procedure is not violative of section 6 of the present agreement and unfair, then it shall be adopted as the procedure in discipline cases. In the meantime the members of the associations shall report for duty and the old system of procedure in discipline cases existing before June 1, 1915, shall be in use. In witness whereof the parties hereof have hereto set their hands and seals the tenth day of September, 1915."

The strikers' committee was headed by William B. Fitzgerald, international representative of the Amalgamated Association of Street & Electric Railway Employees. Vice-President Harry W. Weatherwax and General Manager Charles F. Hewitt represented the company. In the room where the conference was held between the strikers' committee and the company officials were the arbitrators named above and John J. Mackrell, president of the Common Council of Troy and counsel for the Troy local of the strikers. Those signing the agreement were Mr. Weatherwax for the company, and Mr. Droogan, president of Division 148, and Joseph M. McLoughlin, president of Division 132. The agreement was approved by Mr. Fitzgerald for the national association.

As in many other strikes the issue was befuddled by questions of veracity between the representatives of the company and the men. The representatives of the men alleged hearings on charges without personal representation. Charles F. Hewitt, general manager of the company, said that the men were not denied the right to appeal cases in which there had been suspensions, and that out of fifty-eight suspensions since the incumbency of C. A. Coons as superintendent of transportation there had been no appeals. Regarding the administration of discipline Mr. Hewitt issued a statement on Sept. 6 in which he said:

"If Mr. Droogan (the president of the Albany division of the Amalgamated Association) or any of the employees had felt that any employee had been punished unfairly, his case would have been appealed, and as there have been no cases appealed it is reasonably certain that the employees feel that the discipline at least has been fair. Mr. Droogan does not claim that the discipline has been unfair, but he apparently objects to the manner of applying it, and that the right of appeal has been denied to the men. This is not correct. In any single past or future case, any employee has under the rules the right to appeal, first to the general superintendent, and then to myself, and this right is not, never has been and never can be denied, and there has been no curtailment whatever in this right of appeal. My feeling is that what he objects to is that the division superintendents, after hearing the cases, have reported the matter to the general superintendent, who has suggested the discipline which has been applied by the division superintendent, Mr. Droogan wishing that the general superintendent would first hear the case without reference to the division superintendent.

"This would take up a good deal of time of the general superintendent, and in nearly all the cases would be absolutely unnecessary, and in any case when the employee desires it he can appeal his case not only to the general superintendent, but to myself, as provided for in the agreement. This works no hardship whatever on the men, because in the case of either the general superintendent or myself changing any decision of the division superintendent the man is given full pay for time lost.

"I am really greatly surprised at this whole situation; the matter is a serious one, and under the charter and by-laws of the Amalgamated Association they are not allowed to call a strike without having brought in one of their international officers and without taking an actual vote of the employees, neither of which matters seems to have been done in this case. In view of the irregularity of the proceeding it seems strange that Mr. Droogan should assume the responsibility of selecting Labor Day on which to inconvenience the people of Albany."

Sept. 8 saw the complete suspension of service in Albany, Troy, Rensselaer, Watervliet, Cohoes and Green Island. On that day there was a short conference between the officers of the company and the representatives of the men, but it was concluded abruptly upon Mr. Droogan intimating that Mr. Hewitt has sought to misrepresent matters. At this conference the president of the Troy division of the men asked in what respects the system of discipline in use in Albany was superior to that in force in Troy. Mr. Weatherwax, vice-president of the company, declared that the company had a right to adopt its own system of discipline without referring it to the men for approval.

Representatives of employers and employees involved in the strike met for a few minutes with the citizens' conference committee on Sept. 9, and then adjourned to meet again late in the afternoon. The recess was occasioned by the failure of W. D. Fitzgerald, a member of the international board of the Amalgamated Association, who has assumed full charge of the strike, to arrive in Albany.

No attempt was made by the company to operate cars in any of the places affected by the strike. On account of the complete suspension of service the public was in some cases greatly inconvenienced. All sorts of methods of transportation were quickly improvised to meet the situation. The jitney came to the front and did a flourishing business. In the interest of the public Mayor Stevens of Albany issued a strike proclamation urging all owners of private motor cars to give a lift to working people, especially women. The Mayor suggested that people willing to do this should fly the American flag at their radiators. The Mayor of Troy made a like appeal to autmobile owners in that city.

PROGRESS ON MANCHESTER (ENGLAND) LINE

The work of electrifying the railway between Victoria Station, Manchester, and Bury, via Prestwich, is making rapid progress, and it is anticipated that the new service will be ready, in a restricted form, by the beginning of November. Trial runs have already taken place over parts of the line. The third-rail system is used, as on the Liverpool & Southport line. The cars will be of the corridor type, each with a capacity of between 90 and 100 passengers. The districts served include Cheetham, Higher Crumpsall, Heaton Park, Prestwich, and Whitefield.

NEW RAPID TRANSIT LINE INTO CINCINNATI

The West End Rapid Transit Company, Cincinnati, Ohio, was incorporated on Sept. 3 by J. C. Hooven, C. E. Hooven, L. E. Voorhies and Stanley Shaffer, all interested in the Cincinnati, Lawrenceburg & Aurora Electric Street Railway. The capital stock of the new company is fixed at $10,000. The plan is to build a line from Anderson's Ferry, the present terminus of the Cincinnati, Lawrenceburg & Aurora line, to the intersection of Third and Vine Streets in the city. The line will give the Cincinnati, Lawrenceburg & Aurora road an entrance to the city and through connections with other roads to the west. Negotiations have been opened with C. L. Henry of the Indianapolis & Cincinnati Traction Company for the establishment of a connection at some point.

DES MOINES ORDINANCE

Summary of Principal Provisions of Franchise Grant to Des Moines City Railway Advanced by Chamber of Commerce

The City Council of Des Moines, Iowa, has received the Chamber of Commerce franchise looking to an extension of the rights of the Des Moines City Railway. The proposed new grant differs but slightly from the franchise submitted to the Council by the company a year ago. The franchise is for a period of twenty-five years. It provides a rate of fare of six tickets for a quarter, a 2½-cent fare for children under twelve years, children under six free, and forty tickets for $1 for high school students. The question of capitalization for the company is not covered. The only clause by which the value of the company is fixed gives the city the right to purchase the system for $5,000,000, based on the valuation of the company "on Aug. 1, 1915." The company must accept the franchise within thirty days after the ordinance is adopted by the city. The Council must call an election within sixty days by which the grant may be approved by the voters.

The principal provisions of the new grant have been summarized as follows:

One supervisor is to be appointed by the city; one by the company to have authority as to what shall be done affecting the quantity and quality of the service, fixing schedules, routes and terminals, and the character and equipment of cars.

Differences between the company and the city in regard to any of the provisions of the ordinance or failure of the two supervisors to agree, or any difference between the company and its employees to be settled by arbitration; one arbitrator to be appointed by each side. Should the two arbitrators fail to agree a third is to be appointed by them, and if they fail to agree the Supreme Court is to appoint the third man.

The company to spend $1,500,000 within three years to put street railway system in first-class condition.

The company is to keep open to inspection full accounts of money expended and liabilities incurred and statistical accounts of its business and operations, and furnish monthly reports of its car mileage, etc.

The City Council is to have power to order extensions upon petition of a majority of the residents of any district not served by the company's lines, if in its opinion the return to the company will pay cost of operation and depreciation.

Six tickets for a quarter; for children under twelve years, 2½ cents; children under six ride free when accompanied by adult. High school fare, forty tickets for $1.

No stock is to be issued except in conformance with the laws of the State, the city to be advised as to the terms and conditions of all bond and stock issues, discounts on bonds not to be considered in fixing the value of the company's property, all proceeds to be invested in betterments to the company's property.

The city is to have the right to purchase upon six months' notice. For this purpose the value of the property on Aug. 1, 1915, to be considered equal to the sum of $5,000,000.

The company is to agree to surrender all claims in streets of the city other than granted by the ordinance, pay all interest due on any bonds secured by lien upon its property and cause the receivership suit and all-bondholders' suits to be dismissed.

If the company fails to perform terms and conditions stipulated by the ordinance and continues to fail for three months after written notice from the city the city may repeal the franchise.

NEW YORK CONSTITUTIONAL CONVENTION COMPLETES ITS WORK

The Constitutional Convention of the State of New York, which has been drafting the new organic law for that State, practically completed its work on Sept. 4. All that remains now to be done of the preliminary work is the passing of the final draft of the proposed new constitution and an explanatory address to the people. It was expected that these matters would be taken care of when the convention reassembled on the evening of Sept. 9.

If the revised constitution is ratified by the voters the short ballot will be inaugurated in New York State at the beginning of 1917. The Governor, Lieutenant-Governor, Comptroller and Attorney-General are retained as elective officers, but the successors of the Secretary of State, the State Engineer and the State Treasurer are to be appointed by the Governor. The Department of the State Engineer in fact will be supplanted by a department of public works, with the head to have supervision of the construction, care, maintenance and operation of all the public works of the State, including canals, highways and public buildings, and this department will plan all the engineering, architectural and construction work required by the State department. If the voters approve the revised constitution the State budget will in the future be submitted to the Legislature by the Governor instead of being initiated in the Legislature and subject only to a limited veto power by the chief executive. The salaries of the lawmakers are to be raised from $1,500 to $2,500, with weekly railroad fares to and from their homes added. The convention decided to double the salary of the Governor, who after 1917 will receive $20,000 annually. The convention failed to substitute the appointive system for the elective in filling positions on the bench.

The Governor's appointments are freed from the requirement of confirmation by the Senate, except in the case of members of the Industrial, Public Service, Conservation and Civil Service Commissions, which are regarded as quasi-judicial bodies. The Public Service Commissions are made constitutional bodies. So are the Tax Commission, the Industrial Commission and the Civil Service Commission.

In all 725 proposals were presented to the convention. Of these less than 100 got beyond the committees having them in charge. In many instances, however, features of proposals rejected by the committees were incorporated in omnibus proposals which were presented to the convention as committee measures.

SUBWAY APPROACH FOR NEW CLEVELAND BRIDGE

The committee on municipal art and architecture of the Cleveland Chamber of Commerce filed a report on Sept. 3 in which it unanimously recommended the construction of a subway approach to the new Superior Avenue bridge across the Cuyahoga River from the east side. The committee suggested that the subway should extend from the bridge to the Public Square under Superior Avenue and that it would not be well to arrange for emergence at any other points.

A sub-committee reported that during one twenty-four-hour period 7196 motorcycles, automobiles, motor trucks and horse-drawn vehicles passed over the viaduct, while in the same period 3437 street cars, counting cars with trailers as one and a half, crossed, making a total of 10,633 vehicles of all classes, or an average of 143 street cars and 300 other vehicles per hour. While this committee is looking at the matter from the standpoint of beauty and artistic effect largely, the fact that these figures were secured shows that it has not eliminated the practical ideas from its consideration. It will be seen that the traffic that will pass over the new bridge, which takes the place of the old viaduct, is very heavy and within a short time will be much more so, thus making blockades possible at all times. The committee suggested that the County Commissioners find some way of financing the subway so that the rentals required will make the burden of expense as light on the public as possible.

INITIATIVE ORDINANCE FOR PURCHASE OF CLEVELAND RAILWAY

An initiated ordinance was introduced in the City Council at Cleveland, Ohio, on Sept. 7 providing for the issue of $34,000,000 of bonds for the purchase of the property of the Cleveland Railway. The measure has been referred to the proper committees. Should the committees hold the ordinance up until too late to have it voted upon at the coming fall election, about 5000 more names will be necessary to the petition in order to get it before the voters at a special election.

A discussion of the question of changing schedules on Lorain Avenue in order to give some of the men longer hours of work took place before the street railway committee on the same day. George Davies, president of the local branch of the Amalgamated Association, accused Peter Witt, street railway commissioner, of paying certain car crews to make the fast time when the new schedules were introduced on Superior Avenue. Mr. Witt told Mr. Davies that he must have a very poor opinion of some of his members. A committee of the union was before George L. Radcliffe, general manager of the Cleveland Railway, on Sept. 8. The Moylan resolution, providing for the changes demanded, was referred to the city law department for an opinion as to whether Council has authority to make changes in the schedule under the Tayler grant.

The County Commissioners have agreed to an extension of the State Road line of the Cleveland Railway for 2½ miles if the company will agree to place lights on the bridges and at the county road intersections.

The city is experimenting with a semaphore similar to the type used in New York, Detroit and other cities at busy street intersections. The semaphore consists of cross-arms at the top of an iron rod set in a heavy base. It is placed in the center of the street and operated by the patrolman on duty at the crossing. The words "Stop" and "Go" are painted on the arms and indicate the direction of traffic as the patrolman turns it.

EMPLOYEES CONCLUDE IN RHODE ISLAND ARBITRATION

Evidence was concluded on Sept. 2 on behalf of the employees of the Rhode Island Company in the arbitration proceedings at Providence. In the course of the proceedings eighty-six witnesses were examined, 2200 pages of testimony taken and 105 exhibits filed. The company's side of the case is now being presented. In one of the last hearings devoted to the union side, the question of rents was discussed by Arthur Sturgis, Boston, in connection with evidence on the cost of living. Mr. Sturgis said that the average rent paid per month by 359 motormen and conductors of the Rhode Island Company was $13.66. The witness said that the houses obtainable in Providence were far superior to those available in New York City for the same money, but that the cost of food in New York was sufficiently lower than in Providence to make the comparative cost of living higher in the latter city. A classification of orders issued by the company since 1907 totalled 1425. They were made up as follows: automatic collectors, 16; accidents, 103; transfers and tickets, 243; full stops, 76; timetables and operation, 472; mail and newspapers, 69; reports of motormen and conductors, 10; signals, 90; fares, 44; lights, heat, doors and signs, 265; assignment of work, 15; miscellaneous, 17.

Outlining the company's case, Attorney James M. Swift said that the fact that a wage scale was first agreed upon by the union and the company in July, 1913, showed that a fair and proper settlement was then reached. Conditions had not changed materially since, and nothing that had since happened warranted an increase in wages. Wages and conditions elsewhere were immaterial. To grant the demands of the men would cost the company $500,000 a year more than at present. The company's officials appreciated the opportunities to better the service, but only a fair dividend had been paid and the outstanding capital stock was well represented by the money invested in the system. The witnesses called for the company began rebuttal testimony in connection with previous statements of employees dealing with existing wage and working conditions. Among those who appeared were W. D. Wright, superintendent of maintenance and equipment; B. E. Whitcomb, head of the line department; Frederick L. Barnard, chief electrician, Manchester Street power station; Daniel P. Miner, chief engineer, Manchester Street power station, and Henry F. Purington, Jr., inspector of the maintenance of way department. The last-named witness said that improved equipment had made the work easier in his department in recent years. Mr. Swift hoped to complete the company's case during the week ended Sept. 11.

MR. DOHERTY CONFERS WITH COUNSEL IN TOLEDO

Henry L. Doherty, chairman of the board of the Toledo Railways & Light Company, was in Toledo again on Sept. 1, in conference with Attorneys Thomas H. Tracy and Rathbun Fuller, but he gave out no information as to what will be the next move in the franchise negotiations with the city of Toledo.

Some time ago the City Council of Toledo, Ohio, adopted a measure ordering the Toledo Railways & Light Company to remove its tracks from that section of Huron Street between Orange and Stickney Avenues before Sept. 30, in order to allow the city to lay a new pavement. Director of Public Service Neukom has made public his intention of having the tracks removed by the city unless the company takes some steps to do so soon. It is said that the pavement on that section of the street is in bad condition, but the company will not spend any money in such improvements until the franchise matter is settled.

Electrification Proposed.—H. Hirschberg, president and treasurer of the Independence & Monmouth Railroad, operating between Independence and Monmouth, Ore., 19 miles, contemplates electrifying the road. Power will be purchased from the Oregon Power Company.

Two Chilian Concessions.—Augusto Astaburuaga has been granted an extension of two years for the beginning of work on the electric railway from Santiago to Maipu, a suburb of the city. The Compania Molinera El Globo of Collipulli, Chile, has been granted the privilege of establishing a lighting and traction system for the town. The town is 90 miles southeast of Concepción and has a population of 4000. Communications to the company should be in Spanish.

Third-Tracking Contract.—The Public Service Commission of the First District of New York has authorized the New York Municipal Railway Corporation (Brooklyn Rapid Transit System) to award the contract for the erection of steel for additional tracks on the Broadway elevated railroad in Brooklyn between Myrtle Avenue and Aberdeen Street to the Jobson-Gifford Company, the lowest bidder, for $400,441. The company will furnish the materials and the contractor will do the work. The time limit is twelve months. Similar work between the Williamsburg Bridge and Myrtle Avenue is nearly completed.

Storm Precautions at Houston.—The city of Houston, Tex., was saved from a night or more in darkness during the recent tornado by the activity of D. A. Hegarty of the Houston Electric Company. Early in the period of the storm Mr. Hegarty began to take precautions. He telegraphed to distant cities for linemen and supplies, bringing them from as far as New Orleans, and before they were actually needed had an extra supply of wire and lights in the storeroom and the extra linemen housed in buildings of the company. Then for the five days following the storm these men worked continuously under his direction. The daily papers were loud in their praises of Mr. Hegarty, and one of them told the story of his achievement in a graphic way under the title "How Dan Hegarty Turned on the Lights."

Restoring Service Over the Galveston Causeway.—A single track trestle bridging the gaps in the causeway over Galveston Bay, caused by the recent Texas coast storm, was completed on Sept. 1 and regular operation of the Galveston-Houston Electric Railway was begun on Sept. 2 on the two-hour schedule. At the time service was resumed the broken trolley wires had not yet been restrung and a switch engine was used to tow the interurban cars over the spaces where there were no wires. Owing to the fact that this single track is the only one connecting Galveston Island with the mainland and is used by hundreds of freight and passenger trains a day, many delays are encountered and the interurban company contemplates the immediate construction of another trestle for its exclusive use until the causeway is rebuilt.

Radial Railway Data in Preparation.—Chief Engineer Gaby of the Hydro-Electric Power Commission of Ontario made an address on the hydro-radial enterprise of the province before the convention of the Ontario Municipal Association on Sept. 2. He said that within the next few weeks statistics would be completed and reports would be ready for presentation to the various municipalities interested showing the estimated cost for the construction of a network of radial electric railways throughout the western portion of the province. Requests for this information had been received from some 300 municipalities along 1600 miles of roads in the districts from Whitby in the east, to Sarnia and Windsor in the west, including the Huron and Niagara peninsula districts.

Arrears in Taxes Claimed in Cincinnati.—The Cincinnati (Ohio) Traction Company was notified on Aug. 28 that it is indebted to the city of Cincinnati, Ohio, in the amount of $20,810.36, and was requested to send a voucher to the city auditor for that amount. E. O. Biggs has been engaged in auditing the company's books for the city solicitor and he claims that the company has been paying the city a tax on the amount it received from the Millcreek Valley line, 3 cents per passenger, whereas the courts recently decided in other cases that the tax must be paid on the full amount charged for fare, which is 5 cents per passenger. This is one of the lines which operate over the company's tracks within the city. It has no franchise of its own. The city claims taxes on the balance from Jan. 1, 1911, to June 30, 1915, $18,424.63, with interest, $2,385.75.

$160,000,000 of Contracts Under Dual System Plans.—In the *Public Service Record*, a monthly publication issued by the Public Service Commission, First District, New York, it is stated that on Aug. 1 the total amount of rapid transit contracts under the dual system plans on lines to be owned by the city was in round numbers $160,000,000. The contractors on these lines and upon the lines to be owned by the two companies, namely, the Interborough Rapid Transit Company and the New York Municipal Railway Corporation, are employing about 20,000 men. The total of $160,000,000 includes those parts of the new system which are already in operation, namely, the Centre Street Loop subway in Manhattan, the Fourth Avenue subway in Brooklyn and the Queensborough subway under the East River, formerly known as the Steinway tunnel. Out of more than eighty sections contracts have been let for more than sixty. It is expected that the contracts for the remaining sections will be awarded by Jan. 1.

Conference on Newport Franchise.—The City Commissioners, members of the Business Men's Club and representatives of the Cincinnati, Newport & Covington Railway met in Newport on Sept. 1 to consider the franchise question. The commissioners and the railway representatives had previously reached an agreement on almost all other important matters except the rental for the use of the streets. At the conference on Sept. 1 the commissioners stated that they were prepared to accept a lump sum of $12,000 a year for the use of the streets, instead of an amount based on the track mileage. W. W. Freeman, president of the company, and Polk Lafoon, secretary, argued that the company should not be penalized further than the taxes it would be compelled to pay and the improvements it had agreed to make, but that it would be willing to compromise on the payment of $3,000 a year as rental for the use of the streets and no more. Another meeting will be called to adjust the differences if possible.

PROGRAM OF ASSOCIATION MEETING

New England Street Railway Club

The *Frances* has been chartered for the annual men's outing of the New England Street Railway Club, a deep-sea fishing trip, on Sept. 16.

Financial and Corporate

ANNUAL REPORTS

Havana Electric Railway, Light & Power Company

The comparative statement of income, profit and loss of the Havana Electric Railway, Light & Power Company, Havana, Cuba, for the years ended Dec. 31, 1913 and 1914, follows:

	1914	1913
Gross earnings	$5,396,713	$5,417,054
Operating expenses and taxes	2,595,321	2,612,952
Net income	$2,801,392	$2,804,102
Other income	102,119	140,087
Gross income	$2,903,511	$2,944,189
Fixed charges	1,094,140	1,096,085
Surplus after charges	$1,809,371	$1,848,104
Surplus Jan. 1, 1914	1,313,457	....
Total	$3,122,828	....

A summary of the operations of the various departments of the company for 1914 shows the following apportionments:

Department	Gross Earnings from Operation	Operating Expenses and Taxes	Per Cent of Gross Earnings	Net Earnings from Operation
Electric railway	$2,915,033	$1,405,818	48.23	$1,509,214
Electric light	1,605,696	518,257	32.28	1,087,440
Gas	556,157	385,406	69.30	170,751
Stage lines	319,827	285,840	89.37	33,987
Total	$5,396,713	$2,595,321	48.09	$2,801,392

The decrease in gross earnings for the year amounted to $20,340 or 0.33 per cent, while the operating expenses and taxes decreased 0.66 per cent. Rainy days, which were more in 1914 by 23 per cent than in 1913, had a disastrous effect upon car earnings. Moreover, the curtailment of public construction work, the paralysis of travel in certain districts because of quarantine for bubonic plague, the competition of a United Railways line and for a time of a motor omnibus line and the closing of cigar factories on account of the European war, all operated to decrease the electric railway earnings for the first time in the company's history. In view of the events of the year, however, it is surprising that the loss was not greater. The most encouraging feature was that it was found practicable to reduce operation so that during the last four months of the year the passenger earnings per car-mile were equal to those of the preceding year. The following statistics show more fully the comparative results that were obtained for the last two years:

	1914	1913	Per Cent Change
Passenger car-miles	10,778,706	10,543,739	+2.23
Passenger earnings	$2,794,668	$2,839,118	—1.56
Passenger earnings per car-mile	0.2594	0.2693	—3.68
Total operating expenses	1,373,937	1,426,972	—3.72
Total operating expenses per car-mile	0.1275	0.1353	—5.77

The total number of cash fare passengers carried during 1914 was 55,893,367, a decrease of 1.56 per cent as compared to 1913, but still an increase of 7.76 per cent over 1912. The freight equipment of the company did more work than in 1913, transporting a total of 282,190 long tons of materials. The locomotive car-hours increased 15.6 per cent and the trail-car-hours 27.9 per cent. The new track constructed during the year aggregated 8.28 miles, an increase of 11.5 per cent, comparable to 9.5 per cent in 1913 and 2.4 per cent in 1912. Reconstruction work on track was continued, and at the end of 1914 about 32 per cent of the track built under the original light specification had been replaced in accordance with the present heavier standard.

During the year 1914 the rolling stock was increased by twenty passenger cars of standard type and one locomotive, built in the shop, and by twenty steel 6-yd. capacity side-dump trail cars for carrying track and construction materials, shipped from the United States and assembled in the shop. Electrical equipments were received for thirty additional cars and three more locomotives to be constructed, and apparatus for the equipment of the four new locomotives and the twenty-four large steel coal cars with automatic air brakes.

The following table shows the results of operation of the company's stage lines:

	1914	1913	Per Cent Change
Stages owned	166	165	+0.61
Stages operated (daily average)	145	151	—3.97
Stage-miles run	3,266,518	3,402,691	—4.00
Gross earnings	$319,826	$356,894	—10.40
Gross earnings per stage-mile	$0.0980	$0.1048	—6.49

The influence of the generally unfavorable business conditions, and the resulting greatly increased unemployment, especially in the tobacco industry, were most severely felt by the omnibus service. Two other causes contributed materially to the adverse circumstances encountered, namely, the extension of the suburban electric service of the United Railways to a numbr of neighboring small towns, which before were mostly dependent upon the omnibuses, and the very high rate of exchange of Spanish silver during the entire year, which made it so nearly equal to United States currency that there was but slight difference in fare between the omnibuses and the quicker and more comfortable electric street cars. Because of existing conditions, the trial of the electric motor omnibuses, which was projected and was referred to in the 1913 report, was deferred to more favorable times. All the new equipment of this department, however, has been designed with a view to the ultimate establishment of motor vehicle service. An attempt was made during the year by another company to operate gasoline motor buses of English type, but the receipts were so unsatisfactory that it was given up after three months' trial.

During the year the consolidated power plant, described in the ELECTRIC RAILWAY JOURNAL of May 15, 1915, page 920, was substantially completed and was by the end of 1914 carrying three-fourths of the total load. The annual report of the company, on the whole elaborate, contains a handsomely illustrated special report on this power plant. The annual report is also published in Spanish for the convenience of security holders preferring that language.

Denver Tramway System

The statement of income, profit and loss of the Denver (Col.) Tramway System for the year ended March 31, 1915, follows:

Gross earnings	$3,263,954
Total operating expenses	1,683,960
Net earnings before deducting taxes and franchise payments	$1,579,994
Taxes and franchise payments	279,220
Net earnings after deducting taxes and franchise payments	$1,300,774
Other income	32,295
Gross income	$1,333,069
Deductions from income:	
Interest on funded debt	$988,415
Other deductions	22,350
Total deductions	$1,010,765
Net income	$322,304

This is the first report since the reorganization as of March 31, 1914, of the Denver City Tramway System. The Consolidated Securities & Investing Company was incorporated on March 30, 1914, and became the successor of the Denver Realty Company, the Boulevard Real Estate Company and the Denver Excursion Company. The Consolidated Securities & Investing Company, as successor company, acquired ownership of all the stock and bonds of the Denver & Inter-Mountain Railroad. All the stock of the Consolidated Securities & Investing Company was in turn acquired by the Denver City Tramway. Thereafter the Denver Tramway, incorporated on March 30, 1914, purchased all the property of the Denver City Tramway, which company had previously acquired the Denver Tramway Terminals Company and the Denver Tramway Power Company. The Denver Tramway thus became the owner of all the stock of the Consolidated Securities & Investing Company. The Denver & Northwestern Railway, though it is no longer an operating company (having sold it physical property to the Denver City Tramway in 1913), continues to be the holding company of the Denver Tramway.

In view of the above changes a comparison in details of the results for the first fiscal year of the Denver Tramway System with the results of the system for the year preceding would be difficult. The gross earnings of the Denver Tramway, however, showed a decrease of approximately 5.21 per cent for the year just ended. By rigid economy a saving of about an equivalent amount was effected in operating expenses. A general reduction was made in salaries without cutting the wages of men receiving less than $90 per month. After payment by the Denver Tramway of interest on $3,167,000 of prior lien bonds and after taxes and franchise requirements, there remained available out of earnings more than 161 per cent of the fixed charges on all outstanding bonds assumed by the company.

During the year there was a total expenditure by the Denver Tramway of $188,647 for betterments and improvements, of which $89,106 was on account of way and structures, $54,966 for new equipment and $44,574 as the company's proportion of the cost of the work done in construction of the Colfax-Larimer viaduct prior to March 31, 1915. The largest item of track work was in reconstruction of 5.29 miles of single line, where all rail was replaced, principally with 73-lb. steel. The more important items of equipment added were six new trailers, four new rotary snow-sweepers, two motor utility cars, and the fitting of trail cars with bulkhead partitions and electrical heaters. Expenditures for system maintenance amounted to $371,116. No large outlays for capital improvements are contemplated for the current year, except those to which the company is committed and which are under way. It is expected that no financing will be necessary until 1919.

The following table presents some miscellaneous statistics for the entire system:

Passengers carried:	
City lines	75,572,785
Interurban lines	956,034
Total	76,528,819
Passenger earnings per car-mile:	
City lines (cents)	26.53
Interurban lines (cents)	28.98
Passenger earnings per car-hour:	
City lines	$2.56
Interurban lines	4.69
Car-miles operated, passenger:	
City lines	11,174,515
Interurban	366,290
Total	11,540,805
Car-hours operated, passenger:	
City lines	1,159,205.4
Interurban lines	22,622.4
Total	1,181,827.8

Glasgow Corporation Tramways

The ordinary income of the Glasgow (Scotland) Corporation Tramways for the year ended May 31, 1915, was £1,076,877, while the working expenses, including payments to dependents of employees, were £735,987, leaving net revenue of £340,890. The ordinary income of the previous year was £1,083,846 and the working expenses £676,277, leaving net revenue of £407,569. After adding interest on investments and rent of lines, increasing the revenue to £406,717, and after deducting interest, sinking fund payments, taxes, depreciation and other expenses amounting to £393,766, the net balance of £12,951 was paid over to the common good. The gross revenue for the year decreased £6,130, and the average traffic revenue per car-mile increased from 10.609d. to 10.612d. The working expenses, excluding expenditures incurred on account of the war, increased £7,893 or 0.13d. per car-mile. This increase was mainly caused by shorter working hours, wages and taxes. A sum of £51,816 was expended in connection with the war, as follows: Allowances to dependents, £39,736; car tokens, £6,231; war bonus, £5,005; general recruiting, £541, and equipment of pipe band, £301.

During the year £76,391 was expended on capital account, making a total expenditure of £3,751,708 as of May 31, 1915. The amount to the credit of the depreciation and permanent way renewals fund on that date was £2,158,738. The total set aside for the last fiscal year was £172,310, as compared to £212,642 for the preceding year. An amount of £33,768 was expended during the year for track renewals, leaving a credit balance of £2,294,304. The general reserve fund at the end of the year had a total credit of £32,238, £1,970 having been added through the sale of obsolete equipment and £7,801 expended during the year. The sum of £65,875 was expended on the upkeep of the tramway track in ordinary repairs. In addition to this £68,228 was set aside to meet the cost of track renewals, calculated at the rate of £350 per mile of single track. The total cost of ordinary repairs to the power plant and sundry machinery was £8,137, and £23,566 was charged against revenue to meet depreciation. The total cost of inspection and repairs of cars was £55,965, with £41,199 further reserved, and the total cost of maintenance of miscellaneous equipment was £1,192, with £1,840 reserved. The car mileage in 1914-1915 was 24,214,460, with 198.125 miles of single track in operation, and in 1913-1914 24,403,482 car-miles with 196.125 miles of single track in operation. The passengers in the two years numbered 336,260,758 and 336,654,624 respectively. At present 2223 members of the company's staff are enlisted in His Majesty's forces.

KEY ROUTE EARNINGS IMPROVE

According to an official statement issued by George K. Weeks, president, the San Francisco-Oakland Terminal Railway, Oakland, Cal., has deposited with the Wells Fargo Nevada National Bank funds for the payment of matured coupons on the Oakland, San Leandro & Hayward first mortgage 6 per cent bonds, the Alameda, Oakland & Piedmont first mortgage 6's and the Oakland Transit Company first consolidated 6's of 1918. The company has also deposited funds for the payment of interest on the Oakland Traction equipment trust certificates.

These payments have been made after providing for $122,000 of State taxes due in August, and it is understood they will be followed by the payment, from time to time as funds are accumulated, of other matured coupons on the bonds of this system in the order of their apparent seniority.

The recent earnings of this company have been just about sufficient to pay necessary operating and maintenance charges and interest on its outstanding obligations. Some time ago the company, by reason of apparently pressing requirements for capital purposes, fell behind in the accumulation of funds to meet its semi-annual interest payments. Since that time funds to meet this interest have been advanced by various banks in San Francisco and Oakland against the agreement on the part of the road to repay these advances out of daily receipts.

When it came to advancing the interest due last July the majority of the banks felt that some movement for a permanent reorganization of the property was so imminent and the consequent possibility that the repayment of any advance made might be interrupted so greatly that they were not justified in making such advances. A plan was therefore worked out for the purchase by the banks of matured interest coupons from such holders as found it desirable to realize on the same without delay, as noted in the ELECTRIC RAILWAY JOURNAL of July 17. The company has now started the payment of these coupons to the banks which purchased them and to the holders who have retained them without discrimination. Previous references to the condition of this company were made in the issues of May 29, June 12 and 19, and Aug. 21 and 28.

Albuquerque (N. Mex.) Traction Co.—The Albuquerque Traction Company is to be offered for sale on Oct. 1 at the court house in Albuquerque by L. F. Lee, special master. It is expected that the group headed by George Roslington, receiver, will bid in the property.

Birmingham, Ensley & Bessemer Railroad, Birmingham, Ala.—The foreclosure sale of the Birmingham, Ensley & Bessemer Railroad, announced in the ELECTRIC RAILWAY JOURNAL of Sept. 4, is to take place at the Jefferson County Courthouse about the middle of October.

British Electric Traction Company, London, England.—An amended scheme of capital reorganization being considered by the British Electric Traction Company involves reducing the four outstanding classes of capital (exclusive of debentures) to two. It is proposed that the £403,592 of cumulative 6 per cent preference stock shall be exchanged at par into a new issue of a similar character, while the £807,185 of non-cumulative 7 per cent preference stock is to be covered as to 35 per cent into the new cumulative 6 per cent participating preference stock, while the balance of 65 per cent will be represented by new ordinary stock. As regards the £1,070,097 of non-cumulative 6 per cent preferred ordinary stock at present outstanding, 50 per cent will be converted into new ordinary stock, while the balance of 50 per cent will be written off altogether. Of the £665,505 of deferred stock now outstanding, 30 per cent is to be converted into new ordinary stock, the balance of 70 per cent being regarded as lost. The £266,371 of income certificates (non-interest bearing) are to be exchanged as to 10 per cent into fully-paid new cumulative 6 per cent participating preference shares, and as to 25 per cent into fully-paid new ordinary shares, the funds requisite for this purpose to be drawn from the company's reserves. The balance of 65 per cent of the certificates will be cancelled. Thus the capital account is to be written down by £1,001,602. It is believed that this should suffice to enable the assets to be written down to their market value.

Empire United Railways, Inc., Syracuse, N. Y.—The Public Service Commission for the Second District of New York, has authorized the purchase by the Empire United Railways of the 2500 shares of capital stock, $100 par value, of the Monroe County Electric Belt Line at $9.67 a share. The stock will be paid for at $1.67 a share when delivered, $2 a share three months, $2 a share six months, $2 a share nine months and $2 a share twelve months from Sept. 1, 1915.

Everett Railway, Light & Water Company, Everett, Wash.—It is reported that the election held on Aug. 24 resulted in favor of issuing $1,100,000 of 6 per cent utility bonds with which to finance the purchase, or the condemnation and purchase, of the plant of the Everett Water Company, which is owned by the Everett Railway, Light & Water Company.

Gary & Interurban Railroad, Gary, Ind.—The Gary & Interurban Railroad has defaulted on the interest and principal of $350,000 of 6 per cent notes due on Sept. 1. A protective committee composed of D. H. Gordon, S. Baldwin, Sr., W. K. Cromwell and P. L. Poe is asking for deposits of the defaulted notes with the Baltimore Trust Company as depositary. The notes are protected by a deposit of $500,000 of the first mortgage bonds of the East Chicago Railway, indorsed by the Gary & Interurban Railroad.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—The Indianapolis Traction Terminal Company showed a deficit during the year ended June 30, 1915, of $22,865 as compared to $56,886 for the previous year, according to a report filed with the Indiana Public Service Commission. After deducting the loss for the year, the surplus as of June 30, 1915, was $292,894. The current deficit was caused in part by the increase in operating costs incident to an increase of wages at the time of the recent strike. Business also fell off to some extent, and the number of passes, especially to policemen and other officials, noticeably increased. The revenues for the current year totaled $2,889,065 as compared to $2,902,113 for the year preceding. The total fares were 67,967,954 and the transfers 21,778,673, as compared to 68,257,958 fares and 21,282,858 transfers for the preceding year. Wages to conductors and motormen increased from $532,347 to $569,187, and carhouse employees were paid $69,770, an increase of $6,495. Claims for damages and injuries for the year amounted to $115,836. The company spent for construction $96,168, making the total construction work carried on the books $11,198,204. Additions to equipment amounted to $50,527. The income tax increased this last year to $5,929 as compared to $3,459 for the previous year.

Kansas City Railway & Light Company, Kansas City, Mo.—The stockholders' committee of the Kansas City Railway & Light Company has in preparation a plan for distributing the equities among the stockholders and separating the railway and light property, as required by Judge Hook's plan, described in the ELECTRIC RAILWAY JOURNAL of Aug. 21. G. M. Reynolds, Chicago, is chairman of the committee.

Muskegon Traction & Lighting Company, Muskegon, Mich.—The Muskegon Traction & Lighting Company has applied to the Michigan Railroad Commission for authority to increase its authorized stock from $700,000 to $1,000,000. The present stock consists of $600,000 of common and $100,000 of preferred issues.

Standard Gas & Electric Company, Chicago, Ill.—The Standard Gas & Electric Company has authorized the offer to stockholders of $3,750,000 twenty-year 6 per cent notes at 90 and interest. The privilege of subscribing to $3,000,000 of the notes is accorded holders of the preferred stock to the extent of 25 per cent of their holdings of stock, and the common stockholders may subscribe to the remaining $750,000. The right of subscription closes on Oct. 15 and the plan will not be declared operative unless $2,000,000 subscriptions are made. A number of the larger stockholders have pledged themselves to purchase the full allotment. H. M. Byllesby, president, states that the proceeds of the full sale will retire all short time obligations, liquidate the floating debt and enable the company to increase its earnings. It is also stated that in the event of the notes being taken, the preferred stock will be immediately put upon a cash dividend basis, starting with 1 per cent for the first quarter. Since June, 1913, the preferred dividends have been paid in scrip, maturing in about eight years.

Underground Electric Railways, Ltd., London, England.—Further details of the dividend announcement made in the ELECTRIC RAILWAY JOURNAL of Aug. 14 show that the Underground Electric Railways of London was to pay on Sept. 1 or after the interest on its first cumulative income debenture stock, less income tax, at the rate of 6 per cent per annum. As regards the Underground group, the Metropolitan District Railway has declared an interim dividend for the half year ended June 30 on guaranteed stock at the rate of 4 per cent per annum, on the first preference stock at the rate of £4 10s. per annum and on the second preference stock at the rate of 3 per cent per annum. This second preference dividend is the same as for the corresponding half of last year, but compares with a distribution at the rate of 1 per cent per annum for the second half of 1914. The London Electric Railway declared an interim dividend for the half year ended June 30 on the preference stock at the rate of 4 per cent per annum, and on the ordinary shares at the rate of 1 per cent per annum. This ordinary dividend is at the rate paid for the corresponding six months of last year, but for the second half of 1914 the payment was only at the rate of one-fourth of 1 per cent per annum, so that for the full twelve months the dividend was five-eighths of 1 per cent. A third instance of the distribution being restored to the level of the first half of last year is in the case of the City & South London Railway. A year ago the 5 per cent preference stocks of 1891, 1896, 1901 and 1903 received their full six months' dividend and those distributions are now being repeated, but for the second half of 1914 only the two earlier issues received their dividends, nothing being paid on the 1901 and 1903 stocks.

Winnipeg (Man.) Electric Railway.—It is reported that the June returns of the Winnipeg Electric Railway were the most disappointing of any in the last six months. The company's decline in income extends over a full year. The contraction began June, 1914, but it became even greater after the European war started. From a 12.8 per cent decline shown in the January returns, the company has finally come to a 42.6 per cent decline for last June. This follows a 41.2 per cent decline in May and 40.3 per cent in April. Net earnings for six months were $621,643, being a decrease of $256,204 or 29.2 per cent. The half year's figures indicate earnings at the rate of $1,243,286 per annum. This compares with earnings of $1,685,094 for the year 1914 and $1,826,088 for 1913.

DIVIDENDS DECLARED

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1¾ per cent, preferred.

Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont., quarterly, 1½ per cent, preferred.

Eastern Power & Light Corporation, New York, N. Y., quarterly, 1½ per cent, preferred.

El Paso (Tex.) Electric Company, quarterly, 2¼ per cent, common.

Interborough Consolidated Corporation, New York, N. Y., quarterly, 1½ per cent, preferred.

Interborough Rapid Transit Company, New York, N. Y., 5 per cent.

Manhattan Bridge Three-Cent Line, Brooklyn, N. Y., quarterly, 1½ per cent.

United Traction & Electric Company, Providence, R. I., quarterly, 1½ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.						
1m., July,	'15	$68,146	*$37,948	$30,198	$17,462	$12,736
1 " "	'14	67,805	*34,246	33,559	17,351	16,208
12 " "	'15	780,845	*378,809	402,036	211,629	190,407
12 " "	'14	778,667	*367,699	410,968	208,850	202,118
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.						
1m., July,	'15	$90,116	*$63,458	$26,658	$30,337	†$3,679
1 " "	'14	92,696	*61,435	31,261	28,130	3,131
12 " "	'15	1,039,520	*709,344	330,176	351,820	†21,644
12 " "	'14	1,159,210	*711,202	448,008	324,043	123,965
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO						
1m., June,	'15	$108,341	*$71,675	$36,666	$27,348	‡$9,420
1 " "	'14	110,026	*70,291	39,735	27,356	‡12,378
6 " "	'15	583,142	*398,390	184,752	164,760	‡20,583
6 " "	'14	596,846	*399,830	197,016	163,880	‡33,136
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.						
1m., July,	'15	$1,182,520	*$654,686	$527,834	$365,166	$162,668
1 " "	'14	1,143,335	*625,936	517,399	358,812	158,587
12 " "	'15	14,072,518	*7,565,138	6,507,380	4,327,623	2,179,757
12 " "	'14	13,970,316	*7,699,022	6,271,294	4,055,815	2,215,479
CONNECTICUT COMPANY, NEW HAVEN, CONN.						
1m., June,	'15	$685,850	*$461,469	$224,381	$98,310	‡$148,964
1 " "	'14	738,224	*414,139	324,085	93,458	‡252,399
12 " "	'15	7,960,821	*5,726,883	2,233,938	1,185,984	‡1,323,457
12 " "	'14	8,085,399	*5,767,389	2,318,010	1,077,461	‡1,501,072
CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.						
1m., July,	'15	$262,080	*$141,245	$120,835	$64,819	$56,016
1 " "	'14	258,004	*132,359	125,645	63,294	62,351
12 " "	'15	2,555,338	*1,453,628	1,101,710	778,734	322,976
12 " "	'14	2,470,163	*1,426,799	1,043,364	757,926	285,438
EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST, LOUIS, ILL.						
1m., July,	'15	$200,599	*$122,023	$78,576	$63,645	$14,931
1 " "	'14	218,659	*130,214	88,445	61,342	27,103
12 " "	'15	2,448,863	*1,452,450	996,413	758,115	238,298
12 " "	'14	2,758,242	*1,733,817	1,024,425	630,863	393,562
GRAND RAPIDS (MICH.) RAILWAY.						
1m., July,	'15	$105,596	*$72,022	$33,574	$13,933	$19,641
1 " "	'14	115,756	*73,308	42,448	13,566	28,882
12 " "	'15	1,216,108	*833,416	382,692	163,523	219,169
12 " "	'14	1,294,505	*837,522	456,983	156,372	300,611
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO.						
1m., July,	'15	$136,446	*$78,781	$57,665	$36,220	$21,445
1 " "	'14	151,999	*79,221	72,778	35,768	37,010
7 " "	'15	761,570	*513,400	248,170	252,497	†4,327
7 " "	'14	810,105	*510,867	299,238	247,489	51,749
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.						
1m., July,	'15	$75,376	*$44,683	$30,693	$15,949	$14,744
1 " '	'14	72,565	*41,199	31,366	15,497	15,869
12 " "	'15	706,709	*463,361	243,348	187,996	55,352
12 " "	'14	675,185	*459,328	215,861	184,780	31,081
NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.						
1m., July,	'15	$166,927	*$109,847	$57,080	$42,896	$14,184
1 " "	'14	184,081	*110,802	73,279	42,100	31,179
12 " "	'15	2,163,788	*1,281,341	882,447	493,588	388,859
12 " "	'14	2,247,867	*1,399,216	848,651	489,539	359,112
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO.						
1m., July,	'15	$371,736	*$219,704	$152,032	$51,804	$100,228
1 " "	'14	351,659	*206,170	145,489	50,848	94,641
7 " "	'15	2,128,388	*1,321,350	807,038	360,270	446,768
7 " "	'14	2,073,359	*1,265,805	807,554	352,683	454,871
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.						
1m., July,	'15	$467,946	*$260,486	$207,460	$183,947	$23,513
1 " "	'14	511,005	*280,020	230,985	182,303	48,682
12 " "	'15	5,694,808	*3,103,158	2,591,650	2,210,534	381,116
12 " "	'14	6,644,511	*3,340,255	3,304,256	2,127,126	1,177,130
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.						
1m., July,	'15	$792,831	*$549,883	$242,948	$84,927	‡$158,687
1 " "	'14	823,935	*531,416	282,519	83,996	‡199,650
7 " "	'15	5,382,641	*3,893,040	1,489,601	577,700	‡927,294
7 " "	'14	5,337,139	*3,690,976	1,616,163	574,700	‡1,076,939

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

JITNEY JOTTINGS

Ordinance in Newark Before Mayor—Progress of Regulation in Other Cities

The Board of Street & Water Commissioners of Newark, N. J., has passed a jitney ordinance, to take effect immediately, and the measure is now before the Mayor for signature. The measure covers any automobile or other common carrier other than a street car operated within the city for hire at a rate of 15 cents or less. A license to operate must be obtained from the City Clerk. Power is vested with the Board of Street & Water Commissioners to determine the reasonable seating capacity of each jitney, the routes, hours of service and terminal points, and that body is authorized to approve applications as presented or to make such changes in regard to the seating capacity, routes, hours of service, etc., as the convenience and safety of the public may demand. Each holder of a jitney license must take out liability insurance in the sum of $5,000 within two weeks of the granting of the license. Rules are laid down in detail in regard to operation, among them a provision making it unlawful to omit to operate a jitney over the designated route during the hours of service unless consent has been obtained from the general superintendent of works, subject to the approval of the Board of Street & Water Commissioners. Any person who violates any provision of the ordinance is upon conviction to pay a fine of $5 for the first offense and $10 for each subsequent offense, and "any license may be revoked accordingly for violation of the provisions of this ordinance."

The City Council of Newark has passed on first and second reading an ordinance covering the matter of license fees, these fees ranging from $50 to $125, according to the seating capacity of the jitney. This ordinance will come up for third and final reading early in October.

An ordinance regulating the jitney in Waterloo, Iowa, has been adopted by the City Council. The ordinance, known as the motor bus ordinance, applies to every motor vehicle, hotel buses excepted, in the city engaged in hauling passengers for hire. Operators of the vehicles must file an indemnity bond payable to any or all persons who may receive injuries while a passenger in their vehicle. The bond is regulated according to the carrying capacity of the vehicle. A $2,000 bond is required for a vehicle carrying more than one and less than six passengers, driver included; a $3,500 bond for a vehicle carrying more than six and less than eleven passengers, and a $5,000 bond where more than ten passengers are carried. The license fee is also regulated according to the carrying capacity of the vehicles. A license fee of $15 a year is charged a vehicle carrying more than one and less than six passengers, driver included; $20 where the carrying capacity does not exceed eight; $25 where the capacity is not more than sixteen passengers; $30 where the carrying capacity is less than thirty, and $35 a year where the carrying capacity is more than thirty passengers.

An important jitney hearing was set for Sept. 7 before the Railroad Commission of California in the case of the United Railroads of San Francisco versus the Peninsula Rapid Transit Company. The United Railroads on Aug. 3 filed with the Railroad Commission a complaint against the Peninsula Rapid Transit Company. The company asked the commission to rule that the motor bus company was a public utility, subject to regulation by the commission. The complaint requested that the motor bus company be directed to file with the commission a schedule of rates, fares, charges and classifications, and obtain from the commission a certificate of convenience and necessity, and comply otherwise fully with the public utilities act. The Peninsula company runs motor buses with a capacity of twenty each in regular schedules from San Francisco to Daly City, Milbrae, Easton, Burlingame and San Mateo, the latter point being about 22 miles from San Francisco. The United Railroads claims that the Peninsula Company is a common carrier, but has never secured authority as one from San Francisco, or from San Mateo County, or from any of the cities whose streets it uses. The United Railroads points out that it has invested much capital in rights-of-way and in building and in maintaining its suburban line between San Mateo and San Francisco, and that it was operating its line long before the motor buses began to run. The United Railroads also claims that it gives an adequate service at all times and there was no necessity for the establishment of the motor bus company.

The question of whether the city of Oakland, Cal., has the right to impose a tax on jitneys, despite previous payment of a State vehicle tax by the jitney owner has been decided in the affirmative by Superior Judges Ogden, Brown and Waste of Alameda County and Conley of Madera, sitting en banc. The judges held that the State taxed the jitney vehicle, but the city taxed the jitney business. The test case was that of Leroy M. Phillips, arrested for nonpayment of the $60 annual tax imposed by the recent Oakland ordinance.

Stringent regulation of the automobile passenger carrying business in Los Angeles, Cal., is proposed in measures now being drafted by the public safety committee of the Los Angeles City Council. Recommendations from Traffic Chief Butler, the Police Commission, and the Public Utilities Board for the new ordinance include requirements that it shall be unlawful for any passenger carrying vehicle to carry passengers on steps or running boards, or for any passenger to sit on the door of an automobile or street car. Some means will also be considered for eliminating the nuisance and congestion resulting from the hundreds of automobiles maintaining street stands for so-called taxicab service. It is suggested that the operators be required to keep their cars in garages or vacant lots and establish telephone call stands in the business district.

All Redlands, Cal., has been divided into four parts and two zones in an effort to fix a scale of prices for the jitney. The trustees of the city found that many complaints had been made of passengers being charged different prices for the same trip. It has been decided that within a radius of 1 mile from the business district a charge of 5 cents shall be made. The second zone covers a radius of 2 miles from the business section. A charge of 10 cents can be made for a trip from the center to a section of one color in the first zone and then to a section of another color in the same zone. For a trip to a section of color in the first zone, then to a section of color in the second zone, calls for 15 cents. Each zone is divided into four colors. The trustees have decided that not only must the jitney men have insurance of $5,000, but that all automobiles for rent or hire in the city must have the insurance.

Wholesale arrests of jitney drivers have been made at Temple, Tex., on charges of violating the recently enacted ordinance regulating the operation of jitney buses. Few of the drivers complied with the ordinance by providing indemnity bonds of $5,000 and $10,000 and payment of a license fee ranging from $40 to $100, graduated according to number of passengers carried. The ordinance also requires that cars shall take regular stands for solicitation of business in the down-town section, no solicitation on the streets being permitted. Cars are required to remain at the regularly designated stands until loaded, or until time for the driver to make his trip. He is not allowed to stop to solicit passengers while passing through the business street.

In a decree filed by Judge Ferguson of Common Pleas Court No. 3 in Philadelphia he refused to grant the preliminary injunction sought by the jitney drivers of that city to restrain the enforcement of the recent ordinance, which compels the jitney owners to pay a license fee of $50 and file a bond of $2,500. He pointed out that the original injunction granted by Judge Sulzberger in July was vacated on Aug. 7 because of the failure of the members of the Philadelphia Jitney Association to furnish the necessary $2,500 bond, and expressed the opinion that the jitneymen had waited too long to warrant their asking another preliminary hearing. The latter insisted that the failure to file the bond was not the fault of the drivers themselves, but was due to the negligence of their president. If the injunction was now renewed, they said, the bond would be furnished at once. City Solicitor Ryan said he would not consent to a reinstatement of the injunction. He said there had been thirty-six applications to comply with the ordinance and that sixteen operators had entered the necessary bond, paid the license fees and qualified within the terms of the law.

A paper on the subject of jitney ordinances was read by Frank P. Cummings, city solicitor of Williamsport, Pa., at the sixteenth annual convention of the League of Third-Class Cities of Pennsylvania held at Reading recently. No action was taken favoring any special regulations for the jitney, the convention deeming it advisable to await the final result of the litigation over the jitney ordinance in Philadelphia.

COURT EXONERATES MR. DICKSON

Ruling that it would be unreasonable to hold the head of an electric railway responsible for alleged negligence upon the part of a minor employee, when such employee was under the jurisdiction of the head of the particular department in which he happened to work, Magistrate James H. Campbell in Police Court at St. Catharines, Ont., discharged E. J. Dickson, vice-president of the International Railway, Buffalo, N. Y., upon the charge of manslaughter in connection with the Queenstown, Ont., disaster of July 7. In exonerating Mr. Dickson, the magistrate said:

"Mr. Dickson certainly could not be held responsible for any negligence on the part of the crew of the car or the men in the carhouse because each division of the road is under a separate executive head. All possible matters relating to the divisions are dealt with by the executive, but there are some matters which must be left to the men in immediate charge. All the witnesses stated that all the rules regarding safety had been complied with and the car had all the necessary equipment."

Speaking of the construction of the road and the curves on it, the magistrate pointed out plans and specifications of the road had been submitted to the Ontario Railway Board. and no member of the board or anyone else had any suggestions with regard to making the curves safer. The road has been operated for more than a score of years without an accident, and the court held that "the International Railway was perhaps justified in thinking that an accident could not be possible at that point. There is nothing in my mind which would justify me in holding Mr. Dickson for trial and he is discharged."

PETITION FOR ANOTHER FARE INCREASE

The Bay State Street Railway, Boston, Seeks to Establish 6-Cent Fare Unit

P. F. Sullivan, president of the Bay State Street Railway, has notified the Massachusetts Public Service Commission of its intention to establish a 6-cent fare upon all of its lines, beginning on Nov. 1, 1915. In a letter transmitting the proposed schedules of rates in detail, Mr. Sullivan states that the changes proposed cover a general increase from 5 cents to 6 cents as the single cash fare over all the lines; the sale for 50 cents of nine tickets which are to be receivable for fare in Lowell, Lawrence, Haverhill, Salem, Lynn, Saugus, Revere, Chelsea, Malden, Everett, Melrose, Swampscott, Boston, Quincy, Brockton and Fall River; the modification of certain existing and the introduction of certain new fare zones; the modification of transfer privileges, and the withdrawal of reduced fare tickets other than those to be received for the transportation of school children.

In a statement to the press outlining the purposes of its proposed increase in rates the company points out that the general principles recognized in the schedule of fares filed are:

1. A universal cash fare of 6 cents.
2. A reduction by means of tickets in the urban and a portion of the metropolitan territory.
3. A single fare to be charged between centers and within city and town limits, modified in several of the latter to eliminate the present excessively long hauls through sparsely settled territory.
4. A transfer privilege to city or town limits from the centers of adjoining cities or towns upon the additional payment of 2 cents in the metropolitan and a portion of the urban territory.
5. The withdrawal from sale of all workingmen's and reduced rate tickets, including the so-called Boston Elevated 8-cent check.
6. The elimination, as far as practicable, of the present overlaps in fare limits and the inequalities occasioned by different collection points for so-called through and local passengers.

The company says that for several years it has appreciated the need of increased income, but postponed the application as long as possible. It is pointed out that the cost of producing transportation for sale has increased to such an extent that the company is, and has been for some time, selling transportation below cost, all of which will be exhaustively shown to the public and the public service commission at hearings and investigations to be given by that body. Nearly 1000 miles of track are involved in the proposed increase.

Reduction in Children's Fares Denied.—The Railroad Commission of Georgia has refused the application filed with it by Judge Morris of Marietta for a reduction in the fares of children by the Atlanta Northern Railway.

Increase in Speed in Everett.—The City Council of Everett Wash., has passed on first and second reading an ordinance amendment providing that street cars may run 20 m.p.h. in thickly populated portions of the city. The old ordinance limited the speed to 15 m.p.h.

Safety-First Movies in Dallas.—The electric street railways of Dallas, Tex., are conducting an educational safety campaign, one of the chief features of which is the exhibition of a moving picture film called "The Dangers of the Street," in one of the most popular theaters of the city.

Experimental Skip-Stops in Milwaukee.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., began a three months' trial with skip-stops on its Farwell Avenue, Walnut Street and Greenfield Avenue lines on Sept. 1. All stops eliminated or changed in the outlying districts are indicated by signs. The test was ordered by the Railroad Commission of Wisconsin, and the extension of the plan to other lines will depend on the results obtained on the lines mentioned.

New Railway Publication in Ottawa.—The Ottawa (Ont.) Electric Railway has begun the publication of a bulletin in which it is intended to print important notices posted during the month previous to the issue and to give articles of general interest to those engaged in electric railway service in Ottawa. The first issue of the publication was dated August, 1915. It consists of four pages of reading matter, each 8½ in. by 11 in. In its first issue the bulletin urges efficiency, safety and courtesy. It is planned to issue the bulletin on the twentieth of each month.

Changes in Toronto Suburban Fare.—The Toronto & York Radial Railway, Toronto, Ont., announced that after Sept. 6 the sale of thirty-trip commutation tickets between Sunnyside, Long Branch, New Toronto and the Humber would be discontinued. Passengers may purchase tickets as follows: Stop 10, eight tickets for 25 cents; Stop 25, seven tickets for 25 cents; Stop 29, five tickets for 25 cents. There will be no time limit for the use of these tickets as in the case of commutation books. The new issue of tickets may be purchased on the cars, instead of at the company's office.

Result of Near-Side Vote in Denver.—The Denver (Col.) Tramway held an election on Aug. 23, 24 and 25 at which all passengers were entitled to vote their preference for the far-side or the near-side stop. Ballot boxes were placed near the entrances of the cars, and the conductors gave a ballot to every passenger who paid a cash fare. The count showed 252,586 votes cast during the three days' balloting, 149,692 voting for the far-side stop and 96,226 against it. There were 6668 blank ballots in the boxes. Previous to the vote the Commissioner of Safety of Denver announced his intention of introducing an ordinance to require the company to make near-side stops. Since the vote he has reiterated his intention.

Reduction in Height of Steps Ordered.—The Public Service Commission of Oregon has issued an order requiring the Portland Railway, Light & Power Company to lower its carsteps on its lines between Portland and Oregon City, to 15 in. above the rail, if sufficient clearance on Hawthorne bridge can be obtained, and 16½ in. if the clearance for 15 in. cannot be obtained. While the order is confined only to the cars of the lines mentioned recommendations are made for the adoption of the same standard of construction for all the other cars operated by the company. The complaint about the car steps and about insufficiency of cars on the lines was filed by the Social Service Club of Oak Grove. The commission held the complaint that sufficient cars were not provided was not substantiated. Reconstruction of the steps must commence in thirty days and be completed within a year.

Reduction in Seattle Suburban Fare.—The Puget Sound Electric Railway, a subsidiary of the Puget Sound Traction, Light & Power Company, Seattle, Wash., recently obtained permission to make effective immediately a reduction of 5 per cent in the price of commutation tickets, between Seattle and stations south of Georgetown, to and including Renton. The Public Service Commission ordered commutation rates to and from these stations and Seattle in May, 1914, on a basis of 75 per cent of the first-class cash fares, The reduction to be put into effect now is on the basis of 70 per cent of the first-class cash fare. At the same time the company will make effective, with the commission's consent, the same reduction to and from Tacoma, and stations on the Puyallup line, to and including Puyallup. The rate on this line has been reduced from 1.5 cents a mile to 1.4 cents, on the commutation tickets.

Eliminating Stops in St. Louis.—Fifty-five stops on the Olive and Broadway lines of the United Railways, St. Louis, Mo., were eliminated on Sept. 1 in a thirty-day trial by the company to convince the Missouri Public Service Commission that approximately 800 now made are useless. Large blue signs bearing "No Stop" have been put up at corners and other places where the stops have been done away with. Stops along every division are designated with red signs, "Car Stop." During the trial on the Olive line eighteen stops are to be eliminated on the Delmar division, thirteen on the University and nine on the Maryland. About fifteen stops will be eliminated on the Broadway line. None of the present stops on the Olive line east of Eighteenth Street, on the Broadway line between Clark and Franklin Avenues will be eliminated. Notices were posted in each car on the Broadway and Olive lines, indicating stops made and those eliminated.

Objection to Running Boards on Toronto Cars.—The Toronto (Ont.) Railway was committed for trial by Magistrate Denison on Sept. 2 on a charge of criminal negligence, as the result of operating the running boards on the open street cars. The only evidence taken was that of Alderman Gibbons, business agent of the Railwaymen's Union. He stated that he had served as conductor for eighteen years. He then submitted a list of accidents to conductors resulting from falls from the running board, showing that fourteen occurred this year and nineteen last year. There were four deaths from these accidents. The counsel for the company questioned the witness in regard to the union taking the matter of running boards to the Ontario Railway Board, and said that as a matter of fact the company was experimenting with center aisle cars, with a view to abolishing the running board. The case has been sent to a higher court for trial.

"For a Safer City."—Just before the opening of the Ohio State Fair W. C. Campbell, assistant general superintendent of the Columbus Railway, Power & Light Company, issued a bulletin entitled *"For a Safer City."* While it was intended to bring about a greater degree of care in the operation of cars during the week that the city was filled with visitors, it contained many other interesting things. It was stated that 42.6 per cent of all the accidents in which the street cars figured during the first seven months of the year resulted from collisions of cars with automobiles and other vehicles. The bulletin said the point had been reached where strenuous efforts must be made to reduce accidents of this class. The company's records showed a substantial reduction in the number of accidents as compared with previous years, and reports of courteous treatment from employees were much more frequent than in the past. These things showed that progress was being made toward that efficiency which all are so much interested in attaining.

Personal Mention

Mr. J. H. Moir has been appointed to the position of traffic manager of the Edmonton (Alta.) Municipal Railway.

Mr. Williston Fish is now vice-president of the West Penn Traction Company, Pittsburgh, Pa., in charge of the operation of the railways of the entire West Penn System. Mr. Fish has relinquished the duties of comptroller.

Mr. Walter C. Slade has been appointed superintendent of power and lines of the Rhode Island Company, Providence, R. I. Mr. Slade was graduated from Brown University and the Massachusetts Institute of Technology and has been associated with the General Electric Company for the last four years.

Mr. Ralph W. Emerson, who has resigned as general superintendent of the New York & North Shore Traction Company, Flushing, N. Y., to become assistant superintendent of the Cleveland (Ohio) Railway, has been presented with a diamond-studded watch fob by the men of the transportation department of the New York & North Shore Traction Company.

Mr. M. R. Bump, who for twelve years has been a member of the Doherty organization, has resigned as chief engineer of the Doherty Operating Company, New York, N. Y., to become vice-president of the Picher Lead Company of Joplin, Mo., a section that he knows well by reason of the engineering and operative work he has done there for the Empire District Electric Company and other Doherty properties.

Mr. Charles A. Russell, Gloucester, Mass., one of the leading members of the Essex County bar, has been nominated a member of the Massachusetts Public Service Commission by Governor Walsh, succeeding Mr. Clinton White, who retired last July on account of age. Mr. Russell was born at Canton, Mass., and was educated at Colby College and Boston University. He was admitted to the Massachusetts bar in 1880. For eight years he was city solicitor of Gloucester and for many years has been prominent in fraternal organizations.

Mr. Frederick Thomas Leversuch has been appointed traffic manager of the London & Port Stanley Railway, London, Ont. Mr. Leversuch was born at Shrewsbury, England, on Nov. 24, 1884, and entered railway service in May, 1905. From that time until June, 1910, he was in the general freight department of the Michigan Central Railroad at St. Thomas, Ont. From June, 1910, to October, 1911, he was assistant agent of the Canadian Pacific Railway at Windsor, Ont. In October, 1911, he was advanced by the Canadian Pacific Railway to the position of freight agent at Windsor and continued in that capacity until December, 1913, when he was made agent for the company at Windsor.

Mr. James J. Callahan, whose appointment as manager of operations of the London & Port Stanley Railway, London, Ont., was announced in the ELECTRIC RAILWAY JOURNAL of Aug. 7, was born at New Glasgow, Que., on Feb. 25, 1875. He entered electric railway service on April 27, 1897, as a motorman with the Montreal Park & Island Railway, Montreal, and continued with that company until 1901. From 1901 to 1908 Mr. Callahan was inspector and chief instructor of the Montreal (Que.) Street Railway. During 1908 and 1909 he was chief inspector of the New York & Queens County Railway, Long Island City, N. Y., and since 1909 he has been superintendent of transportation of the Montreal & Southern Counties Railway, Montreal.

Gen. George H. Harries, vice-president of H. M. Byllesby & Company, president of the Louisville Gas & Electric Company, and officer of several other Byllesby enterprises, recently resigned his post as commanding officer of the District of Columbia National Guard. The organization over which he presided for many years presented him with an equipment of his rank (major general) in the presence of the command and more than 10,000 spectators. The gift was made in the name of the guard by Brig.-Gen. Harvey. It consists of a major general's presentation saber, appropriately inscribed, a full dress belt, a full dress sash, a gold belt knot and a pair of silver spurs. In his acceptance, General Harries advocated a universal volunteer army for the United States, including the feature of thirty days' military training each year for every able-bodied man between the ages of eighteen and twenty-five.

Mr. F. J. Derge, the present superintendent of the light and power department of the Toledo Railways & Light Company, Toledo, Ohio, and formerly in the New York offices of the engineering department of Henry L. Doherty & Company, has been appointed chief engineer of the Doherty Operating Company, New York, to succeed Mr. M. R. Bump. Mr. Derge was born at Eau Claire, Wis., and is a graduate engineer from the University of Wisconsin. Following the footsteps of other Wisconsin graduates he sought his initial practical experience with Mr. Henry L. Doherty, at the cadet school of the Denver Gas & Electric Light Company. His work at Denver caused him to be chosen for the chief engineership in charge of production at the Massillon Electric & Gas Company, Massillon, Ohio. Later he was called to the Doherty New York offices as a member of the traveling engineering staff. He was made chief engineer of the Trumbull Public Service Company at Warren, Ohio, and when the Toledo property was acquired by the Doherty organization he was moved to Toledo as superintendent of the light and power department.

Mr. Walter N. Polakov was recently appointed to a new office with the New York, New Haven & Hartford Railroad created to handle all matters on the entire system pertaining to the generation of power, heating, lighting, etc., with the superintendent of power as head of the department. Mr. Polakov was born in St. Petersburg, Russia, and received his engineering education and degrees in the Royal Institute of Technology at Dresden, Saxony. Previous to accepting the position of superintendent of power of the New Haven Railroad he was engaged as consulting engineer for the firm of Day & Zimmerman, Philadelphia, managing public utility companies in Pennsylvania, Ohio and other States. Previous to that he was associated with Mr. H. L. Gant in introducing scientific management, and before that held an office as expert consulting engineer for the Board of Estimate & Apportionment of the City of New York, during which time the power plant expenses of the Department of Water Supply, Gas & Electricity were reduced by more than $500,000 and the operating expenses of the New York municipal ferries were reduced $117,000 a year.

MENACE SEEN IN M. O. IN SEATTLE

Allen Dale, a member of the Council of Seattle, Wash., has introduced a bill in the City Council urging the abandonment of the city's plans to develop a street railway system. The bill would repeal an ordinance passed by the Council a year ago last May in which provision was made for the sale of $500,000 of street railway bonds authorized by the voters for the purchase or paralleling of the Seattle, Renton & Southern Railway, and also providing for the issuance and sale of $500,000 of utility bonds, with principal and interest, payable from the earnings of the street railway system. The plan proposed in the ordinance that Mr. Dale seeks to repeal provides for the construction of a line on Ranier Avenue, from the south city limits at Ryan Street to Dearborn Street, at an estimated cost of $375,660; the construction of a line on Dearborn Street, from Ranier Avenue to Fourth Avenue South, and on Fourth Avenue south, from Seattle Boulevard to Spokane Street, for a connection with the Lake Burien line, Division C, and the construction of a line on Stewart Street, between Third and Fourth avenues, for a connection with Division A. The whole plan anticipates acquiring common user rights on Fourth Avenue, from the Seattle, Renton & Southern Railway and on Fourth Avenue south, and Spokane Street, from the Puget Sound Traction, Light & Power Company. Mr. Dale claims that the plan involves the expenditure of a larger sum of money than was voted by the people for street railway purposes and that the burden of debt on the taxpayers is now so great that it should not be increased without their specific authorization.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

West End Rapid Transit Company, Cincinnati, Ohio.—Incorporated in Ohio to construct an electric railway from Anderson's Ferry to a point at the intersection of Third and Vine Streets, Cincinnati, its object being to furnish an entrance into the city for the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad. Capital stock, $10,000. Incorporators: J. C. Hooven, C. E. Hooven, L. E. Voorhies and Stanley Shaffer. [July 24, '15.]

***Aberdeen Railroad, Aberdeen, S. D.**—Incorporated in South Dakota to construct an electric railway. Capital stock, $250,000. Incorporators: Charles A. Howard, S. C. Hedger and Charles N. Harris.

FRANCHISES

East St. Louis, Ill.—The Rapid Transit Company of Illinois will ask the Council for a franchise to construct tracks through East St. Louis to the free bridge. This is in connection with a project to build a line from East St. Louis to Mount Carmel, via Belleville, 150 miles. Joseph Vonnhame, East St. Louis, is interested. [Aug. 21, '15.]

Andover, Mass.—The Bay State Street Railway has asked the Council for a franchise to alter the location of its tracks on Elm Street and Main Street, Andover.

Utica, N. Y.—The New York State Railways has asked the Council for a franchise to extend its Elm Street line on James Street, Utica. The company has also made application to connect its tracks over the new halfway bridge.

Cleveland, Ohio.—The Cleveland Railway has asked the Council for a franchise to construct an extension on State Road, through Brooklyn township.

North Bend, Ore.—The Southern Pacific Company has asked the Council to extend its franchise through North Bend from thirty years to fifty years.

Portland, Ore.—The United Railways has received a twenty-five-year franchise from the Council to operate freight trains between Portland and Oilton.

Dallas, Tex.—An ordinance revoking the franchise granted to John T. Jones and associates to construct an electric railway on Parry Avenue between Kentucky Street and Henderson Avenue is being considered by the city commissioners. Mr. Jones filed a statement with the commission saying that on account of present conditions he is unable to comply with the terms of the franchise and would therefore relinquish it. [Oct. 3, '14.]

TRACK AND ROADWAY

Fresno (Cal.) Traction Company.—Work has been begun by this company on the extension of its line to Merced and J Streets, Fresno.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—It is reported that this company is considering plans to build an extension to Martinez.

***San Francisco, Cal.**—A 2-mile electrically operated line is to be built by the Mammoth Copper Company, which is building a road to the Friday-Lowden mine from the Mammoth smelter.

San Jose (Cal.) Railroads.—Surveys are being made and work will be begun at once by this company on the construction of its extension on Alum Rock Avenue, San Jose.

Connecticut Company, New Haven, Conn.—This company has agreed to pay $70,000 toward the construction of a bridge across the river at Stratford Avenue, Bridgeport. It is estimated that the entire cost to the company for relocation of tracks, paving, installation of new wires and overhead work in general in connection with the construction of the bridge will be about $200,000.

Atlanta & Carolina Railway, Atlanta, Ga.—Proposals to resume work on the proposed railway to connect Atlanta, Athens and Augusta were submitted to Judge John T. Pendleton on Sept. 1. Attorneys representing the trustees for the bondholders and receiver agreed to give option on the franchise right-of-way and all visible assets of the company to Ohio capitalists for $150,000. Formal option will be signed by Judge Pendleton and Receiver R. E. Church will turn the option over to Adams & Sturn of Columbus, Ohio, for the purpose of financing the construction of the line. [May 15, '15.]

Galesburg Railway, Lighting & Power Company, Galesburg, Ill.—Residents of the northeast portion of Galesburg are anxious for a line to be extended to that territory. A petition has been drawn up and signed by many residents of that district between Lincoln and Farnham Streets. An extension from the East Galesburg line or from the North Seminary Street line is proposed.

Evansville & New Harmony Traction Company, Evansville, Ind.—Surveys have been made between Evansville and New Harmony, Poseyville, Cynthiana and other towns north of Evansville, while a line from Evansville south to Owensville is projected. [July 10, '15.]

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—In considering the ordinance to compel this company to build an extension of its tracks from Wells Street west on High Street, the Council has decided that High Street is too narrow to allow the building of the proposed line. Accordingly, a new route has been suggested on Second Street to Clark Street, extending west on Third Street. A new ordinance will be drawn up to cover the new route.

***Marion, Ind.**—Plans are being considered to construct an electric railway from Fisher's Station to Marion, via Noblesville, Perkinsville and Elwood. The project is being planned by Indianapolis people who are being backed by English capitalists and citizens of the towns to be benefited.

Muncie & Portland Traction Company, Portland, Ind.—This company is reballasting its Muncie and Portland line between Portland and Red Key. Twenty thousand new ties will also be used in repairs on this line. This is a correction of an item published in our issue of Aug. 7 in which it was stated that this work was being done by the Union Traction Company of Indiana.

***Burkesville, Ky.**—It is reported that plans are being made to construct an electric railway from Burkesville to Edmonton, about 22 miles. Information may be obtained from the Cumberland Traction Company, which is building a line from Edmonton to Elizabethton.

Bay State Street Railway, Boston, Mass.—Work has been begun by this company laying tracks on Central Square, Lynn.

Boston (Mass.) Elevated Railway.—This company is repairing its outward-bound track from Harvard Square to Porter Square, Cambridge. For the greater part of the distance new rail is being laid and all joints are being welded.

St. Paul (Minn.) Southern Electric Railway.—This company is being urged by residents of St. Paul Park to build a line from Inver Grove across the river to St. Paul Park and northward to Red Rock.

Morris County Traction Company, Morristown, N. J.—Surveys have been begun by this company of the proposed extension of its lines from Landing to Netcong.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has authorized this company to award the contract for the third-tracking of the Broadway elevated railway, Brooklyn, between Myrtle Avenue and Aberdeen Street to the Johnson-Gifford Company at $400,441.

International Railway, Buffalo, N. Y.—Consents have been received from all abutting property owners for the double-tracking of the line from the switch north of the Lackawanna viaduct on Virgil Avenue to a point 200 ft. west of Virgil Avenue on Kenmore Avenue. When this is completed the Kenmore Avenue line will be double-tracked to the junction of Delaware and Kenmore Avenues, the terminus of the line, with the exception of a short section through the woods south of the Lackawanna viaduct and a few hundred feet on Kenmore Avenue.

Dover, Millersburg & Western Railway, Canal Dover, Ohio.—Plans are being made to begin work on the proposed railway from Canal Dover to Millersburg, via Sugar Creek. F. F. Phillips, Canal Dover, is interested. [April 24, '15.]

Cincinnati (Ohio) Traction Company.—Through Assistant City Solicitor Southworth the city of Cincinnati filed suit in Common Pleas Court on Aug. 30, seeking to condemn property for the purpose of straightening Reading Road and to fix the compensation which must be paid to the owners of property taken. This step was taken to secure a shorter route for the extension of the line to Bond Hill and to secure a location where owners of abutting property will not attempt to prevent the laying of tracks. The owners of property on Reading Road between Paddock Road and Mitchell Avenue have successfully combated all attempts to build a railway on that section of the thoroughfare for more than four years, and numerous suits have been fought through the courts.

Cleveland (Ohio) Railway.—Operation has been begun on this company's extension on East 105th Street, Cleveland, to Garfield Park.

Lake Shore Electric Railway, Cleveland, Ohio.—This company plans to construct a cut-off between Toledo and Cleveland, shortening the distance between the two cities by 5 miles.

Columbus Railway, Power & Light Company, Columbus, Ohio.—At a conference between company and city officials on Sept. 1 the company agreed to lay grooved rails on Long and Main Streets. These streets are to be repaved at once for a goodly portion of their length and the company at the same time will renew its tracks. As much of the work will be done before the advent of cold weather as possible.

Toronto (Ont.) Civic Railway.—Bids are being considered for the rods, plates and special track work on the Lansdowne Avenue extension of the civic car lines.

Toronto Suburban Street Railway, Toronto, Ont.—Construction has been practically completed on this company's extension from Guelph to Toronto and it is expected that operation will soon be begun.

Eastern Pennsylvania Railways, Pottsville, Pa.—About $216,000 will be spent by this company in improvements made necessary by the building of the new 2-mile extension out Nichols Street, Pottsville, to St. Clair. New machinery at the power house at Palo Alto and additions to the carhouse will cost about $100,000.

Nashville Railway & Light Company, Nashville, Tenn.—This company has completed the construction of its new tracks to the Tennessee State fair grounds.

The Dallas (Tex.) Consolidated Electric Street Railway.—This company is relaying 2410 ft. of double track on Lamar Street between the Texas & Pacific Railway and Cochran Street with 103-lb. girder rails in preparation for the paving of the street. The improvement will cost $26,000.

SHOPS AND BUILDINGS

Humboldt Transit Company, Eureka, Cal.—This company has purchased a site at the corner of Harris and J Streets, Eureka, for the construction of a new carhouse. The structure will be 240 ft. x 240 ft. and of frame construction, the pits being of concrete. The building will contain a gymnasium for the use of the employees. It is estimated that the carhouse will cost approximately $3,000.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa.—This company has awarded a contract to the Black Hawk Construction Company to build a freighthouse 40 ft. x 200 ft. on Utica Street near Mulberry Street. The building will be of steel, brick and concrete construction. It is estimated that the cost will be about $50,000.

Toronto (Ont.) Civic Railway.—Bids are under consideration by this company for machine-shop equipment at the Danforth Avenue carhouse.

POWER HOUSES AND SUBSTATIONS

Illinois Traction System, Peoria, Ill.—This company has received six new transformers for use in its substation at Fithian. The voltage will soon be raised from 15,000 to 22,000 between Champaign and Danville.

Manufactures and Supplies

ROLLING STOCK

Independence & Monmouth Railroad, Independence, Ore., will probably purchase a combination freight and passenger car and a passenger coach, it being proposed to electrify the line.

Alton, Granite & St. Louis Traction Company, Alton, Ill., advises that the statement published in this paper for Aug. 28 that the company was expecting to purchase new cars to be used between Alton and St. Louis is in error.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., has placed with the Preston Car & Coach Company an order for two closed pay cars with a seating capacity of thirty-two passengers each. This company was reported in the ELECTRIC RAILWAY JOURNAL of June 19, as expecting to make this purchase.

Toronto (Ont.) Civic Railway has ordered from the Preston Car & Coach Company the four cars for which it was reported in the ELECTRIC RAILWAY JOURNAL of June 5 to be in the market. The cars are to be semi-convertible motor cars of the prepayment type, each with a seating capacity of thirty-two passengers.

TRADE NOTES

Root Spring Scraper Company, Kalamazoo, Mich., has recently delivered forty of its No. 2 air-operated scrapers to the Cincinnati Car Company to be installed on cars for the Binghamton (N. Y.) Railway.

Smith-Ward Brake Company, New York, N. Y., announces that Herbert M. Weaver is not in any way connected with the company. Electric railways are asked not to recognize him as a member of this company's staff.

A. L. Whipple, formerly of the Whipple Supply Company, has become associated with the Railway Improvement Company, New York, N. Y., as a special representative in the sales department, with headquarters at the company's executive offices, 61 Broadway.

The J. G. Brill Company, Philadelphia, Pa., is shipping to the Chicago & Milwaukee Electric Railroad fifteen new steel cars on their own wheels. These cars were described last week. The cars will go to Highwood, Ill., over the following route; Philadelphia to Youngstown, Ohio, via Baltimore & Ohio Railroad; Youngstown to Chicago, via Erie Railroad; Chicago to Highwood, via the Chicago & Northwestern Railroad.

United States Steel Corporation, New York, N. Y., and its subsidiary companies received a number of first awards at the Panama Pacific International Exposition. Among the companies which received grand prizes were the Carnegie Steel Company, Illinois Steel Company, Lorain Steel Company, American Bridge Company, American Steel & Wire Company and the National Tube Company. The company also itself received a grand prize and a special gold medal for its exhibit as a whole as being the best, most complete and most effective installation, with a special commendation of the educational value of the exhibit. In the system of awards at the Panama Pacific International Exposition the highest award is the grand prize and but one grand prize is awarded in each class.

Sauvage-Ward Brake Company, Inc., New York, N. Y., has changed its corporate name to the Smith-Ward Brake Company, Inc. The Smith-Ward Brake Company announces that there are no changes in the corporation except the retirement of W. H. Sauvage, who has no further interest in the business of the company. The officers remain as formerly: William S. Scott, president; Frank D. Ward, vice-president; George P. Smith, secretary and treasurer. The executive offices are at 833 Whitehall Building, New York City. The Eastern sales agent is the W. R. Kerschner Company, Inc., 50 Church Street, New York. The southeastern sales agent is J. B. N. Cardoza, Inc., Citizens Bank Building, Norfolk, Va. The business of marketing the S-W brake automatic slack adjusters and other appliances for the electric railway field will be continued.

Esterline Company, Indianapolis, Ind., which manufactures the "Golden Glow" railway headlights, last month received orders which increased the users of these headlights to one out of every six electric railways in this country. The following properties received "Golden Glow" equipment during August: Gulfport & Mississippi Coast Traction Company; Northern Texas Traction Company; Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company (Dan Patch Line); Iowa Railway & Light Company; Winona Interurban Railway; Humboldt Transit Company; McGuire-Cummings Manufacturing Company, for new cars of the Wisconsin-Minnesota Light & Power Company; Sheridan Railway; Hattiesburg Traction Company; Jewett Car Company for new cars of the Ohio River Electric Railway & Power Company; New York & Queens County Railway; American Car Company, for new cars of the Beaumont Traction Company; Cincinnati Car Company, for new cars of the Binghamton Railway; Georgia Railway & Power Company; Mahoning & Shenango Railway & Light Company; Denver Tramway; Scranton Railway; Empire United Railway; Pennsylvania Railroad; Windsor, Essex & Lake Shore Railway; Helena Interurban Railway; Southern Car Company, for new cars of the New York & Queens County Railway; Austin Street Railway; Hutchinson Interurban Railway; Savannah Electric Company; Terre Haute, Indianapolis & Eastern Traction Company; East St. Louis, Columbia & Waterloo Railway; Baldwin Locomotive Works, for new locomotive of Du Pont de Nemours Powder Company; Wichita Railroad & Light Company; Electrical Engineering & Purchasing Company, for Trinidad Electric Company; Virginia Railway & Power Company; San Francisco-Oakland Terminal Railways; Philadelphia Lighthouse Department; Iron River, Stanbaugh & Crystal Falls Railway; the Panama Canal; Cleveland, Painesville & Eastern Railroad; United Railways of St. Louis; Topeka Railway; Lowell & Fitchburg Street Railway; Detroit United Railway; Atlantic City & Shore Railroad.

ADVERTISING LITERATURE

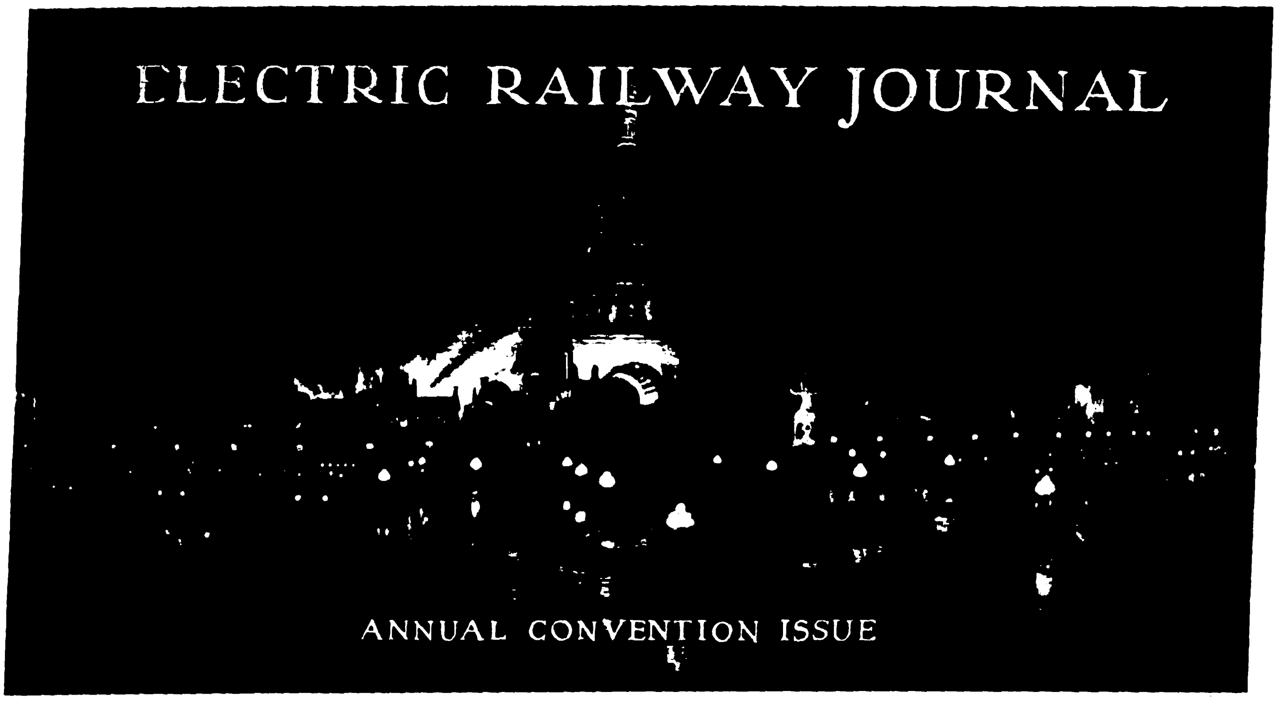
Thurman Vacuum Cleaner Company, St. Louis, Mo., has issued bulletin No. 221, bulletin No. 221-A and a reprint from *Clover Leaves* showing the application of the Thurman car cleaning devices to the coaches of the Chicago & Alton Railroad.

American Rolling Mill Company, Middletown, Ohio, has issued a new publication, "Armco Iron Rust Resisting Products," in which are illustrated and described most of the important Armco products as made at the Middletown factory and quite a number of those produced by other manufacturers. The company has also issued a new edition of "Defeating Rust," which covers the inception, development, qualities and uses of Armco iron. "Defeating Rust" has been revised extensively as compared with the edition published a year ago. Armco iron probably made its first bid for fame in culvert form. In "Defeating Rust" considerable space is given to a comprehensive handling of the subject of ingot iron culverts.

NEW PUBLICATION

Engineering Economics. By J. C. L. Fish. McGraw-Hill Book Company, New York, N. Y. 217 pages. Cloth, $2.

Intended to meet the first needs of students and also to render effective service in office reference work, this publication should succeed in its mission. Its chief value lies in the concise yet ample elucidation of fundamental principles of economic selection (choice based on long-run least cost) which should be thoroughly understood by engineers, but which are too often overlooked in the close application to principles of mechanics and design. After the introductory Part I, Part II treats of the elements of economic selection, such as interest and sinking funds, first cost, salvage value, yearly cost of service and estimating. Part III tells of the principles underlying the comparison of estimates and the determination of the most advantageous choice of project, material or size. Part IV in bibliographical form presents the contents of the most important works that are cited, as well as depreciation and life tables. Part V is a compendium of formulas and tables of values. Carefully arranged and indexed as it is, Mr. Fish's book offers a very fruitful field for the study of basic engineering economics.



From San Diego to Vancouver

WHEN a plan for the Pacific Coast convention issue was considered, it was obvious that descriptions of Pacific Coast properties would be expected by the readers. Nevertheless, the ELECTRIC RAILWAY JOURNAL has covered these properties so thoroughly in the past that any general descriptions would have meant the unnecessary duplication of much material, and, at best, an issue of unwieldly size.

A second plan would have been an attempt to compare the standards of different companies as regards track, line, power and rolling stock. This, too, would have proved impracticable because the properties are comparatively few for the great extent of territory traversed, and they represent an enormous range of conditions from the cable lines of Seattle, Tacoma and San Francisco to the 1200-volt and 1500-volt heavy traction lines of the Bay Cities and Portland.

A third plan was still available. This was to present articles on whatever matters were of the greatest importance to the properties affected and of probably the greatest interest to the stop-over convention visitor. This plan was adopted with the further improvement that this information was obtained in the form of contributions from the men who have been closest to the questions treated. Furthermore, in this form, the ELECTRIC RAILWAY JOURNAL convention issue is a collective invitation from the men of the Coast to their brethren of the rest of the United States and Canada. This is a fitting place to express the strongest gratitude to the contributors whose co-operation made so personal an issue possible.

The table of contents will reveal discussion of topics in almost every branch of electric railroading. Perhaps the articles of most vital interest are those of Messrs. Lewis, Dunne, Black and Hild on the jitney from the respective standpoints of birth, growth and decline, legal status, financial status and public sentiment. After playing the part of a seven-year locust the jitney seems doomed to a grave unmourned, unhonored and unsung save by the trader in used automobiles. Yet the jitney will leave more than a scar on electric railway finance and operation. Above all, it has shown that all public transportation, car and bus together, should be under one control.

Another set of articles that fall under a common heading are those relating to heavy electric railroading. It will warm the cockles of the electric railway man's heart and warm the cold feet of many a steam railroader to see the Southern Pacific Company operate trains at 1200 volts and 1500 volts direct current as an every-day matter, whether it be on the near-city headways of Los Angeles and the Bay Cities or on the electric passenger and steam freight combination of the Portland division. The articles of Messrs. Sears, Hewitt, Johansen, Nichols and Clough indicate emphatically that high-tension d.c. equipment is making good.

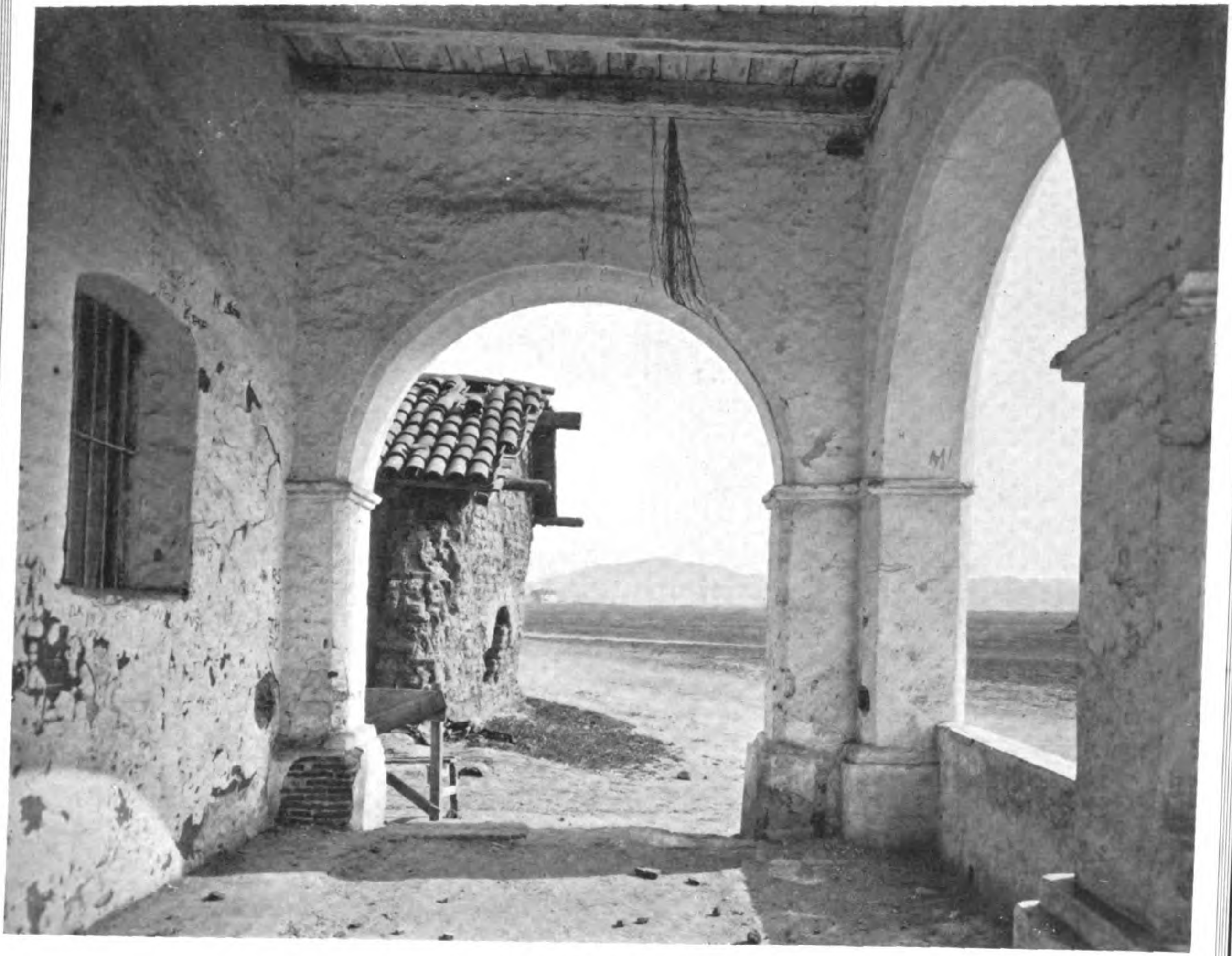
That the most advanced ideas in scientific management also find a haven on the Pacific Coast is proved by Mr. Maize's article on work planning at Portland, and Messrs. Sliter's and Cooper's dissertations on schedules. Progressiveness in other branches of the industry is apparent from the remarks of Messrs. Jones and Cashin on front-end fare collection, of Mr. Hinshaw on helping the farmer, of Mr. Schluss on real comparisons of maintenance costs and of Messrs. Alberger and Murrin on the true worth of motormen's checking devices. The three articles on a.c. track-circuit signal practice contributed by Messrs. Vanatta, Miller and Cunningham bring out the ever-increasing reliability of this apparatus; nor does the foregoing enumeration exhaust the list of good things which will be found in this issue.

Finally, a word is in order concerning the two fairs which are responsible for bringing the American Electric Railway Association to the Pacific Coast. At San Diego the visitor will find what has been most truthfully called a Spanish "dream city." It is doubtful, indeed, whether Spain knew greater beauty even at the height of the Moorish power than has been recreated by the modern American. The area of the fair grounds is also small enough to permit everything to be seen in a couple of days provided the visitor does not linger too long and lovingly over the ravishing displays of California products. The chief railway exhibit at San Diego is by the San Diego Electric Railway, and it's a very good one indeed.

At San Francisco the visitor will find an exposition which will not only attract him at once, but hold him in an ever-increasing thraldom as acquaintance is made with each of its beauties. And, like all others, he will leave with regret that this wonderful art should have been created for less than a year.

Of the technical exhibits, electric railway apparatus forms an important part. It is a pity that all transportation exhibits could not have been placed in one building, for this would have encouraged the exhibit of more detail parts. As it is, the exhibits as described in the ELECTRIC RAILWAY JOURNAL for March 13, 1915, are divided between the Palace of Machinery and the Palace of Transportation. Of course, the displays have been made with the view of attracting the general public, but the spatial conditions are so liberal that the technical man will be able to study details even better than at the usual railway convention. Like the regular exhibits of the American Electric Railway Manufacturers' Association, only the latest developments are shown. Unlike preceding world's fairs, the Panama-Pacific International Exposition commemorates an achievement of to-day, and it is therefore consistent that the exhibits should have been planned in the same spirit.

Part of the San Diego Exposition—United States Marine Force on the Puente Cabrillo



San Fernando Mission

An Electric Railway Paradise

Where Nature's Beauties, an Equable Climate and Rich Soil Are Made Accessible by an Electric Railway Service Which Combines the High Speed of Interurban Operation with a Headway that Approaches City Schedules

By PAUL SHOUP

President Pacific Electric Railway

THE populous section of four southern California counties is served by the Pacific Electric Railway. This garden-like territory, walled in on the north and east by the San Gabriel and San Bernardino mountain ranges, forest-clad on their heights, and rimmed westward and southward with one broad, almost continuous, sandy beach along the Pacific Ocean, has great diversity of attractions for the visitor.

The Pacific Electric Railway, operating 611 road miles and more than 1000 single-track miles, reaches practically every section of this territory. More than a dozen of its interurban lines radiate from Los Angeles. In this section there is not a seaside resort where its lines do not go down the principal aisles of amusement and distribute passengers directly along the sandy beaches.

The forested canyon of Alpine Tavern, with Mount Lowe above, is the mountain terminus of the Pacific Electric Railway, 5000 ft. above the sea.

There is no great citrus fruit growing district in all this section through which the service of the Pacific Electric does not pulsate. Every county seat is connected with every other county seat by its lines, and every populous section has a direct route to Los Angeles and usually to the local business center nearer by. Our lines serve some thirty-five municipalities, and in a third of them we give local in addition to our interurban service.

The private rights-of-way of this railway reach well up into the heart of Los Angeles with the result that the service is not only very frequent but is expeditious.

The great citrus fruit growing districts of southern California lie chiefly along the foothills and in the narrower valleys, though this statement is not wholly comprehensive. From Pasadena eastward, including Sierra Madre, Monrovia, Azusa, Covina, Glendora, San Dimas, Lordsburg, Pomona, Ontario, Uplands, Alta Loma, Etiwanda, Fontana, Rialto, San Bernardino, Highland and Redlands, is a broad belt of almost continuous orange groves, interspersed here and there with lemon groves and vineyards. The valley of Riverside is almost one great orange grove. Southward, the Corona lemon and orange groves have spread from the railway tracks up through the foothills.

In Orange County, the lower mountains wall the beautiful valleys, and here, with Santa Ana and Orange as business centers, are great orchards of citrus fruit and of walnuts.

If vistors should be interested in a citrus fruit valley in the making, there is no journey more educational than that over the Pacific Electric Railway's La Habra line. Here, where a few years ago were the bare plains and foothills, are now several thousand acres of oranges and lemons, all young, and only a small percentage in bearing. What this country will be like may be seen from the Whittier district, a thrifty and prosperous section passed on the way, necessitating only a short side trip.

These territories traversed by the Pacific Electric produce more than 30,000 carloads of oranges and lemons per annum, and this output is steadily increasing.

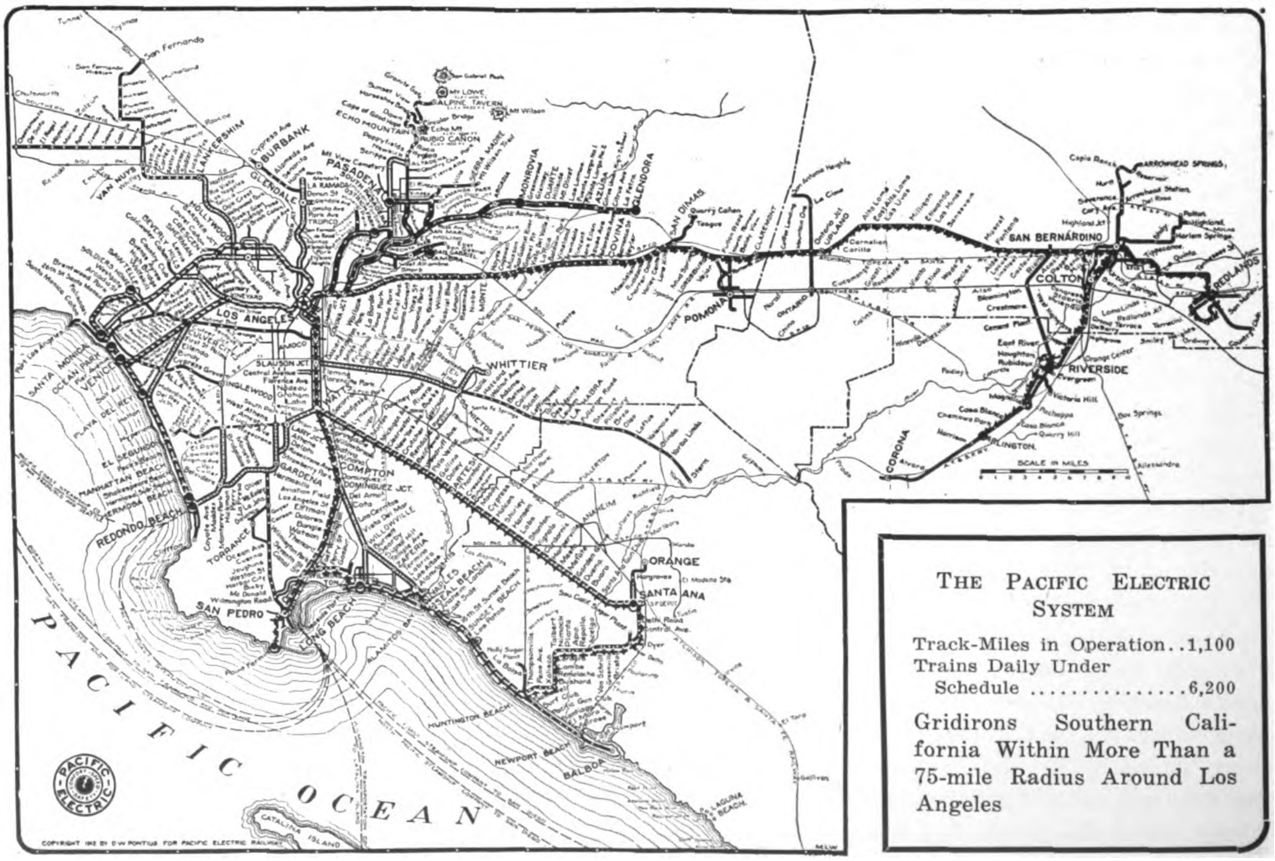
West and south of Santa Ana and Orange is the greatest of sugar beet growing districts, last year's crop being some 250,000 tons. In this comparatively small district are three large beet sugar factories on Pacific Electric lines.

Northward from Los Angeles and separated from the city proper by the Santa Monica mountains is the San Fernando Valley where a grain field of three years ago has been metamorphosed into four thriving towns, a great area of 10, 20 and 40 acres of orchards and vegetable ranches, with many miles of well-macadamized streets, electric lighted, and with every principal section served by the Pacific Electric. The advance of the San Fernando Valley is marvelous, and the towns of Van Nuys, Owensmouth, Lankershim and San Fernando are very interesting to the visitor in that they indicate how rapidly towns may be made. Van Nuys is perhaps the most remarkable example of such creation in the country.

BEACH AMUSEMENT ATTRACTIONS

Southern California, as I have said, offers a great diversity of attractions. Venice, as a seaside resort, has all the play attractions of Coney Island, and the beauty of beach in the fore and of green hills in the background that Coney Island cannot have.

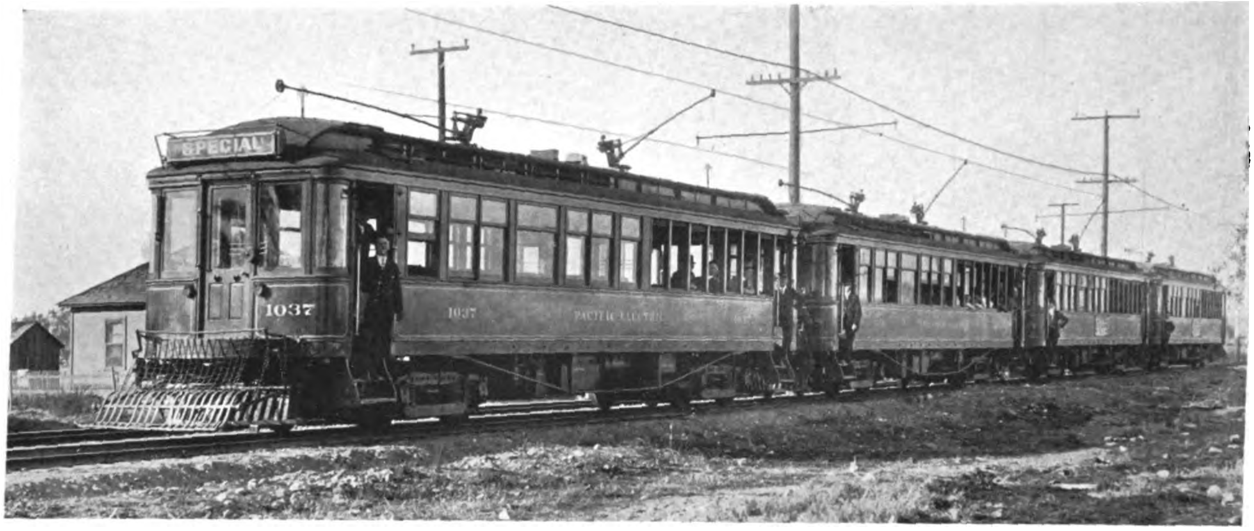
Long Beach, with a hotel unsurpassed so far as I know by any other seaside resort on either coast of the country, is built on an upland and overlooks


PACIFIC OCEAN
LOS ANGELES
PASADENA
GLENDALE
BURBANK
SAN FERNANDO
VAN NUYS
HOLLYWOOD
SANTA MONICA
OCEAN PARK
VENICE
PLAYA DEL REY
EL SEGUNDO
MANHATTAN BEACH
HERMOSA BEACH
REDONDO BEACH
TORRANCE
GARDENA
SAN PEDRO
LONG BEACH
COMPTON
WHITTIER
SLAUSON JCT
MONROVIA
GLENDORA
SAN DIMAS
POMONA
ONTARIO
SAN BERNARDINO
COLTON
RIVERSIDE
REDLANDS
CORONA
ORANGE
SANTA ANA
HUNTINGTON BEACH
NEWPORT BEACH
BALBOA
LAGUNA BEACH
CATALINA ISLAND
ECHO MOUNTAIN
MT LOWE
RUBIO CANON
ARROWHEAD SPRINGS
SCALE IN MILES
PACIFIC ELECTRIC

THE PACIFIC ELECTRIC SYSTEM

Track-Miles in Operation . . 1,100
Trains Daily Under Schedule 6,200

Gridirons Southern California Within More Than a 75-mile Radius Around Los Angeles



Four-Car Passenger Train

the sea. It is claimed that within the due course of time all of Iowa's farming population is planning to retire to Long Beach and enjoy life, and at a meeting of the Iowa State Society in that town you would think this to be true, but the Iowans have no monopoly; there are a great many thousands of other people who know what Long Beach is worth.

What is true of Long Beach and of Venice as to their improvements and their attractions is true likewise of Santa Monica, noted for its upland residences, Redondo Beach, Hermosa Beach, Naples, Alamitos Bay, Seal Beach, Sunset Beach, Huntington Beach, Newport Beach and Balboa. This whole beach country, from Santa Monica on the north to Balboa on the south, is one great playground all summer long. There are no rains and no storms. The weather is invariably pleasant and the bathing unexcelled. At such places as Redondo Beach there is good fishing practically all the time. Every one of these resorts has its merry-go-round attractions, with pleasure piers, and, in nearly every one there are places where good things to eat can be had.

These beach towns are made a part of Los Angeles by a service of trains from fifteen minutes to an hour apart, depending on the distance from Los Angeles. At such points as Venice, Redondo Beach and Long Beach, people hardly consult the timetables, knowing that in any event they will have not long to wait for a train.

AS A WINTER RESORT

The foothill cities of South Pasadena, Pasadena and Alhambra, Sierra Madre, Monrovia, the Hollywood section of Los Angeles, Beverly Hills and other near-by places, are thronged with winter visitors. Here are some of the very best winter resort hotels in America. They are also charming in summer, the green foliage and the white blossoms of the orange trees, the views of the smiling valleys on the one hand and the snow-capped mountains on the other, and the even temperature of the California winters, giving them their greatest lure when the thermometer in the East is frozen down to its boots.

AS A SUMMER RESORT

Southern California is as much of a summer resort as a winter resort; indeed, I think perhaps more so, and what is said of southern California is likewise true of California as a whole. The mountains, outside of resorts such as Mount Lowe, are not easily accessible in the winter time, but in the summer there are between thirty and forty beautiful mountain canyons, nearly every one with a running stream, readily accessible from the lines of the Pacific Electric Railway. In these canyons are groves of sycamore and oaks, and in their upper stretches and along the hillsides forests of pine and cedar. On the mountain tops themselves and spreading down the northern slopes are large pine forests, now practically all timber reserves. There are public camps and pine log lodges which comfortably entertain visitors, while camping out during the stormless summer season is a favorite vacation experience.

TRANSPORTATION SERVICE

The visitor may go from Los Angeles to San Bernardino in the morning via the Pacific Electric, have luncheon at the latter city, take the connecting automobile stage and dine on the top of the San Bernardino range in a pine forest within a few miles of a mountain lake 6000 ft. above the sea. The next day he may ride among the groves over a road looking down into the San Bernardino and Riverside valleys on the one hand and out upon the desert on the other, from an average height of some 7000 ft., and spend the next afternoon and evening by the side of another mountain lake in the

Flowers and Snow at Smiley Heights, Redlands

Orange Grove, Near Riverside

Bear Valley. Such trips as these are not well known to our visitors, but as time goes on they will increase this lure of southern California.

Perhaps the greatest attraction that southern California has is the near association of wilderness and town, of mountain and sea, of all the advantages that come with conventional and man-made improvements and all the advantage that goes with unspoiled nature in canyon and mountain wall, in islands, such as Santa Catalina, and long unbroken stretches of sea beaches. The Pacific Electric Railway makes these contrasts the more vivid in that through the service rendered by it all points are brought close together.

On the main streets of San Bernardino or Riverside or Santa Ana you may take cars at reasonable intervals during the day for Los Angeles, and, on the main streets of Los Angeles, or, from the business center of the city, you may take cars and return to these same points. There is no city in which it does not have up-town facilities.

The business building which is owned by the Pacific Electric and occupied by it as a terminal in Los Angeles is perhaps the largest business building in the city, and its location is near the business center.

All of these conditions create a situation with respect to city and country development and tending to the unity of the two perhaps not found in quite the same fashion elsewhere. This situation accounts for the 2300 scheduled trains a day of the Pacific Electric and for the fact that it handles some 75,000,000 passengers annually in a residence population of possibly 750,000; and of these by far the greater proporton are, of course, interurban passengers, as only a small part of the railway service of Los Angeles is given by this company.

The business man may, indeed, have his business in Los Angeles and his home in Pasadena, from 11 to 15 miles distant, or in Long Beach, 21 miles away, and reach that home as quickly as if he lived in the immediate suburbs.

It has been the effort of the Pacific Electric Railway to keep up with the growth of southern California and this has necessitated a great deal of pioneering. The system as a whole is, perhaps, yet somewhat in advance of the country. Only recently the isolated sections in the San Bernardino and Riverside valleys have been connected with each other and, in turn, connected with the main system around Los Angeles. The full value of this association and interchange of electric car service over

A Flowered Irrigation Canal at Riverside

Typical Home of a Retired Capitalist

Glenwood Inn, Riverside

Lagoons at Venice

the whole territory served by this company will be fully felt only after some period of experience and development.

A LAND OF OPPORTUNITIES

Business opportunities are all relative, and while it may appear that southern California is at this time fairly well populated, it is altogether probable that no rural section in the United States of equal area is destined to greater increase in population during the next ten years than the territory served by this company. This territory possesses attractions that are almost natural monopolies. It is becoming the playground and the resting place of the world. Income on investments elsewhere is being constantly poured into southern California for the maintenance of people who have in whole or in part retired from business activities. Another stream of wealth comes through the creation of beautiful homes from money realized through the sale of properties elsewhere or from income sources. There may be temporary checks in this development, but the past thirty years indicate that these checks can be but temporary, and they who build wisely and well in southern California need have no fear as to the value of their investments nor any fear as to dissatisfaction with the conditions that make their new home life approach the ideal.

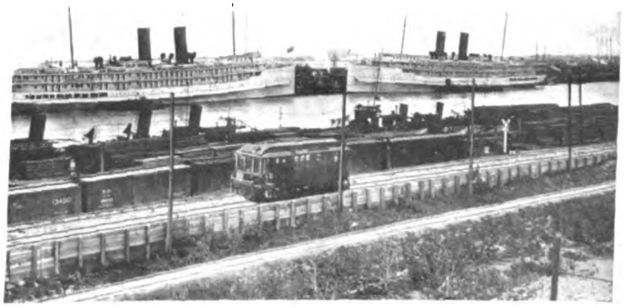
The wealth of the world is behind this development. This country is more than the playground of the nations—it is the home place of all countries. Where once it was said that one might sit idly at Cairo and in the course of time at this cross-roads of the nations meet everyone whom he knew, it will not be long until this expression will be much more applicable to the city of Los Angeles and southern California generally.

It is, however, more than a tourist land and something else than a home place, but I need say little more in that direction. Los Angeles County was, according to the United States census report recently made public, the first in the United States in the value of agricultural products.

OPERATING FEATURES

The aim of the Pacific Electric Railway is to give with its red cars a service constantly abreast of the demand. We are, working within reasonable business lines, improving our operating conditions wherever new ideas make this soundly practicable. Our grade crossings with steam lines are rapidly being protected by interlocking plants. Our dense

Avalon Bay, Catalina Island



Harbor at San Pedro

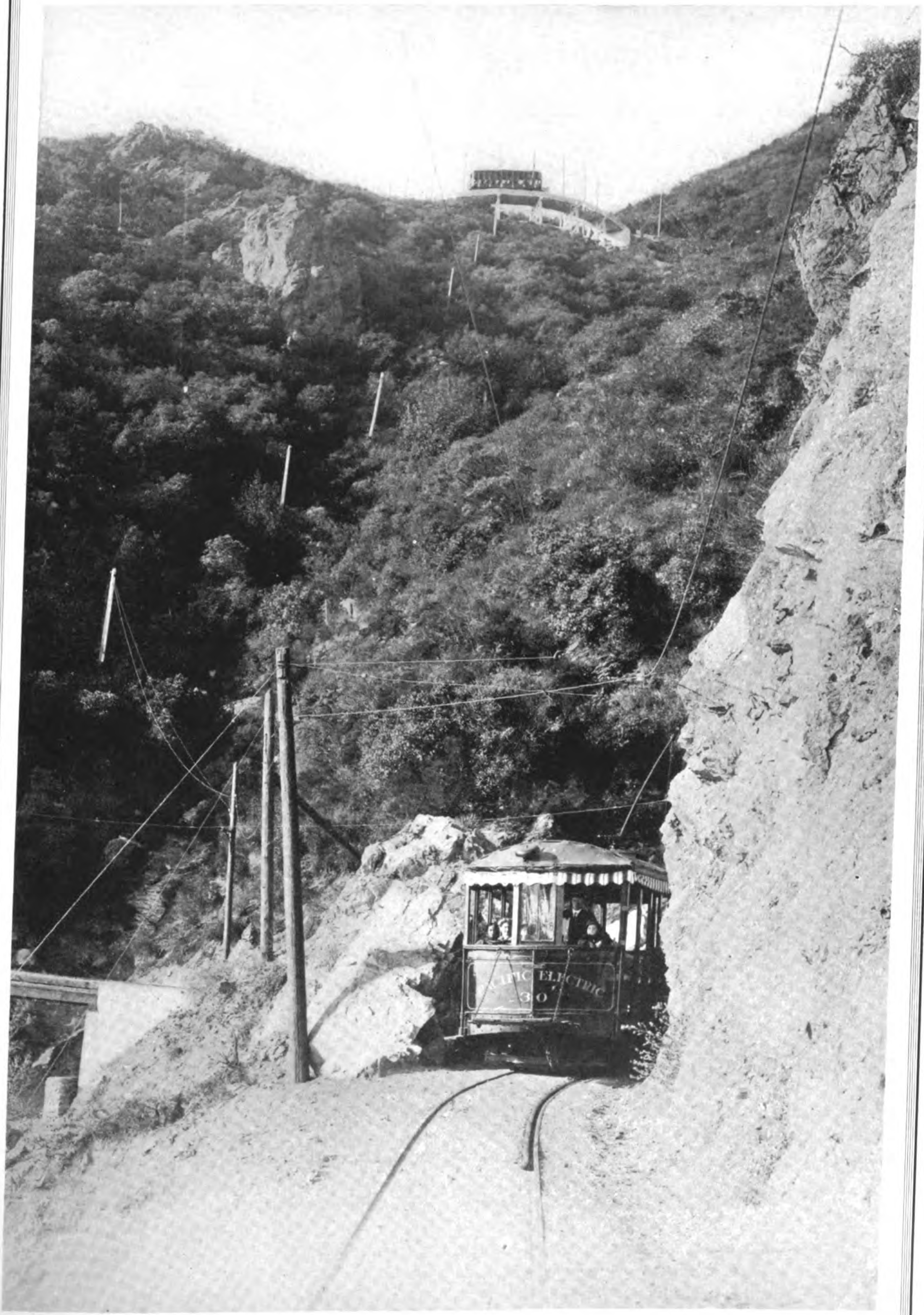
traffic lines are protected by block signals and other lines will be so protected when income conditions make it possible. In connection with other Los Angeles city terminals, plans, in part carried out but deferred until business conditions are better, will enhance the advantages to the public in the private right-of-way service now given. All of our most dangerous highway crossings are protected by automatic wigwag signals invented and first manufactured in our Pacific Electric shops. All of our new interurban cars are steel underframed and all cars of recent purchase are of all-steel construction.

Our operating department organization includes a training school with practical instructors thoroughly qualified by experience, and with proper equipment, including a motion picture outfit. Employees in the operating department are required to take physical tests every three years and oral and written examination on the book of rules especially prepared after some months of study and analysis. These examinations primarily are given after a three weeks' course in the training school and on the road, and finally and comprehensively given at the end of a sixty-day term in the school. The Brown system of discipine is in effect. The same signal test system adopted by many of the steam lines is in effect and rigidly enforced, every operating officer from the general superintendent down being under the necessity of personally conducting tests, which are properly distributed as to divisions, men and rules each month.

With the great number of road crossings and the very large number of automobiles in southern California, the street traffic of various towns and cities to look after, and the many railroad crossings to be guarded against, it has been determined that only thorough qualification of employees and a rigid follow-up system will enable us to maintain our present service in the face of these increasing difficulties to the satisfaction of the public and ourselves and with "safety first" always in our mind.

We want our visitors from the East at the convention in their itineraries to allot enough time to southern California to view it thoroughly. This is a land of hospitality and they will be met with open arms. While, with our sightseeing excursions operated daily a very satisfactory view of southern California may be had in three or four days, yet, if possible, double that time should be allowed.

Magnolia Avenue, Riverside


CIFIC ELECTRIC
30

The Railway on Mount Lowe

Businesslike Methods in Handling Freight by Electric Railroads

Freight Business, Begun by Handling Materials for Building Construction, Now Embraces Every Character of Goods—It Has Been Found Desirable to Handle Express via the Old Line Companies

By J. McMILLAN
General Manager Pacific Electric Railway

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PACIFIC ELECTRIC

Freight Train Approaching Road Crossing

PRIMARILY, the Pacific Electric Railway, like almost all other electric railroads, was designed, constructed, and equipped not for freight handling but for the performance of rapid passenger transportation, or, in other words, for passenger traffic purposes and what might be called the by-products thereof, namely, the handling of such traffic as usually accompanies the passenger business, like United States mail, small packages and express matter.

EARLY DEVELOPMENTS

After the first few years' operation it became quite apparent that the new territory into which the lines had been and were being projected could not develop to the fullest extent without the facilities for bringing into them and to the most convenient points of delivery the necessary materials and supplies for development and improvement. This, of course, meant the establishment of lumber yards, warehouses, etc., for the supplying of building material, lumber, brick, cement, sand, etc., for the building of residences, store buildings, etc., on the many sites decided upon as suitable locations for stations and towns. To accomplish this much-to-be-desired result, the Pacific Electric Railway began in a small way in the freight traffic business by purchasing a few freight cars when they were found to be necessary for the accommodation of the business strictly local to its own lines. After development of the kind mentioned had taken place, the lands improved and places of business established, it, of course, became necessary to extend the freight handling to the extent of hauling to them the merchants' stores supplies, and then, a little later, to afford transportation to the local markets for the products of such communities and developed territory. It is plain, therefore, that the Pacific Electric Railway entered into the freight traffic business more from force of necessity, for the purpose of developing its territories and populating the same in order to create a reliable and permanent traffic, rather than from the desire or expectation of profiting from freight hauling.

Therefore, as is made plain by the foregoing, the Pacific Electric Railways freight traffic, like Topsy, "jes' growed" during the first four or five years of the company's existence until the extent of it and the question of a more satisfactory manner of handling it became an embarrassing one—embarrassing because the facilities for handling it had not been provided and had not been considered in the first place as a contingency to be very amply provided for. Fortunately, the projectors, who were the owners, had the foresight to secure, in most instances, ample rights-of-way and station ground facilities. Possibly this came more as the result of previous experience in the construction and equipment of steam railroads, therefore somewhat of a habit, than from foreseeing that the same would later be necessary for anything like a satisfactory provision for freight traffic handling. As a result of this situation, when it had become quite apparent that the Pacific Electric Railway must be a "regular" railroad for handling all kinds of traffic possible to be handled by any kind of a railroad, and many kinds possibly not handled by most railroads as freight shipments, the company began paying more attention to the freight and express features of its traffic and providing proper facilities in the way of rolling stock and power equipment and stations suitable for such traffic. Then the realization that the builders had built wisely in the securing of station and terminal grounds began to be quite apparent to the road's operating officers, and it was then they commenced to build regular station structures and to provide the necessary station and terminal trackage for the accommodation of the freight traffic.

However, like the fellow who bought the set of harness at auction, then had to buy a horse to fit the harness and then a buggy to fit the horse, and then build roads around the farm over which to use his acquisitions, the question of providing for the handling of through shipments of both freight and express matter was unsettled; that is to say, the handling of matter coming from and going to points beyond its own lines and in many instances interstate shipments. The reason was that as the communities were developed and started along the lines, and the products became more than the local markets could take care of, more distant markets were sought and in return, of course, more distant sources of supplies of merchandise sought these local markets which wanted their goods possibly as much as the more distant markets wanted the local products.

As the steam railroads had not joined in through rates and the interchange of traffic and freight equipment, it was, of course, necessary to move all through freight shipments, both carload and less than carload, by making the rates by the combination of locals; in other words, the rates of both or all the lines handling the same, and to transfer the shipments at what are now called interchange points. This same condition prevailed in the handling of express matter, as the Pacific Electric Railway for several years was operating its own express company, known as the "Pacific Electric Express." These conditions, involving the combination of the rates of two or more lines and the rehandling of through freight shipments coming from and going to the Pacific Electric Railway's local stations, placed a heavy handicap on the merchants or industries located exclusively on the electric railroad. This handicap, however, was, a little later on, made somewhat lighter as to the rehandling of through shipments by means of a limited arrangement whereby the connecting steam railroads agreed to allow their freight cars, and foreign line cars in their possession, to be loaded solidly; that is, in commodity carload lots, to go to their destinations on the Pacific Electric Railway's lines, not competitive with the steam railroads, for delivery.

They also agreed that where back-loading was offered to accept the cars back in the same manner; namely, on the combination of local rates. The electric railroad agreed to pay demurrage charges on the steam road's equipment just as would be charged a merchant or shipper for cars delivered to industry or private service tracks. This condition prevailed up to about two years ago, the higher rates due to the combination of locals still acting as a handicap to a large extent against the electric railroad's freight traffic, and being, of course, a handicap to just that extent upon the electric railroad's shippers or the shippers located thereon having to make or receive shipments to and from points beyond the rails of the electric railroad.

FREE INTERCHANGE OF TRAFFIC WITH STEAM RAILROADS

All these handicaps upon the company's freight traffic and against the free interchange of traffic with steam railroads were removed about two years ago by the good old Southern Pacific coming to our relief with a liberal freight interchange arrangement and the application of through rates, both State and interstate, to and from all stations on the Pacific Electric's lines. Since then, this electric road's freight business has grown quite rapidly.

Evidence of this increase in the electric freight traffic is found in the figures which show that for the first ten months of the fiscal year 1914-1915 the freight tonnage for the system increased 22 per cent over the same period of the previous fiscal year, 1913-1914.

Notwithstanding this, the fact, and the evidence thereof, still remain that the Pacific Electric Railway was designed to serve and does serve the public as a high-class rapid-transit passenger carrying line, because its freight traffic, even after all the development described, amounts now to only 13 per cent of its gross earnings.

FREIGHT HANDLING EQUIPMENT

Another evidence of wise building, or provision, is the fact that in the acquisition of freight equipment, the Pacific Electric Railway has, from practically the very beginning of its provisions for handling freight, purchased and provided standard freight equipment of the same type and equal in quality to the freight equipment of any steam railroad, and superior to that of many steam roads. At this time the company owns 223 box cars, of which ninety are of 100,000-lb. capacity, the rest varying from 80,000-lb. capacity down to 40,000-lb. capacity; 349 flat cars, of which 212 are of 100,000-lb. capacity; 454 gondola cars, of which 250 are of 100,000-lb. capacity, 100 of the latter being of steel construction throughout; thirty-one oil tank cars; ten standard 80,000-lb. capacity stock cars, or a total of 1149 freight cars that are of standard construction and are interchangeable with those of standard steam railroads; twenty-six express and express-freight cars, and eighteen combination express-passenger cars. This does not, of course include any equipment that is assigned for the exclusive use of the construction and maintenance of way departments, such as tool cars, line cars, wreckers, etc.

1600 PACIFIC ELECTRIC 1600

Pacific Electric Locomotive, Type 1600, 1000 Hp., Built Ten Years Ago and Still Doing Good Service

All freight equipment is handled over our own lines by electric locomotives, of which there are eleven 1601-class which weigh approximately 65 tons, and have a tonnage rating of approximately 1400 tons; sixteen 1550-class which weigh approximately 50 tons and have a tonnage rating of approximately 800 tons, and twelve work-train-type locomotives, which are put in freight service and switching service where necessary to help out in heavy movements. Six locomotives of class 1550 have General Electric equipment; all the other locomotives have Westinghouse equipment. In addition, the express-freight type of express car is so flexible, having a loading capacity of 40 tons of freight inside, that it can serve as a locomotive in moving carload shipments between local stations, as well as distributing carload shipments where the emergency requires it and bringing in carload shipments of perishable freight, fruits, berries, vegetables, etc. It has a train-pulling capacity of from eight to ten loaded cars.

The Freight-House Force at the Los Angeles Station of the Pacific Electric Railway

There is considerable satisfaction in the fact that when interchange with steam railroads did come about we encountered no handicap worthy of note on the freight car equipment feature of the business.

Pacific Electric Locomotive, Type 1601, Showing an Example of a Purchased and Later Design

PACIFIC ELECTRIC
1601

Regarding the express business: I should have explained that on account of the handicap on that business coming from and going to far-distant points because of the combination of the two rates, the lack of ample free delivery facilities, extended free delivery limits, etc., it was deemed the better policy, both for the benefit of the Pacific Electric and the public patronizing it, to make an arrangement with an old-line express company. Such an arrangement was made with Wells Fargo & Company, some eight years or more ago, by which that company operates over the entire system, even into and out of what might be called rural districts and under which through rates are applied to and from all Pacific Electric Railway points the same as to and from all steam railroad points on roads operated by regular express companies. Hence, where patrons had formerly to pay the rate to and from Los Angeles, plus the local express rate between Los Angeles and the destination or shipping point on the Pacific Electric Railway, they now pay only the one rate between the points of origin and destination, in most instances saving entirely what was formerly the electric railroad's local express rate. Notwithstanding this saving to the shipper, the electric railroad derives more net revenue from the express business than it did under its local rates and handling. In addition to handling the express business in straight express cars with messengers over lines supporting heavier express traffic, a large amount of this business is handled in connection with passenger service in the express compartment of combination express-passenger cars.

The most difficult part of the electric railroad's freight business has been to overcome what seems to have been and is yet to some extent the opinion of shippers generally that it costs electric roads nothing to handle freight traffic. In fact, the general idea seems to have prevailed throughout the country that electric railroads are built and operated for the purpose of reducing rates. It can be said to the credit of the Pacific Electric Railway that it has never, since its beginning as a railroad, been a rate-cutter, rebater, or demoralizer in any sense of the word. It is true that its rates generally are very low, but they have been made so only to meet conditions; that is, the established rates of other lines into competitive territory as such existed at the time of the opening of the electric railroad for operation, or as the rates were made by the steam railroads at about the time this electric railroad entered the field, or since.

The company's management has tried to follow the policy that "the servant is worthy of his hire," and as its service is of the very best there is no

Express Transfer Between Pacific Electric and Southern Pacific Steam Cars at Wells Fargo Station, Los Angeles

PACIFIC ELECTRIC
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reason why it should not receive as much compensation therefor as any other railroad receives for similar service. It has been and is still the policy of the company to give the best service possible for the compensation received. We know that some electric railroads in some parts of the country have made themselves, as well as all other electric railroads, unpopular with the established steam railroads by following unfair methods in securing and handling freight in an irregular way and by scalping the steam road's rates between competitive points by taking local shipments, packing cases, boxes, packages, etc., between such points, particularly from jobbing centers, into the country on the platforms or inside of their passenger cars and thus distributing to country and village stores along the line at almost any old rate.

On a trip east some four years ago, in riding over the electric roads, I noticed this being done by an electric interurban road in a State and from a city it is not necessary to name. Upon visiting the local manager to see at what rates his road was doing such business, and thinking from the way it was being handled his road was receiving not less, and possibly more, than the express company's rates, I was surprised to learn that such shipments were being handled at much less than the steam railroad's freight rates, which, the Lord knows, were too low even for old-established steam railroads to make any money.

EFFECT OF UNFAIR PRACTICES

To my mind it is just such practices as these on the part of some electric railroads, of which the foregoing is only one example, that have made the established steam railroads loath to recognize electric railroads as freight carriers and to enter into traffic interchange relations with them. Really, it is hard for an unprejudiced railroad officer to see how they could be expected to do so until the electric railroads shall have ceased their haphazard and what might be called disreputable practices and begin doing a freight traffic business on a business basis. My own views are and have been for some time on the same principle; that is, that we are all supposed to pay willingly for what we get. The Pacific Electric Railway or any other electric railroad performing as high-class service should receive a somewhat higher rate for its service, and particularly its freight service, which is, as a matter of fact, practically express service at freight rates. About the only difference between this and express service is the free pick-up and delivery which is performed by express companies and which we all know is, of course, quite an item of expense to freight shippers in the forwarding and receiving of freight shipments.

It might be said by those unfamiliar with the conditions that this is wrong and possibly unnecessarily extravagant handling and dispatch of freight traffic, but with the Pacific Electric Railway it is a case of necessity; for on account of the passenger train units being so frequent and fast, it is necessary when the freight leaves the terminal and gets out onto the lines to move it quickly between stations and handle it quickly at stations to keep it out of the way of passenger cars and trains. Unfamiliarity with these conditions has been the cause of much adverse criticism from some sources that the electric roads' freight service is thought to be unnecessarily extravagant, as well as unfair to old-established steam railroads. Nevertheless, it is hard to see how an electric railroad, the Pacific Electric in particular, could handle the business with any degree of satisfaction to itself as well as to the public in any other way than the way in which it is being handled. As a general proposition, this company's freight traffic is solicited, receipted for, handled, way-billed, loaded, shipped, and delivered in the same manner as such business is handled by the best regular steam railroads, with the possible exception of somewhat closer attention to details and dispatch in loading, moving over the lines and unloading at destination, due to a large extent to the nature of the business. In short, all connected with the business naturally become somewhat electric (quicker) in their habits and movements, as well as the necessities of the situation already explained. However, it is largely due to the compactness of the property and the advantage in this respect which the managing officers have in keeping their fingers on the pulse of the lines at all times.

EXPEDITIOUS SERVICE

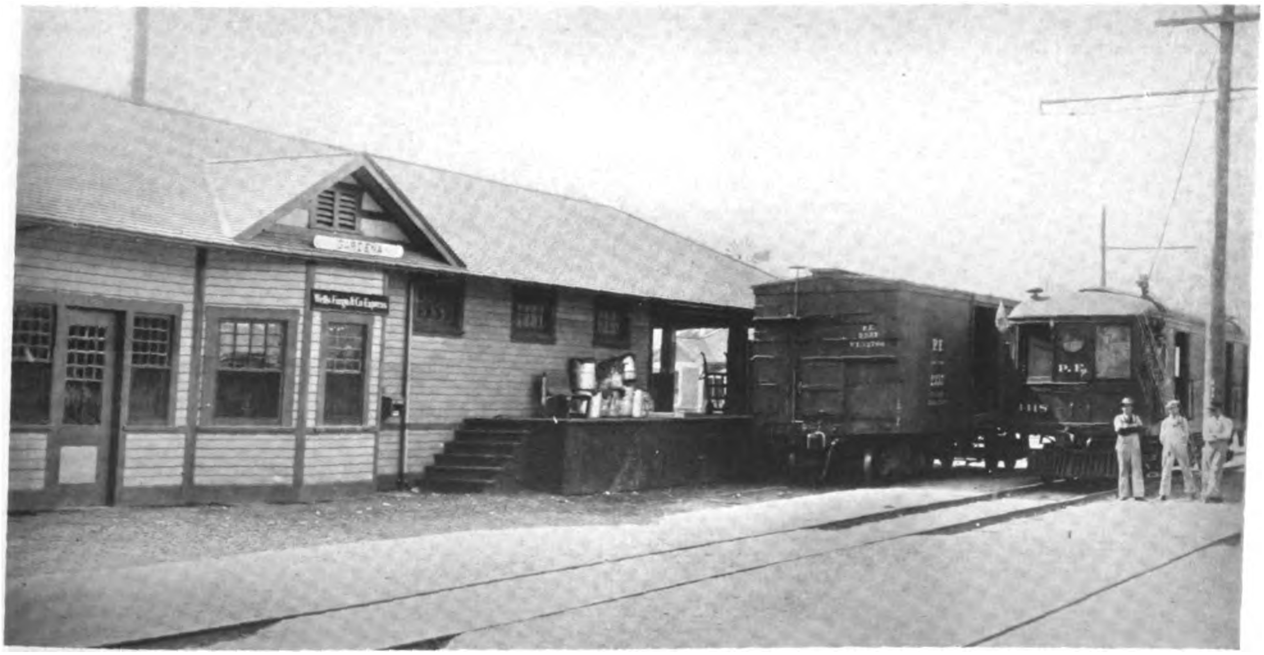
I have been told by the manager of the Pacific Car Demurrage Bureau that the Pacific Electric Railway's records for the prompt movement of and low detention to freight cars excel those of any other member of the bureau. This fact is due, no doubt, to reasons already explained combined with the close attention to detail and alertness of the car service department; also, to its facilities for keeping in close touch by telephone with the handling of rolling equipment at every point on the system.

As far as possible, however, freight traffic moved in trains drawn by locomotives is moved at night. The reasons for this are obvious to electric railroad operating officers; first, because such trains are, of course, slower than passenger trains, the latter are fewer and farther apart at night, and the freights have more opportunity to get over the lines from station to station without delaying passenger cars and trains; and, second, the night power supply, purchased from hydroelectric companies, besides being adequate in amount for heavy motor movements is much lower in cost. It is still questionable in my mind whether heavy freight train service can be performed at a profit during heavy passenger traffic hours, particularly during peak-load conditions with power at the cost of that used for passenger transportation purposes.

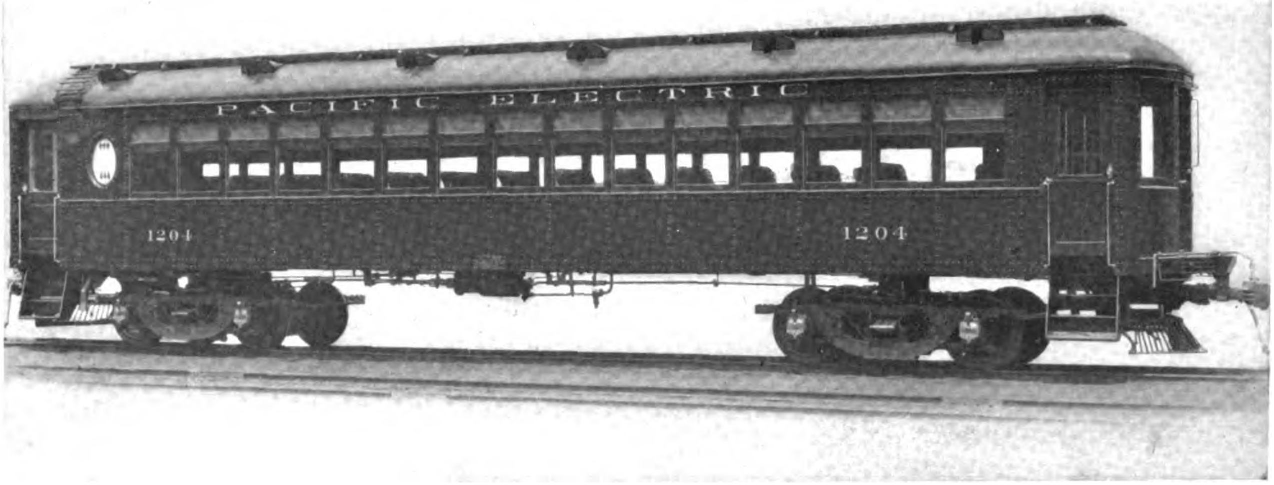
Package Freight Business

It is, of course, necessary to perform what we call "package freight" service; to wit, small, less than carload, shipments of merchandise, a large portion of which has to be delivered at prepay stations, non-agency points, highway crossings, country stores, etc., during daylight hours to avoid the same being stolen or damaged by the weather were it left at such points at night. Such shipments are generally handled in what we call "express-freight" cars, one, two, or three cars per train, according to volume of business, by two trips daily over most of the lines, one in the forenoon and one in the afternoon over the heavier traffic lines, and one such trip starting out in the early forenoon over the lighter traffic lines. Generally, these same cars return to Los Angeles loaded with milk, cream, and package shipments of berries, vegetables, etc., for the Los Angeles markets, the empty cans and crates being taken out and distributed on the outbound trips of such cars and trains. On some lines, however, the milk traffic is of such volume that some runs of such cars are classified as strictly milk trains and are in that service exclusively, returning the empty cans to their many points of loading on the outbound trips. Freight delivered in the forenoon is forwarded on the afternoon trip, and is generally in the consignee's hands the same afternoon or evening; that delivered during the afternoon and evening is forwarded on the next morning's trip of such distributing cars and is delivered to consignees before noon the day following its delivery for shipment to the freight station in Los Angeles. These express-freight distributing cars also carry what is commonly called less-than-carload perishable freight, such as the daily supply of fresh milk, ice cream, fresh meats, fresh fruits, vegetables, etc., from the larger markets in Los Angeles for the daily supply for the larger outlying cities, particularly the beach towns and cities, such as Long Beach, Venice, Santa Monica, and the various ocean and mountain resorts served by these lines. Heavy or imperishable shipments of less-than-carload merchandise received at the Los Angeles freight station during the day is, as far as possible, loaded into separate cars for the larger cities and towns like Long Beach, San Pedro, Santa Ana, Huntington Beach, Covina, Monrovia, Pomona, San Bernardino, and Riverside, thus reducing to the minimum the handling and distribution of less-than-carload shipments by crews on the night freight trains. Where there is sufficient of such shipments to fill a car or cars for a town, the cars are sealed at Los Angeles, sent out in the night freight trains and placed at destinations ready for unloading by the station force the first thing in the morning, so that consignees may secure the goods in time for that day's business.

It is, no doubt, this kind of service, to some extent necessitated by electric railroad exigencies, that causes the local merchants and shippers generally along the electric lines, even at points strongly competitive with one or more steam roads, greatly to prefer the electric railroad's freight service over that of the steam roads.



Typical Pacific Electric Local Station at Gardena, on the Redondo Line, with One Freight Car and One Express Car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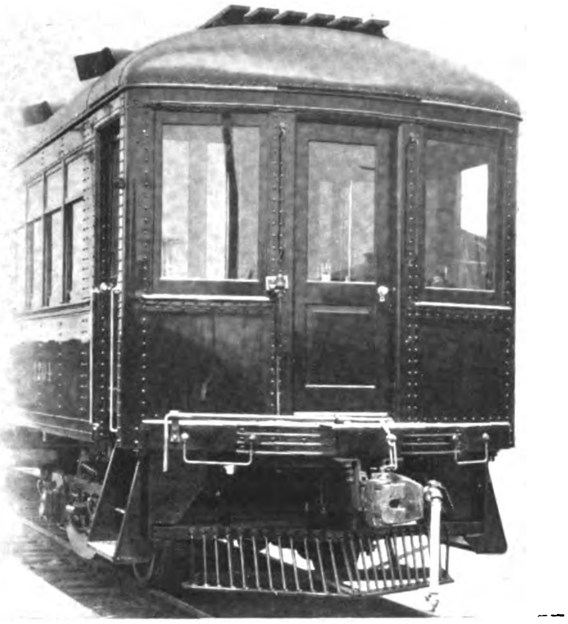
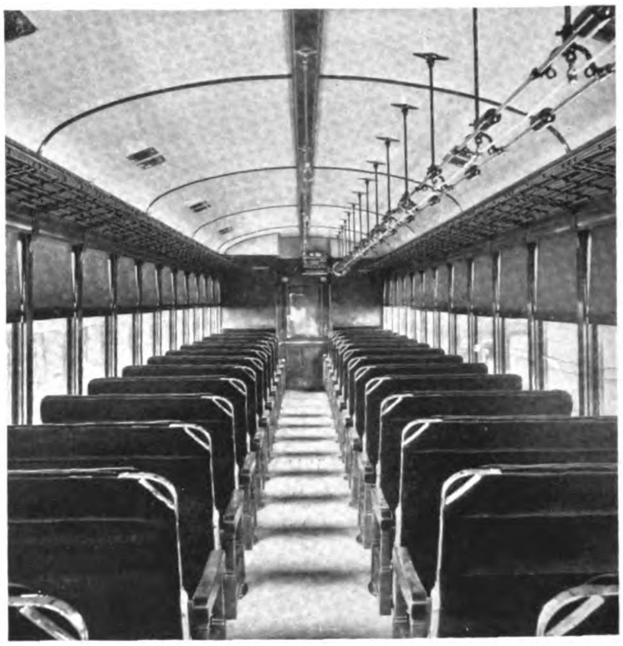
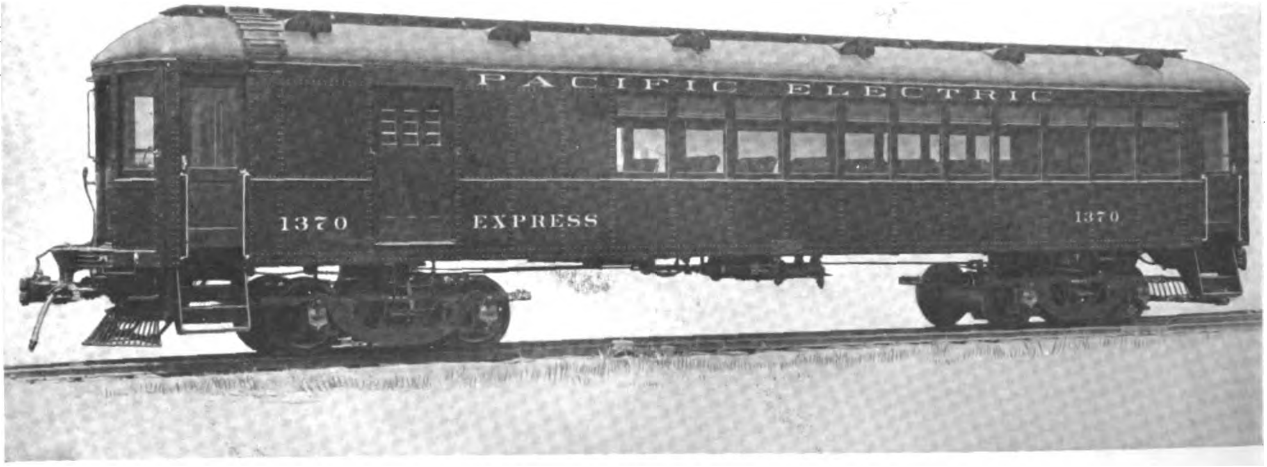
Exterior View of Pacific Electric All-Steel Passenger Car



Head-on View of Pacific Electric Pressed-Steel Car, Showing Automatic Air and Electric Coupler, Anti-Climber, Etc.



Interior of Latest Pacific Electric Pressed-Steel Car, Showing Seating, Ventilators and Fare Collecting Mechanisms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EXPRESS
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Latest Pacific Electric All-Steel Combination Express and Passenger Car

New All-Steel Passenger Cars for the Pacific Electric Railway

A Description of the All-Steel Cars Just Delivered, Including Some Safety-First Braking Features, Modern Lighting, Etc., Is Given

By FRED F. SMALL

Mechanical Superintendent Pacific Electric Railway

THE following is a brief description of our twenty-four new all-steel passenger cars built for the 63-mile run on the 600-1200 volt d.c., Los Angeles-San Bernardino line, of the Pacific Electric Railway.

The car bodies and trucks were designed by the railway company and built by the Pressed Steel Car Company, McKees Rocks, Pa. In designing both car bodies and trucks the railway has kept the safety-first question constantly before it, and with that primary object in view has decided that the cars hereinafter described fulfill all requirements as to safety, speed and comfort to its patrons. No attempt has been made to reduce the weight of material required in the construction of these cars. They have simply been built strong and substantial and in keeping with the high-class passenger service for which they are intended.

The general dimensions of the cars are shown in the accompanying table.

CAR BODY

The underframe consists of two 7-in. 15-lb. I-beam center sills and 6-in. x 3½-in. x ⅜-in. angle-iron side sills. The ends of the sills are securely riveted to combination bolster and platform steel castings furnished by the Commonwealth Steel Company. The sills are tied together by means of 4-in. 5.25-lb. channels which serve as bridgings to support the flooring. In addition to cross bridgings there are two cross-ties each consisting of two ½-in. x 5-in. plates, one plate passing directly over the center sills and the other extending directly underneath them.

Cross-ties are located symmetrically near the center of the car and are spaced approximately 11 ft. They are securely riveted to the top and bottom of the center sills, and are brought together at the side sills to which they are fastened by means of suitable plate gussets. These cross-ties serve to support the weight of the center sills and flooring, and transfer the same to the side framing. As applied to sills they project but little below them and offer no obstruction or hindrance to piping and equipment applied to the bottom of the cars. The arrangement of cross-ties and bridgings as well as the spacing of sills is shown on the cross-section and on the general plan drawings on page 491. The two car types are the same except that one has a 14-ft. express compartment.

Gage	4 ft. 8½ in.
Length over end sills	47 ft. 2 in.
Length over buffers	58 ft. 1 in.
Length over pulling face of coupler	59 ft. 7 in.
Bolster centers	34 ft. 0 in.
Width over side sills	9 ft. 2 in.
Width over all at eaves	9 ft. 4¼ in.
Width inside in the clear	8 ft. 7¼ in.
Height floor to ceiling	8 ft. 6 3/16 in.
Height rail to bottom of sills	3 ft. 7¾ in.
Height rail to top of platform	4 ft. 4 in.
Height rail to top of roof	13 ft. 1 11/16 in.
Wheelbase of trucks	7 ft.
Weight of car body (without equipment) estimated	50,000 lb.
Weight of two trucks (without motors) estimated	29,000 lb.
Weight of car completely equipped, estimated	108,000 lb.
Seating capacity	60

The body side framing consists of 3-in. x 3-in. x 5/16-in. to ¼-in. 5.5-lb. tees securely riveted to the side sills at the bottom, and to 3½-in. x 3½-in. x 5/16-in. side plate angles at the top.

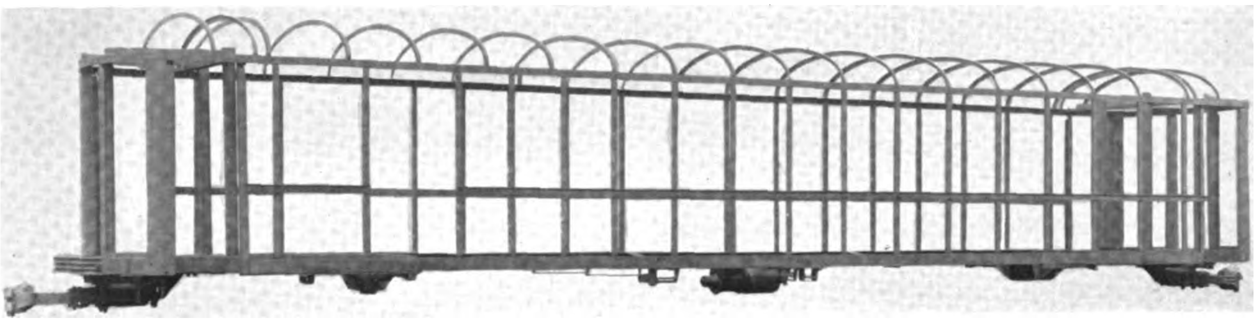
The belt rails consist of a 3½-in. x 1-in. x ⅜-in. dropper bar extending in one continuous length between the body corner posts. The side sheets and the letterboard are of ⅛-in. steel. The carlines are of 2½-in. x 1½-in. x ¼-in. angles securely riveted at the ends to the side plate angles. Roof sheets are of 3/32-in. steel.

The flooring is of Flexolith laid on Keystone galvanized steel floor sheets. A layer of ¾-in. magnesite is applied below flooring for insulation. The floor in the aisle is covered with a "Wearproof" mat extending the full length of the car between the body end doors.

INTERIOR FINISH

The cars are finished inside in mahogany and the ceiling and wainscoting are of ¼-in. Agasote. Light wood furring is fastened to the side posts and carlines to afford means of fastening the Agasote and the mahogany inside finish. The inside of the roof sheets and side sheets is lined with three-ply Salamander hair-felt insulation in order to afford protection against very high or low temperatures.

Each regular passenger coach is equipped with two toilets located diagonally opposite, one at each end of the car. The toilets are equipped with white metal wash basins and Duner water closets for use with air pressure water supply. The toilet room fixtures are Adams & Westlake manufacture. Cars



Body Frame of All-Steel Passenger Car for the Pacific Electric Railway

are equipped with continuous basket racks. The racks are enameled mahogany color to harmonize with the interior finish. The cars are also equipped with Automatic ventilators.

PLATFORM ARRANGEMENT

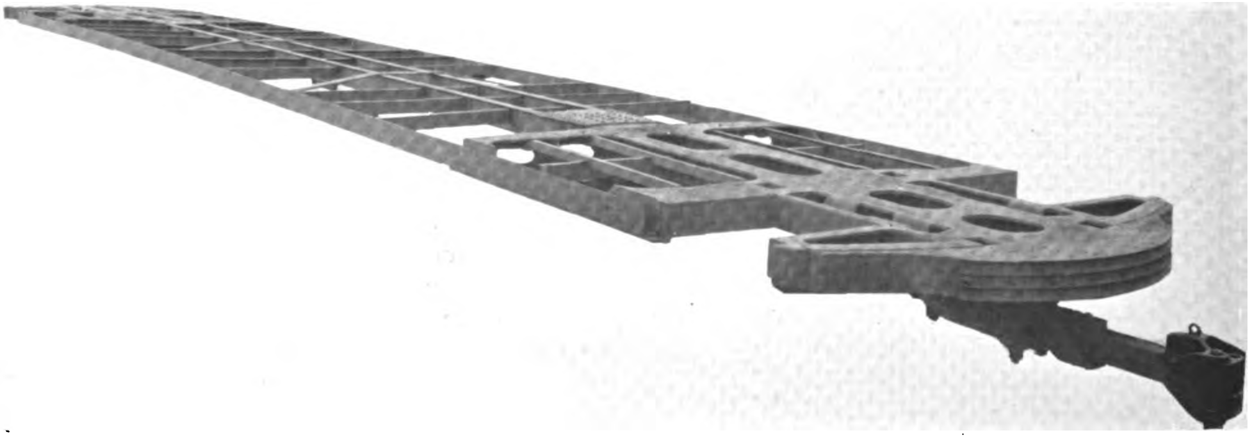
The arrangement of platforms and folding cabs is shown. The Dean end-post construction has been applied to these cars, and this, in conjunction with solid cast-steel platforms, affords an excellent protection to passengers as a means of preventing telescoping. The body and vestibule end posts consist of two 14.75-lb. I-beams each bent into a "U" and inserted through holes in the platform steel castings. In addition to the special heavy Dean end-post construction, the cars are equipped with Rico anti-climbers, which add further protection against liability of telescoping. An oak block is applied directly behind the Rico anti-climbers to serve as a cushion. In the event of possible collision it is considered that these blocks will be crushed and absorb most of the impact, thus relieving the platform and framing from unusually severe shock. The platforms are equipped with O. M. Edwards all-steel trapdoors. The rest of the platform flooring, including step treads, is covered with Mason safety carborundum tread. Stationary steel pilots and Eclipse fenders are also used on these cars.

On account of the short radius curves (45 ft. radius) around which it is necessary to operate these cars in trains it was not considered practicable to attempt to apply vestibule diaphragms between cars.

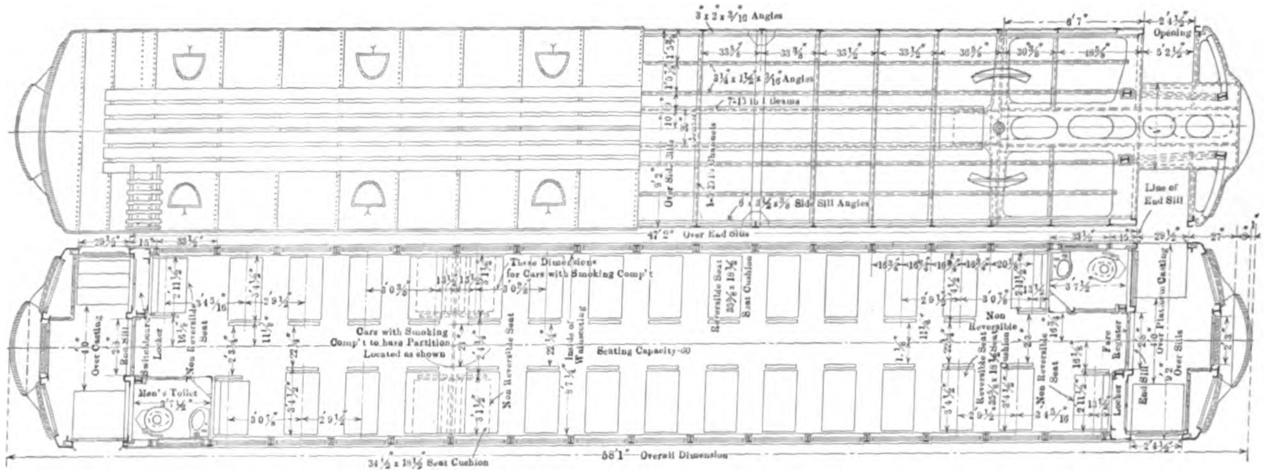
The Westinghouse Air Brake Company's combined car, air and electric couplers are used. These couplers not only serve as a mechanical connection between cars but at the same time make all air-pipe and electrical connections required between cars, thus doing away with air hose and electric jumper cables between cars, as well as the necessity for trainmen to go between cars when making up trains, or cutting off cars. It may be noted that the maximum swing of the couplers when the cars are coupled together and rounding a 45-ft. radius curve is 60 deg. from the center line of the car. On account of this wide coupler swing it is considered that quite an appreciable saving in maintenance will be effected by eliminating air-hose and electric cable connections between the cars.

The cars are equipped with Hale & Kilburn walk-over seats with foot rests and mahogany square-post arm rests. The seat backs are provided with head rolls, bronze grab handles and ticket holders. These seats are spaced 33¾-in. centers to give comfortable seating. They are upholstered in crimson mohair plush, the standard upholstering material on all cars of the Pacific Electric Railway.

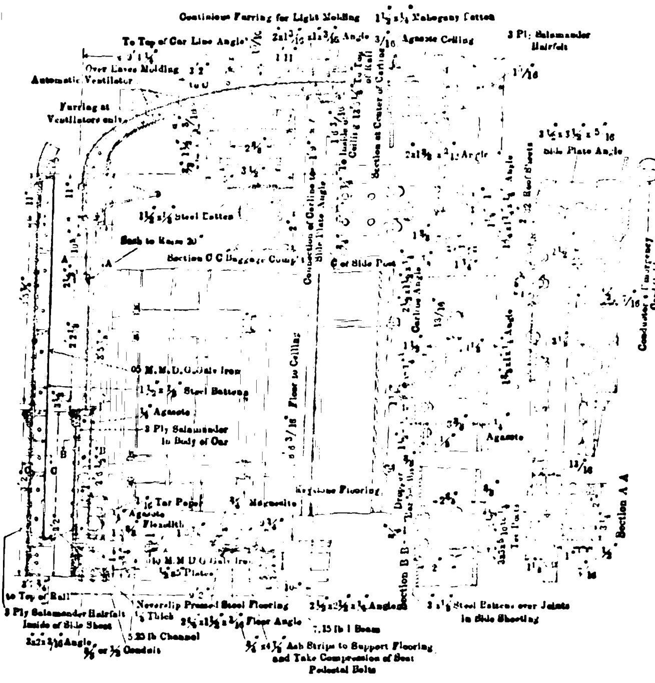
The curtains are of Pantasote and are equipped with the Curtain Supply Company's ring fixtures. The body sashes are of mahogany and are equipped with O. M. Edwards sash locks and compression



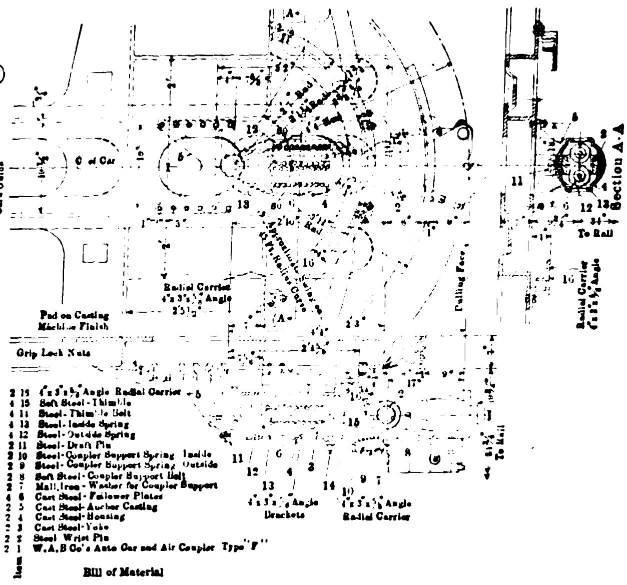
Underframe of All-Steel Passenger Car for the Pacific Electric Railway


3 x 2 x 3/16 Angles
Opening
Line of End Sill
Over End Sills
Men's Toilet
Cars with Smoking Comp't to have Partition Located as shown
Three Dimensions for Cars with Smoking Comp't
Seating Capacity—50
Reversible Seat
Non Reversible Seat
Seat Cushion
Fare Register
Switchboard Locker
34½ x 18½ Seat Cushion
56' 1" Overall Dimension

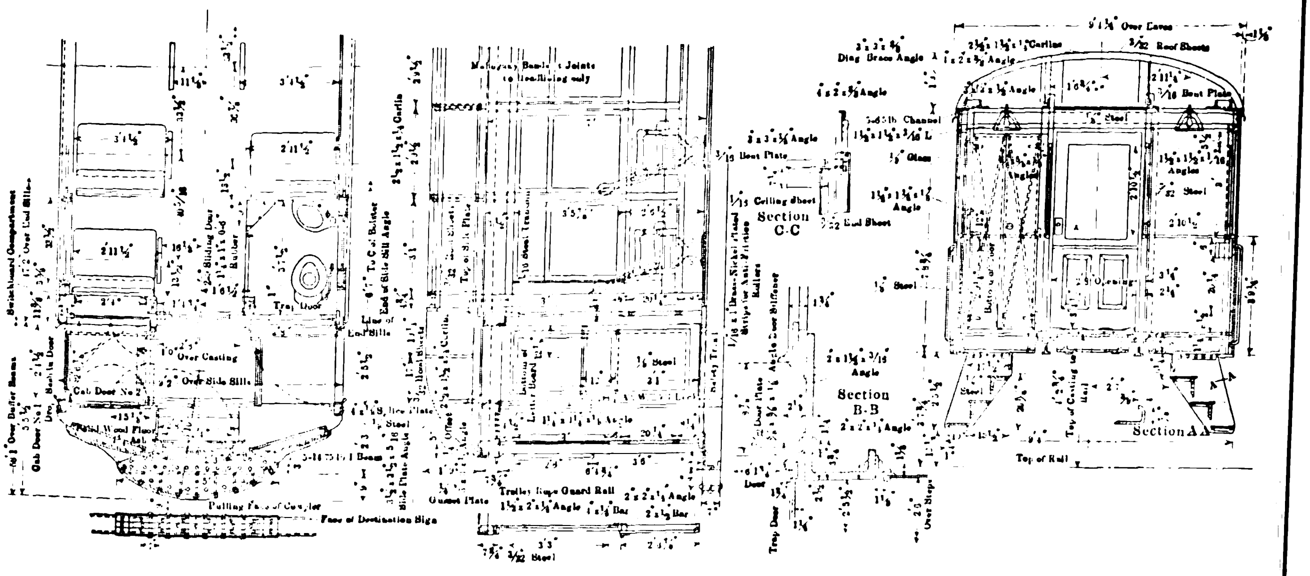
Seating and Framing Plans, 47-Ft. All-Steel Passenger Motor Car, Pacific Electric Railway


Continuous Furring for Light Molding
1½ x 1¼ Mahogany Cotton
To Top of Car Line Angle
3/16 Agasote Ceiling
3 Ply Salamander Hairfelt
Over Eaves Molding
Automatic Ventilator
Furring at Ventilators only
Section at Center of Carline
Side Plate Angle
1½ x 1½ Steel Cotton
Sash to Knee 20"
Section C C Baggage Comp't
of Side Post
Conductor's Emergency Cord Guide
M.M.D. Outside Iron
1½ x ⅜ Steel Batten
¼ Agasote
3 Ply Salamander in Body of Car
Floor to Ceiling
Agasote
Keystone Flooring
Magnesite
Section B B
Section A A
to Top of Rail
3 Ply Salamander Hairfelt Inside of Side Sheet
Neverslip Pressed Steel Flooring
Floor Angle
15 lb I Beam
5.25 lb Channel
⅝ or ¾ Conduits
Ash Strips to Support Flooring and Take Compression of Seat Pedestal Bolts
Steel Batten over Joints in Side Sheeting

Cross-Sections of Passenger and Combination Car, Pacific Electric Railway


Section A-A
To Rail
Conductor's Emergency Cord Guide
Radial Carrier 4" x 3" x ⅜" Angle
Pad on Casting Machine Finish
Grip Lock Nuts
Pulling Face
Radial Carrier 4 x 3 x ⅜ Angle
4 x 3 x ⅜ Angle Brackets
4 x 3 x ⅜ Angle Radial Carrier
2 16 4" x 3" x ⅜" Angle Radial Carrier
4 15 Soft Steel - Thimble
4 14 Steel - Thimble Bolt
4 13 Steel - Inside Spring
4 12 Steel - Outside Spring
2 11 Steel - Draft Pin
2 10 Steel - Coupler Support Spring Inside
2 9 Steel - Coupler Support Spring Outside
2 8 Soft Steel - Coupler Support Bolt
2 7 Mall. Iron - Washer for Coupler Support
4 6 Cast Steel - Follower Plates
2 5 Cast Steel - Anchor Casting
2 4 Cast Steel - Housing
2 3 Cast Steel - Yoke
2 2 Steel Wrist Pin
2 1 W.A.B Co's Auto Car and Air Coupler Type "F"
Item
Bill of Material

Details of Automatic Car, Air and Electric Coupler Attachments


Mahogany Bands at Joints to Headlining only
Switchboard Compartment
Over End Sills
Sliding Door
Trap Door
Over Casting
Over Side Sills
Cab Door No 2
Cab Door No 1
Over Buffer Beams
Pulling Face of Coupler
Face of Destination Sign
Line of End Sills
End of Side Sill Angle
Top of Side Plate
Gusset Plate
Trolley Rope Guard Rail
Letter Board
Section C-C
Ceiling Sheet
End Sheet
Section B-B
Section A-A
Top of Rail
Over Eaves
Roof Sheets
Carline
Diag Brace Angle
Deck Plate
Steel
Glass
Over Steps
Trap Door

Part Plan and Elevations of All-Steel Car, Pacific Electric Railway rollers. Other body equipment includes Ohmer fare registers, Hunter illuminated destination signs and bronze, nickel-plated car trimmings.

TRUCKS

The trucks are of the built-up, double-equalizer swing bolster type with bolsters of cast steel and elliptic springs of sufficient length to possess good riding qualities. These trucks have 36-in. rolled steel wheels, 6½-in. A. E. R. A. Standard vanadium steel axles, 5-in. x 9-in. Symington journal boxes, Baltimore ball-bearing center plates, Woods roller side bearings and Harrison dust guards.

The pedestals of this equipment are provided with channel-shaped steel wearing gibs. Provision is made for raising up cars by the application of shims under swing hanger axle bearings, thus doing away with the necessity of disturbing the adjustment of the side bearing and center plate heights. The bolster chafing plates are arranged so that they may be renewed without removing the bolster from the truck. Case-hardened steel brake pins are used with case-hardened steel bushings.

ELECTRICAL EQUIPMENT

All cars are motor cars arranged for double-end operation. Each car is equipped with four General Electric 254-A, 150-hp. motors with the same maker's control, for either 600 or 1200-volt d.c. lines. The master controllers are equipped with emergency air-brake attachment. The change-over or commutating switch, by means of which proper connections are made for either 600-volt or 1200-volt lines, is operated by air and remotely controlled by the motorman. Suitable relays and protective devices are provided to prevent possible trouble due to any attempt to make 600-volt line connections while on 1200-volt line.

With the gear ratio applied cars are capable of a speed of 60 m.p.h. Each car is equipped with two of this railway's standard pneumatic trolley bases, 12-ft. trolley poles and No. 23 Kalamazoo trolley wheels and harps. The trolley bases are manufactured in our own shops. They are self-retrieving by means of air pressure. Trolley retrievers, therefore, are not required. "Ideal" trolley catchers are used to take care of the trolley rope.

LIGHTING AND HEATING

The lighting system consists of a single row of eight 56-watt Mazda lamps equally spaced along the center line of the ceiling. Each lamp is equipped with the Safety Car Heating & Lighting Company's brass nickel-plated shade holder fitted with holophane reflector. This arrangement when taken in connection with the ecru-colored oval-shaped ceiling, gives an excellent lighting system with ample intensity of light throughout the entire car. The platforms are lighted by means of dome lamps located directly over each stepway. To avoid interference with the motorman's vision these lamps are transferred to the destination sign on the operating end of the car. Step lights are located one at each corner of the car for the convenience of passengers boarding or leaving. For headlight service we use the 4-amp. portable combination Crouse-Hinds type L.A.A. luminous arc and incandescent headlights, with independent resistance.

Each car is equipped with twelve 500-watt, 1200-volt heaters of the truss-plank type, manufactured by the Consolidated Car Heating Company. The heaters are arranged for operating twelve in series on 1200 volts with suitable connections to the change-over switch for changing to two groups of six in series on 600 volts.

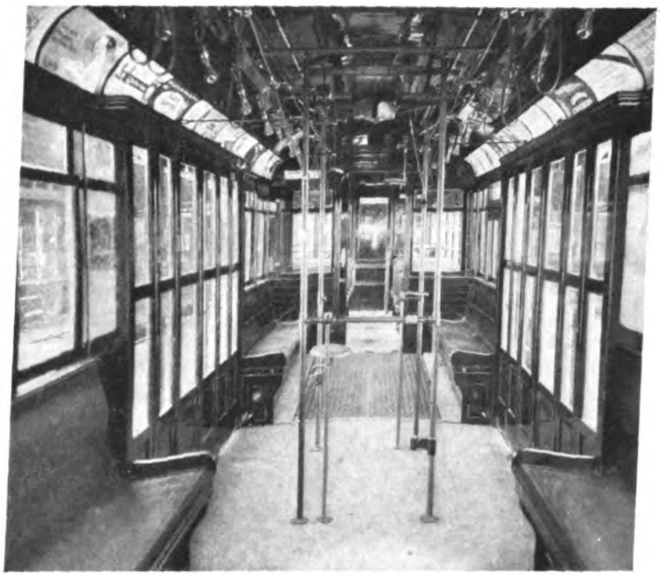
BRAKES

The cars are equipped with the Westinghouse Air Brake Company's latest improved Universal, quick-action, high-pressure, automatic, air-brake equipments. Air pressure is furnished by means of a Westinghouse dynamotor compressor having a displacement of 35 cu. ft. An automatic control switch is inserted in the cable which furnishes current to the controller. This control switch remains open-circuited until the compressor has raised the air in the main reservoir to a certain pressure. By means of this simple device it is impossible to start the car in the usual way by any movement of the controller until the air pressure has been raised a predetermined amount considered sufficient for the proper operation of the air-brake equipment. This is a safety feature and prevents any movement of the car without the air pressure required to stop it. A spring by-pass switch is located in the motorman's cab to short-circuit this device, and when held closed by the motorman it enables the car to be moved without air pressure. This is installed to permit the cars to be run out of the carhouse, as in case of fire, without waiting for cars to pump up the air pressure required to close the automatic control switch.

In addition to these improved air brakes, the cars are also equipped with the St. Louis Car Company's "high power" pilot-wheel hand brake.

CONCLUSION

Without attempting to go into any long and tedious description of the cars the writer has attempted to show that the Pacific Electric Railway has spared no expense to obtain cars consistent with the best engineering design and practice. Much attention has been given to make the cars comfortable and easy riding, and I have no doubt that they will meet all requirements and be in keeping with the high-class interurban service for which they are intended.



Interior of Center-Entrance Car at Platform

Standardization of Twelve Car Types into Two at Los Angeles

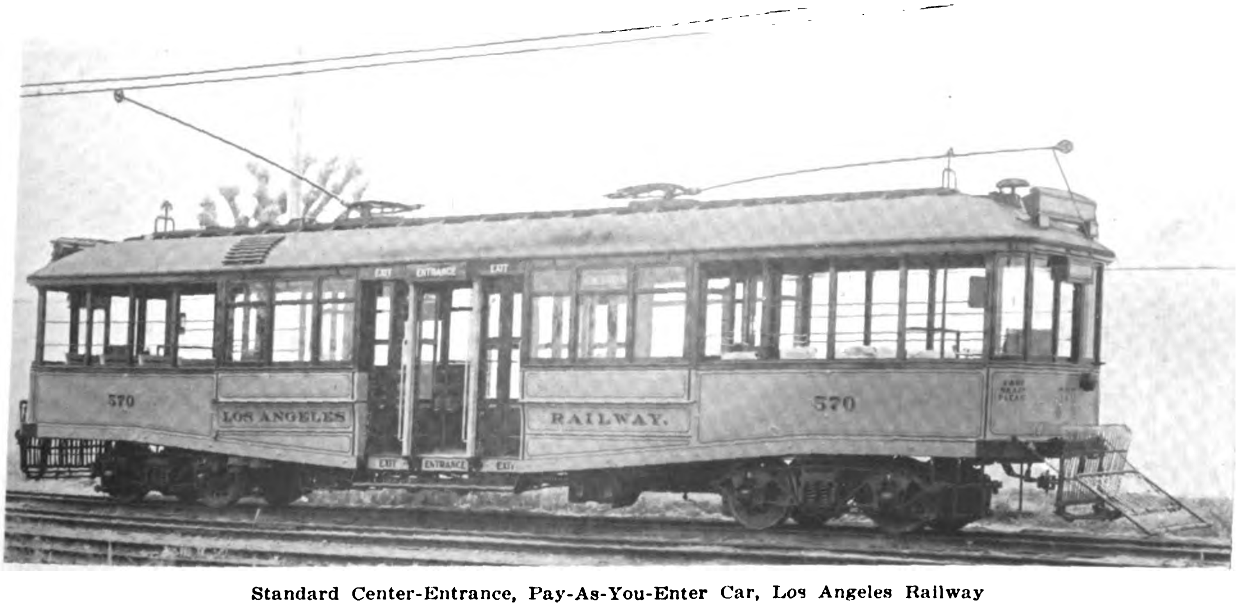
One Truck Is Used for All Car Equipment, Whether of End or Center-Entrance, Passenger or Service, Two-Motor or Four-Motor Type

By E. L. STEPHENS

Master Mechanic Los Angeles Railway

STANDARDIZATION is that one appalling word which is written largely on the page of every activity. In its true sense it means efficiency. Conditions may be standardized in two ways: First, by bringing your present conditions to a high state of efficiency; and, second, by making complete changes in all conditions. As standardized conditions underlie the best results from all other principles, they therefore accelerate the progress of efficiency and make work quicker and easier. The conditions that govern efficiency are quantity, quality and economy.

While standardization could be brought about by discarding all equipment and purchasing a new standard, there are few companies which could undertake such a radical change, no matter how valuable the ultimate results might be. Therefore it would appear that the practical solution is that



Standard Center-Entrance, Pay-As-You-Enter Car, Los Angeles Railway standardization should be gradual for both maintenance and for new equipment. This system involves no great extra expense and, at the same time, accomplishes many of the desirable things of life in a limited time.

The trouble in the standardization of some properties lies not only with the purchaser but with many manufacturers. The latter in designing equipment do not take into consideration the many conditions of interchange of the maintenance parts and will even go so far as to expect radical changes to be made to permit the use of their product. While this is true of some manufacturers, many purchasers also have ideals which are entirely vague. This leads them to make many changes which could not become standard either in their own rolling stock or on any other system. The undertaking of standardizing an electric railway which constitutes the amalgamation of a chain of small companies, each of which had discarded equipments purchased second-hand, is the problem which confronts many rolling stock superintendents at the present time in building all types to a common standard. While some systems have endeavored to be abreast of the times so far as their means would permit, the many miscellaneous items to be considered in standardization will tend to increase the reliability of the service to the public and decrease the maintenance costs of the company.

FROM TWELVE TYPES TO TWO

The undertaking to standardize the rolling stock of the Los Angeles Railway was begun under most of the foregoing conditions. We had twelve different types of passenger cars, ten different designs of trucks, seventeen different types of axles and six different types of motors.

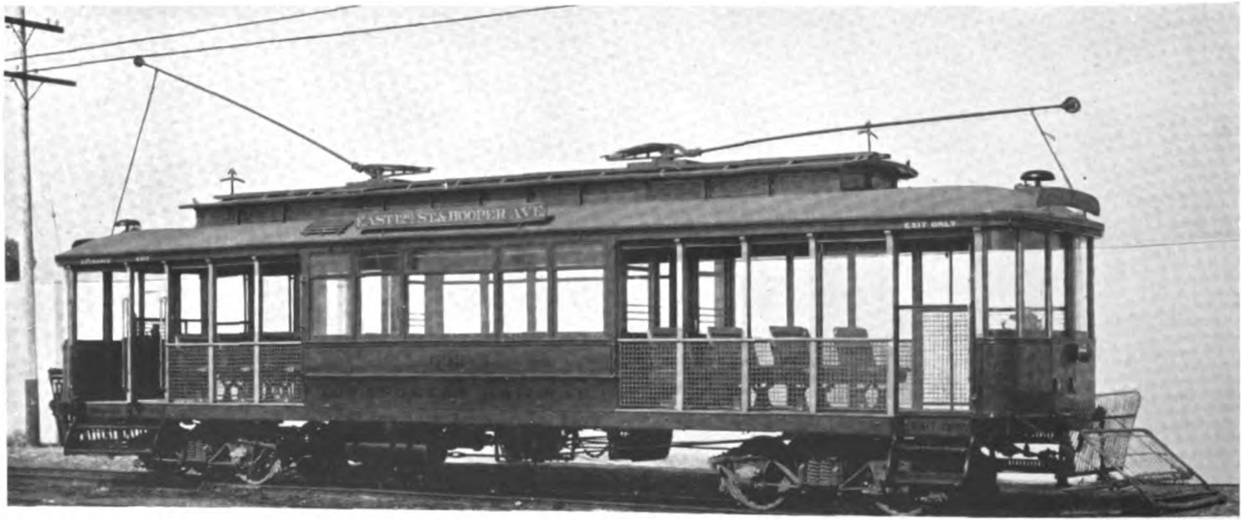
The adopted standard car bodies of this company now consist of two types, known as the California combination pay-as-you-enter rear-end car and the center-entrance car. While they differ essentially from each other in their general appearance, yet they are practically the same in construction, except the floor framing. All other construction and parts subject to maintenance such as vestibules, posts, sash, glass and draft attachments are identical and interchangeable.

It would be rather difficult to give any detailed description of the rebuilding of these car bodies, as the work of rehabilitation was simply the overhauling of what might be considered obsolete standards.

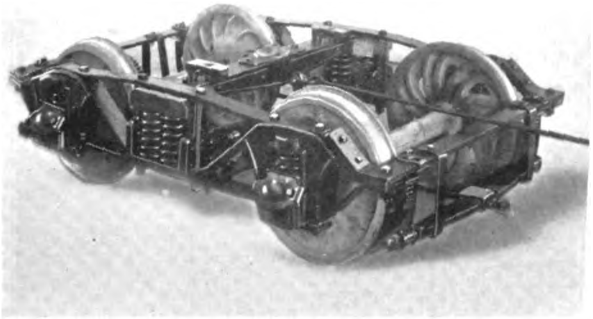
Three hundred of these cars were changed to pay-as-you-enter rear-end type in the period of two years; but then the fashion of women changeth with the setting sun, and in this age of the hobble skirt, it becomes necessary to "rubber" for new designs to meet the prevailing changes in the mind of the fair sex. To be equal to their call, the development of the center-entrance low step became a necessity.

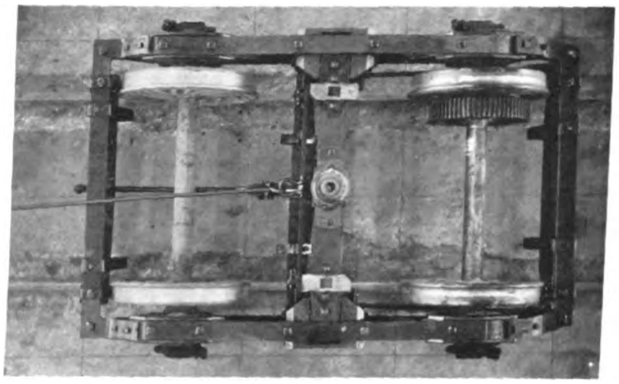
ONE TRUCK FOR ALL CARS

In the standardization of trucks, owing to the many different types, it was next to impossible to rebuild them to a common standard. Therefore, it became necessary to eliminate the old and to adopt an entirely new truck which could become a standard common to all cars, both passenger and service equipment, and which could also be used for either double or quadruple motor equipment. No concrete specifications were prepared for the construction of these trucks, as they were built at the company's shops. Special machinery and jigs were built expressly for this purpose. In the construction of this truck, all parts are not only a special standard but are also interchangeable. Thus the top and bottom arch bars, end plates and braces will fit on either end side, or reversed, and the pedestals are the same. No rivets enter into the construction of



Standard End-Entrance, Pay-As-You-Enter Car, Los Angeles Railway





Side and Top Views, Standard Los Angeles Railway Trucks

this truck, all of the parts being very firmly held in position by bolts, which give a perfectly noiseless truck.

AXLES, BRAKESHOES AND MOTORS

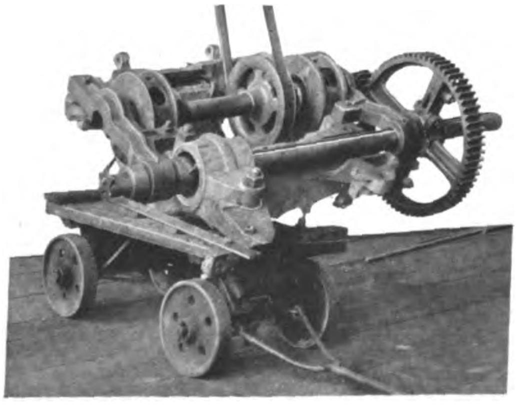
The maintenance of seventeen different axles was a serious condition. After due consideration a 4½-in. cold-rolled steel axle with 30-in. chilled cast-iron wheels was adopted. While we have a single truck as a standard, we have both double and quadruple motor equipments to maintain. This necessitates two different classes of brake construction. With the double motor equipment the brake attachments are simplified to the adjustment of a single nut.

The standardization of brakeshoes also received due consideration. Where seven different kinds of shoes to supply different trucks had been required, six were eliminated and a single shoe was adopted. This is a reinforced-back cast-iron shoe.

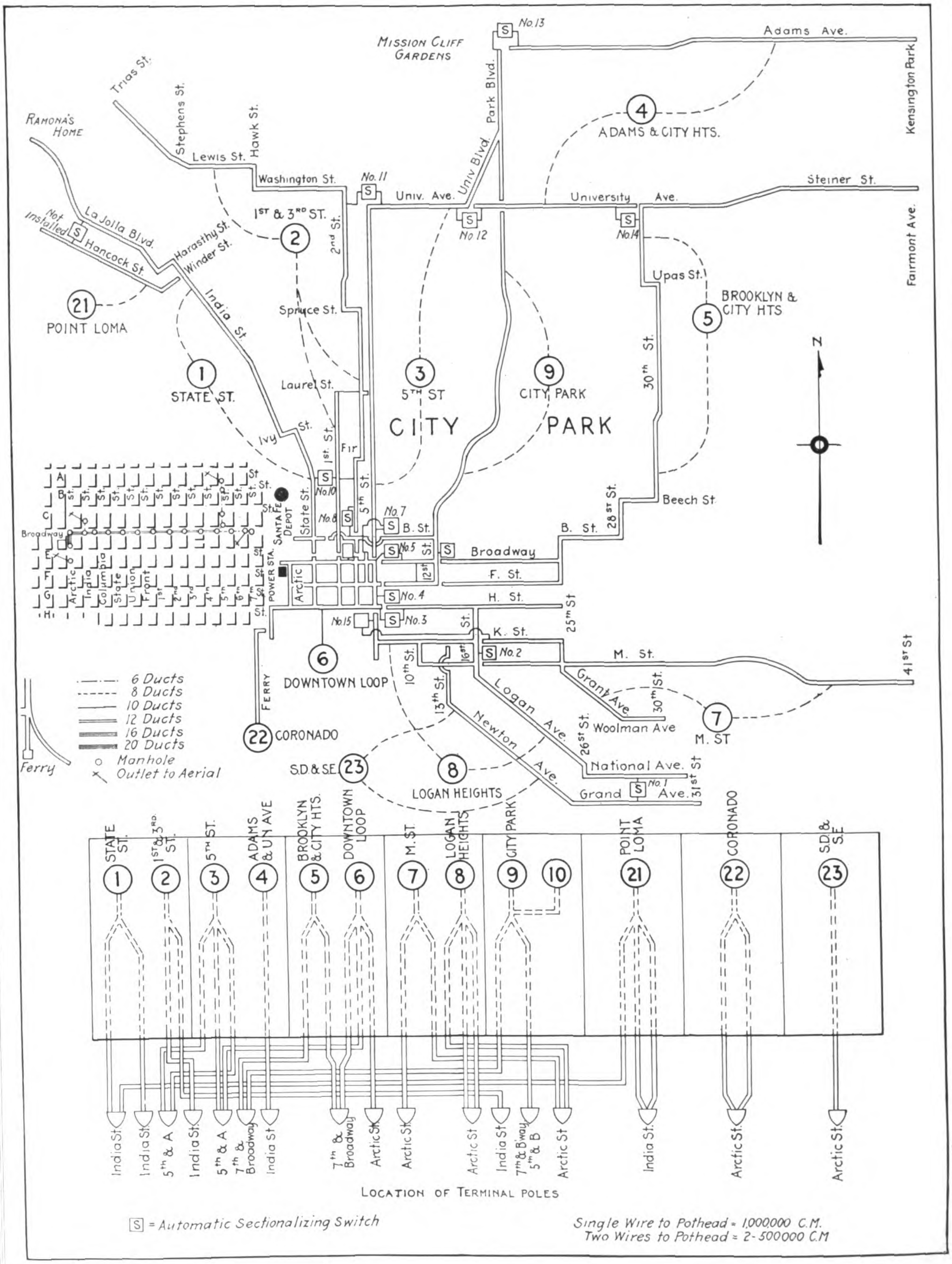
With seven different types of motors to maintain, some of which could not be rebored to fit the adopted standard 4½-in. axle, it became necessary to scrap many of the old motors. As the adopted axle was larger than that for which many of the motors were originally built, it was necessary to devise boring machines for this purpose. One of these machines rebored 828 motors. This was so constructed that it rebored all four bearings in a single operation. This type was shown on page 1332, ELECTRIC RAILWAY JOURNAL, Nov. 21, 1914. The other machine handled 384 No. 101 motors, reboring both axle bearings in a single operation. Some of these motors had different gear and pinion centers, requiring special gearings. These distances were changed to a single standard, which permitted the adoption of a single standard gear and pinion. The reboring of all motors for a standard axle also reduced a variety of motor bearings to a single unit.

Many of these motors were constructed originally for grease lubrication. As the later types of motors were constructed for oil the old motors with grease boxes were chipped out, and a special oil feed-cup was applied.

The work already done on standardization is an indication of our independence of the many varieties of car construction. Every standard has certain factors, as supply, use, price and assignment, and the exploitation of these has saved us time, material and equipment. Furthermore, the interest saved in store stock, where many repair parts were formerly carried, has been a large factor in bearing a portion of the expense entailed in this rehabilitation of rolling stock. The space required for stores is one-half of former days, although we are operating more cars, and the discarded space is now available for car stripping in summer and car washing in winter.



Motor Boring Bar Device


Mission Cliff Gardens
No. 13
Adams Ave.
Kensington Park
4
ADAMS & CITY HTS.
Trias St.
Stephens St.
Hawk St.
Ramona's Home
Lewis St.
Washington St.
No. 11
Univ. Ave.
Univ. Blvd.
Park Blvd.
University Ave.
Steiner St.
Fairmont Ave.
No. 12
No. 14
La Jolla Blvd.
Not installed
Hancock St.
Harasthy St.
Winder St.
1st & 3rd ST.
2
2nd St.
Upas St.
BROOKLYN & CITY HTS
5
21
POINT LOMA
India St.
Spruce St.
1
STATE ST.
Laurel St.
3
5th ST
9
CITY PARK
CITY
PARK
30th St.
Ivy St.
Fir
1st St.
5th St.
N
State St.
No. 10
Santa Fe Depot
No. 8
No. 7
B. St.
Beech St.
28st St.
B. St.
No. 5
Broadway
12st
F. St.
Power Sta.
Arctic
India
Columbia
State
Union
Front
No. 4
H. St.
25th St.
No. 15
No. 3
K. St.
16st
No. 2
M. St.
41st St
10th St.
13th St.
6
DOWNTOWN LOOP
Logan Ave.
Grant Ave.
30th St.
Woolman Ave
26th St.
7
M. ST
Newton Ave.
National Ave.
31st St
Grand Ave.
No. 1
Ferry
22
CORONADO
SD & SE
23
8
LOGAN HEIGHTS
6 Ducts
8 Ducts
10 Ducts
12 Ducts
16 Ducts
20 Ducts
Manhole
Outlet to Aerial
STATE ST.
1st & 3rd ST.
5th ST.
ADAMS & UNIV AVE
BROOKLYN & CITY HTS.
DOWNTOWN LOOP
M. ST.
LOGAN HEIGHTS
CITY PARK
POINT LOMA
CORONADO
SD & SE
1
2
3
4
5
6
7
8
9
10
21
22
23
India St.
India St.
5th & A
India St.
5th & A
7th & Broadway
India St
7th & Broadway
Arctic St.
Arctic St.
Arctic St
India St
7th & B'way
5th & B
Arctic St
India St.
Arctic St.
Arctic St.
Location of Terminal Poles
S = Automatic Sectionalizing Switch
Single Wire to Pothead = 1,000,000 C.M.
Two Wires to Pothead = 2-500000 C.M.

The Sectionalizing of Electric Railway Feeders at San Diego

Map and Diagram Showing Feeder Panels and Districts Controlled in Connection with the Use of Automatic Sectionalizing Switches

A View Among the State Buildings at the San Diego Exposition

The Sectionalizing of Electric Railway Feeders at San Diego

Sectionalizing Switches Adequately Handle Conditions that Otherwise Would Call for a 30 Per Cent Increase in Copper Over Present Use

By HOMER MACNUTT

Superintendent of Motive Power San Diego Electric Railway

THE overhead system of the San Diego Electric Railway, consisting of feeders and trolley, differs considerably from most street railways inasmuch as under normal working conditions the sections are connected together all over the system with automatic sectionalizing switches. The feeders, in consequence, all operate in multiple as shown in the accompanying drawing of trolley sections. The switches are automatic in the sense that they are controlled from the switchboard. At the power station, the feeders to the different lines are mounted on separate panels through switches and breakers in the usual manner, but in case of accident or ground, any section may be cut out by opening the feeder breakers. It is not necessary in any case when it is desired to cut power off of any section to send a man out to pull switches, and as soon as the trouble has been cleared, the operator puts the section back on the line, thereby closing such sectionalizing switches as may be connected with it.

The first part of the San Diego installation was made in 1911 when eleven General Electric switches were installed. They worked out so satisfactorily that in making additions last year five more were installed. Nine of the switches are located within a radius of 1 mile of the power station, and during the five years of application not a single switch was lost. Further, the total amount for repairs during this period has been less than $25.

As the feeders work in multiple, the peak demand is divided among several feeders and the maximum current on any one is much less than if all the current for that one section was delivered over but one feeder. The result is a comparatively steady load on each feeder out of the power station with each feeder designed for that steady load which is less than maximum. To obtain the same voltage conditions without the use of these sectionalizing switches, an increase in copper of about 30 per cent would be required.

When a "short" occurs on the line, all, or nearly all, of the breakers go out. This is considered an advantage rather than a disadvantage because the total current is divided among many breakers, while without the sectionalizing switches one feeder breaker must open the circuit with the consequent

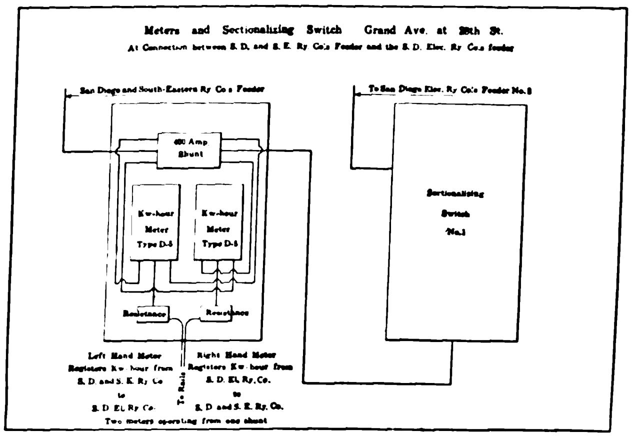

Meters and Sectionalizing Switch Grand Ave. at 28th St.
At Connection between S. D. and S. E. Ry Co's Feeder and the S. D. Elec. Ry Co's feeder
San Diego and South-Eastern Ry Co's Feeder
To San Diego Elec. Ry Co's Feeder No. 8
400 Amp Shunt
Kw-hour Meter Type D-5
Kw-hour Meter Type D-5
Resistance
Resistance
Sectionalizing Switch No. 1
Left Hand Meter Registers Kw-hour from S. D. and S. E. Ry Co to S. D. El. Ry Co.
To Rails
Right Hand Meter Registers Kw-hour from S. D. El. Ry. Co. to S. D. and S. E. Ry. Co.
Two meters operating from one shunt

Diagram Showing Connection for Kilowatt-Hour Meters and Sectionalizing Switches

RECORD AT SECTIONALIZING SWITCH NO. 1

Twenty-eighth Street and Grand Avenue
Feb. 15, 1915

Taken before installing the 500,000 circ. mil additional feeder on Section No. 7, from power station to Sixteenth and M Streets.

This side of the zero mark shows the current in amperes flowing from the San Diego & South Eastern Railway Company's feeder to the San Diego Railway Company's Logan Heights feeder No. 8.

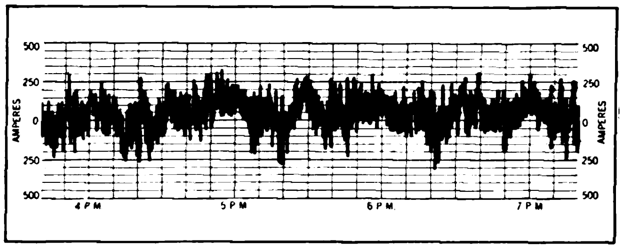


Fig. 1

This side of the zero mark shows the current in amperes flowing from the San Diego Electric Railway Company's Logan Heights feeder No. 8 to the San Diego & South Eastern Railway Company's feeder.

RECORD AT SECTIONALIZING SWITCH NO. 2

Sixteenth and M Streets
March 26, 1915

Taken before installing the 500,000 circ. mil additional feeder on Section No. 7, from the power station to Sixteenth and M Streets.

This side of the zero mark shows current in amperes flowing from the Logan Heights feeder No. 8 to M Street feeder No. 7.

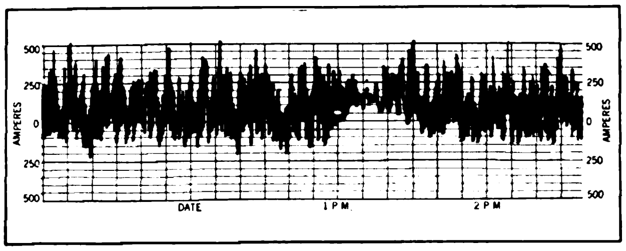


Fig. 3

This side of the zero mark shows the current in amperes flowing from the M Street feeder No. 7 to the Logan Heights feeder No. 8.

RECORD AT SECTIONALIZING SWITCH NO. 3

Fifth and Market Streets
Feb. 1, 1913

Taken before installing an additional 500,000 circ. mil feeder on Section No. 7, from the power station to Sixteenth and M Streets.

This side of the zero mark shows the current in amperes flowing from the Logan Heights feeder No. 8 to the downtown loop feeder No. 6.

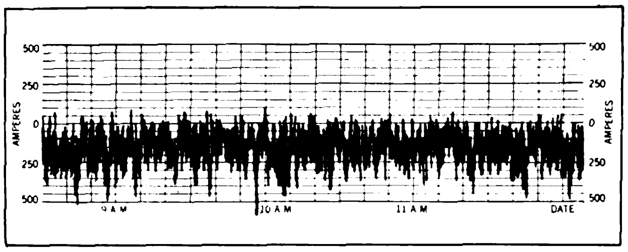


Fig. 5

This side of the zero mark shows the current in amperes flowing from the downtown loop feeder No. 6 to the Logan Heights feeder No. 8.

RECORD AT SECTIONALIZING SWITCH NO. 1

Twenty-eighth Street and Grand Avenue
July 19, 1915

Taken after installing the 500,000 circ. mil feeder on Section No. 7, from the power station to Sixteenth and M Streets.

This side of the zero mark shows the current in amperes flowing from the San Diego & South Eastern Railway Company's feeder to the San Diego Electric Railway Company's Logan Heights feeder No. 8.

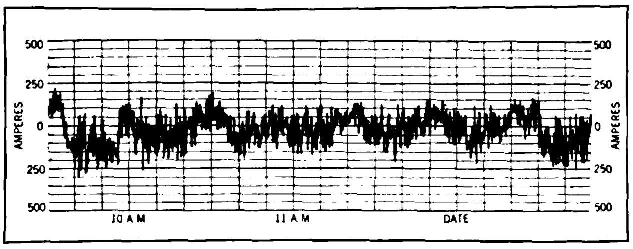


Fig. 2

This side of the zero mark shows the current in amperes flowing from the San Diego Electric Railway Company's feeder No. 8 to the San Diego & South Eastern Railway Company's feeder.

RECORD AT SECTIONALIZING SWITCH NO. 2

Sixteenth and M Streets
July 13, 1915

Taken after installing the 500,000 circ. mil feeder on Section No. 7, from power station to Sixteenth and M Streets.

This side of the zero mark shows the current in amperes flowing from the Logan Heights feeder No. 8 to the M Street feeder No. 7.

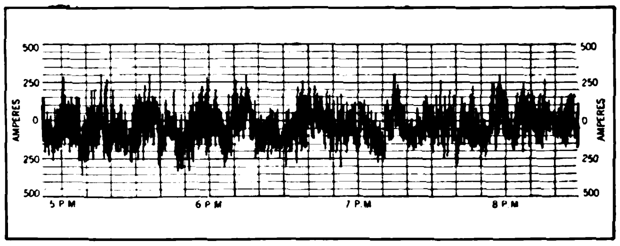


Fig. 4

This side of the zero mark shows current in amperes flowing from the M Street feeder No. 7 to the Logan Heights feeder No. 8.

RECORD AT SECTIONALIZING SWITCH NO. 3

Fifth and Market Streets
July 10, 1915

Taken after installing an additional 500,000 circ. mil feeder on Section No. 7, from the power station to Sixteenth and M Streets.

This side of the zero mark shows the current in amperes flowing from the Logan Heights feeder No. 8 to the downtown loop feeder No. 6.

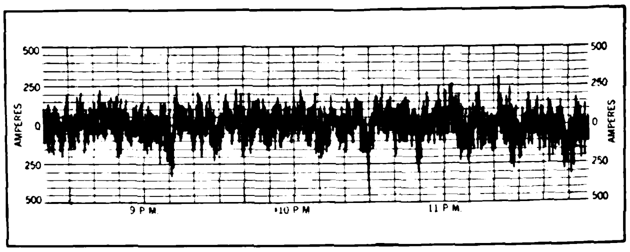


Fig. 6

This side of the zero mark shows the current in amperes flowing from the downtown loop feeder No. 6 to the Logan Heights feeder No. 8.

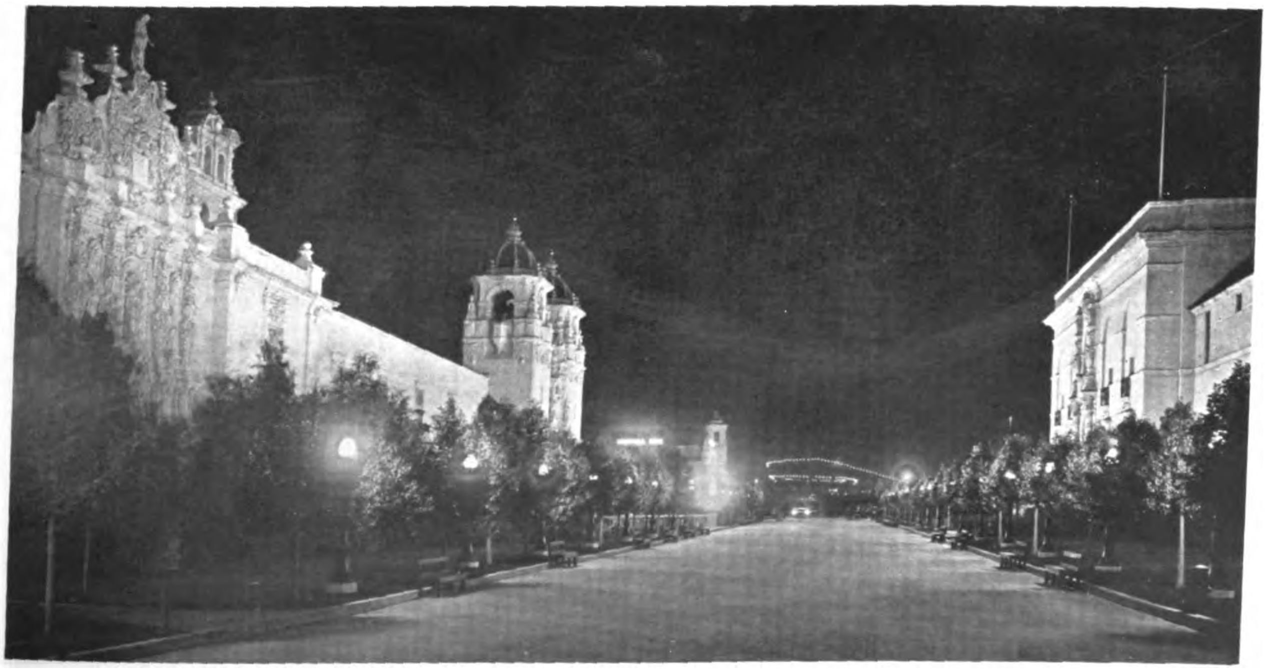
Graphs Showing the Flow of Current in Feeders
Before and After Sectionalizing the San Diego System

burning. During the period this system has been used not a single breaker has been burned or put out of service.

With this system, the current delivered from the power station to any point on any feeder is simply proportional to the resistance. Should the resistances of the two feeders from a switch to the power station be equal, the average current through the switch will be zero, but if the resistances are unequal, the exchange will be all in one direction through the switch, the feeder with the lower resistance delivering the most current. The following example shows the effect of adding copper to one of several feeders operating together:

An additional 500,000 circ. mil. feeder was recently installed on Section No. 7, from the power station to Sixteenth and M Streets and records of the exchange of current through the sectionalizing switches Nos. 1, 2 and 3 were taken. before and after installing, by means of a General Electric Type C-5, curve-drawing ammeter, the zero of which is on the center of the scale. An examination of Figs. 1 and 2 shows that the installation of the additional feeder has made the average exchange of current at switch No. 3 practically zero instead of being about 175 amp. from the loop feeder No. 6 to the Logan Heights feeder No. 8. In other words, this load of 175 amp. has been shifted from feeder No. 6 to feeder No. 8. Similarly, Figs. 3 and 4 show how much the exchange current at switch No. 2 has been reduced and the load demanded by feeder No. 7 carried by the new feeder instead of being obtained from feeder No. 8. Going to switch No. 1, Figs. 5 and 6 show that feeder No. 8 now is in condition to deliver current to the San Diego & South Eastern Railway instead of demanding current from the San Diego & South Eastern Railway, as is seen by the charts.

The San Diego Electric Railway has extended this system to interurban and suburban lines which are customers and take 600 volts direct current direct from the power station. The benefit is mutual as it not only gives the customer additional capacity and better voltage, but gives the city lines the advantage of such copper as is in place on the customers' lines. An accompanying diagram shows the interchange of current between the San Diego Electric Railway Company and the San Diego & South Eastern Railway Company's feeders at switch No. 1. In general, the chart shows that this customer demands more current through this switch from the city lines than the city lines demand from the customer. At such points of connection it is necessary to install, beside the sectionalizing switch, two kilowatt-hour meters. One of these meters registers the energy transferred from the customer to the city lines and the other registers the energy transferred from the city lines to the customer. Each meter is arranged with a detent to prevent it from running backward when the current reverses. The difference between the amounts of power transferred in each direction is the net transfer in one direction. Should this net transfer be in favor of the customer, it is added to his monthly bill; but is subtracted if it is in favor of the city lines. Another drawing shows the connections of these kilowatt-hour meters and the sectionalizing switch with the feeders at Grand Avenue and Twenty-eighth Street. Such connections are made as far from the power station as possible.



The Calle Cristobal, San Diego Exposition. Street Lights Illuminating the Building Fronts

Jitney Attack in Full Swing as Photographed at About 5 P. M. at Eleventh and Main Streets, Los Angeles

The Rise and Decline of the Jitney in Its Birthplace

The Enfant Terrible of Transportation, Its Birth and Vicissitudes—The Unregulated Jitney Can Injure but not Supplant the Electric Railway

By E. L. LEWIS

Superintendent Los Angeles Railway

IN earlier years the only competitor of the electric railway was the wagon or bus transportation, begun by striking trainmen, but these never outlived the period of the strike and often died earlier. It remained for the free-lance 5-cent automobile, or jitney, to offer a seemingly durable competitor, if not a successor, to the electric street railway.

Since Los Angeles has the doubtful honor of having given birth to the jitney its experience with this *enfant terrible* of transportaton is longest and, therefore, possibly most illuminating. It was on July 1, 1914, that the first 5-cent automobile appeared on our streets. Our city, like the rest of the country, was in the slough of industrial depression, and thousands of men were ready to grasp at anything that promised a living. The newspapers also brought many into the jitney ranks by exaggerating the income and ignoring the inevitable items of outgo of jitney operation. No wonder, then, that by Dec. 31, 1914, the number of jitneys had reached the enormous total of 761 in a city of 500,000 people. Of course, it did not take very long to demonstrate the absurdity of operating automobiles at a 5-cent fare, despite the absence of anything but a perfunctory regulation by the police.

By Jan. 11, 1915, following the license renewal date, the number of jitneys had fallen to 501, many routes had been shortened and some abandoned altogether. In fact, at the present time the jitneys do not even attempt to operate in certain sections of Los Angeles.

But while jitney operators were continually drop-

First and Main Streets, Los Angeles, Where the Jitney Park Is Formed for Attack on Electric Railways

Charge of the Jitneys on Electric Railway Revenues at 5.09 P. M. at Fifth and Main Streets, Los Angeles

ping out of the field, on learning that they made less than laborers' wages, the number of machines in service without regulation remained fairly constant, say 490, between Jan. 15 and June 30, 1915. The explanation is the very simple one of "There's a new sucker born every minute." Los Angeles probably has at all times a larger floating, work-seeking population than any other American city of its size, so that defections within the jitney ranks are rapidly made up within the constant average mentioned. For example, sixty-six cars dropped out between March 1 and March 18, but seventy-two cars entered; between March 18 and May 11 137 cars came in and 139 cars went out.

Since Jan. 1, 1915, to Aug. 16, 1915, 1132 automobiles have worked in the jitney service. Of this number 302 were in the service on Aug. 16. On July 1, 1915, the regulatory ordinance became effective, requiring a bond for $11,000, together with the same license fee of $2.50 per month as heretofore paid, and with the additional requirement that the bus owner must elect the line he is to operate on and work on that line and always go to the end of the route before turning back. This regulation immediately reduced the number operating to 245. Since that time, however, they have been gradually adding to the number until something more than 400 have taken out licenses. The difference between this number and the number in operation on Aug. 16 is a brilliant illustration of the undependability of this service. There is no requirement or obligation anywhere that a man

J. NIEDERER COMPAN
1st & MAIN
5
16233

Three Men on a Jitney Running Board Built for None furnish service after he has taken out a license to do so or that he shall make any certain number of trips during a day.

Although 302 were operating at various times on Aug. 16, computing the total time operated by all machines and allowing ten hours for a day's work reduces the number to 265. On that date the trips made by the various machines were as follows: Eight machines made one trip; seventeen machines made two trips; fourteen machines made three trips; thirteen made four trips; twenty-four made five trips; twenty-two made six trips; twenty-four made seven trips; twenty-six made eight trips; thirty-seven made nine trips; thirty-seven made ten trips; twenty-seven made eleven trips; nineteen made twelve trips; fifteen made thirteen trips; five made fourteen trips; eight made fifteen trips; two made sixteen trips; three made seventeen trips; one made eighteen trips; total, 302 machines.

All recent checks show the income per jitney has increased from $1.50 to $2 per day, varying on the different lines. This is brought about by the decrease in numbers and favorable weather.

Bear in mind that prior to July 1 only the law of "jitney eat jitney" was in effect. The jitney was free to go where it pleased, to alter the length of its run at will, to furnish no bond and to pay no taxes whatever, except a fee of $2.50 per month. At the same time the paved streets of Los Angeles offered no physical hindrance leading to extraordinary tire wear or maintenance.

It follows, then, that with everything in its favor the 5-cent automobile can injure but not succeed the electric railway as the chief means of city transportation.

WANTED
PRIVATE OWNERS ONLY
NO DEALERS
AUTOS
NO COMMISSION
MT. VERNON
225
100

Where the Jitneys Come From. Significant Signs at the Open-Air Market on Main Street, Los Angeles

The Application of Established Legal Principles to the Jitney

New Aspects of Old Questions Concerning Financial Responsibility, Regulation and Taxation of Common Carriers Are Presented —If Treated Like a Street Railway the Jitney Cannot Survive

By W. E. DUNN
Vice-President Los Angeles Railway Corporation

EVERY development in the industrial or economic world brings its train of legal problems. In our law libraries and offices are found books, weighty volumes, bearing such titles as "Railroads," "Street Railroads" and "Automobiles," witnessing the law's interest in these successive developments of transportation. If the airship has not already found its place in the same company, it must be because the problems it has so far developed do not come within the range of ordinary law practice.

And now the jitney, mushroom growth though it appears to be, has entered the field of legal vision. Already it has claimed much legislative attention, and it must soon find its way into the courts. We may confidently predict, however, that it will prove with the jitney, as with more substantial and permanent developments of transportation, that the legal questions it presents will be for the most part only new aspects of old problems, and readily solved by the application of settled principles of the law.

FINANCIAL RESPONSIBILITY

Perhaps the most novel, or apparently novel, question which the jitney traffic has raised is that of insuring financial responsibility on the part of the owner or operator. The imperative necessity for legal compulsion in this matter arises from the invariably impecunious condition of those who engage in the traffic. Our law has been familiar with bonds required from public officers to secure the faithful performance of duty, and from contractors on public work to secure the execution of their contracts, as well as for the payment of laborers and material men. But the astute legal mind may observe a difference between the requirement of a bond in these and other instances, in which there is a direct governmental interest, and the requirement of a bond to protect passengers or other persons suffering injury through the negligence of a jitney operator. The closest precedent we have mentioned, the public contractor's bond for the payment of laborers and material men, has been sustained by the courts as tending to secure satisfactory performance of public work, rather than protection to the creditors of the contractor.

Adequate grounds can, nevertheless, be found, sanctioned by judicial precedent, to sustain the requirement of indemnity insurance from the operators of motor buses. The courts are bound to recognize the necessity for such protection to the public. The dubious character of the vehicles usually selected for the jitney traffic, the want of previous experience in the handling of motor cars by most of the operators, and the constant inducement for haste and the consequent taking of risks, render accidents inevitable; and the police records of every city demonstrate how frequently these result in death or serious personal injury. It may well be, therefore, that the courts will hold the requirement of indemnity against such injuries within the scope of that comprehensive "police power" which gives practical force to the maxims *Salus populi est suprema lex* ("The welfare of the people is the supreme law") and *Sic utere tuo ut alienum non laedas* ("So use your own as not to injure another").

This police power has always been regarded as sustaining legislation excluding the incompetent from employments affecting the public health or safety. A familiar instance is the examination and licensing of physicians and dentists. Like requirements have more recently been sustained as to undertakers, plumbers, architects, etc. The examination of locomotive operators under state authority, and of navigators of vessels under federal authority, is another precedent very closely in point. It is thus clear that the incompetent may be excluded by legislative enactment from such an employment as the operation of motor buses on the public streets. It would seem equally clear that competency for such an employment would include the ability to respond financially to liability for injuries occasioned by the negligence of the operator.

REGULATION

There is another legal aspect of the jitney traffic which will sustain the requirements we have been discussing, as well as the other regulations of its operation which the public interest may demand. It must be conceded, we think, that the jitney bus is a common carrier, a public utility. The business it undertakes is clearly a service "affected with a public interest" within the conception established as the constitutional basis of regulation by the decision of the United States Supreme Court in Munn vs. Illinois (94 U. S. 113). The doctrine of that case is epitomized in this sentence from the opinion rendered by Chief Justice Waite:

> When, therefore, one devotes his property to a use in which the public has an interest, he, in effect, grants to the public an interest in that use, and must submit to be controlled by the public for the common good, to the extent of the interest he has thus created.

Subsequent decisions have more fully defined the nature of the power thus affirmed, setting necessary limits of reasonableness in its exercise, but at the same time giving it a most comprehensive scope. Thus, it is settled law that this power includes not only regulation of rates, but also of service, the extent and character of facilities afforded and kindred matters.

That the jitney traffic calls for most positive and effective regulation in the interests of the public even its friends must admit. The temptation to overcrowd its vehicles (of doubtful capacity to start with) to increase the margin of possible profit is irresistible to the average operator. Restriction of the number of passengers carried in respect to the normal capacity of the vehicle is, therefore, a necessity. So also is regulation of the manner of loading, as by prohibiting the carrying of passengers on the running board or in a manner to obstruct the driver's vision. The importance of examination to determine physical competency and moral fitness of the operator is likewise obvious.

Regulation in these and many other particulars by municipal or state legislation is demanded for the protection of the public. All of these matters, as well as the insurance of financial responsibility first discussed, appear to be within the scope of valid regulation of a public service.

TAXATION

Another group of legal problems affecting the jitney traffic arises out of the fact that it makes a special use of the public streets for private gain. This has always been invoked as justification for imposing special and onerous burdens upon railways occupying public streets. The requirement of paving and keeping in repair a designated portion of the street is a familiar instance. In California, for example, this requirement covers not only the space between the rails and tracks, but a width of 2 ft. on each side of the outer rails. Since paving is required for and benefits not only the railway but the general public, exacting its cost from the railway is simply a tax; or, giving it the most favorable construction possible, a compensation demanded for the privilege of making a special use of the street.

Whatever justification this exaction may have as applied to street railways it must also have as applied to other modes of commercial transportation using the streets. Whoever, therefore, argues for the continuance of the jitney as a legitimate competitor of the street railway must admit that it ought to be subject to a corresponding tax for the privilege of using the streets. No one can deny that the jitney buses do an aggregate amount of damage to street pavements far exceeding that occasioned by railway transportation of an equal number of passengers. Indeed, the railway is of no substantial injury to the street or its pavement, while the motor car, with its rubber tires, is recognized as one of the chief destroyers of pavements and other street surfaces. Thus, a parliamentary investigation in Great Britain developed the fact that the cost of maintaining London pavements was more than doubled by the advent of motor buses.

The expense of paving is only one of many forms of exaction imposed upon street railways for the benefit of public revenues. Franchise taxes, car license taxes, percentage tax on gross receipts are burdens commonly laid upon the revenues of the railway companies. Equivalent burdens must be laid upon the jitney traffic or else there is no fairness in its competition with the railway. Protection to the public revenues must also demand such levies upon the jitney traffic, since the latter, if allowed to operate without adequate restriction, will substantially reduce the receipts of the street railway traffic. This directly reduces the amount of every form of taxation based upon gross receipts, and ultimately, if indirectly, other forms of tax as well.

It is evidently not feasible to apply all these special forms of taxation to the jitney traffic, but some equivalent may be devised. A license tax proportioned to the seating capacity of vehicles may afford the readiest solution of the problem. The courts have allowed to legislative bodies the widest discretion as to the amount of license taxes. They have also conceded the right to distinguish in manner and amount of tax between different occupations and lines of business, providing there is any substantial difference between them. The jitney readily differentiates from other modes of transportation, even such as also employ the automobile. It differs in such matters as the rate of fare and the mode of determining its amount, the manner of securing patronage, the receiving on the same trip of passengers from different points bound to different destinations, the control of time and route of journey by the operator, and the frequency of repeated trips over the same route. The last-mentioned point is specially important as justifying a higher license tax, since it marks the greater damage done to street surfaces by motor bus operations.

What will be the future of the jitney if subjected to these necessary regulations and justifiable tax burdens? The experience of the cities which have tried the experiment, as well as the objections raised in other cities where such restrictions are proposed, predict the speedy disappearance of the jitney as a substantial competitor of the trolley car. All competent investigators have agreed that there is little if any margin of profit for the jitney, even when operating without regulation or special taxation. The cost of meeting even the minimum of requirements imperatively demanded by the public interest must prove prohibitive of continued operation of motor buses with a nickel fare.

There should be none to mourn this result. Even the would-be jitney operator is saved from a loss rather than deprived of a profit. And the community at large escapes the disaster which the jitney threatens by the reduction of street railway revenues to the point where adequate service to the public would be an impossibility and extension of lines would mean bankruptcy.

PUBLIC UTILITIES SHOULD BE PROTECTED

This vital interest of the community in the triumph of the street railway over the jitney bus suggests another interesting problem, but one which need never be solved if appropriate regulation realizes the result herein predicted. But if elimination of disastrous jitney competition with the street railway were not effected by the indirect method of regulation, would not its elimination by more direct action be sound public policy and a valid legislative act? The necessity is now recognized by public utility commissions and legislatures of protecting established utilities rendering adequate service to the public by preventing the entry into the same field of rival utilities whose competition could not substantially benefit the public and would be disastrous to the existing utilities. The duty of the public to afford such protection to an existing utility may be justly claimed as an essential complement of its asserted right to measure out the burdens to be borne by such utility. The principle of public policy and regulation thus recognized would seem clearly to justify legislative exclusion of the jitney bus where its competition might be disastrous to an existing railway system, even if the jitney promised when fully established to provide a satisfactory substitute in service to the public. But it is apparent that the jitney, as a substitute for the street railway, is impossible, and as an addition it is little better than a parasite sapping the strength and vitality of the railway service, and giving the public nothing commensurate in return. Wherefore, if the jitney does not voluntarily withdraw from the field, public interest must ultimately force its removal.

Typical Los Angeles Jitney

L.A.R.Y.
L.A.R.Y.
E.
L.A.R.Y.
E.
L.A.RY.
BASE BALL
LEAGUE

One Club in Los Angeles Railway Baseball League

Recreation and Welfare Work for Los Angeles Railway Employees

The Employees' Association at Los Angeles Is Unusual in that It Is Organized for Social Relations and Recreation Exclusively

By L. O. LIEBER

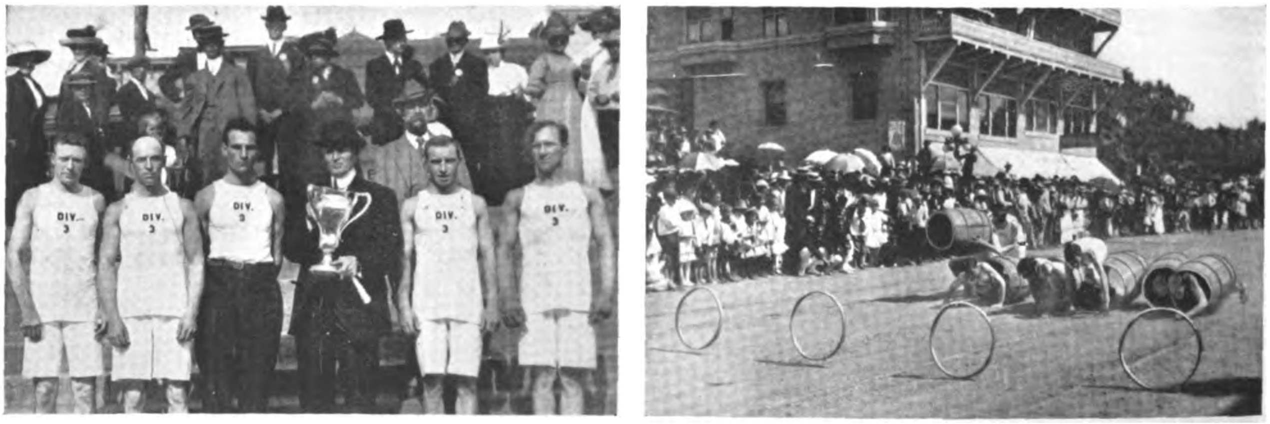
Electrical Engineer Los Angeles Railway and President Employees' Recreation Association

THE climatic conditions in Los Angeles offer such favorable advantages to all kinds of outdoor sports and amusements that nearly all large organizations which employ great numbers of men have extended financial support toward creating or maintaining active interest in the diversity of pleasures possible to their employees.

Through its active heads of departments the Los Angeles Railway has had a very decided interest in the 4199 men on its staff. For some years the platform men have had recreation rooms located at their respective carhouses where they are at liberty, while off duty, to assemble and enjoy billiards, pool, cards, checkers, etc. Gymnasiums and an up-to-date reading room well stocked with books and magazines are also provided.

Inter-departmental baseball has been encouraged. The divisions have been provided with playing suits and grounds for the development of this game.

We also have an active organization of our employees, known as the Los Angeles Railway Employees' Recreation Association. Its object is what the name implies—for the recreation of employees. This association was inaugurated at a picnic at the instance of the writer. The movement was heartily approved by the management and unsolicited support was rendered toward making each annual picnic or banquet one of social betterment.



Sporting Features at Picnic of Los Angeles Railway Employees' Recreation Association

Comedy Feature at Picnic of Los Angeles Railway Employees' Recreation Association

Through the association's direction an organized band of more than fifty pieces has been maintained by the company from a beginning of four or five pieces. The weekly practice nights are well attended as a rule and, as in the case of the baseball club, all uniforms for the band were donated by H. E. Huntington, president of the corporation. Occasional get-together smokers are held at the respective carhouses with the assistance of the band in uniform, where good music, speaking and smokes are enjoyed with a spirit of good fellowship by officials, employees, families and friends.

The company has begun to convert an unused building centrally located into a suitable clubhouse for the association, where it is expected that a still closer bond of co-operation, unity and sociability will be developed.

The association's officers and general committee are selected to embrace the several departments of the railway. At this time the writer is president, Superintendent E. L. Lewis, Assistant Superintendent F. Van Vranken and Master Mechanic E. L. Stephens are vice-presidents; Chief Operator J. E. Bass is treasurer and Clerk T. A. Donahue is secretary.

The general committee consists of foremen and sub-foremen of the different departments and several others who are chosen at large. Membership is open to all employees of the Los Angeles Railway. No dues are charged, nearly all expenses being borne by the company. For example, the annual picnics alone cost the company from $2,600 to $2,900 each, and the total outlay for the last three years averages $4,000 per annum. The only revenue which comes from the members is through their purchase of tickets for special events.

The first annual picnic was held at Redondo Beach, Sept. 17, 1910. The morning events were of athletic nature, such as races for men, women and children, tug-of-war and inter-departmental baseball. In the afternoon, dancing and water sports were the chief features. The winners of the sixteen events of the day received prizes, some donated by individuals in the company and others by local merchants.

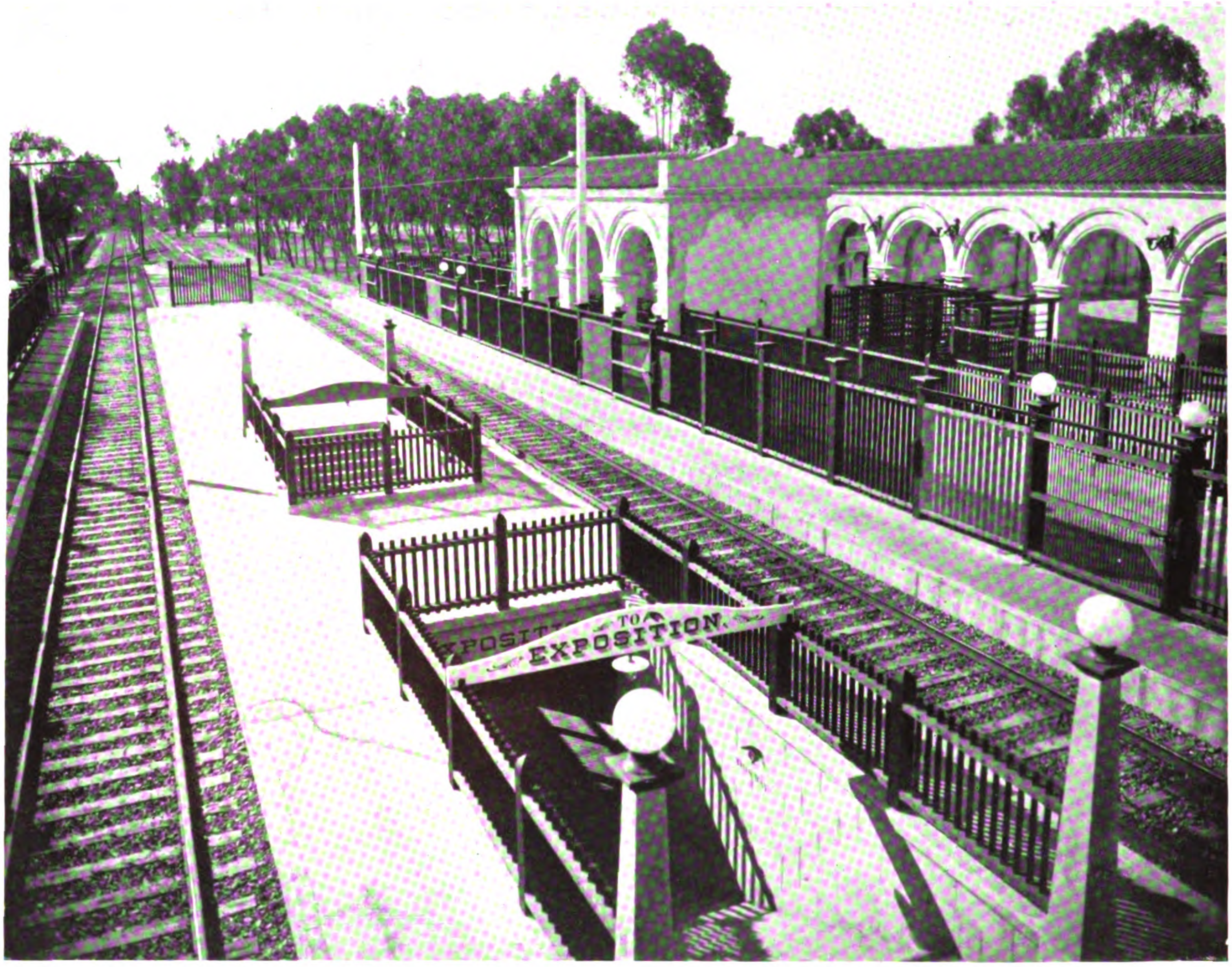
The following picnics have been of like character except that one or more novelties were arranged for each occasion. Thus a "Cinderella" or "fit-the-slipper" contest and a "duck hunt" were features of the 1911 picnic; home-made vaudeville in costume, as illustrated, in 1912; egg and spoon and obstacle races in 1913. In 1913, also, the band came to the fore with a pleasing program of popular and classical music.

Increasing experience in giving the annual picnics showed that the visitors would enjoy themselves still better if they were not obliged to witness too many contests. Therefore, at the 1914 picnic a few events were omitted to give people time to amuse themselves in their own way.

It may be of interest to add that about two years after the formation of our association, a similar body was formed by the Pacific Electric Railway, which operates all interurban railways radiating out of Los Angeles.

L.A.RY. RECREATION BAND

Band of the Los Angeles Railway Employees



Electric Car Terminal of the San Diego Electric Railway

Handling Traffic to the Panama-California Exposition at San Diego

To Provide Adequate Transportation Facilities a New Line Was Built to Balboa Park, Which Previously Had No Railway Connections

By B. M. WARNER
General Superintendent San Diego Electric Railway

THE arrangements made by the San Diego Electric Railway to transport people to and from the Panama-California Exposition have proved ample for safe, expeditious and comfortable service. The grounds are located in Balboa Park, which previously had no railway facilities owing to its undeveloped condition.

We therefore constructed during 1914 a line running on Twelfth Street from F Street to the main eastern entrance of the exposition. This double-track line was 1.5 miles long, and at the same time it served to complete a loop service embracing lines already running on B Street, Third Street and F Street, as shown in the accompanying map. The new work was installed at a cost of $45,000, exclusive of the $20,000 terminal described in the ELECTRIC RAILWAY JOURNAL for March 20, 1915.

As stated in the description of the terminal, passengers alighting from either of the two lines which serve the main entrance walk downstairs, from either of the two unloading platforms, under the departure tracks and return to the original level after passing through exit turnstiles. The latter are used, of course, to prevent improper ingress.

Passengers entering the cars by way of the single loading platform of 2000-passenger capacity first pay their fare by dropping the exact amount into any one of ten turnstile boxes made by the Coin Machine Manufacturing Company, Portland, Ore. A change-making booth is available for those passengers who lack the exact fare. Under this scheme, the passengers enter their cars in the shortest possible time, the conductor being relieved of all work incidental to the collection of fares except the later issuance of transfers.

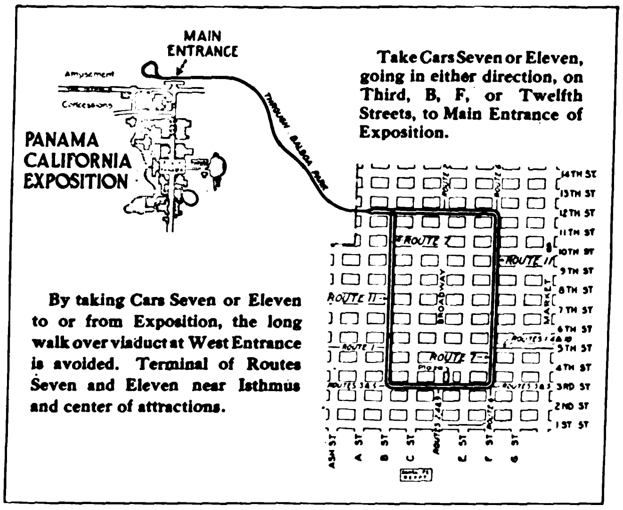
NEW ROLLING STOCK

To handle the extra business anticipated we purchased during 1914 from the St. Louis Car Company forty double-truck center-entrance cars 50 ft. long over all. These cars differed from the preceding type in being 6 ft. longer and having ramped floors instead of a 5-in. riser at the edges of the well. In order to avoid accident from having two types of car wells, the original twenty-four center-entrance cars were rebuilt for ramp operation. The seating capacity of the larger center-entrance cars is fifty-two passengers and of the smaller forty-four.

During heavy service we operate the cars in two-car trains, always using exactly the same type for leader and follower. We find that two-car trains can be operated over the loading tracks at an average of one a minute without the least confusion. It should be stated that the loading platforms are long enough to care for three trains at a time, discharging or loading. The train connections are readily made with the aid of a Westinghouse automatic type C coupler, which takes care of air and coupling. For night service, however, a jumper for the lighting circuits is put in by hand. General Electric type M K control is used with GE-201 motors.

TRAVEL DATA FOR PUBLIC

An interesting point in connection with the routing of travel to the exposition was the education of the riding public. With the original Fifth Street or No. 1 line it was possible for the public to reach the western entrance of the grounds by walking over a bridge. Local riders, familiar with the territory, were especially prone to do this. We therefore issued a pocket folder the inside of which is exactly the same as the illustration already mentioned. This shows that Routes 7 and 11 are preferable for riding to the exposition as they go directly to the main entrance. The same lines also serve the great concrete stadium which the city of San Diego opened on May 31, 1915. This stadium cost $150,000 and seats 30,000—one-third of San Diego's present population. Soon after the issue of this pamphlet in January we found that the No. 1 line, which required a three-minute service for regular business alone, was no longer loaded with exposition travel.


MAIN ENTRANCE
Amusement
Concessions
PANAMA CALIFORNIA EXPOSITION
THROUGH BALBOA PARK
Take Cars Seven or Eleven, going in either direction, on Third, B, F, or Twelfth Streets, to Main Entrance of Exposition.
By taking Cars Seven or Eleven to or from Exposition, the long walk over viaduct at West Entrance is avoided. Terminal of Routes Seven and Eleven near Isthmus and center of attractions.
14TH ST
13TH ST
12TH ST
11TH ST
10TH ST
9TH ST
8TH ST
7TH ST
6TH ST
5TH ST
4TH ST
3RD ST
2ND ST
1ST ST
ROUTE 7
ROUTE 11
ROUTE 11
ROUTE 1
ROUTES 1 & 10
ROUTE 7
ROUTES 3 & 5
ROUTES 3 & 5
BROADWAY
MARKET
Plaza
ASH ST
A ST
B ST
C ST
ROUTES 2 & 4
E ST
F ST
G ST

San Diego Electric Railway Map, Showing Direct Route to Exposition

POCKET CARDS FOR TRAVELERS

For the general information of the public we have also issued two pocket cards. One of these cards describes the routes which correspond to our system of route numbers, the other names places of interest and how to reach them. The back of the second card also carries the schedule of the Coronado (Tent City) division showing the cars that make the local steam railroad connections. Visitors are also aided by our uniformed street solicitor at Third Street and Broadway, who not only directs people but is prepared to sell them tickets to various points of interest. In addition inspectors are stationed at different points in the congested district.

Boarding Cars After Passing Through Turnstiles

Two-Car Train at the San Diego Terminal

Economics of the Jitney Problem from a Traction Company's Viewpoint

With Taxes Imposed in the Form of Licenses and Under Reasonable Regulations the Jitney Is Proving an Economic Impossibility

By C. N. BLACK
Vice-President and General Manager United Railroads of San Francisco

FROM the street railway company's standpoint the most important question in connection with the jitney bus problem is unquestionably the economic one.

If it is financially possible under reasonable regulations to operate a five-passenger Ford automobile on the streets of any city, and carry passengers for a 5-cent fare, the jitney bus has come to stay, and if such is the case the sooner the street railway companies realize the fact and adjust their operating conditions to meet this competition the better. Of course, this would mean the adoption of the European zone system or something of that character. On the other hand, if it is not financially possible to operate an automobile, even under the most favorable conditions, and carry passengers for a reasonable distance, from 2 to 3 miles, for a 5-cent fare, it is safe to assume that the jitney is a passing fad, which will die out within a comparatively short time.

Generally speaking, it has been found that, in those communities which have imposed taxes in the form of licenses, even approximately comparable with those paid by the street railway companies, and other reasonable traffic regulations, the jitney buses have practically ceased operation. It would seem, therefore, that even the apparent margin of profit is extremely small. The words "apparent margin of profit," are used advisedly, because of the fact that the majority of those who are operating jitney buses have no accurate knowledge of the actual cost of the service. This cost will naturally vary to a greater or less extent in different cities, depending upon the character of paving, the topography, the length of haul and the obstructions in the streets caused by other traffic.

In San Francisco the great majority of the jitney buses operate on Market Street, and all of the conditions affecting the cost of operation, with possibly the exception of obstructions in the streets caused by other traffic, are as favorable as can be found anywhere.

For a five-passenger Ford car making an average of 125 miles a day, and operating 300 days a year, the actual cost is very close to $2,500. This cost is made up as shown in the accompanying table.

The depreciation charge is based upon the assumption that the car will have a useful life of one year and at the end of that period it will have a scrap value of $65.

The cost for liability and fire insurance is the present cost of an insurance policy as required by the San Francisco ordinance. Taxes and licenses are based upon the present State and municipal requirements.

It will be noted that the taxes and licenses amount to what is equivalent to $6.75 per passenger seat, while at the present time the street railway companies of California pay to the State alone for taxes an equivalent of approximately $20 per seat, and in municipal taxes, car licenses and paving maintenance there is an additional tax equal to approximately $30 per seat, or a total of $50 per seat, as compared to the $6.75 paid by the jitney buses.

From the above it will be noted that the actual daily operating cost of a jitney bus in San Francisco is at least $8.28, and unless the gross earnings equal or exceed this amount, or unless the driver is willing to render his services for less than $2.50 a day, it goes without saying that the business is conducted at a loss.

From numerous counts of the passengers actually carried by the jitney buses operating in direct competition with the street railways in San Francisco, it has been found that the average receipts are less than $7.50 a day. If these statistics are correct it will naturally be asked how is it possible for them to exist. In other words, where does the revenue come from which the jitney bus driver is enabled to meet the deficit between the actual operating costs and the gross revenue derived from the business of a common carrier?

It is unquestionably a fact that a certain percentage, perhaps a small one, of the men operating jit-

EXPENSES OF FIVE-PASSENGER FORD MAKING 125 MILES PER DAY

Daily operating expenses:	
Gasoline, 7.4 gal., at 10 cents per gallon	$0.74
Oil and greases	0.12
Tires	1.25
Inner tubes	0.21
Lights	0.10
Repairs and miscellaneous	1.00
Driver's wages	2.50
Total	$5.92
Annual expenses and fixed charges:	
Daily operating expenses, $5.92 for 300 days	$1,776.00
Depreciation	450.00
Garage and washing	120.00
Liability and fire insurance	96.00
Interest	15.00
Taxes and licenses	27.00
Total	$2,484.00

This is equivalent to $8.25 a day.

ney buses have been enabled to make a profit over and above a reasonable driver's wage of, say, $2.50 to $3 a day. The amount of $7 to $7.50 per day is probably more than the average jitney bus can earn even by operating twelve hours a day in direct competition with the street cars, but there is another source of revenue available to him, viz., the field occupied by the taxicab. When business is slack along the lines of the street railway the jitney turns to the taxicab business and by furnishing the service at one-half, or less, of the rates charged by the taxicab from $2 to $3 additional revenue is picked up. Of course, this is possible only by reason of the fact that the operators of these cars are permitted to choose their own route, and that they are sole judges as to the service which they shall render. Should they be required to operate over a fixed route, under a given headway and for a specified number of hours a day, the combination service now rendered would be practically impossible. All street railways are limited to a prescribed route, and, generally speaking, they are not permitted to change their routes without municipal permission.

Notwithstanding the inequities to existing industries, however, if the jitney is really an advance and furnishes additional transportation facilities, it will become a permanent industry and transportation companies will have to meet the new conditions.

What are the advantages offered by the jitney service?

First—As claimed by the operator of the jitney bus, a ride in a comfortable conveyance, on upholstered seats, in the open air.

Second—A material saving in time required to reach the rider's destination.

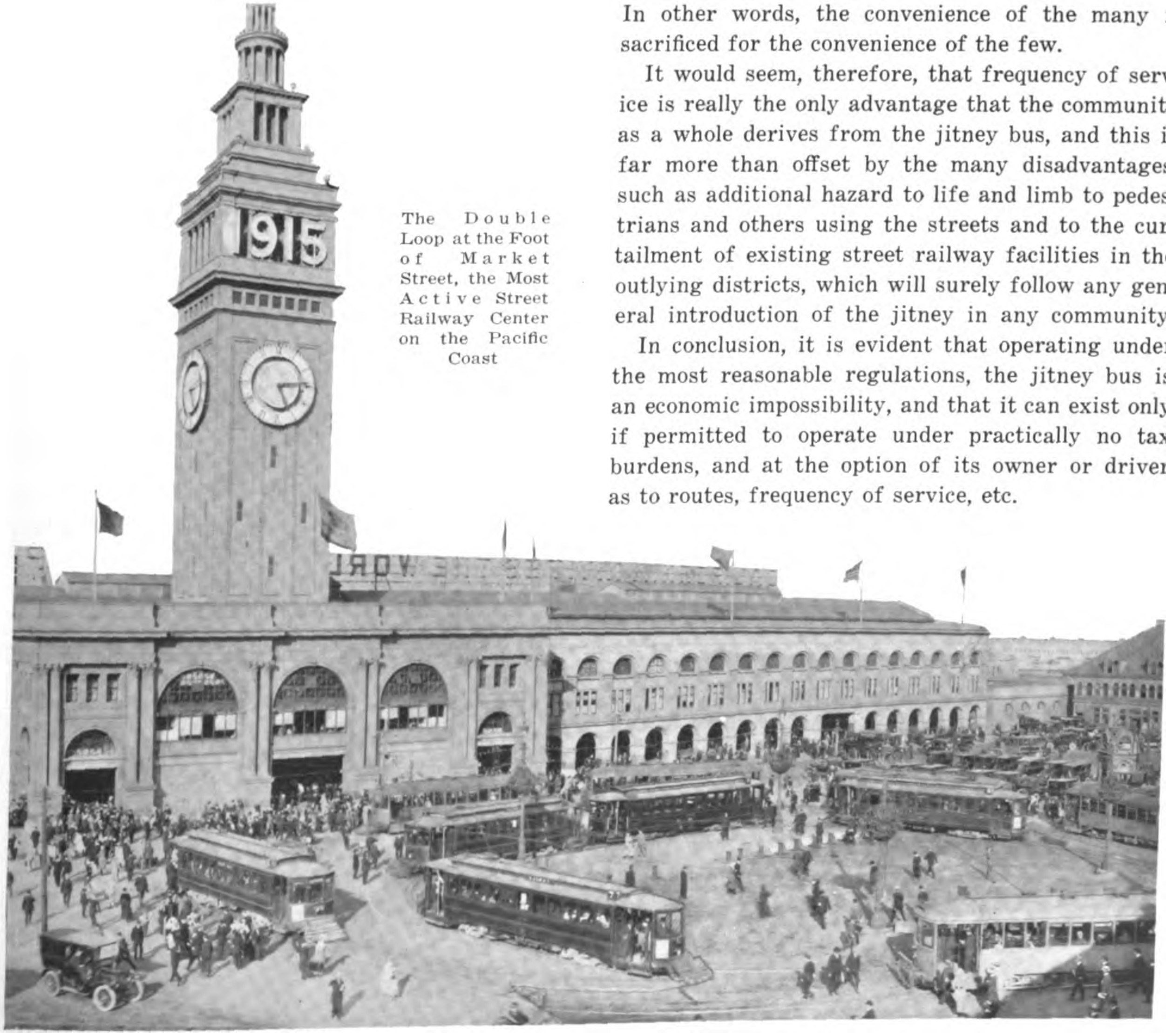
Third—Frequency of service.

The first may be considered as more or less of a passing fad and is largely dependent, as far as comfort is concerned, on weather conditions.

The second is partially true as far as the person patronizing the jitney bus is concerned, but, and this from the community's standpoint, is a most serious objection. While the rider in the jitney is enabled to reach his destination in a few minutes less time, the riders in the street cars, who number at least ten to one jitney rider, are delayed very materially by reason of the congestion of traffic on those streets over which the jitney buses operate. In other words, the convenience of the many is sacrificed for the convenience of the few.

It would seem, therefore, that frequency of service is really the only advantage that the community as a whole derives from the jitney bus, and this is far more than offset by the many disadvantages, such as additional hazard to life and limb to pedestrians and others using the streets and to the curtailment of existing street railway facilities in the outlying districts, which will surely follow any general introduction of the jitney in any community.

In conclusion, it is evident that operating under the most reasonable regulations, the jitney bus is an economic impossibility, and that it can exist only if permitted to operate under practically no tax burdens, and at the option of its owner or driver as to routes, frequency of service, etc.



The Double Loop at the Foot of Market Street, the Most Active Street Railway Center on the Pacific Coast

United Railroads Front-End Fare Collector at Work

Front-End Fare Collection Improves Service at San Francisco

Three Years' Operation with Front-End Collection Has Demonstrated Its Value in Relieving Congestion and Improving Car Loading

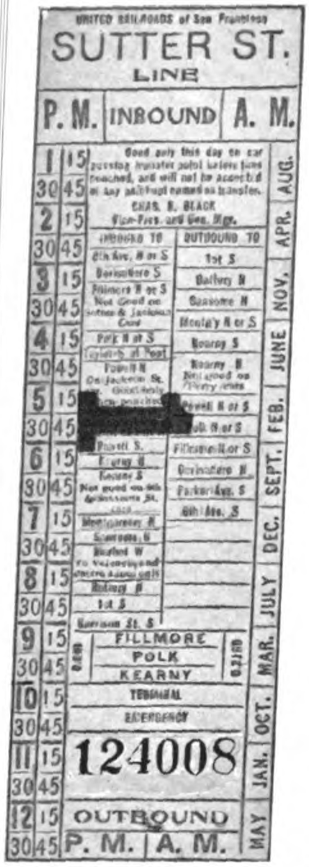
By HENRY T. JONES
General Superintendent United Railroads of San Francisco

LIKE most other city railways of the United States we are blessed with a number of traffic knots or congestion points. The principal one in San Francisco is at the Market Street ferry, where nine lines of the United Railroads and four of the Municipal Railroads come in over a double-track loop. In addition, this locality is the gathering point of hundreds of jitneys, sightseeing vehicles and the various hotel buses and taxicabs to meet the incoming travel from the East. In short, the Market Street ferry has the peculiar although undesirable distinction of being the greatest local and foreign traffic channel in the world. At this place we handle cars on less than a thirty-second headway, and for short periods even on a fifteen-second headway.

Other places where traffic congestion occurs are at our safety stations or isles along 1 mile or so of Market Street, at the exposition grounds, at the top of Fillmore Street hill, at the Third Street depot of the Southern Pacific Railroad, etc.

Of course, the prime essential in avoiding or minimizing congestion is to use every possible means to obtain quick loading. Our cars are all of prepayment type, both the front and rear platforms being from 5 ft. 4 in. to 6 ft. 3 in. over all with a railed entrance aisle of 36 in. on the platform. The steps are of moderate height, and, since the cars are of California open-end type, there are no bulkhead doors at the ends. In spite of this easy access construction the use of prepayment collection by way of the single aisle at the rear platform alone was too slow to meet our conditions. Thus the average time for loading a car with sixty-five people was as high as sixty seconds, thereby seriously handicapping the uniform movement of cars over the loops.

As we did not want to lose the benefits of prepayment fare collection we decided in 1912 that the best way to secure the quickest handling of passengers and still retain the prepayment feature would be to employ front-end fare collectors as aids



UNITED RAILROADS of San Francisco

SUTTER ST.
LINE

P. M. | INBOUND | A. M.

Good only this day on car passing transfer point before time punched, and will not be accepted at any point not named on transfer.
CHAS. B. BLACK
Vice-Pres. and Gen. Mgr.

INBOUND TO | OUTBOUND TO

FILLMORE
POLK
KEARNY
TERMINAL
EMERGENCY

124008

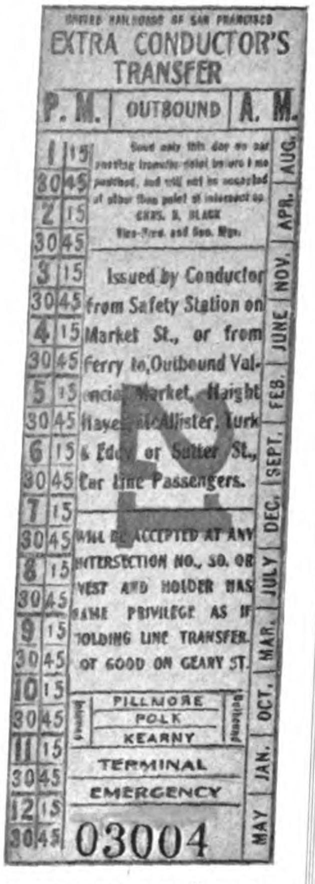
OUTBOUND
P. M. | A. M.

Regular Conductor's Transfer

to the regular conductor. These men, of course, are stationed on the street so that the same man collects fares for the successive cars that come through during the rush hour. In this way the entire width of the front platform is made available for entrance in addition to the entrance aisle at the rear. The time of loading a car with sixty-five passengers is thereby cut down to the point where a fifteen-second headway with prepayment is practicable. Furthermore, as passengers enter from both ends the cars are evenly loaded.

The men employed for front-end collection are our most experienced conductors, chosen especially for their quickness in fare collection and for their ability to direct passengers to the proper routes. For Market Street alone we may require as many as seven men, while at safety stations long enough to accommodate two cars we use two men. In all we employ from ten to twenty collectors, all in evening service between 4.45 and 6.15 o'clock.

Each man carries an International portable register. He rings up each fare as collected, the same showing as a large figure on the front, while the totalizer indication is on the back. No record is made of the fares collected for individual cars. In the meantime the fares received by the conductor on the rear platform are dropped in International or Johnson counting fare boxes, except on those



UNITED RAILROADS OF SAN FRANCISCO

EXTRA CONDUCTOR'S TRANSFER

P. M. | OUTBOUND | A. M.

Good only this day on car passing transfer point before time punched, and will not be accepted at other than point of intersection.
CHAS. B. BLACK
Vice-Pres. and Gen. Mgr.

Issued by Conductor from Safety Station on Market St., or from Ferry to Outbound Valencia, Market, Haight, Hayes, McAllister, Turk & Eddy or Sutter St., Car Line Passengers.

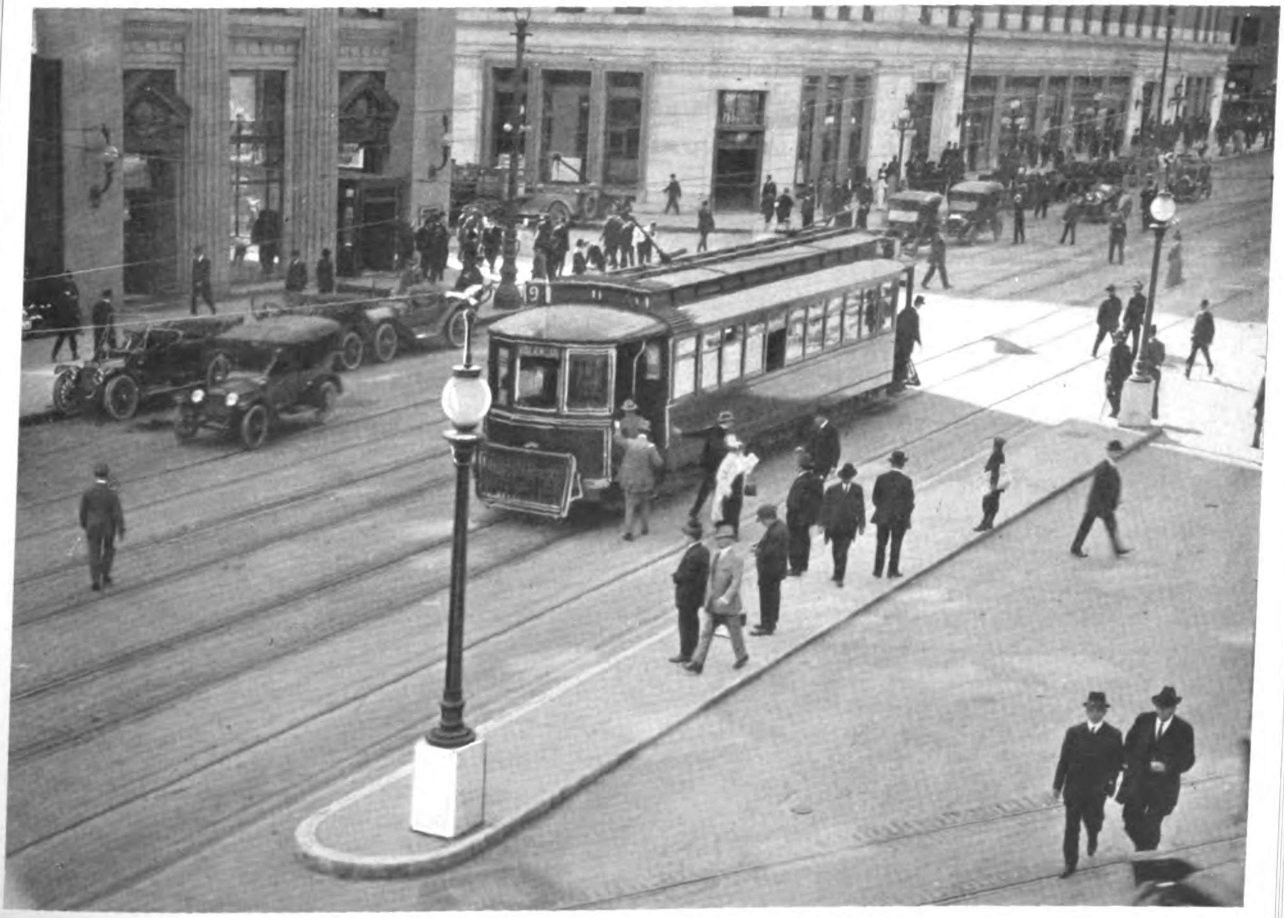
12

WILL BE ACCEPTED AT ANY INTERSECTION NO., SO. OR WEST AND HOLDER HAS SAME PRIVILEGE AS IF HOLDING LINE TRANSFER. NOT GOOD ON GEARY ST.

FILLMORE
POLK
KEARNY
TERMINAL
EMERGENCY

03004

Extra Conductor's Transfer



The New Type of Market Street Safety Station, San Francisco lines where fares are collected by hand and then registered on International machines by means of a foot plunger.

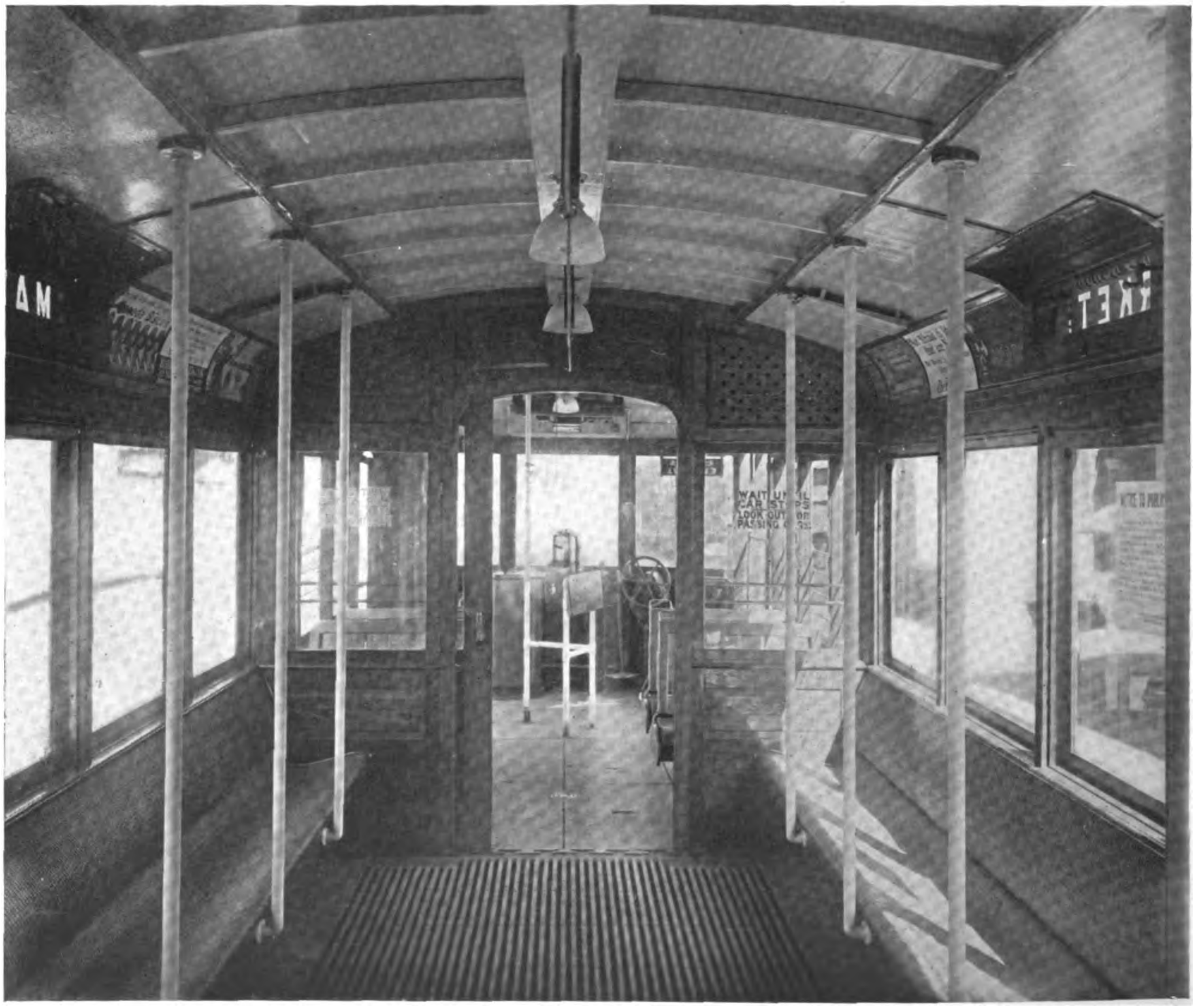
DIFFICULTIES IN ACCOUNTING

Of course, from the accounting standpoint the non-segregated registration of the front-end collectors is a disadvantage in not knowing the exact intake per car or even per line. So far as crediting each line is concerned, this is readily cared for by the accounting department, which assigns to each route its due pro-rata. The pro-rata, of course, can easily be determined by using the morning rush-hour receipts as a guide, since the passenger who goes out in the morning must come back in the evening. The only weakness is in the difficulty of checking conductors unless the inspector rides on the car for a considerable distance to watch pick-up traffic. It should be borne in mind, however, that the great bulk of the fares is taken at the street collection points where accurate inspection is easy. The system would be ideal from the checking standpoint if the register of the front-end collectors contained a means of separately totalizing the collection of the successive cars.

SPECIAL TRANSFERS

In order to relieve the regular conductor from distributing transfers to passengers who enter via the front way, the collectors are supplied with transfers of the type illustrated. These differ from the regular transfers in that they do not bear the name of any issuing line, but do show the names of the connecting lines on which they are valid within the time punched. One feature of the transfer issued on the car is that it shows the transfer intersections in order, thus serving as an effective aid to the stranger who is watching for his transfer point.

On the whole, nearly three years' experience has convinced me that no more effective means than front-end collection could be devised for reducing congestion at so small an expense. Any company is warranted in giving it a thorough trial before going to the cost of building terminals in downtown districts.

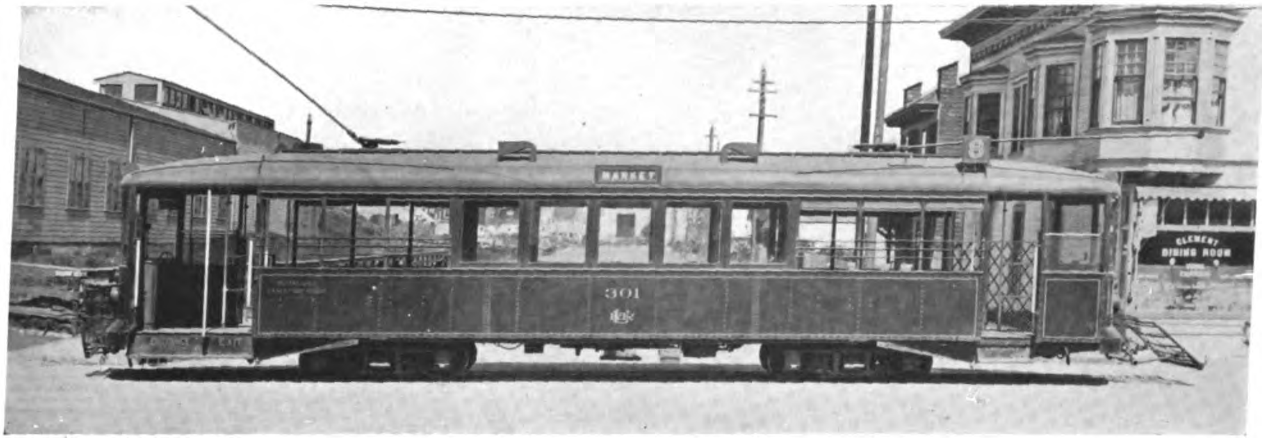


United Railroads Low-Floor Car with Longitudinal Seats in the Center Closed Section and Cross-Seats in the End Sections

The Development of a Light, Low-Floor Car for San Francisco

By JESSE M. YOUNT

Master Mechanic United Railroads of San Francisco



The Latest Car Developed by the United Railroads Is the Low-Floor Type

THE earliest type of electric car for San Francisco was the double-step, open-end California design, that is to say, a car with a central closed section fitted with longitudinal seats and open-end sections also fitted with longitudinal seats, the steps running the full length of the open section.

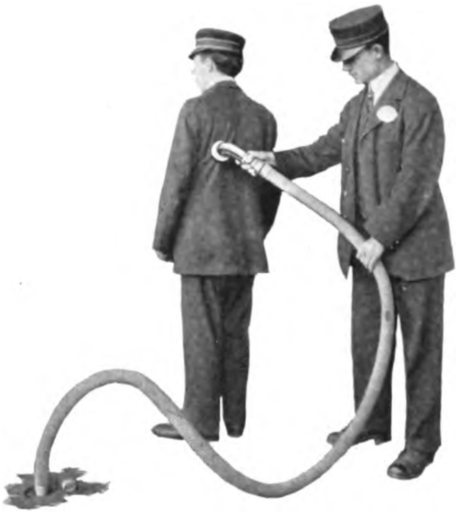
The first advance, made in 1904, was to eliminate the full length steps of the open sections, regular length platform steps being placed near the ends of the closed section. Following this, in 1906, the California design as such was superseded by a closed, open-platform car similar to those long used in the southeastern part of the United States. This design proved unpopular because a large number of Californians prefer to ride in the open all the year around. In 1913, therefore, we returned to the California type except that a drop platform was substituted for one flush with the main flooring.

The 1913 car was much wider and longer than the early California type. It has proved so popular with the riding public that it has been adopted as standard by both our company and the San Francisco Municipal Railway, contrary to earlier recommendations made to the latter by its consulting engineer, Bion J. Arnold. Nevertheless, this car with standard equipment was heavier than what our management considered desirable for San Francisco conditions. We therefore set about to see what mechanical and electrical improvements were possible to retain all desirable features while making the car lighter, easier of access, safer and cheaper to operate.

Naturally, much of the excess weight was in the motor and truck equipment. This led us to adopt for future cars the 24-in. wheel truck with the baby-type, high-speed motor and 10-cu. ft. compressors. By these changes alone we cut down the weight of the under-body equipment approximately 10,900 lb.

While the greatest reduction in weight came through changes in equipment under the car body, we also made a closer study of car-body framing and fittings. Among the changes that followed were the elimination of composition headlining, leaving the roof boards exposed; the size of carlines was very much reduced and the center line of the arch roof was lowered 3 in.; the length and width of the car were not altered from the dimensions of the 1913 type, but the platform construction was changed to avoid a riser from the platform into the car body. We are now using a ramp which is inclined upward 4⅜ in. within the 8-ft. length from the platform edge to the bolster line. This was accomplished by offsetting the end sills as described on page 1016 of the ELECTRIC RAILWAY JOURNAL for May 29, 1915.

The results of the most recent improvements may be summarized as follows: We now have a car 47 ft. long, 9 ft. 2 in. wide, furnished with four GE-247 35-hp. motors, seating fifty people and weighing 34,180 lb., or 683 lb. per passenger. This compares with a car of the same dimensions weighing 49,000 lb., or 980 lb. per passenger. Probably no other city in the United States needed a light car so much as San Francisco, for on account of our many grades the average energy consumption per car-mile greatly exceeds that of other cities.



An Unexpected Vacuum Application

Use of the Vacuum System for Cleaning Cars in San Francisco

Vacuum Apparatus Has Replaced Hand Sweeping and Dusting at Two Carhouses with Noticeable Improvement in Cleanliness and Reduction in Cost

By F. W. ALLEN

Division Superintendent United Railroads of San Francisco

ON Aug. 14, 1912, we made our first installation of a vacuum outfit for car cleaning, the equipment being placed in our Geneva Avenue carhouse. The very first work indicated the superiority of the vacuum process over handwork, both in speed and quality, and the results since obtained with experienced men have proved still better. The initial tests of Aug. 14, 1912, for sweeping and dusting showed up as follows for vacuum and hand operation respectively:

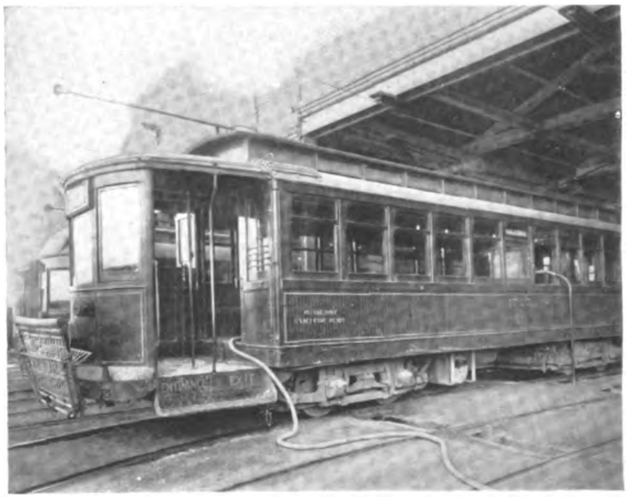
Type P & W Cars—Five cars averaged fifteen and one-half minutes per car with vacuum, and a second five cars averaged twenty-five and one-half minutes per car by hand.

Type 1200 Cars—Twelve cars averaged eleven and one-quarter minutes per car with vacuum and eleven cars averaged twenty-six and two-eleventh minutes per car by hand.

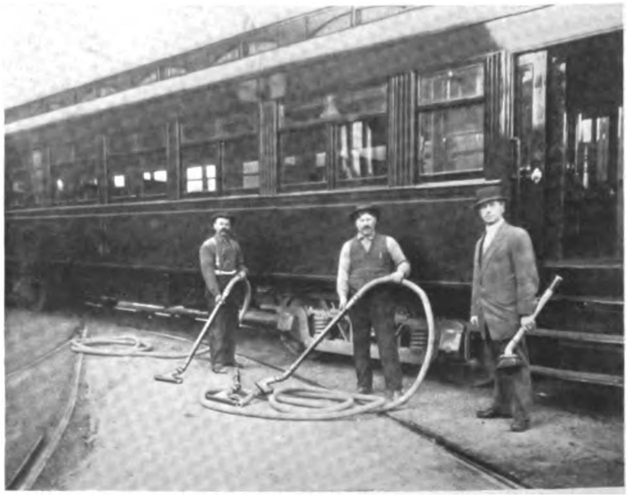
Type 1700 Cars—Six cars averaged eight and one-third minutes per car with vacuum, and five cars averaged twenty-four minutes per car by hand.

Type 1300 Cars—Six cars averaged six and two-third minutes per car with vacuum, and seven cars averaged twelve minutes per car by hand.

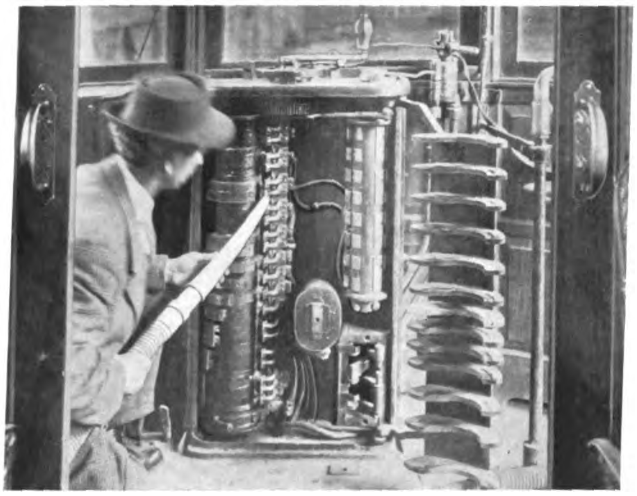
Continued experience with our vacuum cleaning outfit has proved to our satisfaction that it is the most efficient method of cleaning. Brooms and dusters merely agitate the filth and cause it to lodge in another part of the car after the agitation ceases; whereas the vacuum cleaner takes out



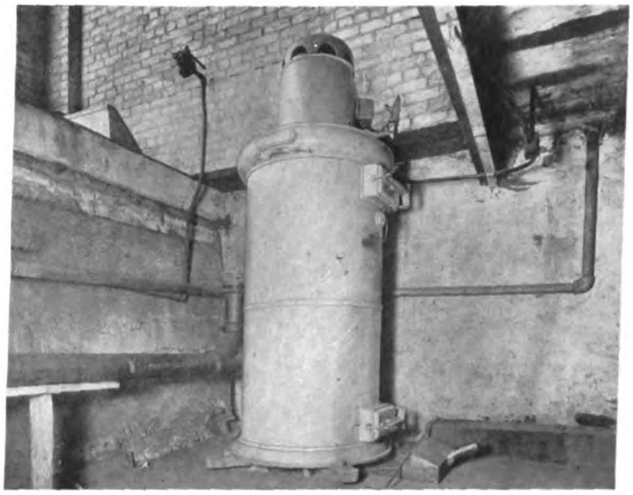
Method of Getting Hose Into Car



Vacuum Hose and Fittings for All Cars



Rubber Nozzle Attached to Hose for Removing Dust from Controller Fingers and Segments



6.5 Hp. Machine Complete with Motor, Vacuum Producer and Separating Tank

of the car all dust, dirt and insects. Furthermore, while the cleaning is going on, the car is getting more than 100 cu. ft. of free air per minute. When the job is done the car floor looks as if it had just been scrubbed with a mop. The car cleaners like the machine, too, as they lose no working time from breathing dust and becoming ill in consequence.

Our first equipment was placed in daily operation on Aug. 15, 1912, and it required no attention at all until Sept. 27, 1913. The apparatus comprises but one 6.5-hp. motor-driven 3500-r.p.m. machine of Tuec type, made by the United Electric Company of Canton, Ohio, and San Francisco, Cal. This machine supplies four 1¾-in. lines of hose at one time, an intake of 80 cu. ft. of air per minute being required at the nozzle of each line. We handle with this machine ninety-six cars in a nine-hour day, but if required the machine could handle 250 cars in twenty-four hours.

The installation cost of the plant was about $1,500, while the maintenance cost has averaged but $20 a month, inclusive of hose and tool replacements and repair. Its economy is shown by the fact that the old method of hand cleaning required the services of nine men whereas the vacuum cleaner has enabled us to dispense with three men for nine months of the year. An extra man is put on only during the rainy season when there is much mud. The annual saving in labor is $1,980, and allowing $20 a month maintenance expense, the annual saving, exclusive of fixed charges on first cost, is $1,740.

I might add that we have altered the original fittings in only one respect, namely, in replacing bristle brushes with felt, as the latter material is much more effective for going over both plain floors and maple strips. The felt also costs us but 35 cents to 40 cents compared with $3 to $4 for the original brushes. We also modified the aluminum nozzle connection to the brush by using a less abrupt angle. The consequent absence of an offset prevents matches, toothpicks and similar objects from fouling the nozzle.

Owing to the satisfactory results obtained with the Geneva Avenue equipment, a duplicate outfit was placed in our Twenty-eighth Street carhouse.

Old Hand Broom Method of Cleaning

New Vacuum Method of Cleaning

Improvements in Transit Lines to Handle Exposition Traffic

Transportation to the Exposition Is Ample—Front-End Fare Collection Has Proved Especially Helpful in Accelerating Car Movement

By T. A. CASHIN
Superintendent Municipal Railways of San Francisco

San Francisco Ferry Building from the Bay

WHEN the question of electric railway transportation to the Panama-Pacific International Exposition came up during 1913, the only means of reaching the grounds was by the Fillmore Street and Peak Street lines of the United Railroads of San Francisco. These two routes, however, could not furnish the most direct service from the principal centers of population. One reason for this condition was that the exposition grounds were located along a previously unused waterfront. In fact, a large part of the exposition is on made ground.

As the United Railroads and the California Street Cable Railroad considered the city's franchise provisions for extensions prohibitive, the municipality undertook to build the necessary routes as permanent extensions to the system which had begun with the Geary Street line. This meant an increase in single track from 15.08 miles to 41 miles. This total, however, includes the old Presidio & Ferries line which comprised 7.14 miles. The total amount of new track was therefore 33.86 miles. This work, including additions to the Geary Street carhouse, a new carhouse at Seventeenth and Hampshire Streets, track connections and 125 new cars, cost about $3,000,000 in all. An important feature toward avoiding heavy grades was the accelerated building and completion of the Stockton Street tunnel, a project which had been in hand for several years.

Before the exposition, we had only forty-three cars, just enough for the Geary Street line. Toward the end of 1913 contracts were let with the Jewett Car Company, Newark, Ohio, for 125 cars of California type and substantially similar to the latest design of the United Railroads of San Francisco. These cars seat fifty to fifty-two people each.

EMPLOYMENT OF ADDITIONAL MEN—FRONT-END FARE COLLECTION

The exposition travel also compelled us to employ about 400 extra platform men, eight front-end collectors and sixteen inspectors, thus increasing our transportation force from 375 to about 750. I might add here that the use of front-end collectors, with San Francisco registers, has proved exceptionally beneficial. This practice not only speeds up fare collection and the loading of cars, but causes strangers to direct their inquiries at the collectors on the street rather than blocking car platforms while talking to the conductor. The front-end collectors also act as starters. At the main gates of the exposition the use of front-end fare collectors enables us to keep the cars on headways of fifteen seconds and even less.

Owing to local charter provisions all employees had to be hired by way of the civil service. The nature of the educational and physical examinations for platform men and inspectors has already been detailed at length in your issues of Sept. 5, 1914, and Nov. 14, 1914. Out of 3000 applications for platform jobs, 554 men passed the final examination in arithmetic, rules, etc., as motormen and 633 as conductors. Of the 140 candidates for inspectors, not more than seven passed the quiz of December, 1914, but fifty-six passed the examination held in April, 1915. All platform men work an eight-hour day and receive a minimum of $3, or 37.5 cents an hour, with time and one-half for overtime. Inspectors receive $115 a month with one day off per week.

In the original examination for the first Geary Street men and in the December, 1914, and April, 1915, examinations the employees were all experienced railroaders. The second of the later examinations, however, brought a great majority of inexperienced men. The reason for this was that we made a large reduction in the credit for experience. This brought the desired increase in younger men and better physique. About 400 of this class are now at work.

We have been very fortunate in regard to accidents, in view of the fact that new men have been dealing with a riding public which naturally has a large proportion of strangers. On some days we carried 225,000 people without serious mishap.

It is a peculiar fact that the stream of travel within the exposition grounds does not take the course almost everyone expected. It was the general belief that most visitors would enter via the main gates at Fillmore and Scott Streets, on Chestnut Street, the thought being that they would see the large palaces first and then leave through the zone section. In practice the use of the gates has not followed any definite course. Both the United Railroads and the Municipal Railways have found, therefore, that the terminals built at Van Ness Avenue and Fort Mason respectively were not entirely necessary, especially as the front-end fare collectors do so much to speed up the traffic.

A most agreeable surprise of exposition travel is that the visitors straggle in and out of the grounds leisurely, so that peaks are handled with more ease than in the ordinary American rush hour.

Outside of the service given by both street railway companies, the San Francisco-Oakland Terminal Railways gives a direct rail and ferry service from its territory, so that patrons from Oakland, Alameda, Berkeley and other transbay communities can visit the exposition without using San Francisco cars. On special days the Northwestern Pacific Railway gives a similar service from Sausalito. In San Francisco itself the street railways have to compete with 10-cent jitney service and 10-cent double-deck bus service. The number of jitneys running to the exposition is about 125 and the number of buses about a dozen. It is an illuminating fact that some of the buses came from Los Angeles and other towns where they had failed to pay in every-day transportation. Thus, with the various sources of competition enumerated, not forgetting the private automobile, the street railways are having no difficulty in handling all the business they can get.

Municipal Railway Car at the Scott Street Entrance to the Exposition

Reduction in Power Cost Effected by the Use of Coasting Recorders

The Greatest Value of Car-Checking Devices Is Declared to Be the Improvement in All-Around Work of the Men

By W. R. ALBERGER

Vice-President and General Manager San Francisco-Oakland Terminal Railways

THE use of the Railway Improvement Company's coasting recorders on the cars of the San Francisco-Oakland Terminal Railways has resulted in a very satisfactory decrease in the cost of power consumed in operating cars. By this I do not mean to say that the mere installation of the coasting recorder has resulted in a saving of power, for such is not by any means a fact. Reduction in consumption of power has been brought about through the use of coasting recorders in enabling the company to keep a record of the performance of its various motormen and to keep all concerned advised as to the efficiency of each man.

The desirability of some method of checking the performance of motormen has been recognized for some time. Electric railway companies have, without exception, spent large sums in various devices for checking conductors in the handling of fares and transfers, but very little has been done toward the checking of motormen who are handling equipment worth many hundreds of dollars and who are also responsible for the lives and safety of their passengers. Any device which would enable the officers of a railway company properly to check and keep track of the performance and efficiency of motormen is, in my opinion, a most valuable adjunct to the economical and safe operation of electric railways.

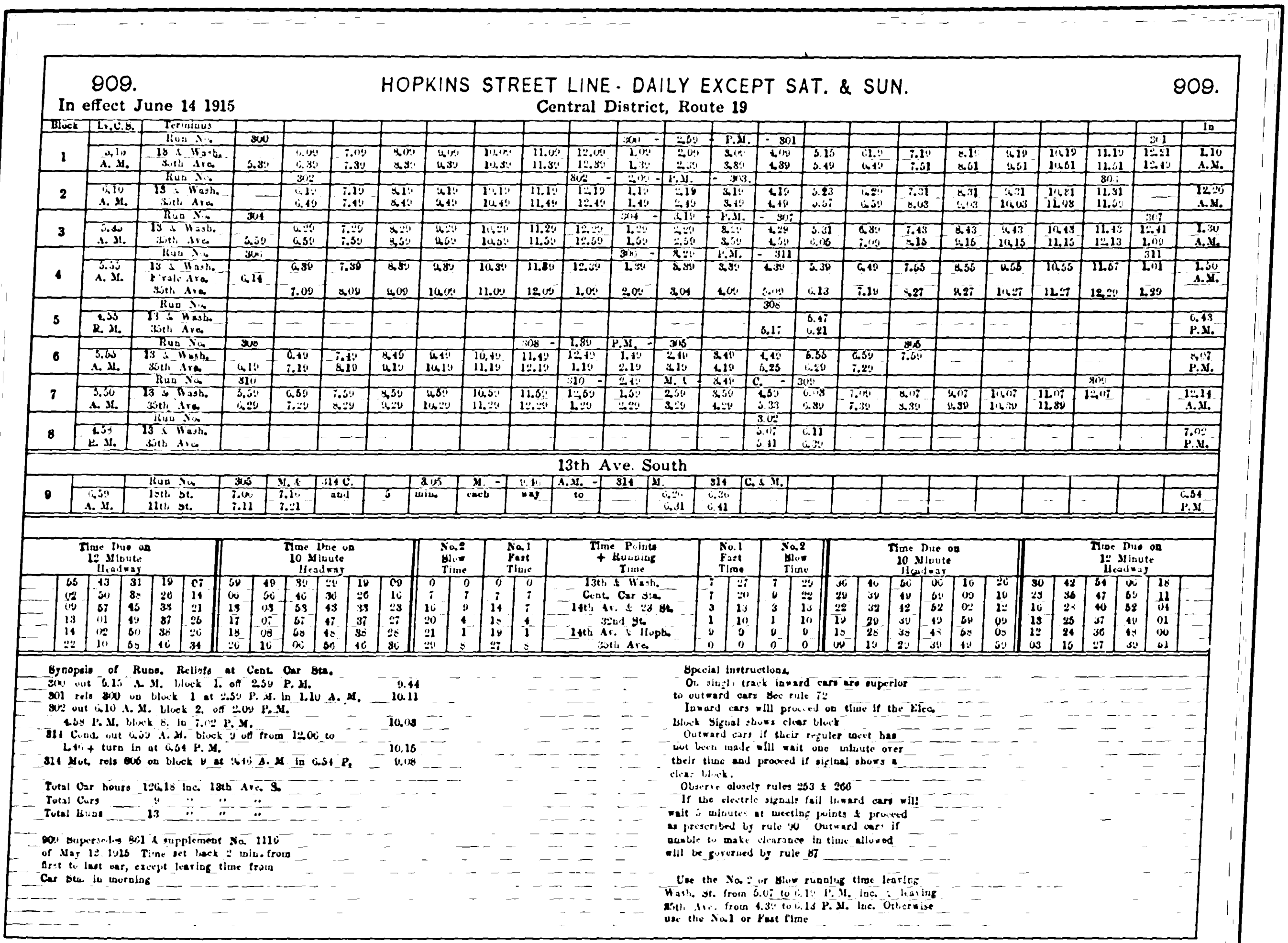
It can be scarcely expected, under the limitations of human nature, that a man will be as careful and conscientious in his duties knowing that there is no check whatever upon his actions as he will when he is aware that there is a careful watch kept upon him, and that his superiors will know positively whether or not he is exercising due diligence in the discharge of his duties. Hence the benefit to be derived in the use of the coasting recorders is not entirely through the operation of the recorder itself—it is through the securing of reliable information by the instrumentality of the recorder as to the manner in which a motorman is operating his car and in his own knowledge that his record is reported to and closely scanned by the officers of the company as well as by his own mates.

The experience of this company has been that in keeping the principles of coasting before our motormen many other points in connection with economical and safe operation of cars are naturally brought out. Our records show very clearly that motormen with good coasting records also show good records on other matters as well. It seems quite evident that the fact that a motorman's performance is being recorded tends to keep his mind upon his work, to the end that he not only secures a good coasting record but handles his car better in every way and is much more alive to the safety of his passengers. If the coasting alone were the result of the installation of recorders I would not feel that they were entirely successful, but the general improvement in the efficiency of the motormen of this company since the installation of the recorders convinces me that this method of checking motormen is an exceptionally good one, and I believe that there can be no question whatever as to the desirability of a check upon the performance of motormen.

The cost of power used by this company for operation of cars has been decreased from 15 per cent to 20 per cent since the installation of coasting recorders, in addition to which there has been an appreciable reduction in the cost of brakeshoes and also in the cost of maintenance of electrical equipment. All of this, I believe, is due to a more careful and more intelligent handling of equipment by our motormen, which improved handling is due to an awakening of their own ambition to make good records, as well as to the general instructions which they have received in connection with the special instructions regarding coasting.

As stated before, the mere installation of coasting recorders will not alone produce results. A constant follow-up course and constant supervision and instructions to motormen are necessary. Without question all electric railways spend considerable money on inspectors for motormen, and it is my belief that reports secured through coasting recorders act as a guide to the inspectors, giving them the necessary information as to what motormen need instruction and the sort of instruction required.

The expense of maintaining recorders and maintaining the office force necessary for keeping the records and making reports is nominal and should not in any way be considered in connection with the benefits derived.



909. HOPKINS STREET LINE - DAILY EXCEPT SAT. & SUN. 909.

In effect June 14 1915 Central District, Route 19

Block	Lv.C.S.	Terminus																					In
1		Run No.	300								300 -	2.59	P.M.	- 301								301	
	6.15 A. M.	13 & Wash. 35th Ave.	5.39	6.09 6.39	7.09 7.39	8.09 8.39	9.09 9.39	10.09 10.39	11.09 11.39	12.09 12.39	1.09 1.39	2.09 2.39	3.09 3.39	4.09 4.39	5.15 5.49	61.9 6.49	7.19 7.51	8.19 8.51	9.19 9.51	10.19 10.51	11.19 11.51	12.21 12.49	1.10 A.M.
2		Run No.		302						302 -	2.09 -	P.M.	- 303.								303		
	6.10 A. M.	13 & Wash. 35th Ave.	—	6.19 6.49	7.19 7.49	8.19 8.49	9.19 9.49	10.19 10.49	11.19 11.49	12.19 12.49	1.19 1.49	2.19 2.49	3.19 3.49	4.19 4.49	5.23 5.57	6.29 6.59	7.31 8.03	8.31 9.03	9.31 10.03	10.31 11.03	11.31 11.59	—	12.29 A.M.
3		Run No.	304								304 -	3.19	P.M.	- 307								307	
	5.45 A. M.	13 & Wash. 35th Ave.	5.59	6.29 6.59	7.29 7.59	8.29 8.59	9.29 9.59	10.29 10.59	11.29 11.59	12.29 12.59	1.29 1.59	2.29 2.59	3.29 3.59	4.29 4.59	5.31 6.06	6.39 7.09	7.43 8.15	8.43 9.15	9.43 10.15	10.43 11.15	11.43 12.13	12.41 1.09	1.30 A.M.
4		Run No.	306								306 -	3.29	P.M.	- 311								311	
	5.55 A. M.	13 & Wash. F'rale Ave. 35th Ave.	6.14	6.39 7.09	7.39 8.09	8.39 9.09	9.39 10.09	10.39 11.09	11.39 12.09	12.39 1.09	1.39 2.09	2.39 3.04	3.39 4.09	4.39 5.09	5.39 6.13	6.49 7.19	7.55 8.27	8.55 9.27	9.55 10.27	10.55 11.27	11.57 12.29	1.01 1.29	1.50 A.M.
5		Run No.												308									
	4.55 P. M.	13 & Wash. 35th Ave.												5.17	5.47 6.21								6.43 P.M.
6		Run No.	308						308 -	1.39	P.M. -	306				306							
	5.55 A. M.	13 & Wash. 35th Ave.	6.19	6.49 7.19	7.49 8.19	8.49 9.19	9.49 10.19	10.49 11.19	11.49 12.19	12.49 1.19	1.49 2.19	2.49 3.19	3.49 4.19	4.49 5.25	5.55 6.29	6.59 7.29	7.59						8.07 P.M.
7		Run No.	310							310 -	2.49	M. &	3.49	C. -	309						309		
	5.50 A. M.	13 & Wash. 35th Ave.	5.59 6.29	6.59 7.29	7.59 8.29	8.59 9.29	9.59 10.29	10.59 11.29	11.59 12.29	12.59 1.29	1.59 2.29	2.59 3.29	3.59 4.29	4.59 5.33	6.08 6.39	7.09 7.39	8.07 8.39	9.07 9.39	10.07 10.39	11.07 11.39	12.07	—	12.14 A.M.
8		Run No.												3.02									
	4.55 P. M.	13 & Wash. 35th Ave.												5.07 5.41	6.11 6.29								7.02 P.M.

13th Ave. South

Block	Lv.C.S.	Terminus																					In
9		Run No.	305	M. &	314 C.		8.05	M. -	9.46	A.M. -	314	M.	314	C. & M.									
	6.59 A. M.	15th St. 11th St.	7.00 7.11	7.10 7.21	and	5	min.	each	way	to	—	6.26 6.31	6.36 6.41										6.54 P.M.

Time Due on 12 Minute Headway					Time Due on 10 Minute Headway						No.2 Slow Time		No.1 Fast Time		Time Points + Running Time	No.1 Fast Time		No.2 Slow Time		Time Due on 10 Minute Headway						Time Due on 12 Minute Headway				
55	43	31	19	07	59	49	39	29	19	09	0	0	0	0	13th & Wash.	7	27	7	29	36	46	56	06	16	26	30	42	54	06	18
02	50	38	26	14	06	56	46	36	26	16	7	7	7	7	Cent. Car Sta.	7	20	9	22	29	39	49	59	09	19	23	35	47	59	11
09	57	45	33	21	13	03	53	43	33	23	16	9	14	7	14th Av. & 23 St.	3	13	3	13	22	32	42	52	02	12	16	28	40	52	04
13	01	49	37	25	17	07	57	47	37	27	20	4	18	4	32nd St.	1	10	1	10	19	29	39	49	59	09	13	25	37	49	01
14	02	50	38	26	18	08	58	48	38	28	21	1	19	1	14th Av. & Hopb.	9	9	9	9	15	25	35	45	55	05	12	24	36	48	00
22	10	58	46	34	26	16	06	56	46	36	29	8	27	8	35th Ave.	0	0	0	0	09	19	29	39	49	59	03	15	27	39	51

Synopsis of Runs. Reliefs at Cent. Car Sta.

300 out 6.15 A. M. block 1. off 2.59 P. M.	9.44
301 rels 300 on block 1 at 2.59 P. M. in 1.10 A. M.	10.11
302 out 6.10 A. M. block 2. off 2.09 P. M. 4.58 P. M. block 8. in 7.02 P. M.	10.08
314 Cond. out 6.59 A. M. block 9 off from 12.06 to 1.46 + turn in at 6.54 P. M.	10.15
314 Mot. rels 306 on block 9 at 9.46 A. M. in 6.54 P.	9.08

Total Car hours 126.15 inc. 13th Ave. S.
Total Cars 9 " " "
Total Runs 13 " " "

909 Supersedes 861 & supplement No. 1116 of May 12, 1915 Time set back 2 min. from first to last car, except leaving time from Car Sta. in morning

Special Instructions.

On single track inward cars are superior to outward cars See rule 72

Inward cars will proceed on time if the Elec. Block Signal shows clear block

Outward cars if their reguler meet has not been made will wait one minute over their time and proceed if siginal shows a clear block.

Observe closely rules 253 & 266

If the electric signals fail inward cars will wait 5 minutes at meeting points & proceed as prescribed by rule 90 Outward cars if unable to make clearance in time allowed will be governed by rule 87

Use the No. 2 or Slow running time leaving Wash. St. from 5.07 to 6.19 P. M. inc. & leaving 35th Ave. from 4.39 to 6.13 P. M. inc. Otherwise use the No.1 or Fast time

Construction of a Day Table, Showing Crews Handling a Given Car (Block Number), Use of Two Sets of Time Points, Explanatory Notes, Etc.

Time-Table Practice of the San Francisco-Oakland Terminal Railways

By U. S. SLITER

Efficiency Superintendent San Francisco-Oakland Terminal Railways

As so little has been published on the subject of time-table practice on the Pacific Coast, operating men from other parts of the country may be interested in our method of planning schedules to compare it with their own.

The information for the schedule is based upon traffic data derived from special traffic counts obtained by checkers who are stationed at various points along the line at important intersections, as well as from conductors' trip cards or from traffic slips. Trip cards, of course, show the total business of a line, whereas the traffic slips and checker reports show the amount of travel at selected points, which travel is of special importance in showing the changes in the maximum load at given points. We find that the traffic slip is the most popular method of securing the necessary information when a change of schedule is contemplated, and the direct saving is appreciable. Because of the high class of conductors employed by the San Francisco-Oakland Terminal Railways we can rely upon their figures. We are, therefore, using very few checkers since the traffic slip illustrated was introduced.

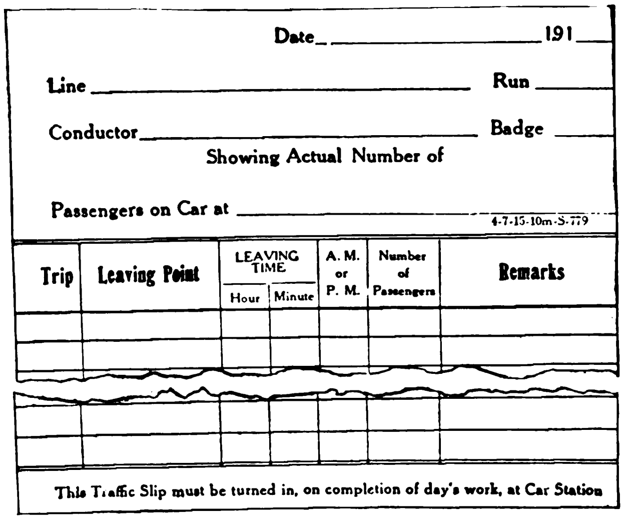
From the information obtained in this manner, traffic charts are prepared on 7-in. x 10-in. cross-section paper, convenient for filing. These charts usually show a whole day's performance of a line in half-hourly or hourly periods, together with the number of cars operated, headway, seating capacity and other information that may be desired by the transportation department to show at a glance all the traffic conditions of the line so that loss of revenue will not ensue because of ignorance or hasty conclusions in making alterations in schedules on account of changes in business.

One of the prints reproduced shows the number of cars in service, by hours, on a typical week day. Our morning peak on both divisions is from 7 to 9 o'clock and our evening peak from 4 to 7 o'clock. During these periods 40 per cent of the total traffic is handled. On the Key division the transbay travel to San Francisco represents about 20 per cent of the total; commuter travel on the Key division alone represents 40 per cent of the traffic on that divison, or 8 per cent of the total. The mid-day travel begins about 1 o'clock and increases until 3 o'clock, due to shoppers and pleasure seekers.

Our runs are divided as follows: straight day, 29 per cent; straight night, 35 per cent; swing runs, 36 per cent. Only 4 per cent of the swing runs are divided into more than two parts. The time per run averages nine hours and forty-five minutes a day. Swing runs are laid out to give a man at least twelve hours between his last run of the day and the first part of his run the following day. All trainmen, on both the Key and Traction divisions, are off duty one day each week, a sufficient number of regular crews being assigned to relief runs so that all men are relieved regularly.

A typical week-day time-table, reproduced on page 521, is that of the Hopkins Street line. In the first place it will be noted that the first column carries nine block numbers. Each block number represents a car, but the time that this car is handled by successive crews is indicated by the run numbers written horizontally across the table. The second column shows the time the car of each block number was taken out of the station. The third column shows the terminal, and the following columns except the last show the scheduled leaving times at the terminals known as Thirteenth and Washington Streets and Thirty-fifth Avenue. Spaces are provided over each group of time figures to show when the crews are relieved. The last column, of course, shows time in at car station.

Below the schedule of the Hopkins Street line and its Thirteenth Avenue branch will be found a detailed table of the time points and running time. The first two sections of this table applying to east-bound trips show the motorman at what minute past the hour he should pass the time points presented in the center of the table. The last two sections of the table cover the same information for west-bound trips. It will be observed that two sets of time points are used; one corresponding to a twelve-minute headway and the other to a ten-minute headway. "No. 1 Fast Time" and "No. 2 Slow Time" at the immediate right and left of the time points in the center of the table show running minutes between the time points and total minutes from initial leaving point. "Slow Time" is used when it is necessary to run at a lower rate of speed during the rush-hour period as designated in the last paragraph under "Special Instructions." A comparison of scheduled leaving times and actual running time will show that lay-overs up to three minutes are provided. At the base of the table synopses are prepared for the convenience of those interested. For example, a crew can see off-hand just what it is expected to do throughout the day. The rest of the table shows the total car-hours, total cars, total runs, etc.



Date________________191___

Line ________________________ Run ______

Conductor______________________ Badge ______

Showing Actual Number of

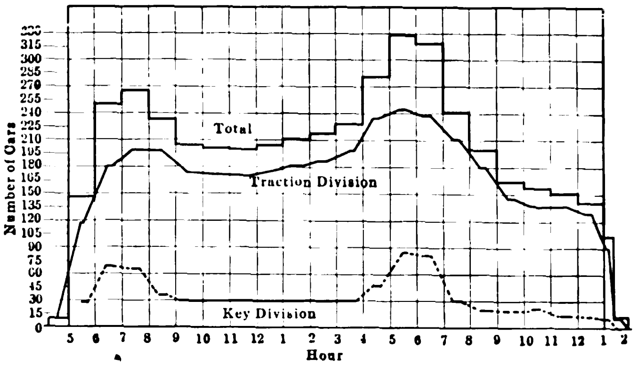
Passengers on Car at ________________________

4-7-15-10m-S-779

Trip	Leaving Point	Leaving Time		A. M. or P. M.	Number of Passengers	Remarks
		Hour	Minute			

This Traffic Slip must be turned in, on completion of day's work, at Car Station

Traffic Slip Turned in by the Conductor



Variation in Car Requirements from Hour to Hour

The time-table described is for use daily except Saturday and Sunday. On account of the variation in traffic conditions on Saturdays and Sundays, as compared with week-days, a different schedule is used for each of these days on most of our lines.

Saturday peak-load conditions remain about the same as other week days, but we find it necessary to extend the tripper service, and also to allow the closer headway to operate to a later hour on congested district lines to meet the increased travel during the evening.

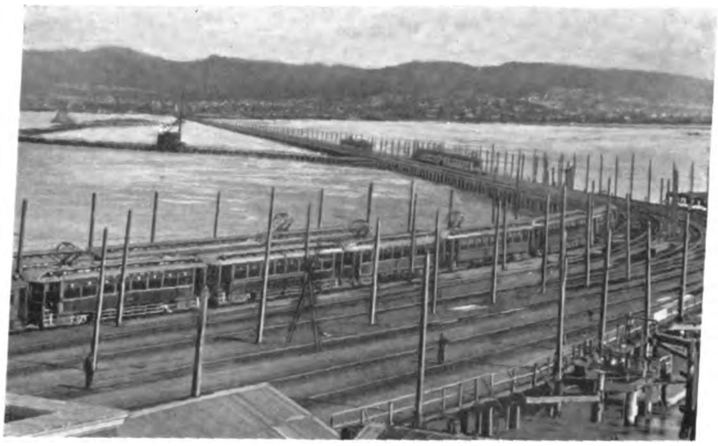
Sunday morning travel does not warrant tripper service except for baseball or special events. The comparatively light business enables the company to lengthen the headway during the forenoon, which partially offsets the increased expense caused by the additional cars operated for Saturday traffic.

In compiling our time-tables the information is arranged to provide for cutting and filing in a uniform manner. On the left-hand margin of the schedule in its original form, circles are used to show where perforations are to be made, and a short line appears at the left to show where the sheet should be cut so that the information will be conveniently divided on all pages of the schedule.

San Francisco-Oakland Terminal Railways' Way Standards

By GEORGE H. BINKLEY

Chief Engineer Maintenance of Way and Structures Department



Pier Terminal Yard, Showing New Construction with 2-Mile Fill

THE San Francisco-Oakland Terminal Railways operate a system of tracks in nine municipalities and two counties on the east side of San Francisco Bay with a ferry connecting the East Bay Cities and San Francisco. All of the cars are operated by electricity, but some of the lines are doing a strictly street railway business, while others are in the nature of interurban lines, handling both freight and passengers, requiring track construction for M. C. B. equipment.

Owing to the requirements of so many municipalities and the varied character of service, it has been impossible to adopt standards of construction to apply to the entire system. Generally speaking, the recommendations of the American Electric Railway Association have been followed in the construction of tracks and paving.

EXCAVATION AND DRAINAGE

Trench excavation as a rule has been made by hand, loading material on cars or wagons, but recently good results have been obtained by using a Brown hoist and a small steam shovel, materially reducing the cost of loading excavated material. Where a trench is located in the streets, it is the custom to scarify the macadam surface.

Most of the tracks are laid in a clay soil, and because of the character of the soil it has been deemed advisable in all recent work, whether under a concrete mat or stone ballast, to install a drain tile connected with the city sewers. Most of the drain pipe installed is 4-in. farm tile, but in one case second-class vitrified conduit was used. Most of the tiling is laid under the center of the space between the two tracks. In laying this tile a trench is excavated, approximately the width of a shovel, and the space around the drain is filled with clean crushed stone. Where concrete is to be used for the track foundation, a strip of roofing paper is laid over the drainage ditch in order to prevent the wet concrete from filling voids in the stone surrounding the pipe. Where practicable, a power roller is used to roll the subgrade, but in some cases, owing to the presence of service pipes near the bottom of the trench, it has been necessary to use a light horse roller.

CONCRETE FOUNDATIONS

For some years past, concrete beam construction in different forms has been used to some extent, but in recent construction a 6-in. concrete mat has been laid, the concrete for all track construction being a 1-3-6 mix. Where the density of traffic is so great that it is not practicable to remove track in order to place a concrete mat, from 6 in. to 8 in. of stone ballast is placed under the track and thoroughly grouted.

Material for concrete is hauled to the street by cars. The concrete is mixed by an Austin two-sack cube mixer, operated by steam and burning oil. This machine is mounted on wide-tired wheels, running on the street. The mixer is charged with a one-sack batch, but when laying paving foundation under traffic, and the machine cannot discharge during the passage of cars, a second batch is mixed, so that as soon as the car is clear the machine discharges two batches, thus materially increasing the output of the machine. There has never been a time when it was possible to have trench or track work completed far enough ahead to work the mixer to its full capacity for an entire day.

The mixer is self-propelled, but carries no large water supply and moves slowly, so that in moving from one job to another it is hauled by team or by means of a gasoline road roller. Owing to its weight long moves are somewhat trying on the machine, and for that reason two machines are in service, located in different territories.

In order to avoid absolute rigidity and to obtain some degree of elasticity, the top of the concrete mat is laid 2 in. below the bottom of the ties, and the ties are tamped with dry concrete, no water whatever being used in the mix. This dry concrete, however, absorbs moisture from the paving foundation of wet concrete when it is laid and hardens somewhat, although there is no difficulty in loosening it with picks in case of repairs or reconstruction. This concrete mat with dry concrete tamping material has proved successful so far, even when 70 lb. A. S. C. E. relayer rail was used.

Three accompanying drawings show the general style of construction, using the 141 lb. Trilby rail, 6-in. 60-lb. T-rail and 70-lb. A. S. C. E. rail.

BALLAST

On the Traction lines, where the traffic is not dense and where lighter cars are operated, the tracks are laid on 6 in. of stone ballast, under which drain tile has been installed and the subgrade rolled. The tracks on which there is interurban service are ballasted with 12 in. of crushed stone. There are several stone quarries in this vicinity, and it is possible to obtain excellent ballast at a reasonable cost. All ballast is bar tamped.

TIES AND RAIL

For standard construction 6-in. x 8-in. x 8-ft. split redwood ties, spaced 2-ft. centers, are used; under crossings pine timbers of large dimensions are used. Ties are not treated, as in stone ballasted track the mechanical life of the tie governs, and where laid in concrete it is assumed that the life of the tie will equal the life of the rail.

In laying these split ties, it is necessary to adze them in order to obtain a uniform bearing and good alignment with 9-in. rail. Where tie plates are used, they are placed by means of a plating machine in the yards, but no tie plates are used in the concrete construction. An effort is made to have on hand at all times sufficient ties to permit proper seasoning before laying.

Like a great many other roads which have been in operation for a number of years, this company has rails of various sections, as follows:

70-lb. A. S. C. E. in 33-ft. lengths.
6-in. 60-lb. T in 60-ft. lengths.
7-in. 80-lb. T in 60-ft. lengths.
9-in. 106-lb. Trilby in 60-ft. lengths.
9-in. 125-ft. Trilby in 50-ft. lengths.
9-in. 141-lb. Trilby in 45-ft. lengths.

The 9-in. Trilby rail has been used to satisfy the requirements of municipal authorities, but, except under conditions of very dense traffic, good results have been obtained with 6-in. 60-lb. T-rail.

Specifications recommended by the American Electric Railway Association as to chemical composition have been followed in purchasing rail. There has been no serious trouble from corrugation. Where rail has become badly worn or cupped at the joint, material has been replaced by electric welding and ground, using a Kerwin power grinder operating on the track.

Practically all of the track is laid on tie plates, and for some time the shoulder tie plate has been used exclusively. As previously stated, tie plates are omitted with concrete construction. Standard spikes are used, there being no screw spikes in the track. Flat tie rods are used with all rail except the 70-lb. A.S.C.E. section, where no rods are used.

JOINTS AND SPECIAL WORK

When constructed, a considerable portion of the track was laid with angle bars, and these have been replaced largely by Continuous joints. All new work has either Continuous joints, or the rails have been electrically welded.

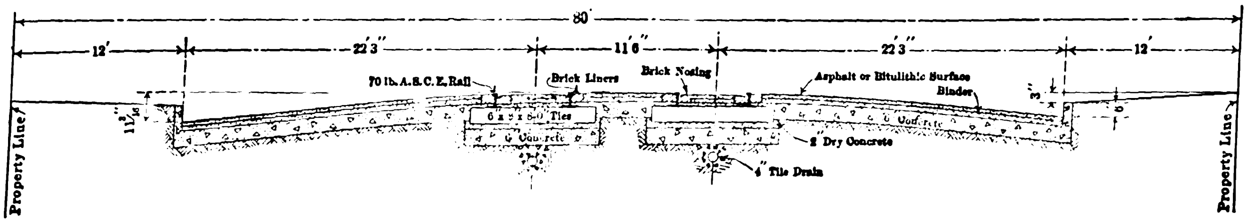
During 1914, this company welded about 6000 joints on different sections of rail, most of the welding being done on old track. This was the first use of the Lorain process west of Lincoln, Neb. The total failures to date on all sections of rail under varying conditions of track and rail have been 0.8 per cent of the number of joints welded.

The Vixen rail planer is used when installing new Continuous joints on new rail. The Continuous joints used are as follows:

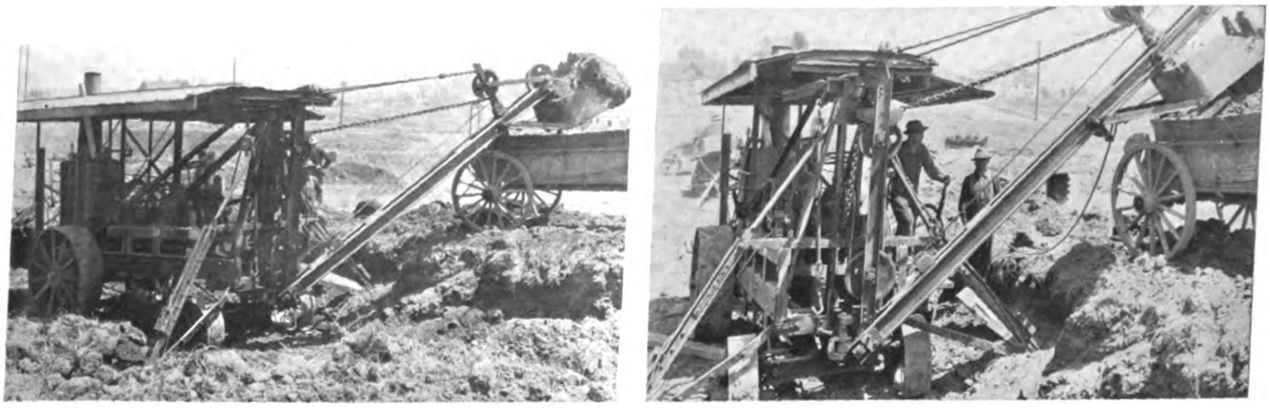
For 70-lb. A. S. C. E., four hole, 26 in.
For 6-in. 60-lb. T, six hole, 26 in.
For 7-in. 80-lb. T, six hole, 26 in.
For 9-in. 125-lb. Trilby, eight hole, 24 in.
For 9-in. 141-lb. Trilby, eight hole, 24 in.

On the Traction lines with frequent service, insert manganese centers have been generally used, although there is some solid manganese. Split switches are used in open track where provision must be made for M. C. B. flanges. Where such cars operate in streets, double-tongue manganese switches with a radius of 350 ft. are installed.

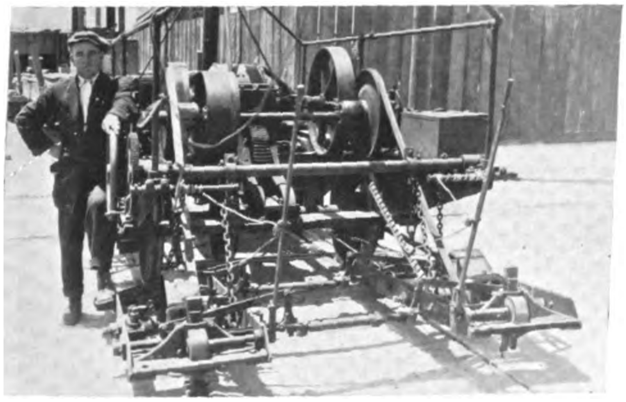
Crossings maintained by this company are built-up crossings, or have manganese centers. Built-up crossings and frogs for open track are constructed in the company's shops. Where renewable centers have been used in crossings and special work, they have not always remained tight, and there has been some trouble from breakage. In some cases this is perhaps due to the fact that the manganese castings are not heavy enough to stand up under the traffic requirements, but the failures are nearly


80'
12'
22' 3"
11' 6"
22' 3"
12'
70 lb. A.S.C.E. Rail
Brick Liners
Brick Nosing
Asphalt or Bitulithic Surface
Binder
3"
6"
11 3/16"
6 x 5 x 8-0 Ties
6" Concrete
6" Concrete
2" Dry Concrete
4" Tile Drain
Property Line
Property Line

Typical Cross-Section of Grove Street Between Allston Way and Woolsey Street, Oakland



Traction Excavators Used on Trench Excavation on Park Street, Alameda

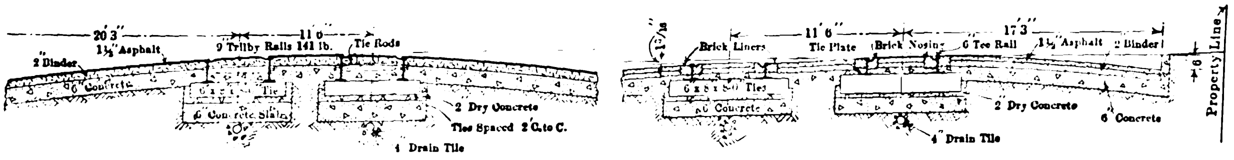


Rail Grinder on Hollis Street, Oakland

Rail Planer on Grand Avenue, Oakland

Photos by Bullis

Cube Mixer on Park Street, Alameda; Discharge End


20' 3"
11' 6"
2" Binder
1 1/2" Asphalt
9" Trilby Rails 141 lb.
Tie Rods
6" Concrete
6 x 8 x 8 Tie
6" Concrete Slab
2" Dry Concrete
Ties Spaced 2' C. to C.
4" Drain Tile
1 3/16"
Brick Liners
11' 6"
Tie Plate
Brick Nosing
6 Tee Rail
17' 3"
1 1/2" Asphalt
2 Binder
6 x 8 x 8-0 Ties
6" Concrete
2" Dry Concrete
6" Concrete
4" Drain Tile
6"
Property Line

Typical Cross-Sections—At the Left, Shattuck Avenue from Ward Street to South City Limits, Oakland; at the Right, Twelfth Street from Broadway to Fallon Street, Oakland always where crossings or special work are designed to accommodate the use of different sized wheel flanges, thus prohibiting the installation of flange risers. Where special work is not flange bearing at crossings the receiving section breaks or wears, and the paving deteriorates rapidly.

Specifications are being prepared with the idea of establishing a standard for all heavy traffic of 9-in. solid manganese construction for special work and crossings. In installing such work, special attention will be given to the preparation of good foundations, and it is believed that the manufacturers are now producing a better quality of manganese castings than formerly.

The recommendations of the American Electric Railway Association are being followed as to the length and radii of switches and mates.

Spirals are used on all curves, and the minimum radius is 55 ft. All double track curves are designed so that cars will clear, excepting where the streets are so narrow that this is impossible.

PAVING

Practically all of the paving on this system consists of two kinds—oil macadam is used in outlying districts, and on main thoroughfares standard asphalt paving consisting of a 6-in. concrete base, on which is laid a 2-in. binder course with a finish surface of 1½ in. of asphalt. Recently there has been a movement for the use of bitulithic pavement, consisting of a 2-in. course of bitulithic laid on 5 in. of concrete or on a macadam base.

This company does practically all of its oil macadam construction and repair work, the principal exception being when the street is being improved by a municipality, when the pavement outside of the tracks is done by the contractor for the street. For this work, covering more than 100 miles of single track measurement, there is an equipment consisting of a wagon oil spraying outfit, a car oil spraying outfit, and three 12-ton three-wheeled gasoline road rollers. The oil macadam pavement is serviceable and easily kept in repair, but is not adapted to heavy vehicular traffic, and at times during the warm weather there is too much oil on the surface.

In the selection of paving in its tracks, this company is governed by the State law, which specifies that the tracks must be paved with the same character of paving as is used on the rest of the street, so that very little latitude is allowed, although in some cases a municipality permits the use of a pavement differing somewhat from the adjacent paving.

The company has a stationary asphalt plant of a capacity sufficient to manufacture all asphalt paving material for its own use, and is doing all of its own paving with the exception of the strips laid by the street contractor, as in the case of oil macadam, this arrangement being made in order to eliminate the paving joint alongside of the tracks.

The Railroad Commission of California has ruled that the minimum distance from center to center of double track in streets shall be 11 ft. 6 in., and the State law requires all companies to pave 2 ft. on each side of its tracks, so that in all cases it is necessary to pave this strip, at least 20 ft. in width.

In carrying out asphalt street improvements, the manufactured product is hauled from the plant in steel side dump cars, having a capacity of 5 cu. yd. This permits delivery of the material at the proper temperature, as it can be delivered in this manner in large quantities, and much more quickly than by wagon or truck. Rolling is done by use of an oil-burning steam tandem 5-ton roller, which has been weighted so as to give a compression of 250 lb. per linear inch, a 5-ton roller being selected for this purpose because of its having a roll 29 in. in length, which permits it to operate between rails.

Liners of three kinds are used, asphalt brick, vitrified brick, and basalt stone. The asphalt brick liners have not stood up under traffic and the vitrified brick have not been entirely satisfactory, as there is a tendency to break along the rail, and the basalt liners do not make a smooth pavement, nor can they be used except with a high rail. A special vitrified brick with a depth of 3½ in. has been used with the 70-lb. A. S. C. E. rail. Liners are laid as headers in cement grout.

In the most recent installation of Trilby rail liners have been omitted, and so far this seems to be satisfactory.

Owing to the reduction in the number of steel-tired vehicles using the streets, and the fact that the company has its own asphalt plant and can readily and cheaply make paving repairs, it would seem advisable to omit liners under all conditions except at intersections carrying maximum traffic.

BRIDGES, TRESTLES AND CULVERTS

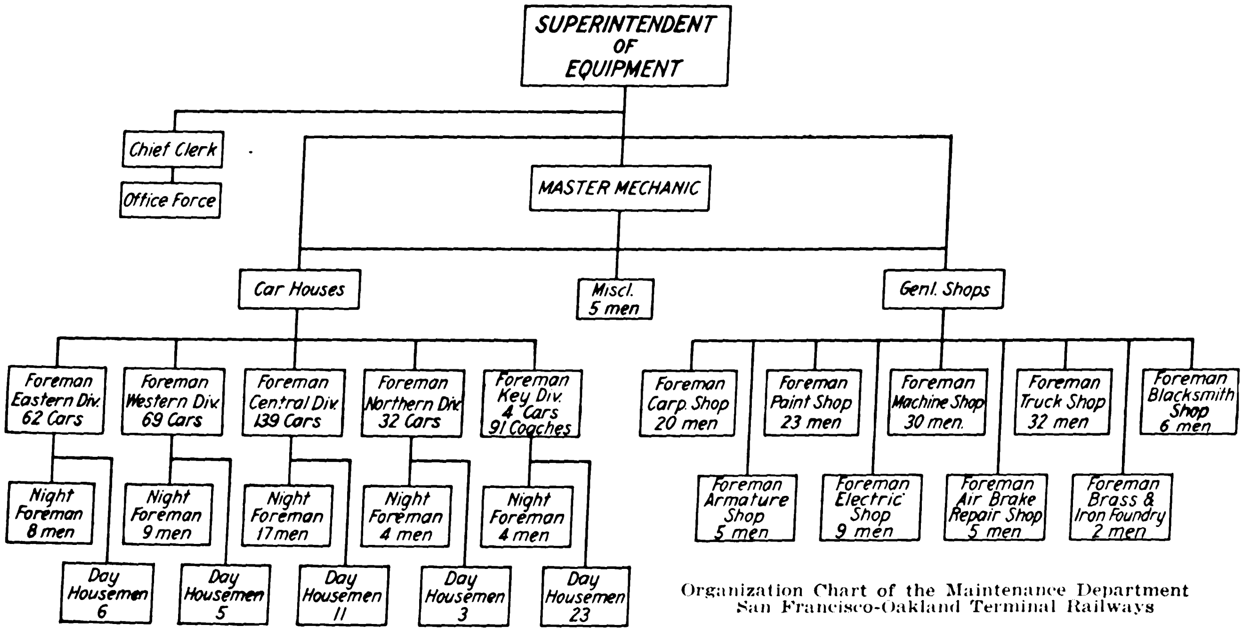
There are two subways on the system, both of which require daily pumping, but there are no large bridges or long trestles aside from the double-track trestle at the Pier Terminal, which extends at present 3 miles from shore (the longest trestle of its kind in the world). A solid fill for 2 miles of this distance is now under construction, this being the limit for which the federal authorities will allow a solid fill to extend into the bay.

Culverts installed under the tracks in paved streets are in most cases metal arch culverts of the same design as used by the municipalities, but in some cases where low rail is used in paved streets, in order to obtain clearance, concrete culverts with the upper part constructed of 40-lb. rail and concrete have been used.

Car Maintenance on the San Francisco-Oakland Terminal Railways

One Feature of the Cost Keeping Is that All Work of This Kind Is Concentrated in One Statistical Organization, Which Gives the Engineering Departments Any Desired Information on Demand

By GEORGE ST. PIERRE
Superintendent of Equipment San Francisco-Oakland Terminal Railways


SUPERINTENDENT OF EQUIPMENT
Chief Clerk
Office Force
MASTER MECHANIC
Car Houses
Miscl. 5 men
Genl. Shops
Foreman Eastern Div. 62 Cars
Foreman Western Div. 69 Cars
Foreman Central Div. 139 Cars
Foreman Northern Div. 32 Cars
Foreman Key Div. 4 Cars 91 Coaches
Night Foreman 8 men
Night Foreman 9 men
Night Foreman 17 men
Night Foreman 4 men
Night Foreman 4 men
Day Housemen 6
Day Housemen 5
Day Housemen 11
Day Housemen 3
Day Housemen 23
Foreman Carp. Shop 20 men
Foreman Paint Shop 23 men
Foreman Machine Shop 30 men
Foreman Truck Shop 32 men
Foreman Blacksmith Shop 6 men
Foreman Armature Shop 5 men
Foreman Electric Shop 9 men
Foreman Air Brake Repair Shop 5 men
Foreman Brass & Iron Foundry 2 men

Organization Chart of the Maintenance Department San Francisco-Oakland Terminal Railways

THE San Francisco-Oakland Terminal Railways department of car maintenance and construction has charge of 402 passenger cars which average about three motors per car, and about seventy miscellaneous work motors, freight and service cars. Work is also done for outside departments, as on buildings, manufacture of frogs and crossings for the track department, construction of overhead material and manufacture of miscellaneous material of all sorts on store department orders. Further, we maintain five ferry steamers.

As the average location of car equipment is but 4½ miles from the general shops all heavy repair work is done at the shops, inspection, cleaning and light repair work only being left for the carhouse forces to do.

When cars are in operating condition advantage is taken of the central location of the shops to route shop cars as trippers from outlying divisions to the central part of the city in the mornings and vice versa in the evenings.

Running Inspection and Overhauling

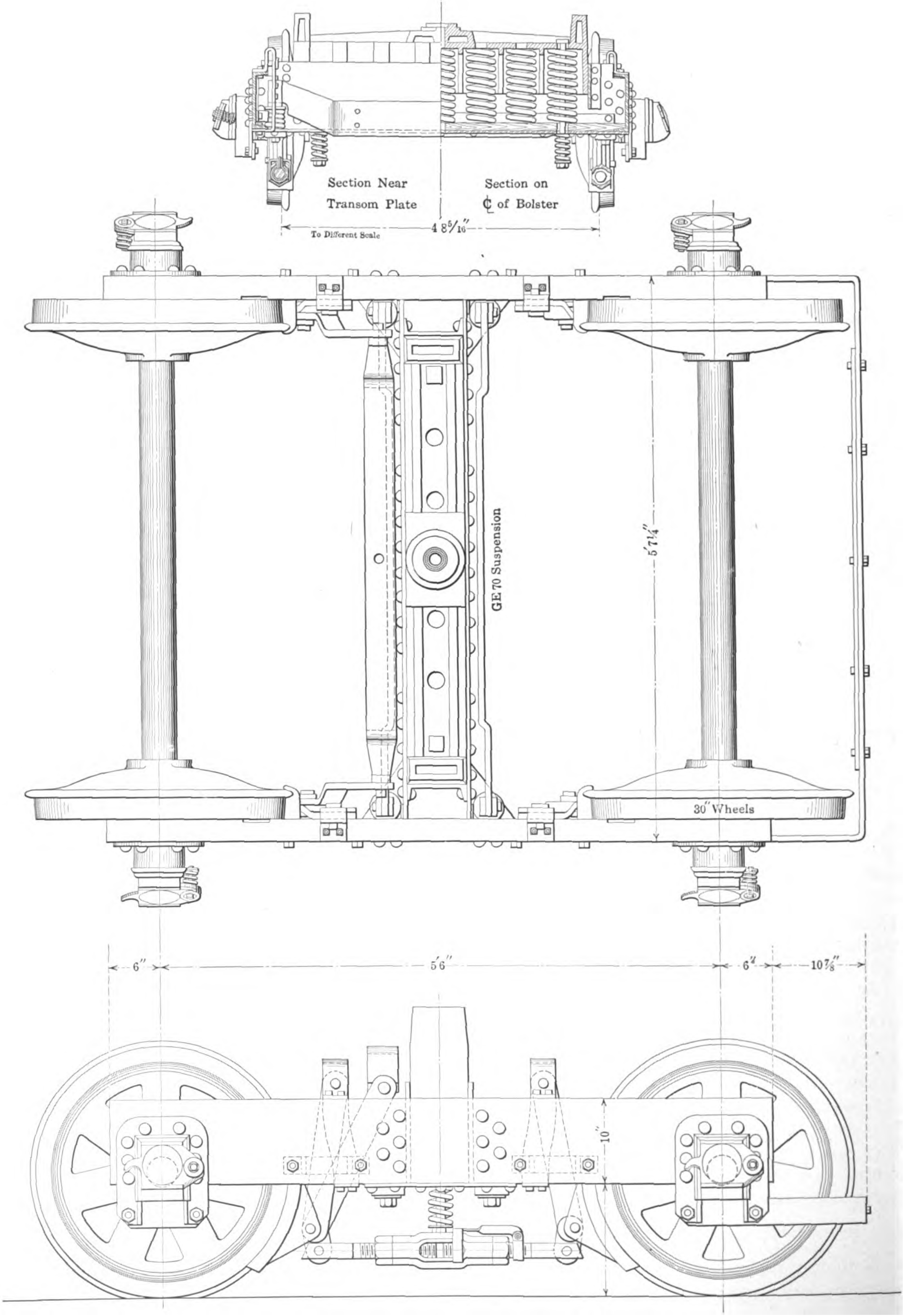
At the carhouses each car receives a running inspection daily, special attention being given to brakes, motor bolts, etc. Controllers and trolleys are lubricated every third day. General inspection and lubrication are on a mileage basis, 800 to 1500 miles being allowed between inspections according to the class of equipment. Car cleaning is done on a time basis, but cleaning periods are made to coincide with inspection periods whenever possible.

Cars are brought into shops for varnish and body overhauling every fourteen months.

Overhauling is on a mileage basis. Obsolete type motors are overhauled every 15,000 to 20,000 miles; semi-modern motors 50,000 to 75,000 miles and modern motors every 100,000 to 130,000 miles. Air compressors are overhauled on an average every 100,000 miles. These overhauling mileages are not arbitrarily adhered to, but are made to coincide whenever possible with the painting and body overhauling. We have some equipments which are varnished twice while the motors are overhauled but once.

Statistics

The company maintains a statistical department by which statistical information of any nature required is furnished to any other department on request. The several departments furnish the original information to the statistical department in the form of properly segregated charges on time cards and material requisitions.


Section Near
Transom Plate
Section on
₵ of Bolster
4 8 5/16″
To Different Scale
GE 70 Suspension
5′7¼″
30″ Wheels
6″
5′6″
6″
10⅞″
10″

Standard Passenger Car Truck Built in the Shops
of the San Francisco-Oakland Terminal Railways

The concentration of this class of work into one organization operates satisfactorily, and no doubt brings a considerable saving over the old method wherein each separate department maintained its own statistical organization. Thus the maintenance of equipment department receives from the department of statistics monthly comparative statements giving maintenance costs, total and per 1000 car-miles, on car bodies, trucks, painting, air brakes, accidents, headlights, gongs, fenders, wheel guards, broken glass, grinding wheels, route signs, coasting clocks and fare boxes, all chargeable to account No. 30; while on account No. 33-A detail charges are received giving separate costs per 1000 car-miles on each of the ten different types of controllers and the cost per 1000 motor-miles on each of the thirteen different types of motors. Costs per 1000 car-miles are also given on miscellaneous control equipment, pantograph trolleys and pole trolleys.

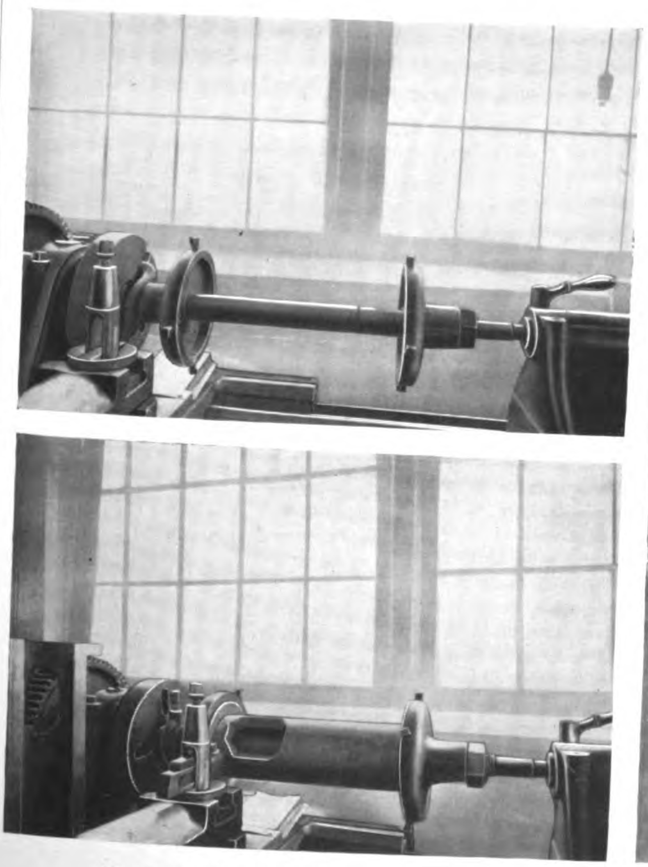
Reports are also received for each carhouse giving total costs per 1000 car-miles for lubrication (labor and material in detail) car cleaning, sanding, inspecting, switching, signing, changing cars on road, advertising, dispatching, testing fare boxes, reading fare registers, inspecting coasting clocks, fire drills, incandescent and arc lamp supplies, trimming headlights, inspecting alarm gongs, lamps and markers and general carhouse expense. Details are also given for the amounts which are spent on regular maintenance work at the various carhouses.

Monthly meetings are held with all foremen wherein these statements and other matters pertaining to department efficiency are considered.

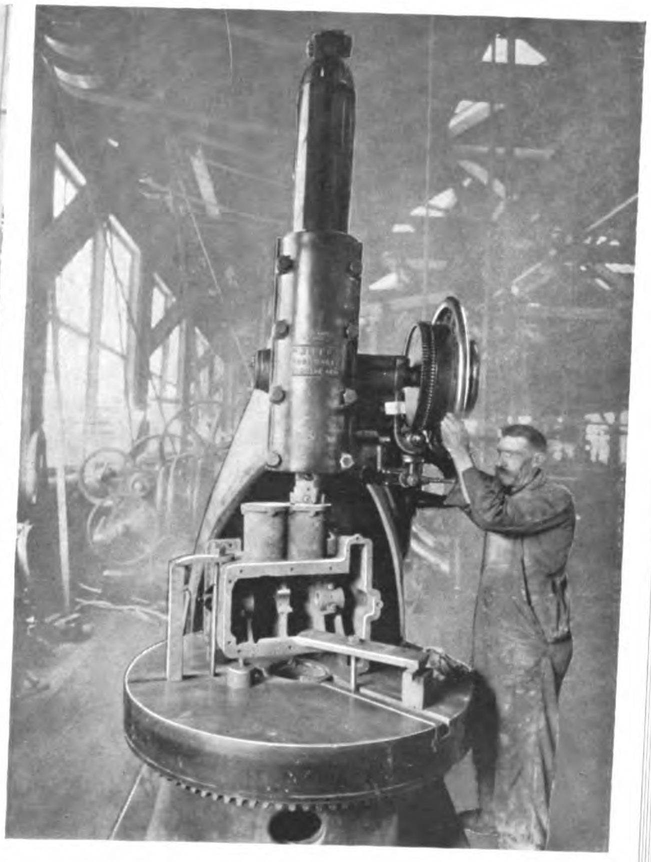
New men hired for carhouses receive a few months' training in truck and motor repair work at the company's general shops before being assigned to the carhouses.

SHOP AREAS AND EQUIPMENT

The main shops, built in 1904, consist of twelve buildings of wood frame and galvanized iron construction, including: Carpenter shop, 100 ft. x 200 ft., with twelve tracks—capacity eighteen cars; mill, 60 ft. x 100 ft. equipped with woodworking machinery necessary for car building and general repair work; paint shop, 100 ft. x 200 ft.—thirteen tracks inside and four wash tracks outside, capacity about twenty cars of various sizes; truck shop, 100 ft. x 200 ft.—fourteen tracks, capacity seventeen cars of any size. We have eleven motor-driven car hoists capable of raising eleven of the largest cars at one time, and all tracks are served with air hoists on jib cranes for truck and motor work. The building serving the machine shop, armature and air-brake departments is 70 ft. x 200 ft. and is equipped with air hoists or jib cranes and traveling trolleys where necessary.



Top View, Jig for Boring Axle Brasses; Bottom View, Brass in Place



Reboring Air Compressor Cylinder on Wheel Boring Mill

The brass foundry is 40 ft. x 50 ft., equipped with two oil furnaces for melting brass in pots and two babbitting furnaces. The iron foundry immediately adjacent is equipped with one Swartz No. 5 oil furnace for melting iron in 1800-lb. heats.

The blacksmith shop, 40 ft. x 200 ft., has ten fires and is equipped with two steam hammers and furnaces, shears and bulldozer. This department turns out all forgings for the boats and cars and all special track work. It has a capacity of turning out two new cars per week outside of the equipment and maintenance of 500 cars and five steamboats. It also turns out all material for the maintenance of way and building departments.

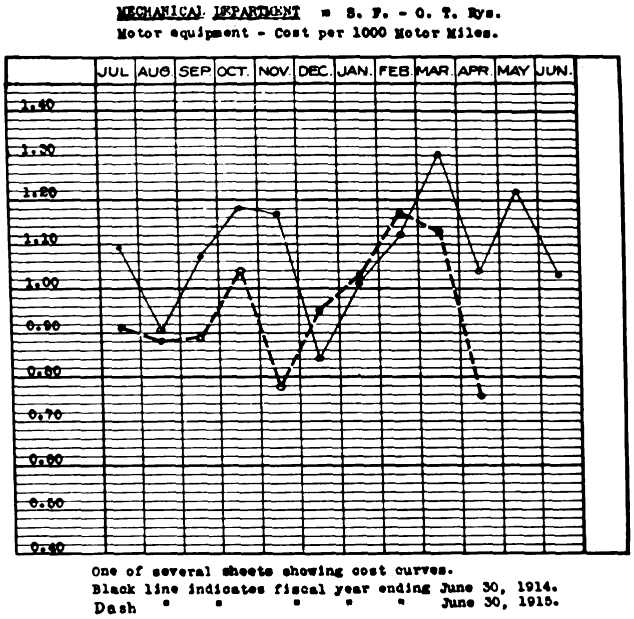
At these shops we have built ninety street cars of an average length of 44 ft. and ten Key Route cars 58 ft. long with seating capacity for sixty-eight, sixteen Key Route cars 69 ft. long with seating for seventy-four and remodeled seventy-six California type open-end cars into pay-as-you-enter type. With the exception of the electrical equipment these cars were manufactured complete at these shops.

MAINTENANCE AND REPAIR PRACTICES

Our axles are made from hammered steel. All bearings are turned and rolled in the lathe with the holder, and a revolving hardened roller is pressed up to the axle by the screw of the compound rest to insure a smooth surface and prolong the life of the axles.

Trucks made in our shops are one-piece frames riveted with ¾-in. rivets. They consist of two ½-in. x 12-in. x 5 ft. 6-in. transom plates, with ½-in. x 3-in. angles 5 ft. 6 in. long, with a ⅜-in. x 8-in. plate for the bottom and seven 5½-in. x 14-in. round 1-in. steel coil springs set in the frame with a cast-iron hollow truck bolster fitting on the springs. The sides of the truck frame are made from 10-in. channel 6 in. x 6 ft. long riveted to the transom by one 4-in. x 4-in. x ½-in. angle, on each corner of the channel. U-shaped 3-in. x 3-in. x ½-in. angles are riveted into the side frames to receive the journal box.

Axle brasses are cast in one piece, after which they are planed and put in a jig on a lathe to be turned. This jig is made to turn one pair at one setting. We turn the body and face inside of collars, and then part them in the center with parting tool, making two pairs, at one sitting. The lathe jig is made from a 2-in. shaft with two hollow heads with four set screws in each head, one solid with the shaft and the other up with the nut on the shaft. Then we turn up the brasses by means of set screws, this making very quick operation. Finally we place the brasses in a chuck and bore them.


MECHANICAL DEPARTMENT - S. F. - O. T. Rys.
Motor equipment - Cost per 1000 Motor Miles.

One of several sheets showing cost curves.
Black line indicates fiscal year ending June 30, 1914.
Dash " " " " " June 30, 1915.

Motor Maintenance Graphs, San Francisco-Oakland Terminal Railways

Armature brasses are made in our brass foundry. They are then turned, bored and tinned before babbitting. We leave a space of 3/32 in. for babbitt.

We manufacture all our own crossings, frogs and switch points with cast-iron fillers which are made in our foundry.

As the compressors become worn out in the bore of the cylinder we set them on a wheel-boring machine, trueing them up by the top and bottom of the cylinder, parts which are not worn by piston travel. We then bore the compressors ¼ in. larger than standard size within ½ in. of the bottom of the cylinder to the squared shoulder. Next we take liners made from the very best cast iron, chuck the liners in the lathe, turn and bore them at one sitting, this practice insuring true liners after cutting them off the correct lengths. We press the liners in the cylinder by using clamps with long bolts on the top of the liner and on the bottom of the cylinder. The compressor is then ready to be assembled as good as new.

When old steel tires are worn down too thin for Key Route car service we cut them up in sections, draw them out into bars and use them for all track tools such as: tamping bars, pinch bars, pick points, chisels, etc. As they are of very good steel they make first-rate tools.

Our cars are painted according to the Ce Ve process of the Chicago Varnish Company, which requires seven days to complete or nine days for service. The system may be summarized as follows: No. 1, primer for wood or iron; No. 2, surfacer; No. 3, varnish color and two coats of Supreme varnish. In addition, a glazing compound is applied over No. 2. This is put on with a brush and then knifed, sanded or rubbed with a rubbing stone. Where expeditious work is required this painting process is desirable.

Key System Pier Terminal

Maintaining Proper Relations Between a Railway and Its Car Men

Verbal and Written Communications to the Men Have Proved to Be Very Effective in Promoting Appreciation of the Operating Rules

By GEORGE H. HARRIS

General Superintendent San Francisco-Oakland Terminal Railways

THE San Francisco Oakland Terminal Railways realizes that no other one thing is more productive of satisfactory operation, both from the standpoint of the company and the public, than a proper understanding on the part of the car men as to what is expected of them in carrying out the rules and regulations of the company.

In order to keep the men fully informed in this respect our company has for some time held periodical meetings for the car men in a schoolroom specially provided for the purpose. At these meetings short talks on matters pertaining to operation are made by the chief instructor, division superintendents and other officials, after which the car men present have an opportunity to bring up and discuss any subject of interest.

These discussions frequently result in bringing out valuable suggestions from the men and give to them an opportunity to present their viewpoint on any subject under discussion.

In addition to these meetings it has been the practice for some time to issue monthly pamphlets which are distributed to the men with their pay checks. These pamphlets are of a size convenient to be carried in the pocket, and deal with various subjects of operation, such as: "Courtesy," "Service," "Co-operation," "Slippery Rails," "Accidents," "Coasting," "Safe and Comfortable Operation," etc. This method of getting important points of operation before the men has also proved effective, notably in the case of a pamphlet on "Coasting."

It is a well-known fact that with the installation of coasting clocks, if the motormen are not properly instructed on coasting they are likely to get an entirely erroneous idea of the manner in which a car should be operated to obtain the desired results. All cars of this company are equipped with coasting clocks and at the time of installation every effort was made fully to instruct the motormen on coasting. First two, then later one coasting inspector has been regularly employed to look after this work, but with a large number of cars in operation the instructor is not able to get around to each motorman at close intervals. As an aid to this important work a "Coasting" pamphlet was issued.

In this pamphlet the more important points in connection with coasting were briefly set forth, serving the motorman as a rule book, as it were, to which he might frequently refer. It was found that this pamphlet was of much benefit in bringing to the attention of the motormen the proper manner in which a car should be operated to obtain the greatest amount of coasting. In this case also, as with other similar pamphlets, a better understanding with the men was obtained.

The spirit in which our pamphlets are written is exemplified by the following extract from the one issued in February in connection with the exposition:

"To Motormen, Conductors and Collectors:

"During the present year the company will be called upon to handle an increased number of passengers, on account of the Panama-Pacific International Exposition, many of whom will come from all parts of the United States and foreign countries.

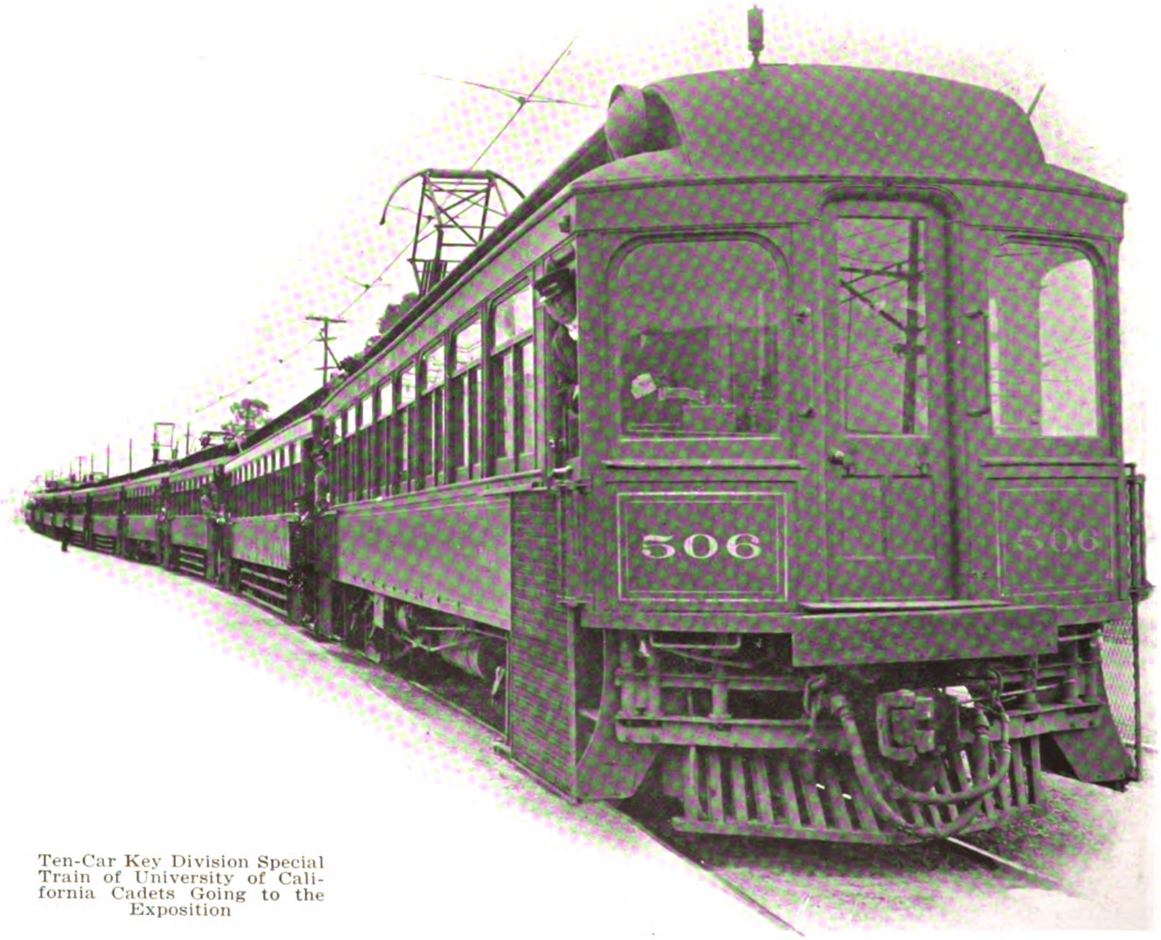
"These visitors will not be familiar with the city, or car routes, and they must naturally look to some one *who knows* to direct them to their desired destination, and to the various points of interest in and around the East Bay cities.

"It is to this class of patronage that I wish to draw your special attention at this time. The strangers in our city will look to the car men more than to any other public employees to give them information about the city, and to direct them how to reach any point therein. May I therefore impress upon each of you the importance of thoroughly familiarizing yourselves at this time with the various car routes operated by the company, and the territory into and through which each line runs, so that *you* will be the one *who knows* and can direct the stranger?

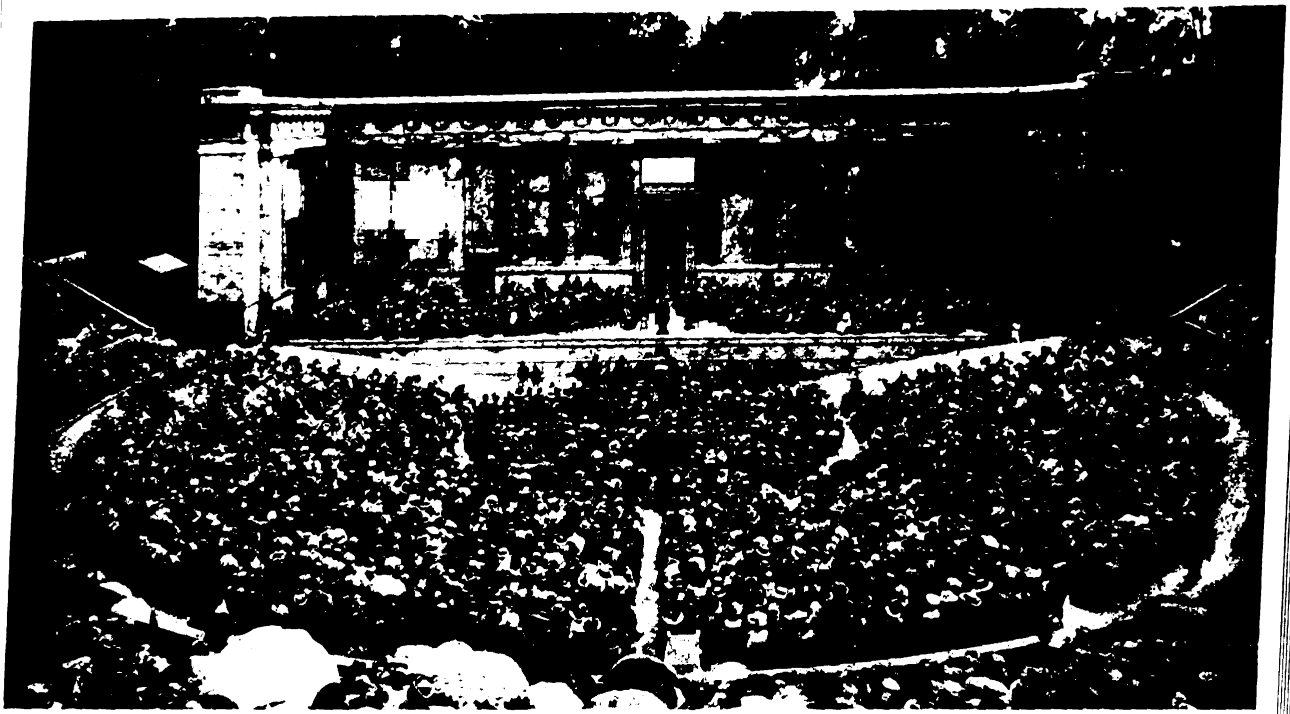
"In addition to the service now in operation the company will inaugurate and maintain during the exposition period a direct ferry service between the Key System pier and the exposition grounds. A heavy expense has been incurred in preparing for this service and we want your full co-operation in making it a success.

"To derive the greatest benefit from this service and to make it entirely satisfactory to the public, cars, trains and boats must be operated on schedule as near as possible; the public must be able to readily obtain information relative to the service, and it will be *you* from whom they will naturally expect to be able to get the information desired."

As a rule it is not a difficult problem to obtain satisfactory service from car men, and to have the most cordial relations exist between them and the company, provided they are properly instructed as to their duties when first starting to work and also if they are followed up by interesting methods of bringing the more important points of operation before them, somewhat along the lines described. Under this plan it has been observed that a majority of the men make an effort to concentrate their minds on the work and endeavor to carry out their duties in an entirely satisfactory manner.



Ten-Car Key Division Special Train of University of California Cadets Going to the Exposition



Greek Theater in Berkeley

Building Up Local Pleasure Travel to Points in the East Bay Cities

Co-operation with Privately-Owned Parks Is a Regular Feature—Special Provisions Have Been Made to Facilitate Direct Travel to the Exposition

By J. H. BROWN

Traffic Manager San Francisco-Oakland Terminal Railways

THE development of pleasure travel on the urban and interurban lines of the San Francisco-Oakland Terminal Railways is retarded to a certain degree by the geographical location of the cities served on the east side of the Bay of San Francisco, the movement of the pleasure traveling public being toward San Francisco. This condition is not dissimilar to the condition prevailing in other territory contiguous to a large city.

San Francisco, with her beautiful parks, ocean view and bohemian life, offers inducements to all classes of the public and affords competition that our local pleasure resorts meet only to a certain degree. Different inducements are offered local pleasure travelers to influence their trips between various points in the East Bay cities.

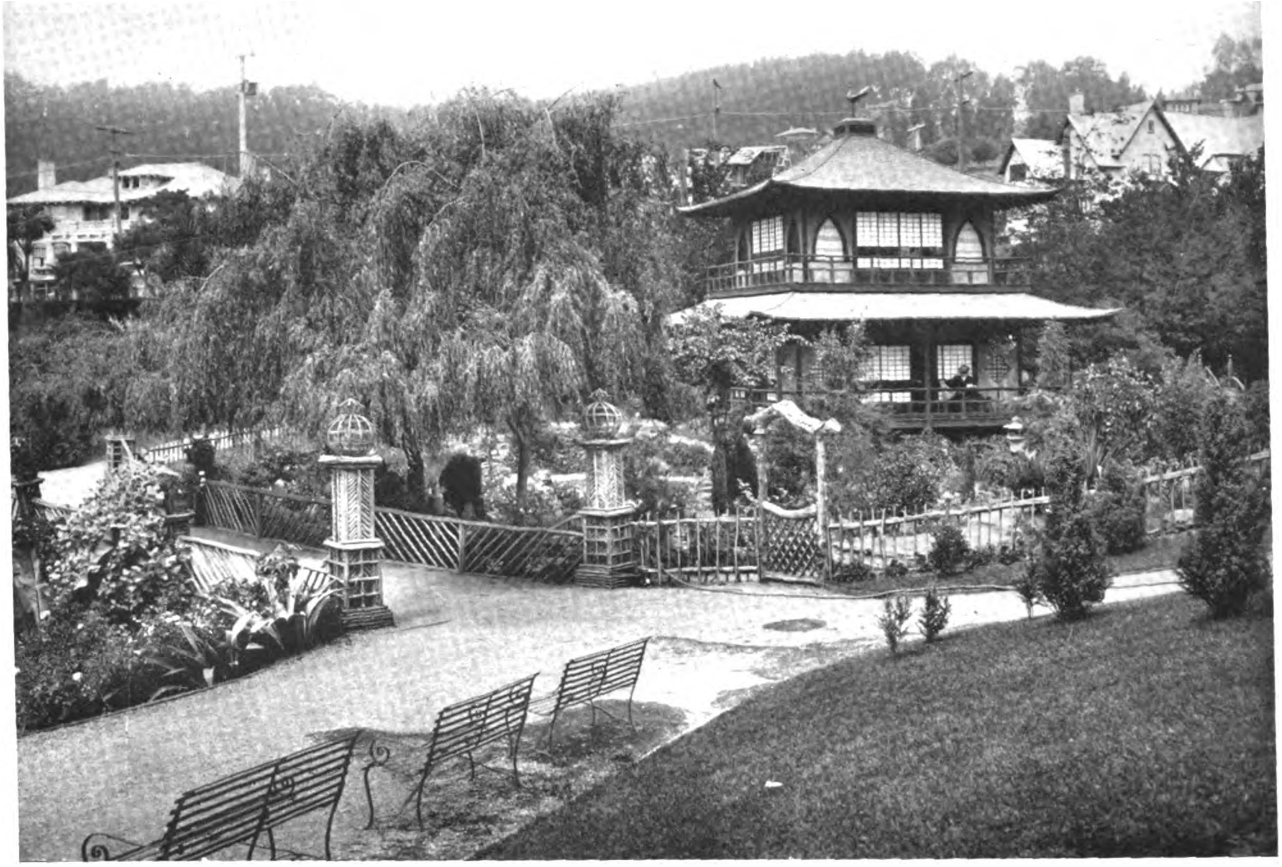
This company maintains a beautiful park adjacent to Richmond to which free admission is given to all organizations, except such as desire the exclusive use of the park or charge an admission thereto. No liquor privileges are permitted in this park, an arrangement which is very popular with Sunday schools and fraternal organizations of San Francisco and the East Bay cities. Thereby, in a way, we offset the regular pleasure travel toward San Francisco.

Oakland and her sister East Bay cities maintain and support a number of the best equipped children's playgrounds on the Pacific Coast. These, to a certain extent, influence pleasure travel during the school vacation period.

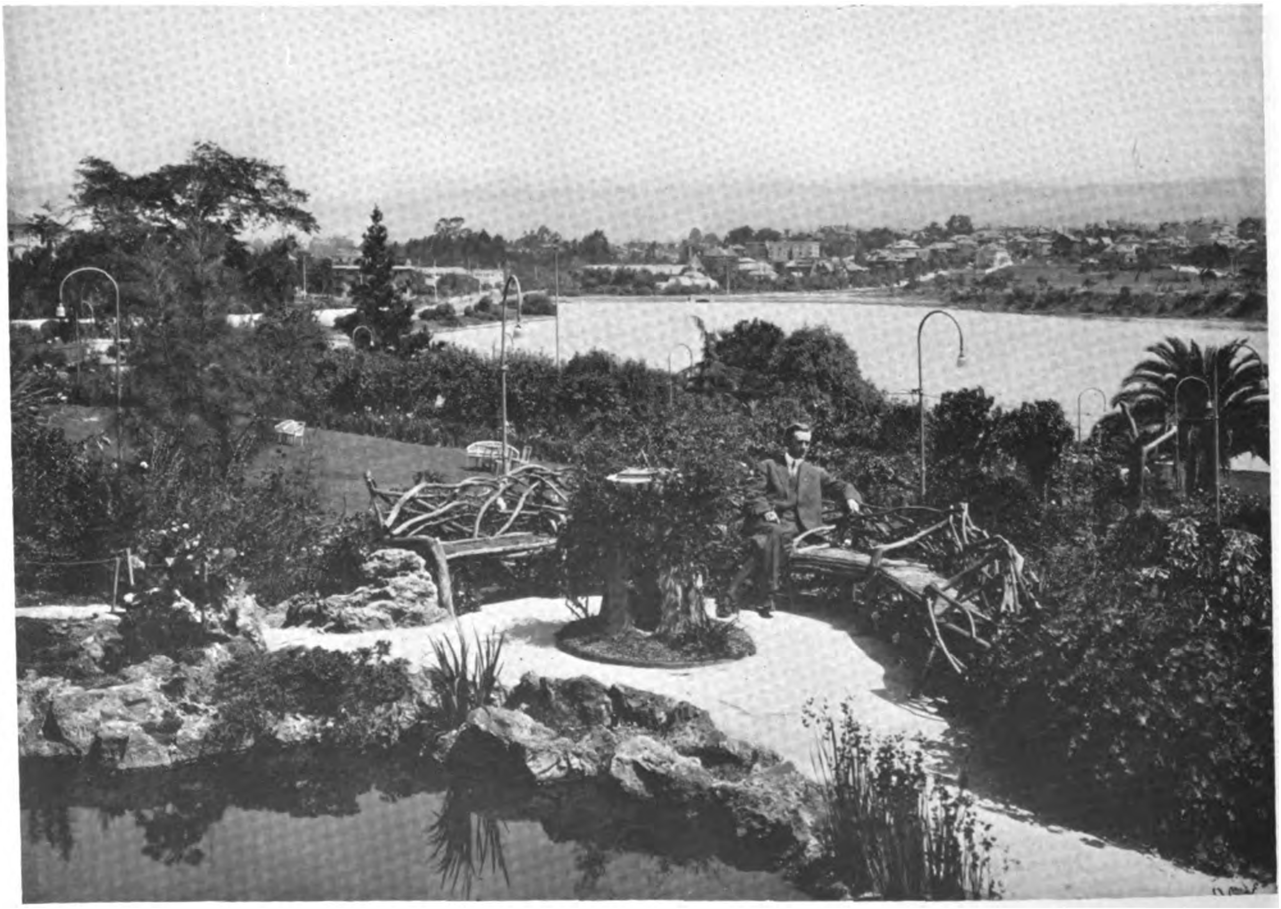
In addition to the foregoing pleasure resorts there are a number of privately-owned picnic parks, some with and some without liquor privileges. The managements of such parks, of course, have their regular bookings of picnic parties, and our traffic department co-operates with them in every way possible, thereby assisting them in securing bookings with the result that, to a certain degree, these resort managers act indirectly as passenger agents for our company. As a medium of making friends for the company, I believe this policy of dealing with privately-owned parks is a good thing.

INVITING TOURISTS TO SEE US

San Francisco has always been a magnet for the tourist travel, and with the Panama-Pacific International Exposition located in her boundaries this year she offers a greater attraction for tourists than any other city in the United States. The method of inducing a large number of these tourists to cross the bay and visit the East Bay cities is



Tea House at Piedmont Park



A View in One of Oakland's Public Parks

being worked out through the co-operation of Alameda County, the various civic organizations, hotel association and this company by the distribution of attractive advertising matter and personal solicitation by the various arganizations mentioned.

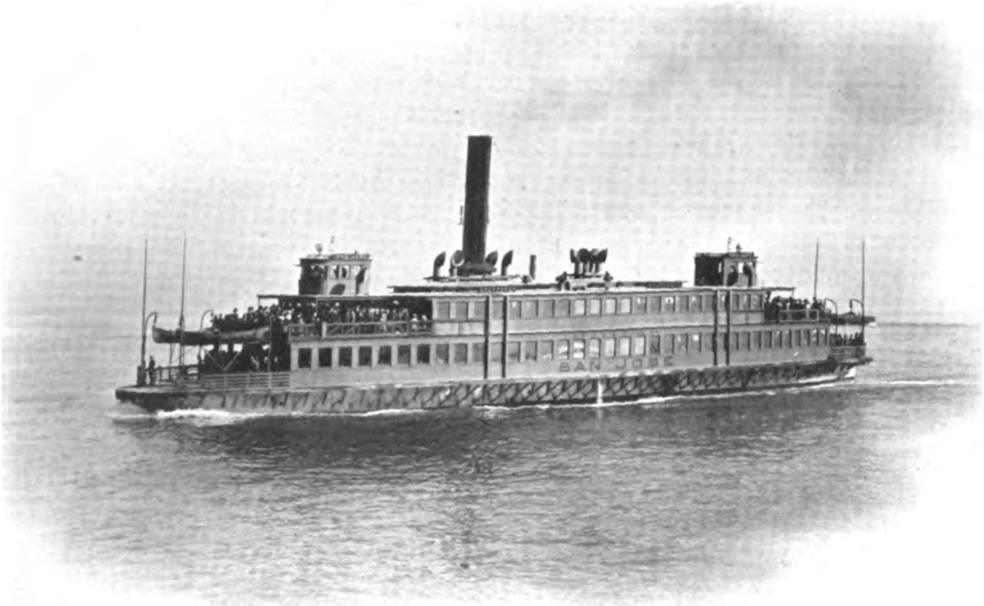
In addition to its large exhibit at the Panama-Pacific International Exposition, the county maintains exhibits and information bureaus throughout various Eastern cities, at the San Diego Exposition and Los Angeles through which the advantages of the East Bay cities receive publicity.

For the Panama-Pacific International Exposition tourists, this company has established a special visitor's ticket good for transportation direct from the exposition grounds to and through various points in Oakland or Berkeley and return to San Francisco proper. These tickets are on sale only at the exposition grounds and receive publicity through the medium of a pictorial folder containing a bird's-eye view depicting an area of approximately 75 square miles of the territory served by our lines. This folder also contains a number of photographic reproductions of points of interest in the East Bay cities, with complete information regarding various car lines serving such points.

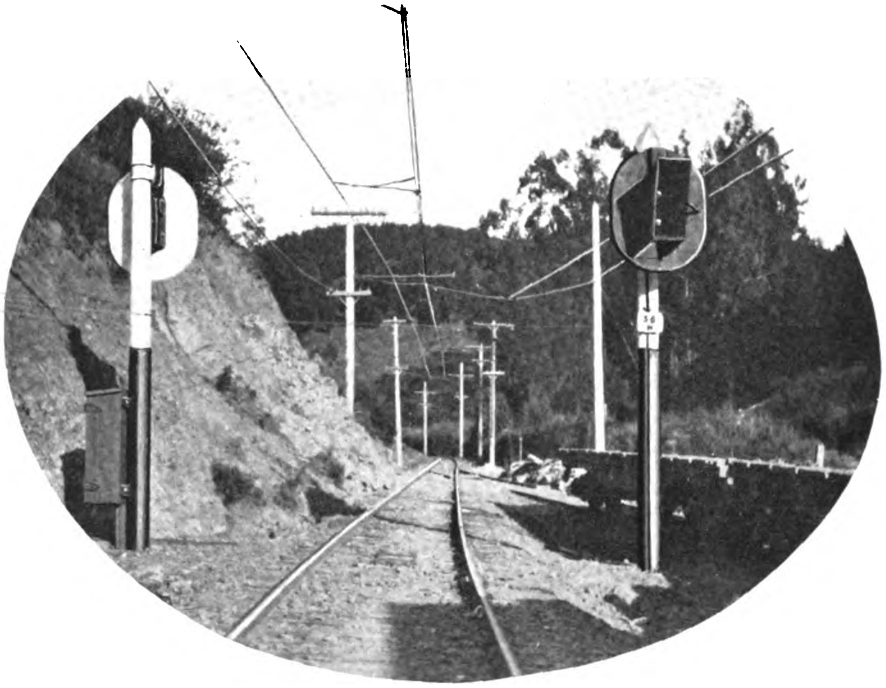
In the printing of such folders we have used a soft tone of green color on a white background, thereby avoiding strong and distinctive colors. The soft color tones used have met with many favorable comments from the public.

As the San Francisco-Oakland Terminal Railways is the only company operating a direct ferry service between the cities of the east side of San Francisco Bay and the exposition, we are often called upon to handle peak loads which are subject to attendant congestion at ticket agencies, inasmuch as no exposition tickets are sold on our cars. To avoid possible congestion at agency points, we have our tickets on sale at many hotels and business houses, the proprietors of which act as our ticket agents without remuneration. The popular demand for such class of tickets carries with it an advertising value to such agents, and in all cases we have found them very glad to offer such an accommodation to their guests or customers. As these selling agencies are distributed in such a manner as to cover practically all main-line points we are enabled to handle large crowds with little or no congestion at any one ticket office.

At our pier terminal we have constructed a large waiting room with twenty-five entrances, arranged in such a manner that we can handle any size crowd without delay. Exposition passengers pass from this waiting room through exit doors, where count is made, and board boats. We are thus enabled to keep an exact count of passengers boarding boats and also to close the exit gates immediately upon loading a boat to its maximum, thereby avoiding overloading any boat. The patronage of this service bespeaks its popularity.



Key Division Boat on San Francisco Bay, Headed for the Panama-Pacific Exposition



Signals at Hartens

Signal Operation on the Oakland, Antioch & Eastern Railway

By F. A. MILLER

Superintendent of Power and Equipment

THE Oakland, Antioch & Eastern Railway is a purely interurban high-speed railway operating out of Oakland for 85 miles of route east and north to Sacramento. At Oakland we have trackage rights over the lines of the San Francisco-Oakland Terminal Railways so that we can run cars to that company's ferry terminus.

The greater part of our line is, of course, single track with sidings at intervals varying from 2 to 5 miles. Our passenger trains are run up to a maximum speed of 62 m.p.h., although our cars are geared for 55 m.p.h. Trains consist either of motors and trailers or of locomotives and trailers. We also have extra fare parlor buffet cars with porter service. The locomotives are used chiefly for special excursion service as they can haul five 60-ft. sixty-seat cars at 57 m.p.h. on level track. Westinghouse 600-1200-volt motors and HL control are used throughout.

Between Oakland and Bay Point 30 miles distant we operate a mixed through and local service; beyond that point to Sacramento all passenger trains are of through character, connecting with the Northern Electric Company at Sacramento, where parlor cars are attached to trains of that company, thus giving through service to Chico, 180 miles from Oakland. We operate also four branch or feeder lines on which we give local passenger service.

Our freight service is so arranged that one local train is operated between Oakland and Bay Point and another between Sacramento and Bay Point, which is our place of car and l. c. l. interchange with the Southern Pacific and Santa Fé Railways. At Oakland we interchange with the San Francisco-Oakland Terminal Railways and at Sacramento with the Northern Electric Railway. The freight trains, which are hauled by electric locomotive, leave Oakland at 8.50 p. m. and Sacramento at 6 p. m. respectively, meeting at Bay Point. The freight train for Oakland reaches that city by 4 a. m., and the Sacramento train reaches its depot about 5 a. m. The last passenger train leaves Oakland at 8.30 p. m. and the first morning train does not leave Oakland until 7.50 o'clock, so that there is no interference whatever with freight. On the other hand, the last passenger train out of Sacramento leaves at 7 p. m., overhauling the out-bound freight at Headquarters siding. In the morning, however, the freight and train has returned to Sacramento two hours and fifteen minutes before the first passenger train leaves. Freight trains run up to 35 m.p.h.

In general, our through passenger trains are run on a two-hour headway and local trains on the hours between. Therefore, between Oakland and Bay Point we have one train an hour each way, but the limited trains each way, one in the morning and one in the afternoon, do not stop in the entire run of 85 miles between Sacramento and Oakland. The lim-

SIGNAL MAINTAINER'S TROUBLE REPORT

..........6/16...........1915

To........F. A. Miller, Sig. Supt...

Following Apparatus R. B. O. by........Condr. #11...............

..........Sig. 691H..........*at*................11.37....*A.M.*.

Report received by me...

While at........Train #11..

Arrived at apparatus at........11.37......................*A.M.*

Repaired and O. K. at........1.00...........................*P.M.*

Reported O. K. to........Dispatcher........*at*....1.00......*P.M.*

Following trains delayed........#11 about 2 minutes.............

Cause of failure:........Section gang lining track at Millor spur put switch-box out of adjustment...

....................................Manear........*Maintainer*

SIGNAL MAINTAINER'S DAILY INSPECTION REPORT

..........6/15............1915

To Superintendent of Signals:
The following signals and signal apparatus have been inspected by me and found in the condition noted:

No. of Signal		No. of Signal	
462D	Lamp No. 2 B. O.	544D	O.K.
464H	O.K.	546N	"
465H	"	547H	"
467D	"	549D	"
490D	"	562D	Lamp No. 2 B. O.
492H	"	564H	" " "

..............Manear.............. *Maintainer*

SIGNAL LAMP RECORD

Signal No. 178-D *Location* Saranap

Lamp No.	Make	Volts	Date In	Date Out	Remarks
2	Westinghouse	120	3-5-15	4-19-15	2 to 1
1	Westinghouse	120	3-5-15	4-19-15	Burnt out

Signal Maintainer's Daily Report Forms; Signal Lamp Record

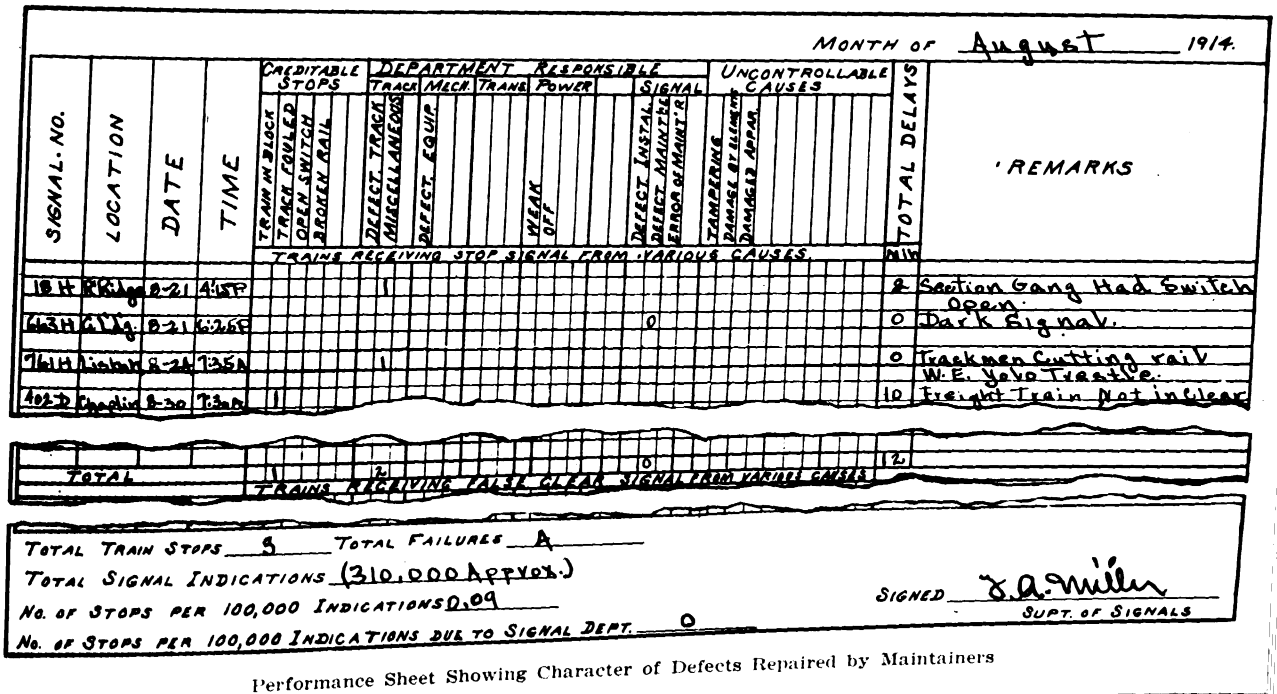
iteds make this run in two hours forty-five minutes exclusive of four minutes' running time on about 0.39 mile of city track in Sacramento.

CHOICE OF SIGNALS

The present signal system was completed in May, 1914, following the extension of the original Oakland & Antioch Railway from Lafayette to Oakland, at which time the service was altered from suburban to interurban type. The original line had no signals whatever. The system now in use was furnished by the Union Switch & Signal Company, both for the section between Oakland and Bay Point and the last extension completed September, 1913, to Sacramento. This signal installation is the only a.c. track-circuit system in the vicinity of San Francisco which uses light signals.

The signal system is operated by sixty-cycle current which is supplied to the signal mains at 2200 volts at Eastport and Concord for the signals from Oakland to Mallard, and at Dozier or Lisbon for the signals from Chipps to Sacramento. At Concord current at 2200 volts is available, but at the other places two transformers are installed to step down the voltage from 11,000 to 2200. A double-pole, double-throw oil circuit breaker connects either transformer to the line.

The transformers at Drawbridge substation are not in use on the signal system at the present time. At signal locations and cut sections 0.6-kva. transformers supply current at 110 volts for relays and signals. Adjustable-core transformers feed the track circuits at the center, though about twenty less than 4000 ft. in length are end-fed. All spurs have a light switch indicator to show when a train may enter the main line. Sidings having one set of home signals are provided with light switch indicators at the east ends; sidings having two sets



MONTH OF August 1914.

Signal No.	Location	Date	Time	Creditable Stops: Train in Block	Creditable Stops: Track Fouled	Creditable Stops: Open Switch	Creditable Stops: Broken Rail	Track: Defect. Track	Track: Miscellaneous	Mech.: Defect. Equip.	Power: Weak	Power: Off	Signal: Defect. Instal.	Signal: Defect. Maint'ce	Signal: Error of Maint'r	Uncontrollable Causes: Tampering	Uncontrollable Causes: Damage by Element	Uncontrollable Causes: Damaged Appar.	Total Delays Min	Remarks
18H	R.Ridge	8-21	4:15P					1											2	Section Gang Had Switch Open.
663H	C.Vlg.	8-21	6:26P										0						0	Dark Signal.
761H	Lisbon	8-24	7:35A					1											0	Trackmen Cutting rail W.E. Yolo Trestle.
402D	Chaplin	8-30	7:30A	1															10	Freight Train Not in clear
TOTAL				1		1		2					0						12	

TRAINS RECEIVING STOP SIGNAL FROM VARIOUS CAUSES.

TRAINS RECEIVING FALSE CLEAR SIGNAL FROM VARIOUS CAUSES

TOTAL TRAIN STOPS 3 TOTAL FAILURES 4

TOTAL SIGNAL INDICATIONS (310,000 Approx.)

NO. OF STOPS PER 100,000 INDICATIONS 0.09

NO. OF STOPS PER 100,000 INDICATIONS DUE TO SIGNAL DEPT. 0

SIGNED F. A. Miller
SUPT. OF SIGNALS

Performance Sheet Showing Character of Defects Repaired by Maintainers of home signals are provided with light switch indicators at both ends.

Signals are hung on cedar poles, 25 ft. long, 7-in. tops, shaved and painted. All wiring is carried down poles and underground in redwood trunking and galvanized conduit. Bonding at switches and frogs and connections to impedance bonds are No. 0000 D. B. W. P. stranded copper.

Track circuit wiring is No. 6 copper, rubber-covered, and all connections between line wires and signals and relay boxes are made with No. 12 and No. 14 copper, rubber-covered. Spare wires are drawn through all conduits. Distant signals (non-automatic) placed 1000 to 2000 ft. in advance repeat the indications of their respective home signals. The overlaps favor west-bound trains; they vary in length from 300 ft. to 400 ft.

Two No. 6 bare copper wires for the signal mains and three No. 10 D. B. W. P. copper wires for common and east and west-bound control were strung by the line department. Distant signal and switch indicator wires were strung by the signal department. The number of miles protected is 85; the number of home signals, 117; the number of distant signals, 90; and the number of crossing signals operated in conjunction with signal system, 14.

BEHAVIOR OF SIGNALS

We have approximately 300,000 signal movements per month, and our averages for the twelve months from May, 1914, to May, 1915, show as follows:

Total train stops	7.3
Total failures	9.07
Number of stops per 100,000 indications	2.02
Number of stops per 100,000 indications due to signal department	0.5

The signal system auxiliaries comprise fourteen automatic flagmen highway crossing signals which are operated from the track circuits. They ring a bell, swing an arm and show red and white lights. The flagmen originally were operated from the 1200-volt d.c. trolley circuits, but we found that the maintenance costs would be decreased by using alternating current at 110 volts in place of 220 volts direct current. The flagmen were furnished by Bell & Jamison, Los Angeles.

Three men are employed exclusively for the maintenance of all signals and telephones. Each man has approximately one-third of the mileage to inspect and maintain. Gasoline cars of Mudge type are used to get over the line quickly. It may be added that we began with four signal maintainers, but increasing experience leads us to believe that two men will suffice in the near future.

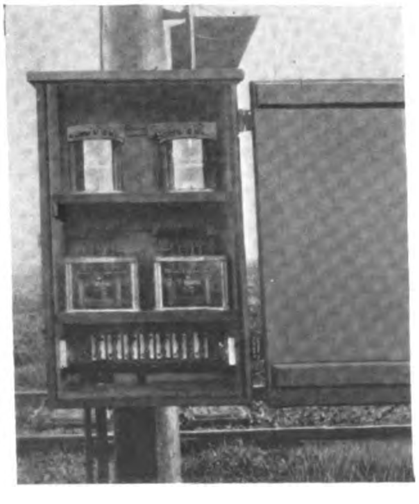
The maintainers must report to the dispatcher every hour, thus furnishing an account of their movements and giving the dispatcher the information needed to enable him to locate the maintainers quickly in case of telephone trouble and the like.

The principal trouble experienced is broken and burnt-out lamps, this amounting to about two per month. To minimize such failures each signal location is supplied with a signal lamp record (illustrated) which shows the period the lamp has been in service. We use a 112-volt 25-watt GE-18½ tungsten bulb, the average life of which is four months of twenty-four hours a day. Other signal troubles are so rare that they can scarcely be called recurrent.

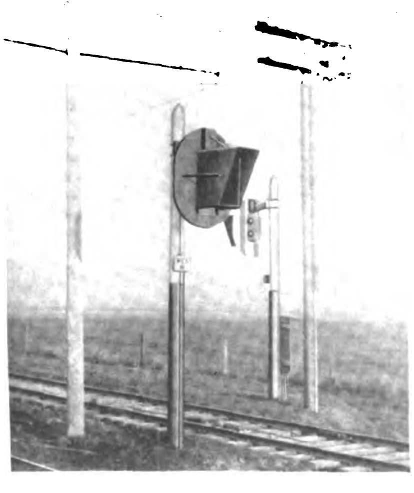
In addition to the regular system on our own lines we operate a Westinghouse electro-pneumatic interlocking plant with eleven active and twelve spare levers at our Oakland connection with the San Francisco-Oakland Terminal Railway.

The total maintenance cost of the track circuit signals, highway crossing automatic flagmen, electro-pneumatic interlock and telephones averages $400 per month, including both labor and material.

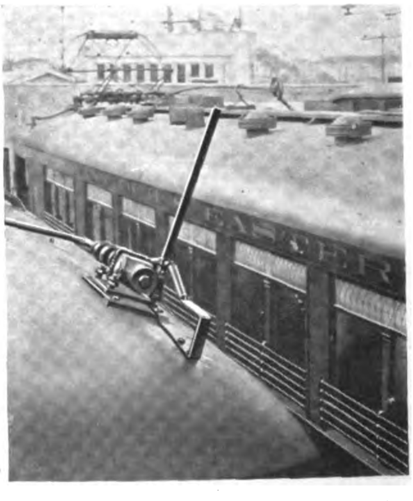
Although we have every confidence in the signal system we do not feel that we would be justified in having it take the place of regular train order dispatching. Both practices in co-operation appear necessary to secure the greatest degree of safety.



Signal Box Ready for Inspection



Side View of Light Signal



Automatic Train Stop in Key Route

MANOR
SAUSALITO

Typical Eight-Car Suburban Train on the Northwestern Pacific

Signal, Bonding and Contact Rail Notes on the Northwestern Pacific

This Company's Pioneer A.C. Track-Circuit Signal System, Installed in 1903, Has Made an Excellent Record in Maintenance—Soldered Bonds Are Also Used Successfully Despite Earlier Failures

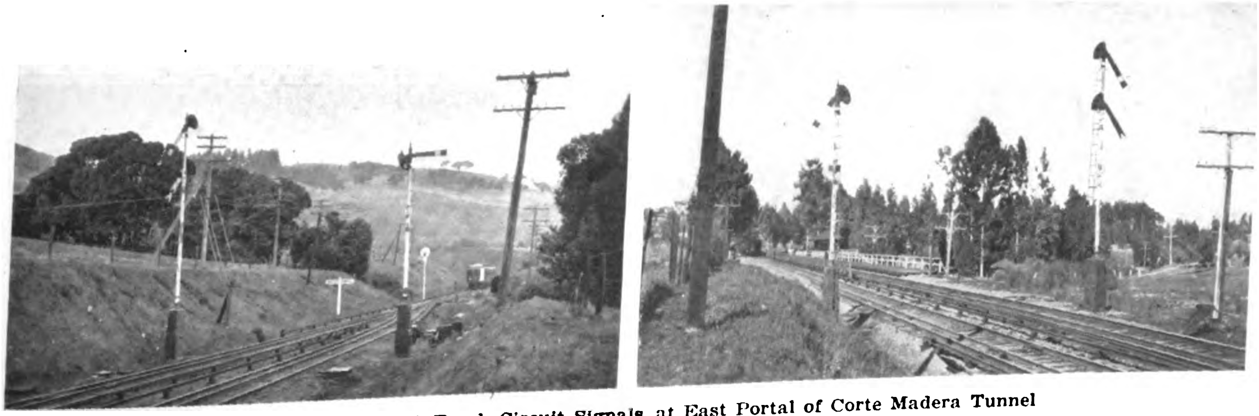
By F. T. VANATTA

Chief Electrician Northwestern Pacific Railroad, Sausalito

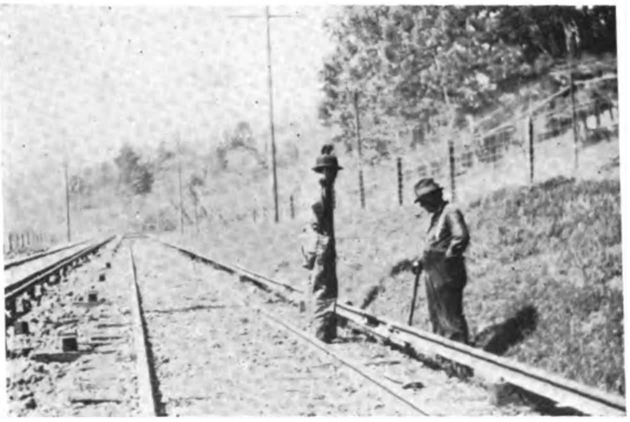
THE Northwestern Pacific Railroad is one of the few third-rail lines on the Pacific Coast and the first of its kind in this territory. We operate a total of 32.6 miles of single track electrically, the rest of our mileage being steam. A peculiar feature of the service is the operation of both standard-gage steam and electric and narrow-gage (3 ft. 6 in.) steam trains, the narrow gage being formed by a third running rail as illustrated.

Because of the mixed steam and electric operation with two gages unusual signal arrangements prevail. On the double track between Sausalito and Corte Madera all six rails are used for the railway return circuit. The narrow-gage rail is tapped into the center of the inductive bonds of the signal circuits, and the transformers and relays of the signal equipment are connected across the narrow-gage track. Ordinarily the connection would be from outside rail to outside rail, but this would not give satisfactory signaling for narrow-gage trains. The signals on this section are operated by alternating current.

Between Corte Madera and San Anselmo the two



Twelve-Year-Old A.C. Track Circuit Signals at East Portal of Corte Madera Tunnel



First Step in Moving Live Conductor Rails

common rails are used as a signal rail, the other four serving for the railway return. This arrangement was the original one for all electric track, but on this section the signal rails are not yet required to increase the capacity of the railway return. The signals on this section are direct current, operated from storage batteries in the signal cases, these batteries being charged from the third-rail.

One addition made by us to improve the efficiency of the signal system is a change in the control of the signals which govern short single-track sections, particularly of single-track or gauntlet track in tunnels. The standard signal post was cut down until the blades in their horizontal position were 12 ft. from the top of the rails to remind the motormen that they were for a special purpose, and also to bring the operation within their line of vision from the train as they ran by. The signal which has the preliminary is held normally at danger, its control circuit being looped through a mechanical switch of the signal at the opposite end of the block section. Hence this signal cannot be cleared until the opposite signal has been brought to the stop or danger position. When a train enters the preliminary of the block section it throws the signal at the opposite end, which will allow this train's proceed signal to go to clear if there is no other train in the block.

This signal installation is notable as the first a.c. track-circuit outfit installed by the Union Switch & Signal Company. The first equipment, placed in 1903, was for 10 miles of double track, and this has since been extended to cover the 32.6 miles of electric track and 8 miles of the steam track. During the entire period of its service this pioneer installation has proved entirely satisfactory. To-day, after twelve years' use, the upkeep expense is not appreciably more than when the apparatus was new. On several occasions the signals have more than paid for their cost, notably in giving warning of broken rails in our 2200-ft. tunnel near Corte Madera.

Twelve-Year Old A.C. Track Circuit Signals at Ross

Second Step in Moving Live Conductor Rails

We have five interlocking plants, one of which is of the General Railway Signal Company's all-electric type, two of the Union Switch & Signal Company's mechanical type and one of the latter company's all a.c. electro-pneumatic type, and one of the same company's all d.c. electro-pneumatic type.

SUCCESSFUL SOLDERED BONDS

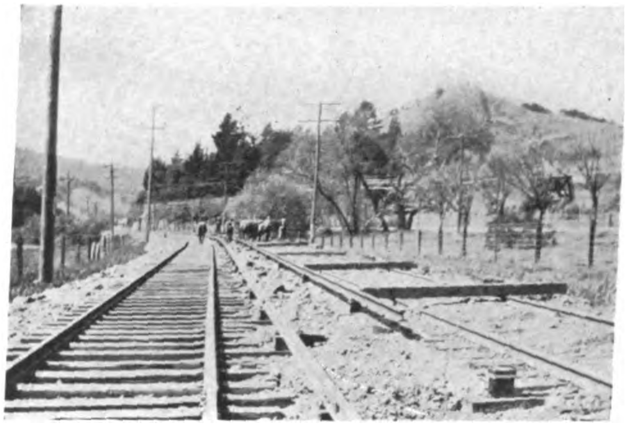
We can also lay claim to some pioneer work in soldered bonds. Our first bonds, placed in 1903, were of the plastic alloy or mercury amalgam type. These soon went to pieces. Next we tried a short-ribbon bond which was soldered to the ball of the rail. These bonds, including the loop, were only 8 in. long over all. They were soon shaken off, partly because of bad soldering and partly because vibration broke the short ribbons. In 1906 we adopted a third bond but stuck to the soldering principle as we felt that success would come with a better design and more experience in application. The new bond was of wire strand type with T terminals, was of 300,000 circ. mil capacity and 8 in. to 9 in. long between the centers of the terminals. This bond has proved entirely satisfactory.

As the soldered bond has lost favor during the past few years, it is proper to explain why we have retained faith in it. The failures with our first soldered bond taught us that the question of temperature during application was all-important. To apply a bond we first chip the rail and then heat the chipped section just enough to permit tinning instead of trying to bring the rail to a temperature hot enough to melt the solder. The bottom edge of the bond is then held against the rail with the top edge about ¼ in. away. The gap at the top is then filled with solder melted with the gasoline torch. Heat is applied to the terminal until the solder is just warm enough to handle in the way that a plumber wipes a joint. Next the bond is straightened, and the extruded solder is wiped off, thus completing the job. Two men average eighty bonds in a ten-hour day.

Third Step in Moving Live Conductor Rails

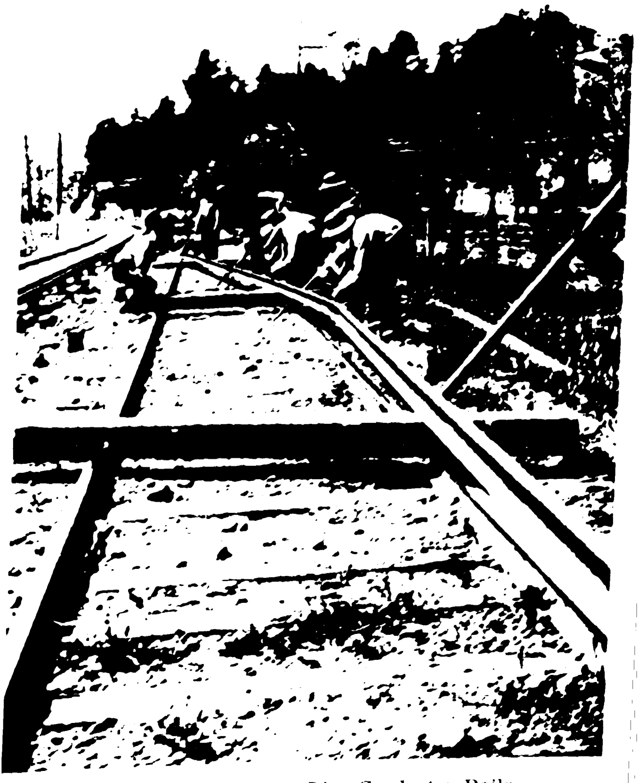
A soldered bond correctly applied in the manner described has between the terminal and the rail a cushion of solder which is thick enough to absorb a good share of the rail vibrations. On the other hand, the use of excessive heat causes the solder to run down and spread until it is little more than a film. We also use soldered bonds on our contact rails, their terminals being attached to the base of the rails.

TRANSFERRING CONTACT RAILS ALIVE

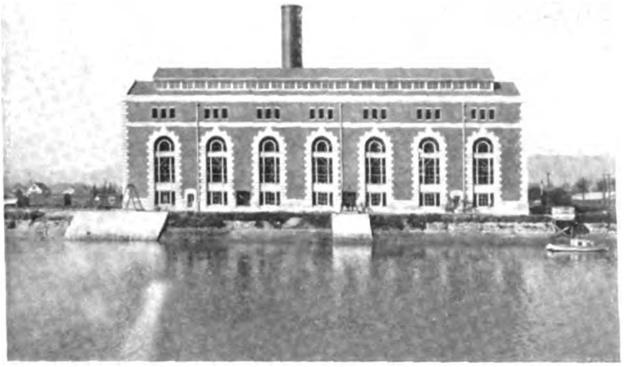


Fifth Step in Moving Live Conductor Rails

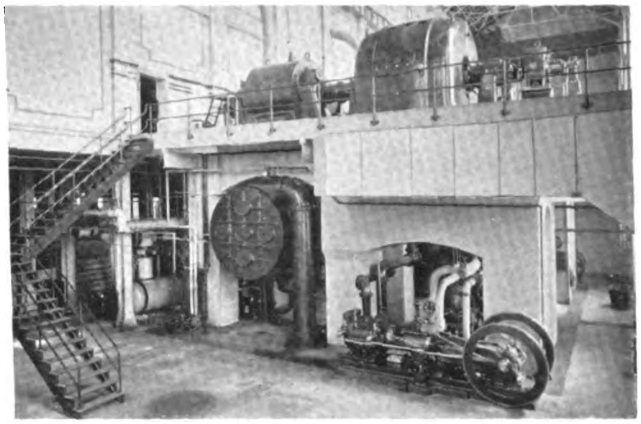
Our contact rails are of the over-running type. We have made no change in them since the original 60-lb. T-rail conductors with aluminum rod and copper cable feeders on opposite sides of the rail web were installed. In 1913, however, owing to double-tracking, we had occasion to transfer about 2000 ft. of the contact rail from one side of the track to the other. The interesting point of this work was that the rails were alive during the entire operation so that service was not interrupted. To accomplish this we first placed 9-ft. ties at right angles to and under the contact rail at intervals of 15 ft. for the complete distance. The naked contact rail was then pushed over to its new location by means of wooden priers. The gang numbered seventeen men, about twelve of whom stood about 10 ft. apart to pry over one section of rail while the others set the rail in its permanent position. The circuit was maintained with flexible insulater cable at the ends. The job was done in thirty minutes.



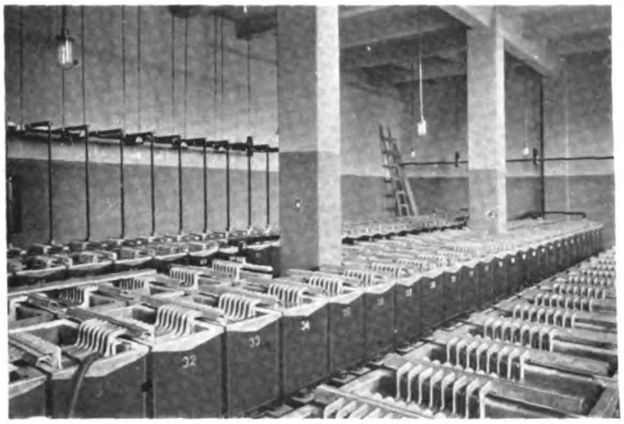
Fourth Step in Moving Live Conductor Rails



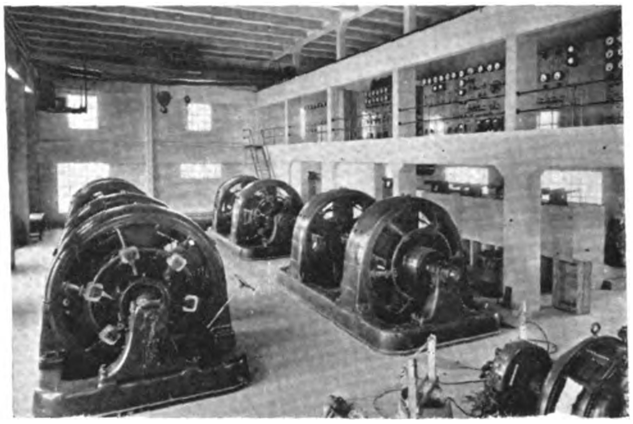
Southern Pacific Power Plant, Fruitvale



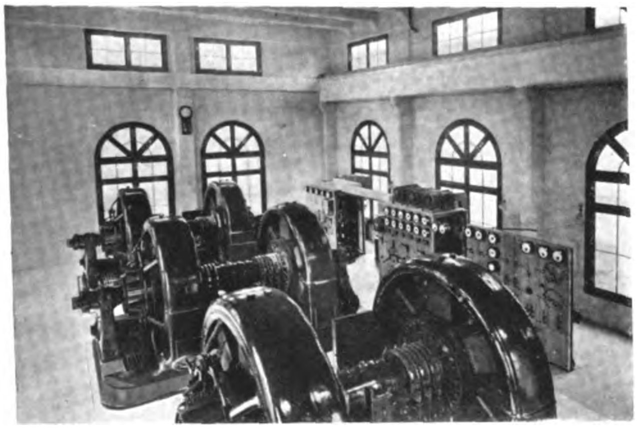
Interior View of Southern Pacific Power Plant, Fruitvale



Battery Room, Southern Pacific Power Plant, Fruitvale



Rotaries, Southern Pacific Substation, Oakland

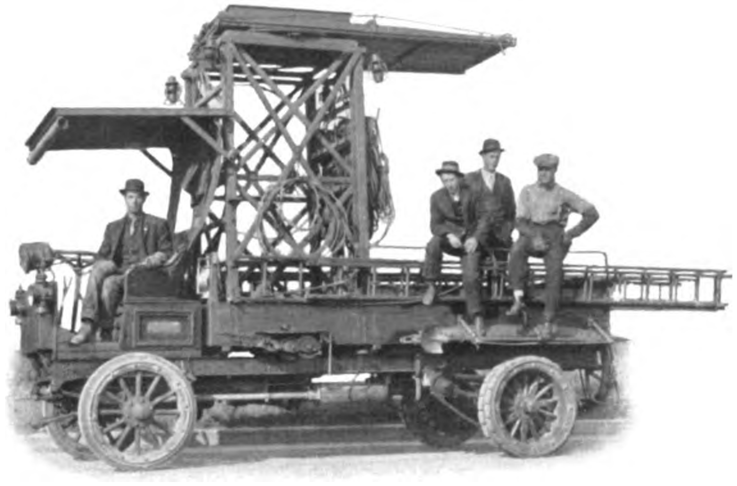


Second Floor, Southern Pacific Substation, Berkeley

West Oakland Substation and Flower Garden

Car Repair Room, Southern Pacific Shops, Alameda Point

Interior View of Southern Pacific Electric Car



Gasoline Emergency Line Auto Truck, Southern Pacific Electric Lines

Maintenance of a 1200-Volt Catenary on Southern Pacific Lines

By JESSE B. NICHOLS

Supervisor Overhead Lines Southern Pacific Company, Electric Division

THE Oakland, Alameda & Berkeley lines of the Southern Pacific Company serve the Bay cities on the east side of San Francisco Bay, comprising the towns of Oakland, Alameda, Berkeley, Albany, Emeryville and San Leandro. They comprise 101.04 miles of track, or 52.38 miles of road.

The overhead construction consists of a 7/16-in. messenger and a No. 0000 grooved copper trolley wire, with a catenary hanger of the loop type, which gives good flexibility to the system. The operating voltage is 1200 volts direct current.

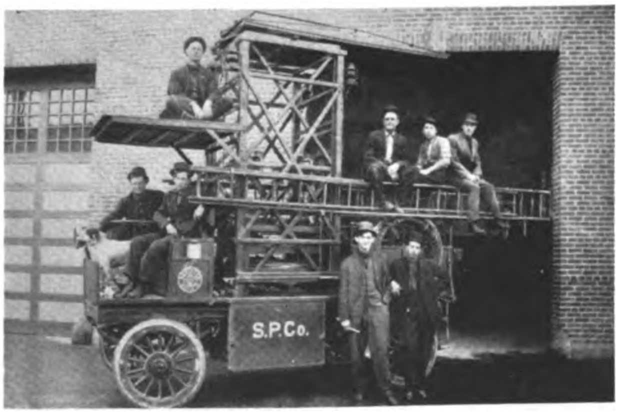
The center pole and span wire catenary construction is used exclusively with the exception of both Alameda and Oakland Moles, which are of bridge construction with double catenary overhead. Iron poles set in 6½ ft. of concrete are used. They are first given a coat of red lead, and a second coat of black carbon paint. The span varies from 60 ft. to 120 ft., while the bridge spans commonly are 240 ft. long.

For high-tension circuits we use a seven-strand No. 0000 copper wire with a voltage of 13,200 volts alternating current, which is installed either underground or on iron lattice poles 65 ft. above the ground, excepting the estuary crossings, which are either submarine or are installed on towers 265 ft. high, spanning the estuary about 1200 ft. apart.

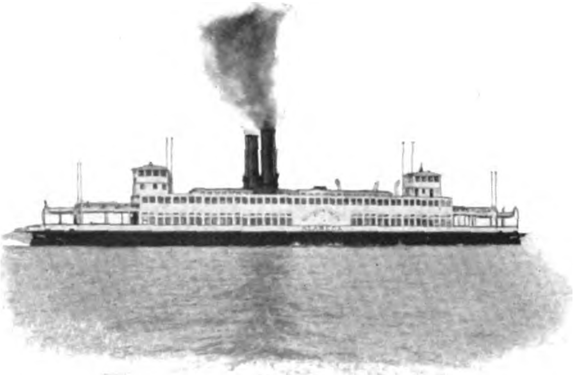
The 1200-volt direct current is distributed over the system by aluminum feeders, ranging in size from 1,000,000 circ. mil to 2,000,000 circ. mil. These are strung on bridges, towers, catenary and high-tension poles. The feeders are sectionalized at different points, thus making it possible to kill parts of the lines at a time.

Other overhead circuits consist of signal, arc, light and power, which are installed on bridges and both catenary and high-tension poles. We also maintain a private telephone system, the cables for which are installed both underground and on catenary and high-tension poles on the overhead. Telephone instruments are installed on bridges and catenary poles in the most convenient places for the use of the operating forces.

For maintenance and emergency, three crews are required for the three districts. Each crew consists of one foreman, three linemen, one groundman, one driver and one crew caller. For tower trucks, we use two Kelly gasoline and one General Vehicle electric. Other crews required are for splicing and bonding, the former consisting of a cable splicer, helper and teamster, and the latter being composed of a foreman and helper.



Electric Vehicle Truck for Line Maintenance



Southern Pacific Ferryboat, "Alameda," San Francisco Bay

Notes on Southern Pacific Electric Service in the Bay Cities

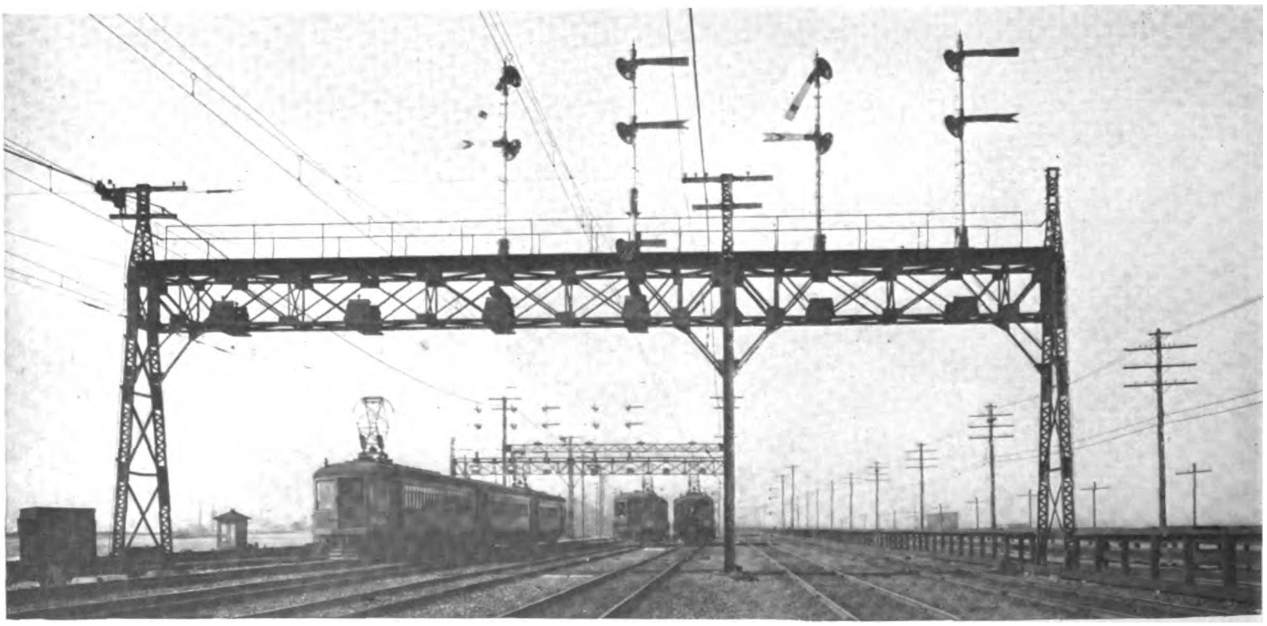
In the Remarkable Ferry and Rail Service for the Cities of Oakland, Alameda and Berkeley Trains Up to Seven Cars Are Operated on Headways as Low as Twenty Minutes

By J. C. McPHERSON
Superintendent Electric Lines Southern Pacific Company

THE passenger traffic handled via the Oakland, Alameda and Berkeley electric lines of the Southern Pacific Company is composed principally of people whose work or business is located in San Francisco, but who make their homes in Oakland and vicinity. This results in very heavy travel between 6.30 and 9 a. m. and 4 and 7 p. m., between which hours we estimate from 60 to 70 per cent of the traffic is handled. During other hours of the day and night our traffic is light, having to depend almost entirely on local business and pleasure seekers and shoppers to and from San Francisco. The average number of passengers carried per month approximates 1,800,000.

SCHEDULES

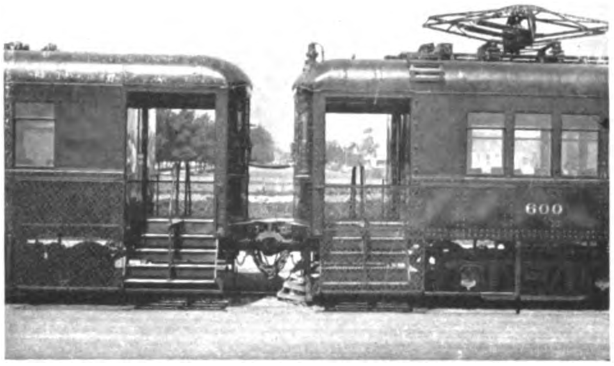
In the way of schedules, we maintain twenty-minute service between the San Francisco ferry building and Oakland Pier, and thirty-minute service between the San Francisco ferry building and Alameda Pier from approximately 6 a. m. until 8 p. m., when the interval between trains operating out of Oakland Pier is lengthened to forty minutes and out of Alameda Pier to forty-five minutes. On



Block Signal Bridge, Oakland Mole

Saturdays and Sundays twenty-minute service is maintained on the Oakland Pier lines until midnight.

Each ferryboat arriving at Oakland Pier connects with four Berkeley and two Oakland trains, and during morning and evening rush hours with one train to Alameda. Boats arriving at Alameda Pier connect with one Oakland and two Alameda trains. The size of the trains varies from one to seven cars, according to the density of travel. During the peak load about two and one-half or three minutes are consumed in loading and unloading passengers. This means that within three minutes from the time the ferryboat hits the slip all passengers have left the boat, boarded their respective electric trains to the different suburbs mentioned and gone on their way.



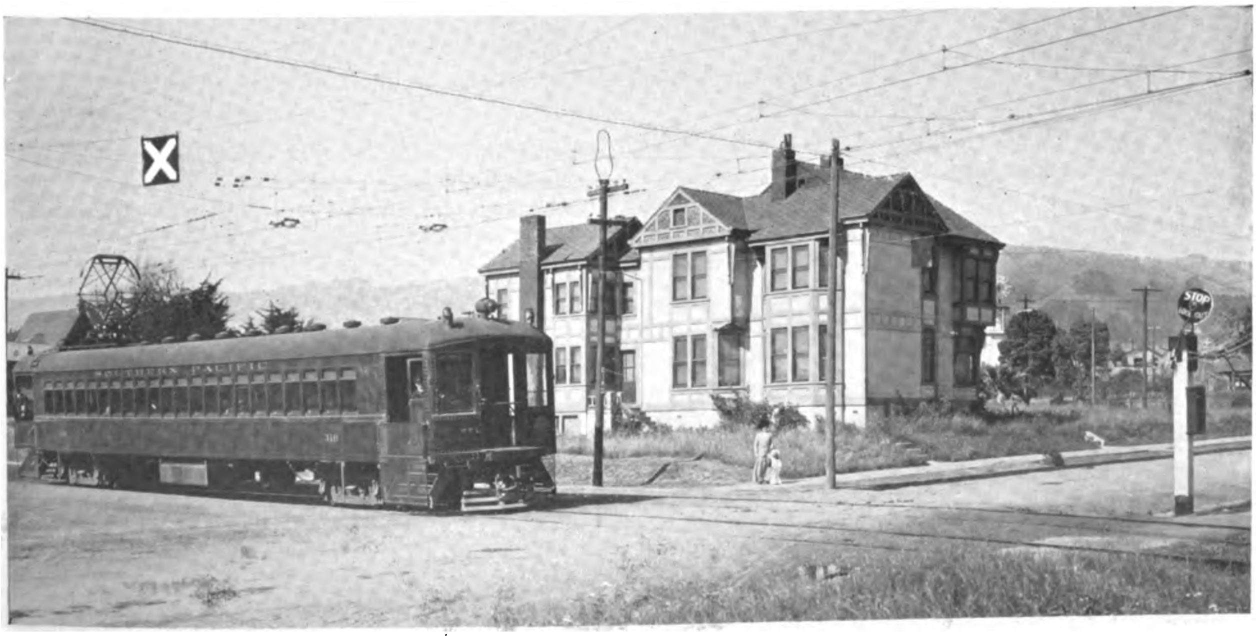
Southern Pacific Electric Cars

To meet the demands of our patrons for fast service, advantage is taken of every condition tending to expedite the movement of trains, after first, however, conserving the safety feature. A good idea of the service can be obtained by considering the schedule of our Alameda line, where a train travels 14.6 miles, 8 miles of which is through city streets and makes twenty-four stops, in a total running time of forty-five minutes. The distance between the stations varies according to density of population, but as a general rule the stations average about 1500 ft. apart.

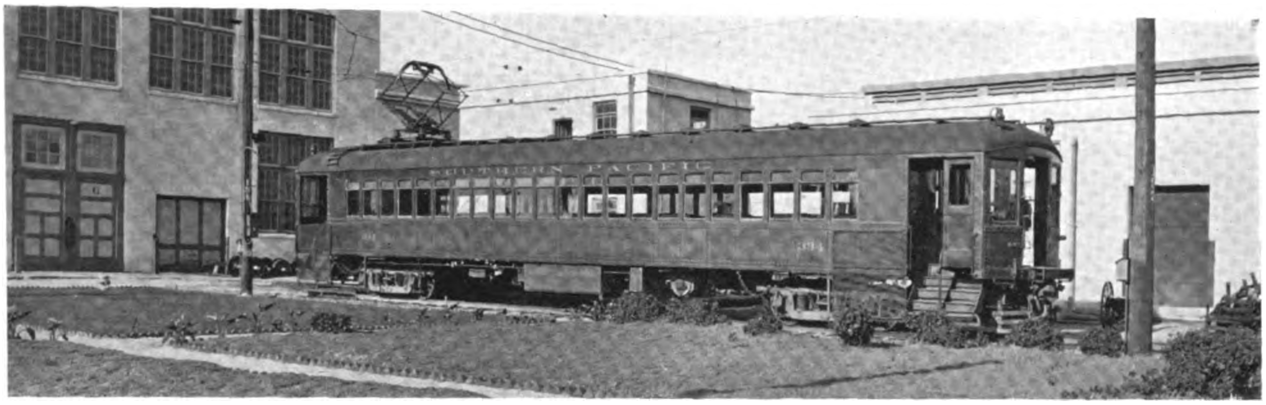
The fare collection during periods when travel is heavy sometimes presents quite a problem, as at some points on the system it is often necessary for the collector to take up 100 fares or more, besides assisting in the supervision of passengers boarding and alighting, within a period of less then ten minutes. Ohmer fare registers are used exclusively on the trains, the collector registering each fare separately as it is taken up. At the ferry building a standard form of ticket chopper is used. All passengers paying their fare before admission to the waiting room have access to both landings. No fares are collected on the boats.

All motormen who are used in operating the electric trains are locomotive engineers, whose seniority rights give them the privilege of working on the Southern Pacific steam locomotives out of the Oakland terminal or on electric trains. The conductors are now also taken from extra-passenger lists of the Southern Pacific steam lines. The collectors are classified as gatemen and employed as the business warrants. The best of these men are retained in the service and they are promoted to the position of brakeman after passing the examination which is prescribed by the American Railway Association.

The average train-miles operated per month approximates 250,000, while the average car-miles operated per month approximates 400,000.



Automatic Wigwag Danger Signal at Berkeley



Southern Pacific High-Speed Car at West Alameda Shops

Maintenance of 1200-Volt D.C. Cars by the Southern Pacific Company

By R. E. HEWITT

Master Mechanic Southern Pacific Electric Lines

THE Southern Pacific Company, electric division, since June 1, 1911, has been operating a high-speed service with 1200-volt d.c. equipments through the trans-bay cities of Oakland, Alameda and Berkeley. At this time eighty-one motor cars, sixty trailers and ten center-entrance cars are in use. Most of the motor and trail cars are 72 ft. over all, and the center-entrance cars which are used in crosstown city service between Oakland and Alameda are 45 ft. over all. The big cars are 10 ft. 5⅞ in. over eaves, thereby making possible a triple seat on one side of the aisle and a double seat on the other side. This gives a total seating capacity of 116 in all straight passenger cars, and of eighty-eight in the twenty-nine combination baggage and smoking cars, which are 67 ft. long. All cars are of steel construction. The 72-ft. 4½-in. motor cars weigh 943 lb. per seated passenger and 1562 lb. per running foot; the corresponding trailer figures are 579 lb. per seated passenger and 929 lb. per running foot. The side sill and center the sill of all of the cars are of 7-in. channels and the floors are of corrugated steel covered with Flexolith.

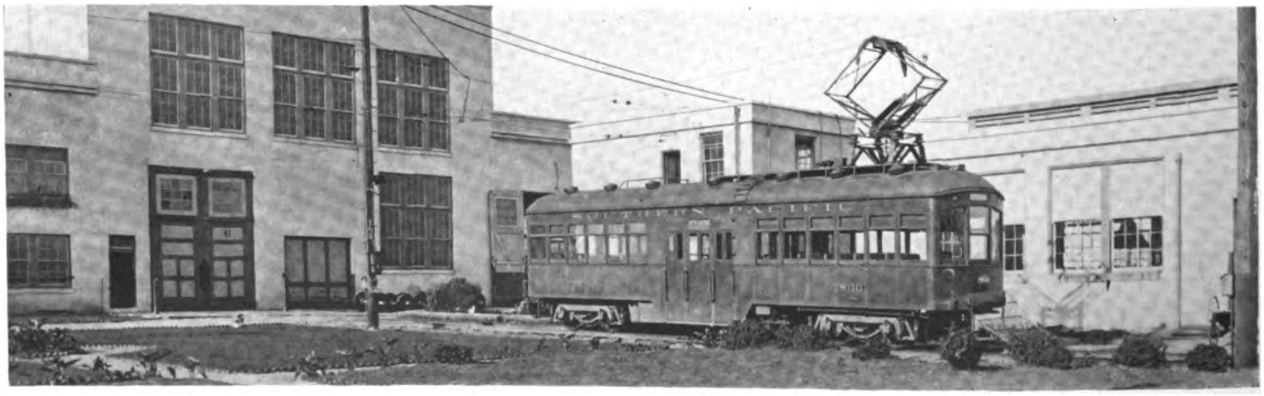
Motor cars are inspected at intervals ranging from 1200 to 1500 miles, and trailers every 2000 miles. Both are overhauled every eighteen months to two years, including paint retouching.

CAR-BODY MAINTENANCE

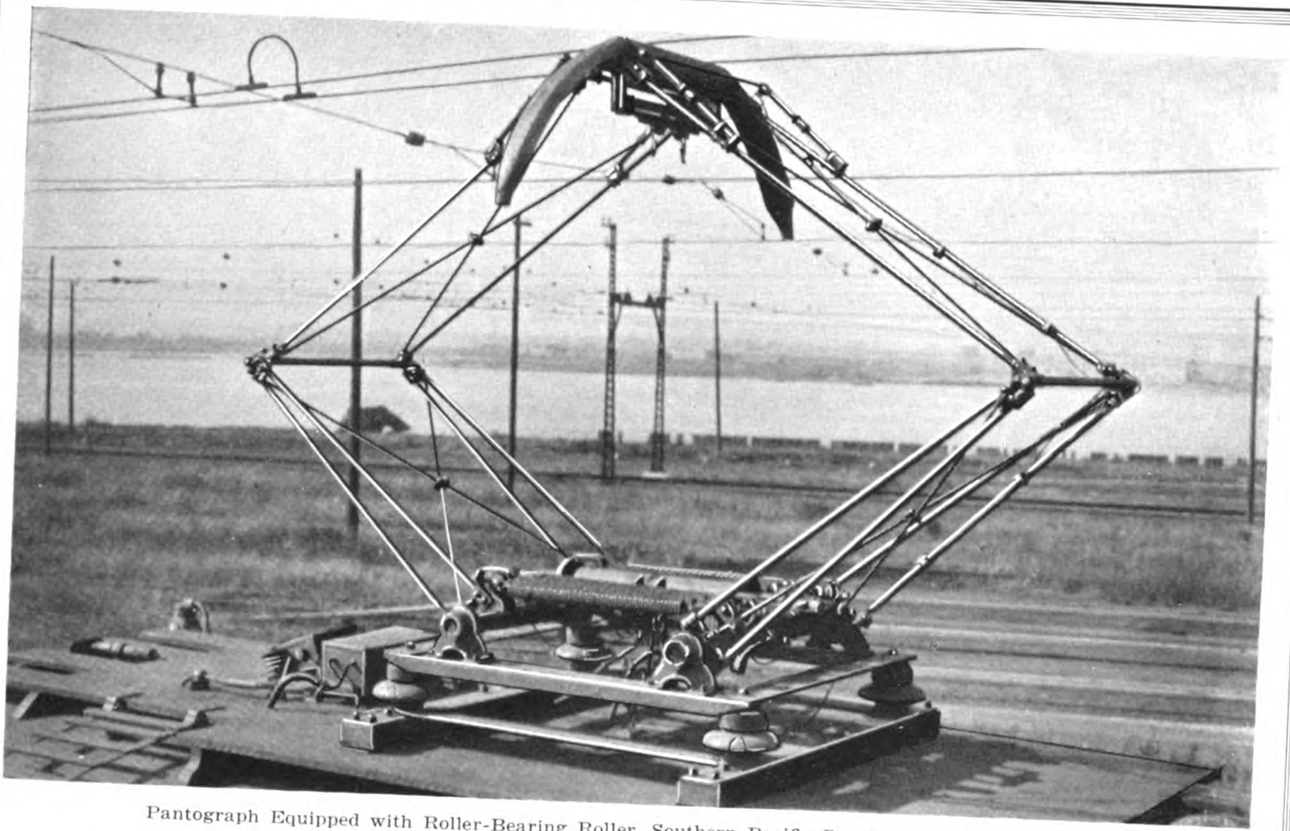
At the time these cars were placed in service opinions were expressed in some quarters that they might prove too light. Although they are operated in trains up to seven cars with maximum speeds of 40 m.p.h. and stops as frequent as three per mile on some runs, the construction has fully justified itself in four years' operation. To confirm this statement the following incident may be recounted:

On one occasion a towerman threw the switch between two trucks of a motor coach. This veered the car in such a way that a steel trolley pole of 8-in. to 10-in. diameter at the base was sheared off at the ground line without causing more than a slight camber in the side sills of the car. A like accident at this junction would have completely cut a wooden car in two. This car was sheathed with ⅛-in. steel up to the belt rail.

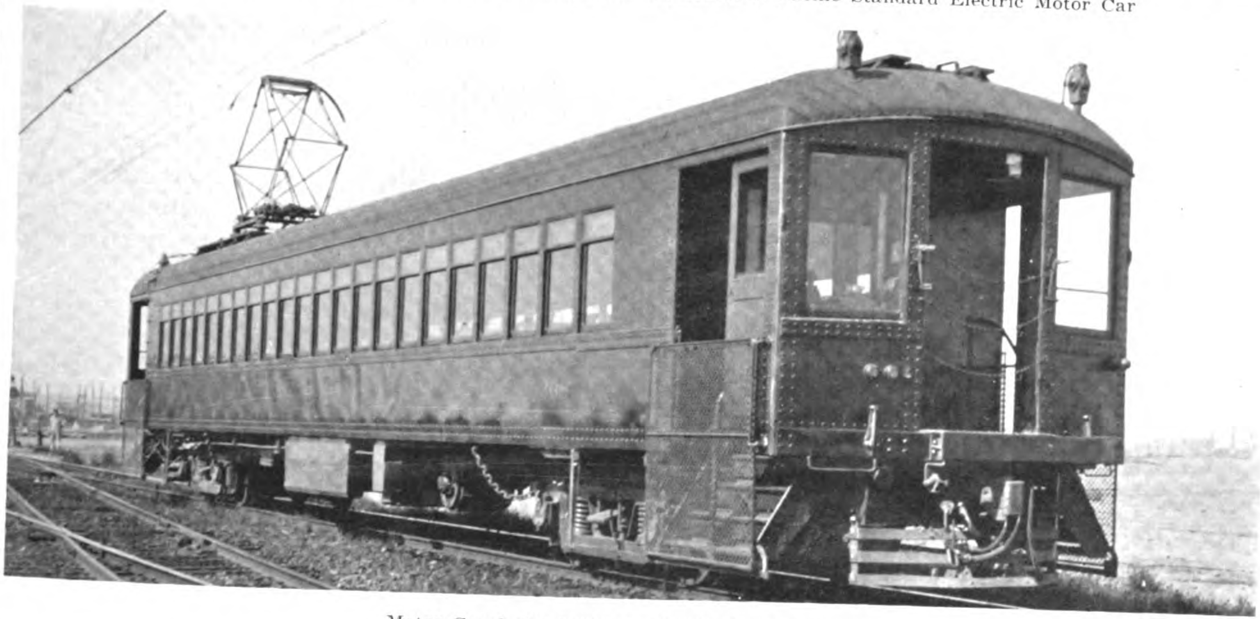
Generally speaking, our only car-body main-



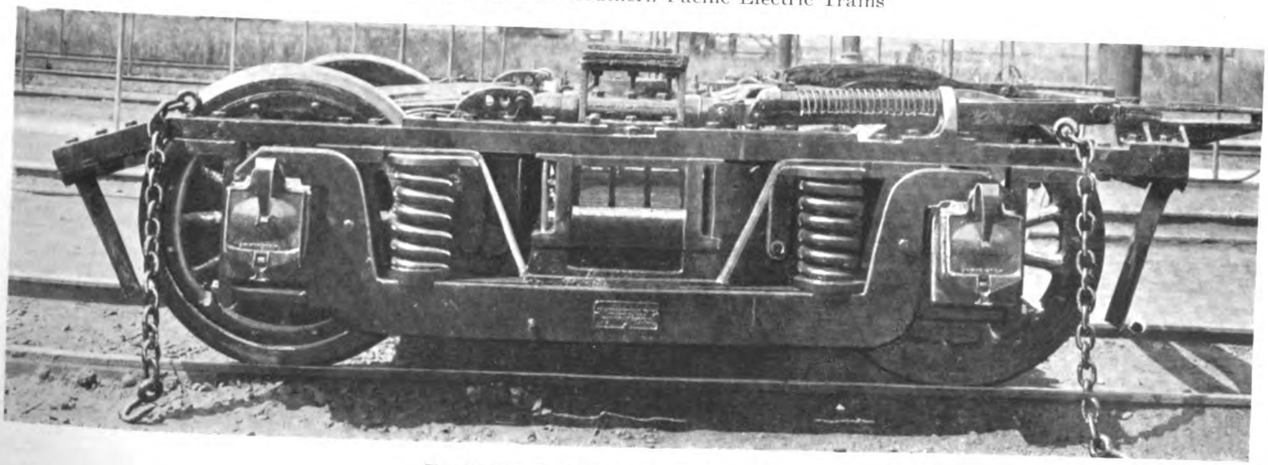
Southern Pacific Center-Entrance Car Used for Crosstown Service



Pantograph Equipped with Roller-Bearing Roller, Southern Pacific Standard Electric Motor Car



Motor Coach for Southern Pacific Electric Trains



Truck for Southern Pacific Motor Cars

tenance has been the occasional renewal of the composition flooring, especially in the aisles. The Flexolith renewals are made readily by troweling the mixture of cement and special liquid and allowing about thirty hours for the covering to set. The first renewals were not made until after three and a half years' service. There is nothing to show that any members of the framing have been pulled out of line, demonstrating that this pioneer lightweight type for heavy, high-speed service was correctly designed. All but the last fourteen cars, which are of Pullman make, were built by the American Car & Foundry Company, St. Charles, Mo.

TRUCK AND ELECTRIC MAINTENANCE

The trucks, which are of Baldwin manufacture, have required very little attention to date. Our principal work in under-car mechanical equipment has been confined chiefly to inserting case-hardened steel bushings in the pinholes of the brake rigging and the occasional renewal of Symington journal boxes.

The four motors per car are of GE-207-A 145-hp. rating, operated permanently two in series on 1200 volts with Sprague Type A-1 control. About 85 per cent of the trains comprise one motor car and one trailer.

For three years we never brought an armature into the shop except for the replacement now and then of string bands. More recently armatures are coming into the shop for the reslotting and possible turning down of commutators, but this we regard as the result of normal wear. Le Carbone brushes operated at 4-lb. to 5-lb. tension are standard. Some of these brushes have been in use for three years without renewal, which means that they ran for at least 180,000 miles. Furthermore, the commutators look as bright as the day they entered service.

Control renewals have been rare, the only work in that respect being the renewal of contactor tips and interlock posts. Circuit-breaker and reverser defects are virtually nil.

IMPROVEMENTS IN PANTOGRAPHS

When we began operation our current collectors were pantographs of the United States 121 type, equipped with a roller of 5-in. diameter, 24-in. length, and graphite bushing bearings. The original rollers were made of brass, but as they wore out after only 8000 miles aluminum was tried as the first substitute. This metal proved even less satisfactory than brass and was quickly discarded in favor of iron pipe. The second substitute was an iron pipe roller which gave a life of approximately 12,000 miles.

Before making any further change in rollers we set about to determine whether the life of the roller could not be lengthened by a change from graphite bushings to roller bearings. The initial set was tried with some trepidation in view of the opinions of many engineers that an anti-friction bearing would suffer so much from pitting and sparking due to the passage of current, that it would soon be destroyed even if it did conduct sufficient current. Our experience with the trial bearings did not bear out these pessimistic contentions. We soon found that the combination of the iron roller and the roller bearing would give a much longer life, and consequently the change to roller bearings was authorized before the pioneer pair had worn out. The latter was installed July 26, 1913, and was removed in May of this year after a service of 118,707 miles. During this time it wore out six contact rollers. This roller bearing for pantograph operation has since been patented by the writer.

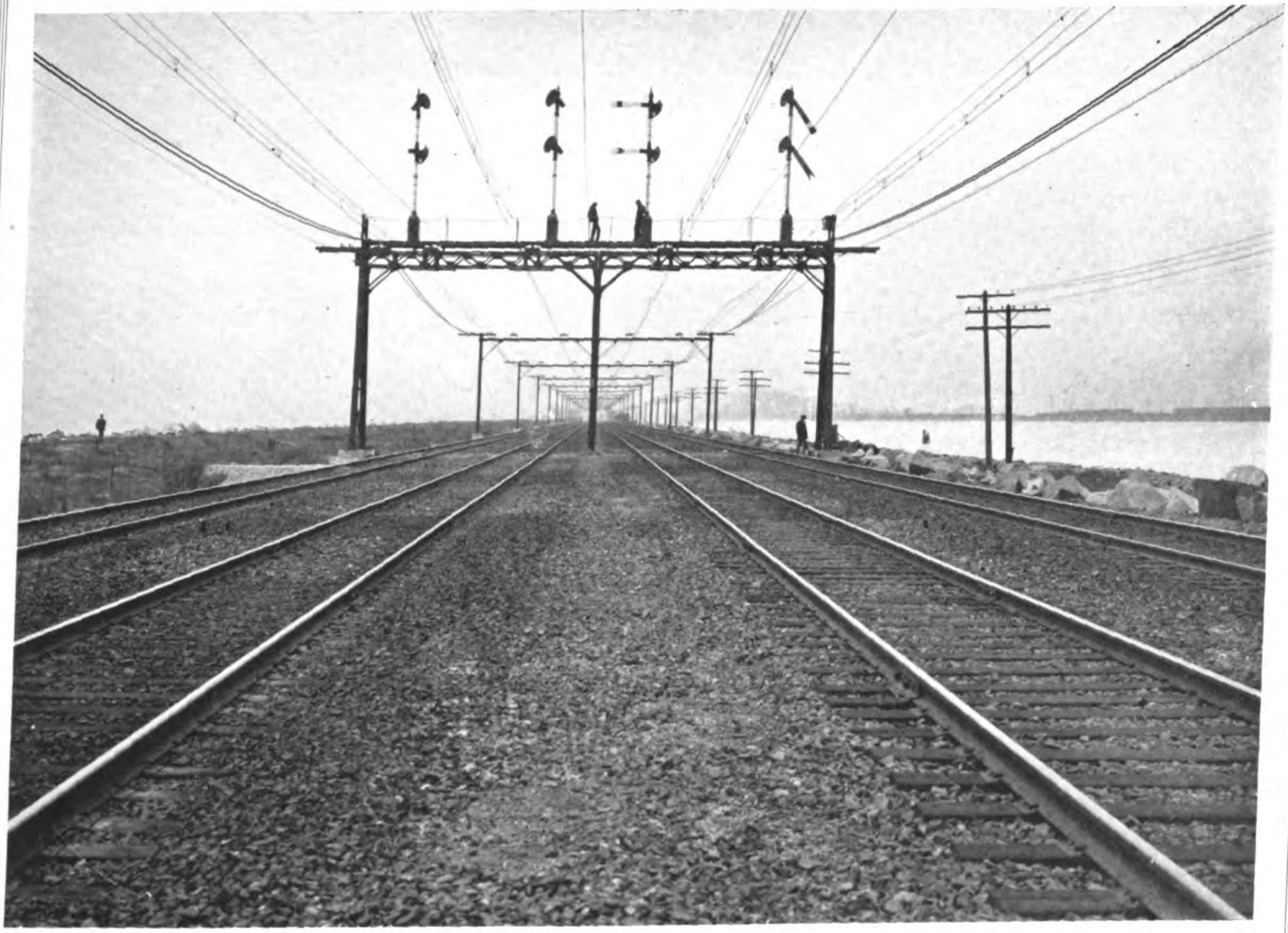
Although the iron pipe roller was giving good life, it did require a good deal of machining to prevent scoring of the trolley wire and for the installation of a suitable cage to carry the end castings in which the rollers are held. About July, 1914, we adopted a roller made of cold-drawn steel tubing. This requires no machining whatever, and as a current collector it is good for at least 18,000 miles with a possible maximum of 24,000 miles. On the lighter center-entrance crosstown cars, the same outfits had made 40,000 miles by July 1, without renewal.

The financial value of these improvements may be expressed by the following figures:

Old Rollers with Graphite Bushing Bearings	
Average mileage of 72-ft. cars, miles	12,406
Maintenance labor per month	$580.75
Maintenance material per month	97.60
Lubrication (Welsh oil) per month	13.00
Total	$691.35
224 new steel rollers made in 1913, at $5.47 each	$1,225.28
Roller-bearing Rollers	
Average mileage of rollers on 72-ft. cars, miles	18,000
Maintenance labor per month	$77.35
Maintenance material	34.00
Lubrication (graphite and vaseline) per month	3.62
Total	$114.97

Thus the monthly saving for ninety-one cars alone is $500 or more.

It will be noticed on comparing the lubrication item that we not only cut down its cost but were enabled to change the materials from Welsh oil and waste to a mixture of graphite and vaseline. This change has proved a boon to the car roofs and windows, which are no longer spattered and stained with oil, nor need trainmen and passengers worry about oil stains due to the current collectors. The car cleaning has been made easier, and complaints about splashing oil have been eliminated. It may be added that it was formerly necessary to lubricate the pantograph rollers twice a day; now one lubrication every regular inspection period of 1200 to 1500 miles suffices.



Catenary Bridge Suspension, Alameda Mole

Operation of a 1200-Volt Direct-Current Distribution System

Substation Operation at 1200 Volts, Direct Current, Has Proved an Unqualified Success, Even at Temporary Overloads of 125 Per Cent

By J. JOHANSEN

Chief Operator Southern Pacific Electric Lines

THE Southern Pacific electric lines which serve the towns of Alameda, Berkeley and Oakland were among the first 1200-volt d.c. systems in this country, operation having begun early in 1911. The high-tension end of the system is 13,200 volts, twenty-five cycles, three phase, and the low-tension end of the rotary converters is 440 volts with 630 volts at the d.c. end. Our adoption of 13,200 volts as the transmission potential was an advance of some 2200 volts over previous practice, but of far more importance was the use of 1200 volts for the contact wires.

SUBSTATION EQUIPMENT

In all we have three substations—Fruitvale, West Oakland and Berkeley. These contain respectively three, four and three pairs of 1500-kw. General Electric rotary converters, each pair made up of 630-volt d.c. machines permanently in series. Under ordinary operating conditions six rotaries, two at each station, are used during the morning and evening peaks which run up to 7000 kw. on an hourly-load basis. The momentary swings are very severe, ranging from 2000 kw. to 11,000 kw., as shown by the station-load curves. These swings affect particularly the Fruitvale and West Oakland stations, which are nearest the pier terminals. The rotaries in these stations consequently get overloads of 100 per cent to 125 per cent momentarily. Despite this we have not yet suffered a single breakdown or flashover from these machines. In fact, the rotaries in all stations show practically no signs of wear or deterioration.

After 10 p. m. the load drops to approximately 4500 kw. at the power plant buses, and upon this Fruitvale is cut out. At midnight the load drops to about 3000 kw., whereupon Berkeley is cut out, leaving West Oakland, in the center of the system, to carry the entire load up to 5 a. m. With West Oakland so used, one station feeds as far out as Thousand Oaks, 10 miles distant. Under these conditions the drop in the line has not been found to exceed 100 volts at any time, the average being 50 volts. During the day the drop is too small to be considered.

PROVISIONS AGAINST SERVICE INTERRUPTIONS

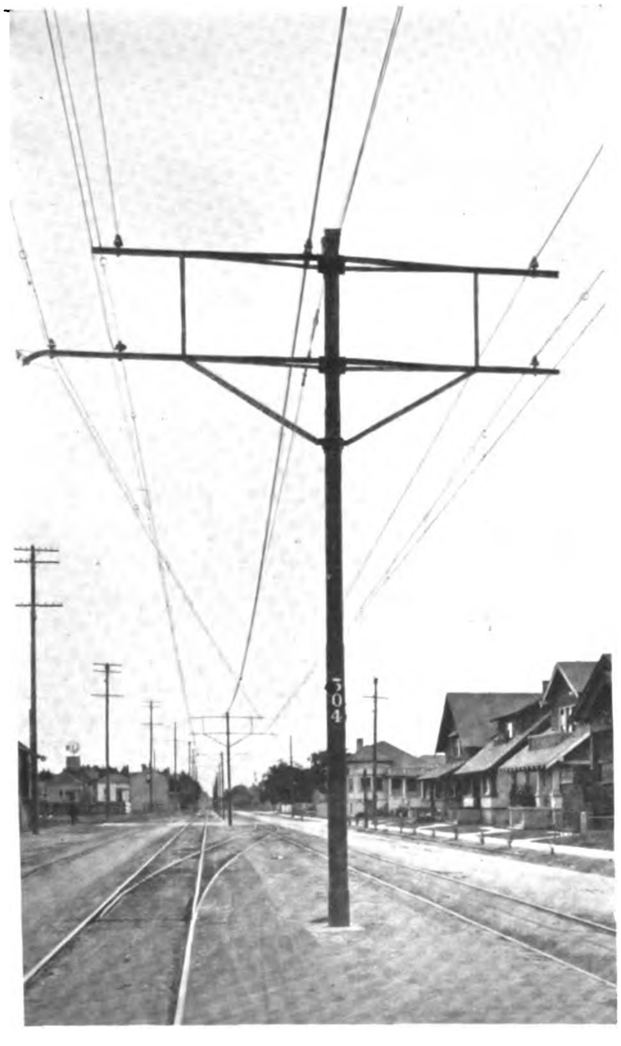
Interruptions in service have been very few, and even these have been due to causes outside of the stations, such as breaks in strain insulators. In four years' operation, we have not had a power detention in excess of fifteen minutes as the result of trolley or substation troubles.

Should a heavy short occur near any one of the substations, the interruption would be only momentary as the length of cable between stations affords enough resistance to keep one or two stations feeding into the line.

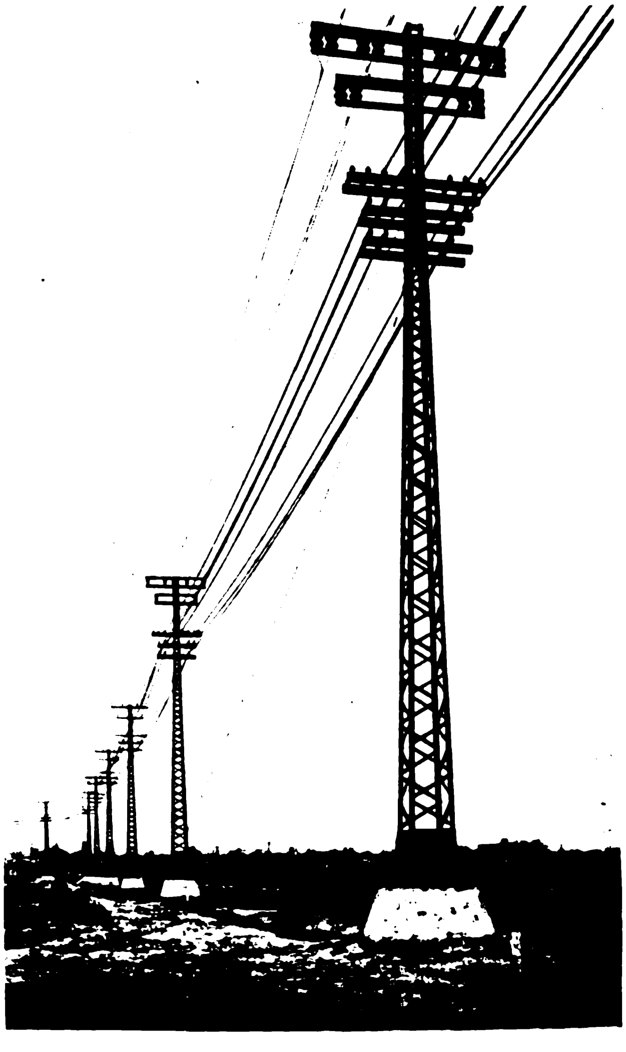
When a breaker opens up on a short-circuit, the operator closes the breaker immediately three successive times. If the trouble is still on the line he will report to the chief operator, who then sends out the emergency crew to the section affected. However, the chief operator will ask that the triple closing test be repeated several times because linemen are supposed at all times to work with the 1200-volt lines alive. In other words, we do not wait for the report of the emergency crew before continuing operation.

MAINTENANCE CREWS

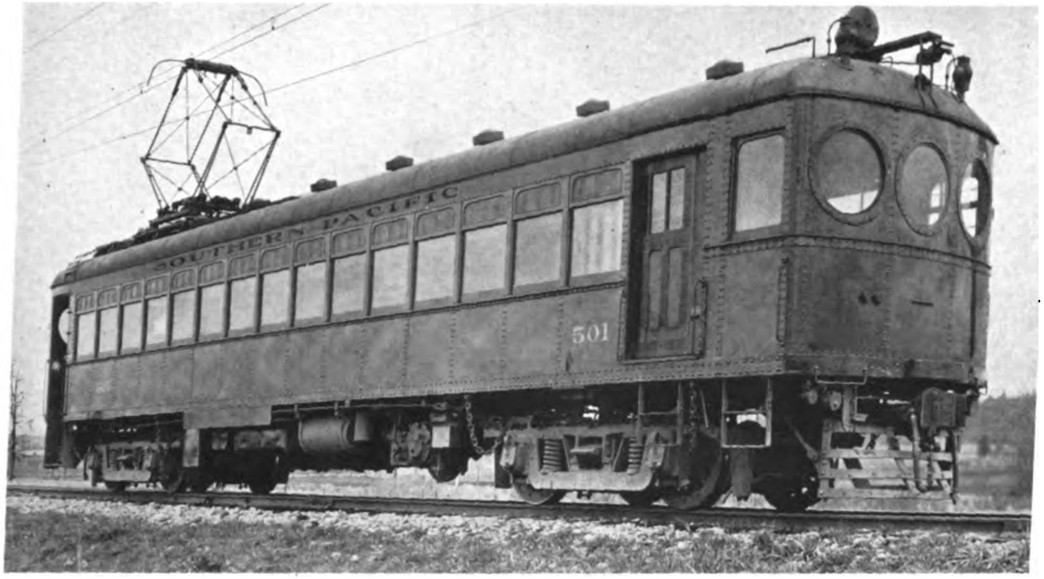
Our outside maintenance force comprises three gangs, each equipped with an auto-truck, as described by Jesse B. Nichols elsewhere in this issue. The substation personnel comprises the following: Fruitvale and West Oakland each have from 8 a. m. to 4 p. m. an operator, an assistant operator and a machine tender; each of the other two watches, 4 p. m. to 12 midnight, and midnight to 8 a. m., are taken by an operator and assistant operator. This makes a total of seven men per station. At Berkeley, one operator is on duty during the first watch from 8 a. m. to 4 p. m., another operator covers the second watch from 4 p. m. to 12 midnight, and the third watch is taken care of by an assistant operator, making three men in all.



Center-Pole Catenary Suspension



Transmission Line, Oakland Electrification



Combination Passenger and Baggage Car

Maintenance of 1500-Volt D.C. Cars by the Southern Pacific Company

Early Difficulties with Dynamotor Flashing, Brush Breakage and Pantograph Collectors Have Been Eliminated—Excellent Detention Records Now the Rule

By E. SEARS
Superintendent of Electrical Equipment Southern Pacific Company, Portland Division

ALL cars operated on the Portland division of the Southern Pacific Company are steel, the interior being trimmed with mahogany and the seats upholstered in green plush. These cars were built by the Pullman Company with the exception of three mail cars, which were built by The J. G. Brill Company.

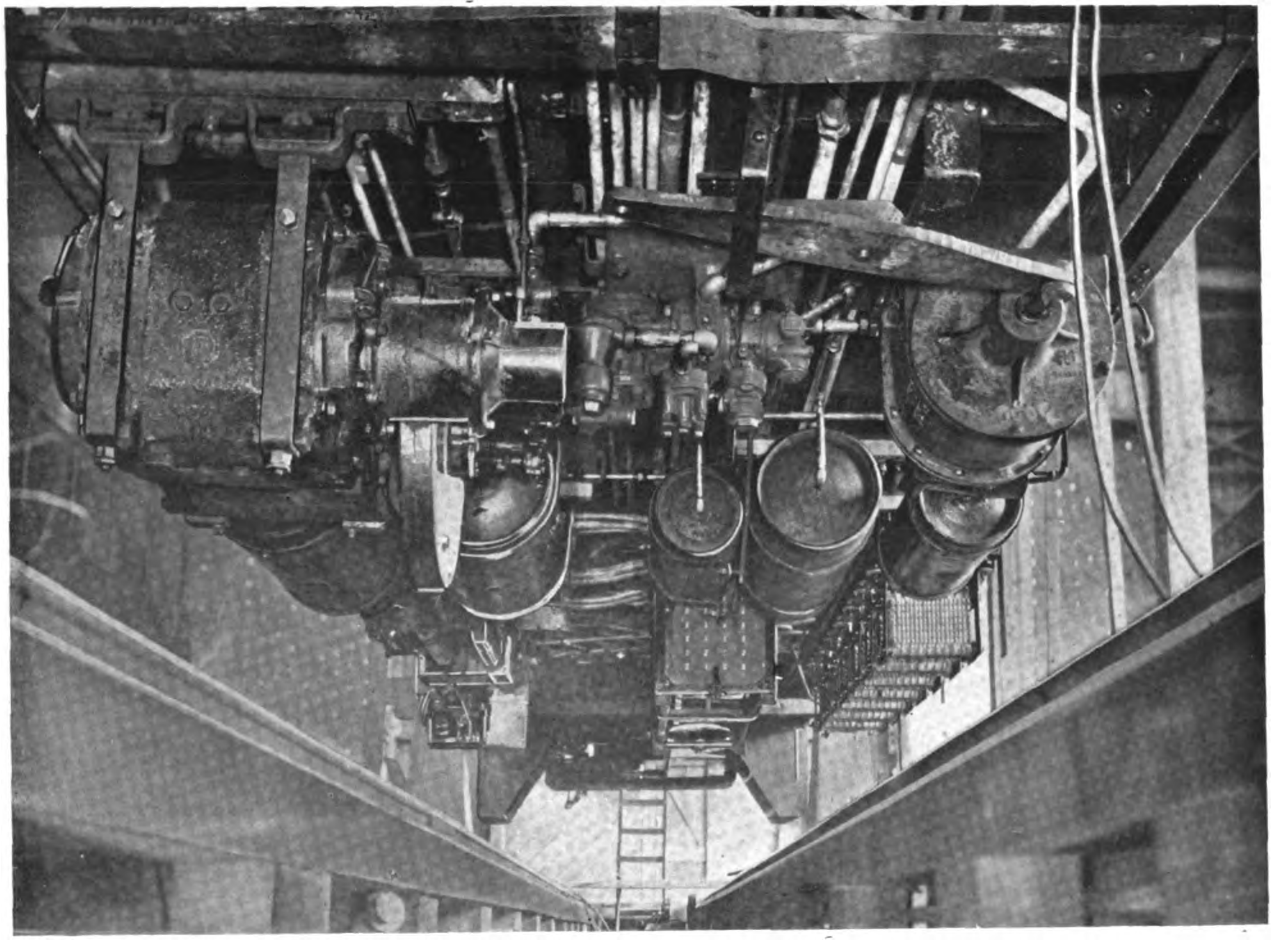
The equipment consists of seventeen single-end combination baggage and passenger motor coaches, with smoking compartment, total seating capacity fifty-two; thirteen double-end passenger motor coaches with smoking compartment, total seating capacity. sixty; eleven double-end control coaches, seating capacity sixty; five motor baggage and express cars, three motor baggage, express and mail cars, the mail compartment being a standard 21-ft. mail compartment. The length of cars over the buffers is 56 ft. 10 in., width of cars over the sills, 9 ft. 2 in.; wheelbase for car 42 ft., approximate weight of car, 51 tons, except control coaches, which weigh 32 tons each.

The electrical equipment for these cars was furnished by the General Electric Company, and the air-brake equipment by the Westinghouse Air Brake Company.

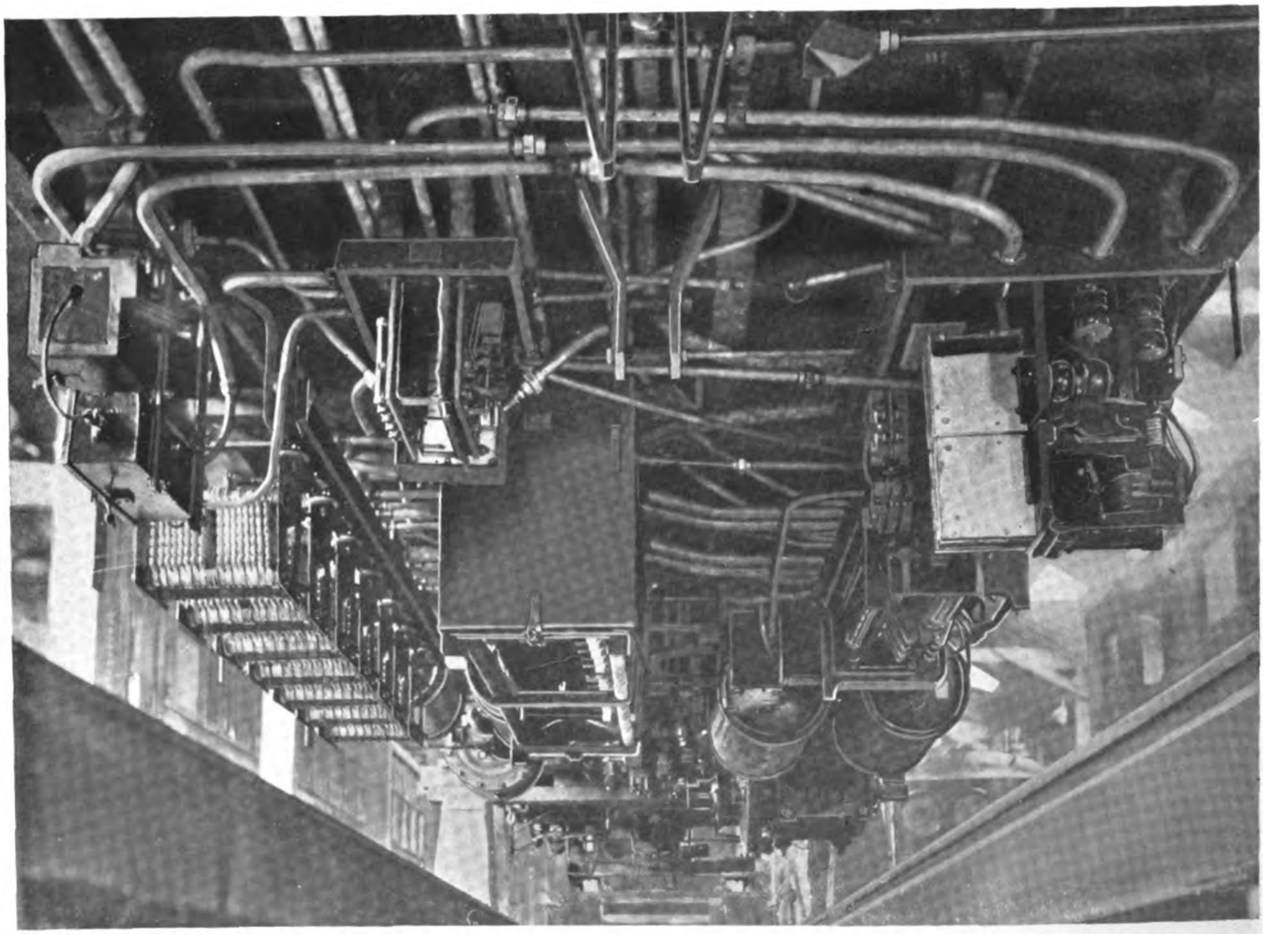
The equipment is arranged to operate on 600 volts and 1500 volts. The 600-volt operation at present consists of operation within the limits of Portland, the change from 600 volts to 1500 volts being accomplished automatically by electric-pneumatic operation. There is a 35-ft. grounded dead section between the 600-volt and 1500-volt sections. The head car is thrown by air while passing over the dead section. The air is operated from a valve switch in the motorman's cab, which also has electric contacts, so that, with the exception of the head car, which is thrown directly by air, the remaining cars are thrown electro-pneumatically, the valve switch being held in its proper relative position.

It is necessary to throw the controller off on the head car while changing it over. After this car has passed over the dead section, the controller can be replaced in the "on" position and each car can be operated on its relative voltage until it comes to the dead section, where it automatically changes over to the required voltage.

The potential relay drops out when on the dead section. It is so interlocked that the interlocks close the circuits necessary for operating the com-



View Underneath Motor Car, Air-Brake End, Showing Dynamotor and Universal Bracket in Foreground



View Underneath Motor Car, Electrical End, Showing Circuit Breaker in Right Foreground mutating switches, for the 600-volt and 1500-volt positions. The commutating switch is operated by small air cylinders that are fed by the opening and closing of magnet valves, which are operated by the above-mentioned circuits. The commutating switch changes all dynamotor connections, as well as all motor connections, for the 600-volt and 1500-volt positions. The dynamotor furnishes lights and control on 1500 volts, but drives the air compressor on 600 volts. Lights and control on the 600-volt section are taken directly from the trolley.

The dynamotors gave considerable trouble due to flashing when first put in operation. The four shunt fields had been connected in series with a 400-ohm resistor; after they were connected in parallel, each with a 1000-ohm resistor, all trouble due to flashing was eliminated.

RELAYS

The control features, on account of 600-1500-volt operation, are somewhat complex because of additional relays.

A protective relay is used to protect the 600-volt wiring from 1500 volts, in case the car does not change over in going from 600-volt to 1500-volt sections; it also protects the dynamotor from receiving 1500 volts in the 600-volt position.

The current limit relay is the same relay as used on all General Electric 600-volt equipment.

The potential relay used is in at all times when the pantograph is on the energized trolley. It carries three interlocks, one for the control wire, one for the 1500-volt and one for the 600-volt position of the commutating switch. When on a dead section, the potential relay drops out, closing the circuit for operating the commutating switch.

The time-limit relay opens No. 4 wire and drops out on line contactors at section breaks. This does away with heavy flashes at these points. This relay is operated by means of an auxiliary contact rod on the pantograph, which is insulated from the pantograph frame. A brush or tickler is set a few feet ahead of the dead section. On coming in contact with the auxiliary rod on the pantograph the brush energizes the time-limit relay, causing it to open No. 4 wire.

A by-pass relay is used where grades prevent the current limit relay from picking up, thus keeping motors on resistance. This relay makes it possible to by-pass the current limit relay and not remain too long on any resistance point.

OTHER CONTROL FEATURES

The circuit breakers on this equipment are so arranged that they have a calibration for 600-volt and 1500-volt operation. The extra calibration for 600 volts is accomplished by a magnet which is energized by means of a contact on the commutating switch in the 600-volt position. Further, a calibrating spring is used for 1500-volt operation so that when the commutating switch is thrown to the 1500-volt position, the magnet coil is de-energized on the circuit breaker, leaving only the calibrating spring.

Another feature on this equipment is an automatic control cut-out switch, which opens the control wiring until the brake handle has been placed on the brake valve and the proper train-line pressure built up, so that the car cannot be started until after the brakes are properly charged.

The control features on this equipment have given us very little trouble. Each car is equipped with four GE 205-B motors, which have shown no defects, except for a few cases of armature coil trouble due to defective coils. We have had only one hot armature bearing since the beginning of operation, in January, 1914, and we have had no trouble from flash-overs.

The brush wear on the equipment is nominal. Some trouble was experienced when inaugurating operation, by the breakage of motor brushes, but this was corrected by getting suitable brushes.

On the whole we have not noticed that there is any particular difference between 600-volt and 1500-volt operation, as far as peculiarity of equipment is concerned. The only complexity is that in situations like ours it is necessary to have equipment that will operate on 600 volts and 1500 volts, a fact which causes numerous extra connections and pieces of apparatus.

CURRENT COLLECTION

A roller pantograph, U. S., Type 122, is used to collect current. Pantographs of all cars in a train can be operated electro-pneumatically by the motorman from the front car. It was found necessary to develop a different type of lubrication for the collector than that originally furnished. We now use a circulating oil system, which employs a hollow shaft with a deflector. The shaft is stationary and as the roller rotates about it the oil is collected from the inner outer edge of the collector shell by the deflector and conducted to the shaft, which in turn carries it to the roller bearings. This type of oiling was necessary due to the high speeds attained by our trains. The cost of lubricating these collectors is about 10 cents per 1000 miles. The cost of maintenance has been 64 cents per 1000 miles, much of the latter cost being due to broken shafts, resulting from broken collector frames (which the factory is now strengthening); also to the fact that our first collectors were made of iron pipe, which opened up in the seams. We are now using 5-in. steel tubing, from which we expect to get an average of at least 50,000 miles and possibly more, although it has not been in service long enough for us to determine this fully. The oil in the roller is replenished at every third inspection, or after every 6000 miles.

The only thing unusual about the air-brake system is the universal valve. This has given no trouble to date, and we have had no detentions due to air-brake equipment. All air-brake parts are inspected on a 2000-mile basis. At the shop we have a Westinghouse test rack, on which all parts are tested before being put into service.

Painting was begun on cars in November, 1914, at the end of eighteen months' service. Our cars have now been out more than two years, and before all cars are painted some of them will have been out thirty months or more. The cars are cleaned at each inspection, or at the end of 2000 miles, using an oil cleaner only if necessary. Between inspection cars are dry wiped. If it is raining, a scrubbing brush and water are used to rinse off the body. Windows are cleaned with Bon Ami.

We have not given our cars a general overhauling. In fact, we do not intend to give them what can be termed a general overhauling, as the cars will be painted when it is found necessary, and motor repairs will be made when a gage shows that the bearings are worn sufficiently to be removed. Other parts on all of our equipment are handled in a similar manner.

DETENTIONS OF CAR EQUIPMENT, 600-1500-VOLT LINES—PORTLAND DIVISION

January, 1915

Mechanical, none.
Electrical, thirty minutes. Number of detentions, two.
Man failure, twenty-four minutes. Number of detentions, two.
Total miles operated, 112,372.

February

Mechanical, none.
Electrical, none.
Man failure, thirty-five minutes. Number of detentions, one.
Total miles operated, 100,702.

March

Mechanical, none.
Electrical, none.
Man failure, fifteen minutes. Number of detentions, one.
Total miles operated, 111,093.

April

Mechanical, none.
Electrical, none.
Man failure, none.
Total miles operated, 108,739.

May

Mechanical, none.
Electrical, none.
Man failure, none.
Total miles operated, 119,683.

June

Mechanical, none.
Electrical, fifteen minutes. Number of detentions, one.
Man failure, forty-three minutes. Number of detentions, two.
Total miles operated, 128,632.

Southern Pacific Repair Shop, Fruitvale

Train with Parlor Car at Salem, Oregon Electric Railway

Maintenance of 1200-Volt D.C. Cars by the Oregon Electric Railway

A Unique Feature Is the Successful Inter-Operation of Old 600-Volt and New 1200-Volt Motors in the Same Quadruple Sets

By D. I. CLOUGH

Master Mechanic Oregon Electric Railway

THE 1200-volt lines of the Oregon Electric Railway comprise 122 miles of single track over which a total of ninety passenger motor cars and ten locomotives are operated. In the city of Portland we operate at 600 volts, but elsewhere 1200 volts are used. The original line ending at Salem, 50.8 miles distant, had been operated at 600 volts, but when the line was extended in 1912 to Eugene, 122.4 miles from Portland, the change to 1200-volt operation was made.

The twenty-four original cars were changed only by the addition of 1200-volt type-M control and two GE-205 motors, two out of four 600-volt GE-73 motors being retained for 1200-volt operation by permanent series connection on the low side. These older motors are not changed in any way. The new cars carry four GE-205 motors and the same control and dynamotors already named. The locomotives are of General Electric type, four 50-ton locomotives carrying four GE-207 motors and six 60-ton locomotives carrying four GE-212 motors. The locomotives are used for freight only.

Cars are inspected every 1800 miles and locomotives every 1000 miles. Overhauling on both classes is made every 100,000 miles. Inspection is carried out at the Hoyt Street carhouse, but all overhauling and heavy repair work is done at the Porter Street shops, both at Portland. We also have a running inspection of journals and trolley wheels made by inspectors stationed at Salem and Eugene.

For current collection we employ a Holland-type trolley wheel with U. S. 13 base and Knutson retrievers. But one pole is in use at a time. The estimated life of these wheels is from 6000 to 8000 miles. Cup grease lubrication is used. The tension of the base springs is maintained at 30 lb. The maximum current passed by this wheel in regular service during the acceleration of a two-car train is 450 amp.

Despite the unusual combination of 600-volt and 1200-volt equipments the motors have given excellent service. Not more than two flash-overs occurred within the past year and these were caused by broken brushes. The latter, which are chiefly of General Electric grade-B type, are maintained at about 6.5-lb. tension, and aside from the two breakages noted they have caused no other troubles. The only other motor defects have been the rewinding of two or three armatures of the older motors due to breakdown of insulation. Even here replacements have been made with factory-wound coils.

When the change to 1200-volt operation was made, we slotted the GE-73 motors 1/32 in. so that the same grade of brushes could be applied and also that other advantages of slotting might be obtained. Commutators have given us practically no trouble.

We attribute the good behavior of the motors to four causes: inherently good design, correct construction, frequent inspection and to reasonable operating conditions, as we do not attempt to make up trains with less than 50 per cent live equipment.

The control, which embodies automatic acceleration, has also made a creditable record.

Our delay statements tell the story of equipment reliability better than anything else. Some typical figures covering delays ascribed to mechanical trouble are shown in Table I.

TABLE I—OREGON ELECTRIC RAILWAY DELAY RECORD AND CAUSES

	Miles Operated	Loss in Minutes			
		Mech.	Elec.	Air	Man.
June, 1914	251,386	28	25	0	0
July, 1914	235,477	0	0	120	0
August, 1914	247,567	15	5	35	0
September, 1914	254,172	0	30	0	0
October, 1914	242,221	0	5	20	0
November, 1914	212,816	0	20	0	0
December, 1914	218,513	30	0	20	0
January, 1915	219,635	40	0	0	0
February, 1915	195,029	19	20	0	0
March, 1915	208,821	0	0	0	0
April, 1915	197,901	0	0	0	0
May, 1915	206,774	50	0	0	0

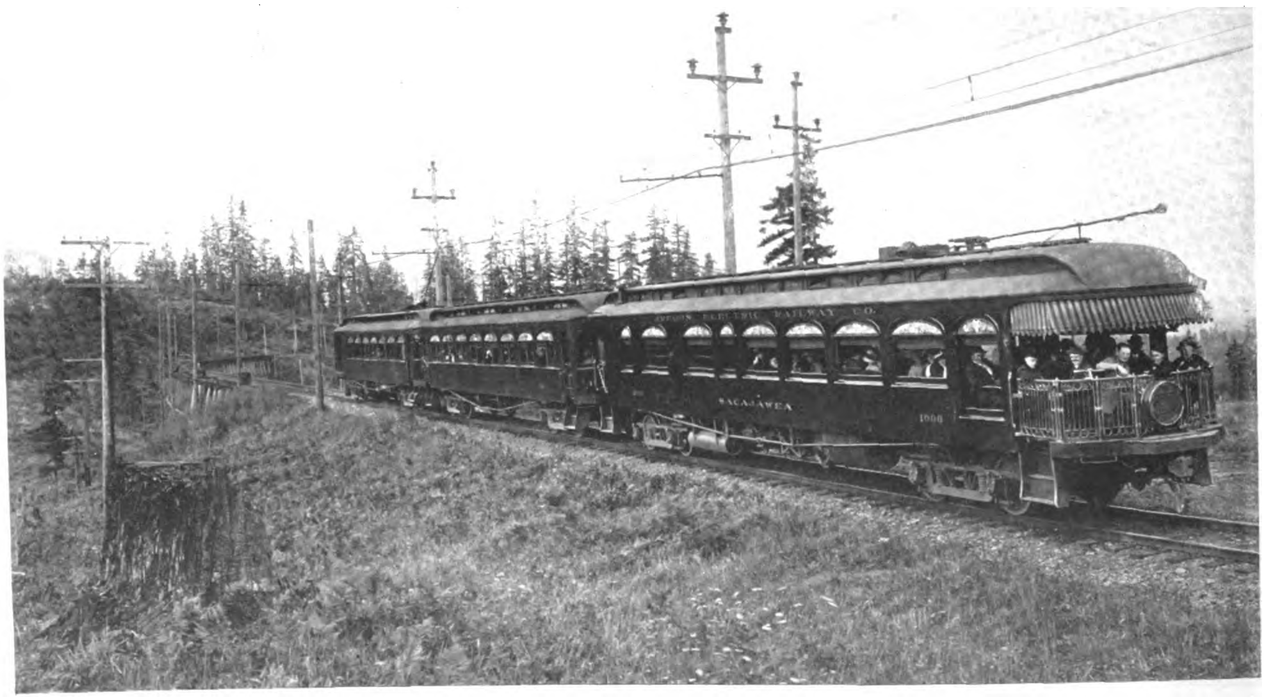
Our lubrication cost for all equipment, exclusive of trolley wheels, has proved so low that some operators may even question the figures. For example, our costs per 1000 car-miles were as follows in the months named: June, 1914, $0.082; July, 1914, $0.92; August, 1914, $0.098; September, 1914, $0.1198; October, 1914, $0.141; November, 1914, $0.1046; December, 1914, $0.0449; January, 1915, $0.0685; February, 1915, $0.0595; March, 1915, $0.0601; April, 1915, $0.0621, and May, 1915, $0.0628. This lubrication is under the usual Galena guarantee.

These low figures are due to the economic reclamation of oil from used waste and the efficient oiling of the equipments.

The brakeshoes, which are of Love flanged type, also are showing very low costs, as illustrated by the figures in Table II.

TABLE II—BRAKESHOE RECORD—OREGON ELECTRIC RAILWAY

	Per Cent Wear	Miles Per Shoe	Cost Per 1000-Car-Miles
August, 1914			
Passenger shoe wear	58.0	6919	$0.648
Locomotive shoe wear	61.0	2629	0.192
September, 1914			
Passenger shoe wear	68.0	4181	1.240
Locomotive shoe wear	35.0	3182	1.344
October, 1914			
Passenger shoe wear	60.0	5301	0.92
Locomotive shoe wear	62.3	2052	2.46
November, 1914			
Passenger shoe wear	63.0	4186	1.13
Locomotive shoe wear	58.0	2258	2.43
December, 1914			
Passenger shoe wear	63.5	4184	1.13
Locomotive shoe wear	61.0	3654	1.27
January, 1915			
Passenger shoe wear	69.75	5348	1.26
Locomotive shoe wear	62.5	2304	2.06
February, 1915			
Passenger shoe wear	63.5	4286	0.82
Locomotive shoe wear	55.0	2606	1.78
March, 1915			
Passenger shoe wear	57.5	4605	1.27
Locomotive shoe wear	61.5	2659	2.22
April, 1915			
Passenger shoe wear	58.2	4153	1.05
Locomotive shoe wear	66.5	2840	1.56
May, 1915			
Passenger shoe wear	62.0	4115	1.00
Locomotive shoe wear	46.0	3205	1.27



Oregon Electric Limited Train with Observation Parlor Car Between Portland, Salem and Eugene

Top-Post Mechanism of A.C. Track Circuit Signals on Double-Track Section at Maplewood, Oregon Electric Railway

Signal Maintenance on the 1200-Volt Oregon Electric Railway

One-Fourth the Time of One Man Is Found Sufficient to Maintain 8.2 Miles of Block Signals on Double Track

By E. R. CUNNINGHAM

Electrical Superintendent Oregon Electric Railway

THE Oregon Electric Railway operates out of Portland approximately 200 miles of single track, of which the first 8.2 miles from Portland were double-tracked in 1913. This section was a part of the original 600-volt line built in 1907, and the second track was added and a number of curves were eliminated better to handle the increased business.

The cost of the double-tracking between the Jefferson Street station and the junction at Garden Homes, about 7 miles, of straightening tracks, reducing grades and eliminating curvature was about $750,000. In this work the street grade was abandoned in the approach to the station at Jefferson Street, and the tracks were placed part of the way on trestle work over private right-of-way. Increase of trains and traffic necessitated these improvements.

The principal work and the expensive portion was between Multnomah station and Garden Home. One big cut and two fills, one of which was about 95 ft. deep at the highest point in the ravine, were necessary to complete the cut-off. This improvement eliminated a reverse curve and a high trestle and altogether shortened the main line by about 1300 ft. The fills aggregate 2000 ft.

On this double-track section we operate trains on a minimum headway of five minutes; on the single-track sections beyond the Garden Homes terminus of the double-track sections the minimum headway is twenty minutes. Therefore we are operating what is practically a suburban service to Garden Homes and an interurban service beyond that point. All cars, however, are geared for the same speeds.

This service is protected with the General Railway Signal Company's three-position, left-hand upper-quadrant a.c. track-circuit signals installed in 1912. In connection with the double-tracking we changed relays for double-track operation and relocated posts where necessary. This was done without interruption to service.

The line is divided into blocks varying in length from 1.4 miles to ½ mile, according to curvature and other conditions. Only one signal maintainer is required. His duties also include the care of about twenty Hoeschen crossing bells, two interlocking plants, track bonding, and tunnel signals on the United Railways division of this company.

Substation and Agent's Office Combined,
Oregon Electric Railway

Concrete Substation at Orrville,
Oregon Electric Railway

In fact, the maintenance of the block signals alone calls only for about 25 per cent of his time.

To facilitate quick movement over the line, the signal maintainer is provided with a Fairbanks-Morse gasoline car. Conditions as to repairs and replacements are reported to the electrical superintendent.

The most serious trouble has been the squeezing out of the insulation between rail ends because of extraordinary rail expansion during unusually warm weather. We have tried to correct this trouble by replacing the single piece of horn fiber with a set of alternate laminations of fiber and steel, but with no particular success.

The only change made in the signal mechanism is an improvement in the bearings of the Model 2-A signal-operating motor. This change was initiated by the General Railway Signal Company to forestall possible trouble from worn bearings.

The performance of the signals is indicated by the following record for the months of this year covering respectively the number of signal movements and the failures which are due to the signal mechanism:

STATEMENT OF SIGNAL MOVEMENTS FOR YEAR ENDED JUNE 30, 1915

Signal Number	Total Movements	Failures	Signal Number	Total Movements	Failures
1.5	39,395	5	5.6	20,491	0
1.8	19,251	4	6.1	23,189	1
2.1	21,857	6	6.4	20,209	1
2.2	28,352	7	7.1	22,358	2
2.6	21,007	4	7.0	21,261	0
2.9	21,734	3	7.7	31,624	2
3.6	20,699	1	7.8	22,238	3
3.9	19,217	0	7.9A	14,442	1
4.5	19,429	1	7.9B	9,325	6
4.8	21,130	0	8.4	7,462	9
5.5	20,140	0	8.6	11,450	2
Total				456,270	58

One failure to every 7867 movements of 45 deg. each.

Top-Post Mechanism of A.C. Track Circuit Signals at Cross-over on Double-Track Section, Oregon Electric Railway

Double-Track Tangent, Oregon Electric Railway, Between Portland and Garden Homes

How a Railway Helps the Farmer to Produce Bigger and Better Crops

In Conjunction with the Oregon Agricultural College the Southern Pacific Company Teaches the Farmers, on Both the Steam and Electric Lines, to Make the Most of Their Opportunities

By H. A. HINSHAW

General Freight Agent Southern Pacific Company

An Interested Audience of All Ages at Forest Grove

As early as 1908 the Southern Pacific Company instituted a farming demonstration train in conjunction with the extension service of the Oregon Agricultural College. The subjects covered by these trains are horticulture, dairying, hog raising and poultry husbandry; and the exhibits include specimens of dairy cows and hogs to prove the points made by the demonstrators.

The railroad company furnishes the rolling stock and operates the trains on a rigid schedule, advance notice of which is sent direct to every farmer in the affected territory, to all newspapers, commercial bodies and the station agents. The merchants in the towns along the line are always particularly helpful in urging the farmers to attend.

The college, which is a State institution, furnishes all livestock and other demonstration material. It also supplies the faculty of agricultural and other professors who deliver lectures on their specialties, from silos to eggs. From the first the work attracted much interest among the farmers, and this interest has continued to this day.

While this work of the Southern Pacific Company extends over a zone of more than 1000 miles, it may be of interest to tell more in detail of what has been done in the territory immediately to the southwest of Portland. In this section, locally known as the "Loop," about 100 miles of route had been electrified in 1913 for 1500-volt d.c. passenger service in the name of the Portland, Eugene & Eastern Railway, now absorbed. This electrification introduced new conditions inasmuch as the more frequent service brought the farming communities closer to large masses of consumers. Thus a change in the character of products arose although the products themselves were still moved largely by steam trains.

Originally the loop territory was devoted almost entirely to grain. With the coming of the demonstration trains the farmers learned that dairying, hog raising and fruit would find a more profitable market. The electrification has made the latest change, for owing to the increase in the population of commuting towns, truck gardening has been inaugurated on a large scale.

In all of these developments the farmers have been guided largely by the demonstration service. They have been shown not only what classes of products were most desirable but what particular varieties of animals or plants were best adapted for this territory and the different soils thereof.

One result of this education is reflected in the fact that the highest prizes for milk at the Panama-Pacific International Exposition were awarded to the dairy interests of Portland and vicinity.

On the whole this work has proved gratifying not only in increasing the value of freight shipments, but in securing the good-will of the farmers and the country newspapers. The movement has made such headway that one demonstration train, run in February, 1914, was visited by 7000 people in one day and 36,000 people within two weeks. The interest shown by the children is so great that a "Children's Special" is a possibility of the future. In fact, the "college on wheels" should prove a potent factor in keeping the younger generation on the farm.

Effect of Publicity on the Jitney Movement in Portland

The Portland Company Finds that a Straightforward Statement of the Facts to the Public Is Helpful—A Weekly Pamphlet Distributed on the Cars Is One of the Best Mediums of Such Instruction

By F. W. HILD

General Manager Portland Railway, Light & Power Company, Portland

PORTLAND saw its first jitney in January of this year, although 10-cent auto-buses, in competition with our suburban trains to Vancouver Ferry, had already come into being a month or two earlier. With the arrival of the jitney, the 10-cent auto-bus went out of business because it lacked speed and frequent service and embodied an attempt to use in passenger equipment apparatus designed to handle freight. Evidently the rate of fare was not the real objection because the jitney buses also charge a 10-cent fare on the 7.5-mile line to Vancouver Ferry.

PUBLICITY MEDIUMS

Our first publicity concerning the jitney took the form of addresses by President Griffith and other officers of the company before the Chamber of Commerce and other public bodies. As the jitney's novelty then made it a matter of live news, accounts of the addresses received good space in the newspapers.

On Feb. 4 the employees of the Portland Railway, Light & Power Company, as represented by several organizations, including the Brotherhood of Electric Trainmen, circulated a petition addressed to the City Council. This petition, signed by 27,500 people of Portland, requested the City Commissioners to pass an ordinance requiring the jitneys to operate only under franchise. This petition did not lead to the desired result, as the commissioners believed that the public was not yet in the proper frame of mind to help a public service corporation constructively.

PAMPHLETS EFFECTIVE

During the period that the petition was in circulation we put out a pamphlet on the jitney bus addressed to all employees, but with the suggestion that it be passed on to others. This pamphlet discussed the jitney in its various phases, particularly in its relation to the electric railway and its employees. This was followed by a pamphlet showing how much money the company paid to the municipality, both directly in taxes and bridge tolls and through the less obvious forms of paving charges and free transportation for city employees. This second pamphlet was widely distributed, and, from the voluntary comments received, it must have made a decided impression upon the thinking members of the community.

This pamphlet was supplemented and followed by display advertisements in the daily press. Each advertisement took up a definite aspect of the taxation problem, amplifying it enough to bring out all the pertinent points and yet not detailed enough as to prevent understanding the statement in one reading.

However, the most striking announcement proved to be a full-page display in the "house warming" issue of the *Evening Telegram*. This advertisement was entitled "Why Such Irresponsibility?" and told its own story in the form of a sheaf of clippings reproduced from daily newspapers. These clippings were grouped to show the menace of the jitney from the four standpoints of moral danger, thuggery, accident risk and service irresponsibility. This advertisement was not only reproduced in the ELECTRIC RAILWAY JOURNAL of March 27, 1915, but also attracted the attention of prominent magazines in other fields, such as the *Sunset*, the leading monthly of the Pacific Coast, and of *Printers' Ink*, the great advertising journal. Mats of this announcement were also sent to electric railways as far south as Texas, as far north as Canada and as far east as Maine.

INTRODUCTION OF A HOUSE ORGAN

The fact that the public was showing a genuine interest in our statements accelerated the publication of a four-page weekly of pocket size which is now distributed in our cars to the number of 50,000 per issue. We purposely began its publication without a name, offering prizes amounting to $30 for the best title. About 10,000 suggestions were received from a population of 240,000, this indicating in itself that the public was already reading the pamphlets. In the opinion of the four city newspaper editors who constituted the jury of award, the best title submitted was the punning one of "*Watts Watt.*"

The value of such a weekly publication as *Watts Watt* lies in keeping the company's side of important problems continuously before the public, and of concentrating on any particular topic that may happen to be in the foreground. The case of the jitney election is one in point.

The jitneyites had circulated a referendum petition but had so chosen the time of filing that the ordinance, as eventually passed by the Council on April 2, 1915, would have been held up for two years, namely until the municipal election of 1917, before the attitude of the electors could have been ascertained. However, under the Oregon law, legislative bodies may refer their own measures to the people for approval or rejection. This action was taken by the City Council in time for the election of June 7, 1915, at which time the voters indorsed, by a substantial majority, the principle of jitney regulation.

Two causes were potent in attaining this result: First, our publicity campaign, as outlined hereinbefore, supplemented by an aggressive display advertising propaganda in the public press for about one week prior to the election; second, the active interest and co-operation of the company's employees aroused by personal addresses made by President Griffith and the writer.

One lesson that the jitney experience has confirmed is the wisdom of going directly to the public with your side of the case. If a utility's publicity appropriation will permit a house organ, I would by all means favor its publication as a way of greatly improving the relations between the company and the employees and also as of interest to the more prominent stockholders. However, within the limits of a publicity appropriation, I would give priority to a pamphlet for circulation among the public. This conclusion may be due to a study of the local conditions as I find them in Portland and of similar conditions in other Pacific Coast cities where a very sad confusion of economic ideas is reflected in the encouragement to competition of utilities and of occasional unintelligent, hostile legislation against corporations in general.

My study has led me to the conclusion that a pamphlet of this nature should not exceed four pages, and that the size should not be large, in order that the subject may be perused within the duration of a street car ride. It is my further belief that the public will more readily absorb and digest the rather dry and heavy matter which must necessarily form a presentation of the facts relating to utility economies if such matter is accomplished by semi-humorous text. The principle, of course, is first to get the town good-natured to have it listen to you willingly.

Copyright, 1913, Weister Company, Portland

Beautiful Portland, the "Rose City," with the Impressive Snow-Clad Peak of Mount Hood

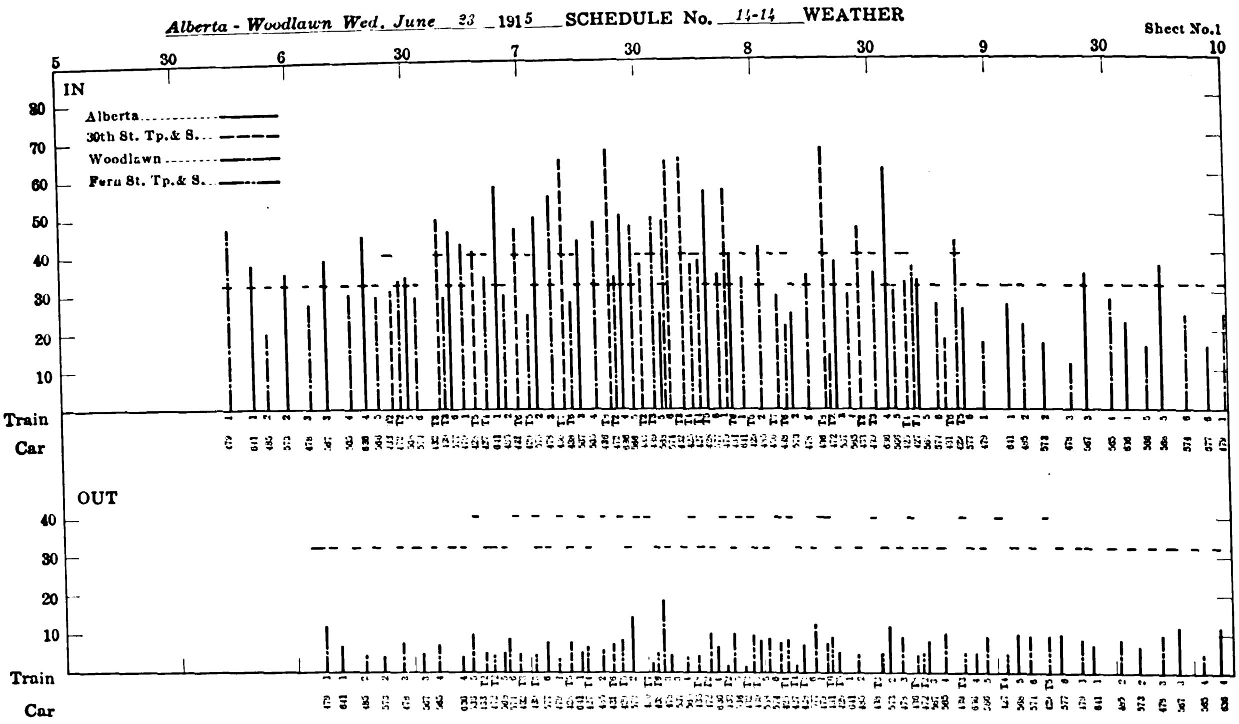


Chart Showing Conductors' and Inspectors' Peak-Load Slips Reduced to Graphic Form

Traffic Analysis and Schedule Planning at Portland, Ore.

Schedules Are Compiled from Data Supplied by Conductors and Inspectors—Standards of Car Service Have Been Established—The Assignment of Miscellaneous Duties Has Simplified the Question of Earnings for Extras

By FRED COOPER

Superintendent of Transportation Portland Railway, Light & Power Company

IN 1912 the Portland Railway, Light & Power Company inaugurated a system of traffic analysis and schedule planning in charge of a centralized schedule department. Previously, each division made up its own schedules, the principal guide being the experience of the local superintendent, modified by the pressure exerted by the public on the one hand and by the management on the other. We felt that this practice was too inexact to provide adequate service and to provide it economically.

The data upon which our schedules are built up are, first, the standards of service required by the public; second, the car-hours required to provide fairly satisfactory runs for the platform men; third, the standard of service laid down by the management.

To harmonize these three points of view it is essential to know exactly where the traffic originates and what volumes must be handled between different points.

I am aware that a number of Eastern companies employ special checkers and inspectors to make traffic counts. We do not have to go to this expense, however, partly because of the excellent platform personnel but even more owing to the fact that the density of population is much lower in a given area than in cities like Boston, Pittsburgh and Newark. It is, therefore, practicable for us to rely upon special reports from conductors covering the number of passengers at selected peak points on each trip.

This peak-load slip, which constitutes our fundamental form, is reproduced herewith. The instructions on the form are self-explanatory. Special attention, however, may be directed to the fact that this record also covers delays and their causes. Information on delays is very important inasmuch as it shows whether the cause of unusual congestion is permanent or accidental. Continued congestion which causes delay necessarily calls for a careful study of conditions, rerouting or other possibilities of traffic relief.

The peak-load checks are supplemented by the regular inspectors who devote their chief attention to checking variations in car spacing. Since they also note the number of passengers, their figures are a check on those supplied by the conductors.

The information collected from the conductors'

PORTLAND RAILWAY, LIGHT & POWER CO.

Peak Load and Delay Card

Line......Woodlawn..........Car..484....Train..3....Run...3.
Cond....Simpson, D. P., No. 634....Date....6-2-15......191....

Sufficient cars are operated on every line to carry all normal traffic without overloads. If all seats are taken and there are thirty passengers standing, your car will be considered overloaded.

Look at your watch and note exact time you arrive at peak load point. If space is too small to explain cause of delay or overload, make note*—and write explanation on back of this sheet.

Inbound at Union and Broadway				Outbound at Union and Broadway			
Time	Pass.	Min. Late	Cause	Time	Pass.	Min. Late	Cause
A.M.				A.M.			
6.04	25			6.31	08	5	Bridge delay
7.06	31			7.30	06		
8.13	34			8.35	08		
9.20	33			9.42	07		
10.22	18			10.44	14		
P.M.				P.M.			
1.28	44	4	Auto	1.46	21		
2.30	22			2.52	14		
3.32	31			3.54	19		
4.41	14			5.05	44		

PEAK LOAD CHECK

By......J. A. D......................................6-23....1915
At........Union and Broadway..................................In

Line	Train	Car	Time, A.M.		Pass.
			Due	Arrived	
W. L.	5	566	6.22	6.22	35
W. L.	72	472	6.28	6.28	36
W. L.	6	574	6.33	6.32	37
W. L.	73	439	6.39	6.35	30
W. L.	1	479	6.44	6.45	45
W. L.	74	427	6.50	6.50	30
W. L.	2	485	6.55	6.55	28
W. L.	75	429	7.01	7.01	29
W. L.	3	478	7.07	7.08	56
W. L.	76	438	7.12	7.12	29
W. L.	4	565	7.17	7.18	52
W. L.	72	472	7.23	7.23	34
W. L.	5	566	7.27	7.29	52
W. L.	73	439	7.32	7.33	50
W. L.	6	574	7.38	7.38	50
W. L.	74	427	7.43	7.44	36

Forms Used for the Compilation of Traffic Data

MT. TABOR SATURDAY SCHEDULE NO. 3 EFFECTIVE AUGUST 1ST, 1914

11th & Yamhill to E. 88th & Yamhill

Train 1 Barn 4:55		Train 2 Barn 5:05		Train 3 Barn 5:25		Tripper 1		Train 4 Barn 5:35		Train 5 Barn 5:55	
11-Y.	88th	11-Y.	88th	11-Y.	88th	11-Y.	88th	11-Y.	88th	11-Y.	88th
	5:30		5:40		6:00				6:10		6:30
6:07	6:45	6:17	7:00	6:37	7:15			6:47	7:30	7:07	7:45
7:22	8:00	7:37	8:15	7:52	8:30			8:07	8:45	8:20	8:55
8:40	9:15	8:50	9:25	9:10	9:45			9:20	9:55	9:30	10:05
9:50	10:25	10:00	10:35	10:20	10:55			10:30	11:05	10:40	11:15
11:00	11:35	11:10	11:45	11:30	12:05			11:40	12:15	11:50	12:25
12:10	12:45	12:20	1:00	12:40	1:15			12:50	1:30	1:03	1:45
1:21	2:00	1:38	2:15	1:53	2:30			3:08	2:45	2:23	3:00
2:38	3:15	2:53	3:30	3:08	3:45	Barn	4:07	3:23	4:05	3:38	4:20
3:53	4:34	4:08	4:47	4:21	5:00	4:33	5:13	4:46	5:26	4;59	5:39
5:12	5:52	5:25	6:07	5:38	6:22	5:51	6:30	6:04	6:37	6:17	6:52
6:30	7:08	6:45	7:23	7:00	7:38	Barn	7:07	7:15	7:53	7:30	8:08
7:45	8:23	8:00	8:38	8:15	8:53			8:30	9:08	8:45	9:23
9:00	9:38	9:15	9:53	9:30	10:08			9:45	10:23	10:00	10:38
10:15	10:53	10:30	11:15	10:45	11:25			11:00	11:45	11:15	12:00
11:30	12:07	13-H.		13-H.				13-H.		13-H.	
		11:55	12:32	12:05	12:42			12:25	1:02	12:40	
Barn 12:44		Barn 1:09		Barn 1:19				Barn 1:39		Barn 1:10	
19:49		20:04		19:54		3:00		20:04		19·15	

RUNS

Run 1 Train 1 4:50 to 10:43 and 12:28 to 4:52	10 Hours, 15 Minutes
Run 2 Train 2 5:00 to 10:53 and 12:38 to 5:05	10 Hours, 20 Minutes
Run 3 Train 3 5:20 to 11:13 and 12:58 to 5:18	10 Hours, 15 Minutes
Run 4 Train 4 5:30 to 1:08 Tpr. 1 B. 4:07 to 7:07	10 Hours, 40 Minutes
Run 5 Train 5 5:50 to 10:58 and 1:21 to 6:30 S. S. Tpr. 5 to 6:45	10 Hours, 30 Minutes

MINIMUM RUNNING TIME

INBOUND

88th St. to 69th St	6 Minutes
to 48th St	12 Minutes
to 39th St	14 Minutes
to 24th St	19 Minutes
to Grand Ave	24 Minutes
to 3rd St	30 Minutes
to 11th & Yamhill	35 Minutes

OUTBOUND

13th & Hall to 11th & Yamhill	5 Minutes
11th & Yamhill to 3rd St	5 Minutes
to Grand Ave	11 Minutes
to 24th St	16 Minutes
to 39th St	21 Minutes
to 48th St	23 Minutes
to 69th St	29 Minutes

PEAK LOAD POINT

E. 6th & E. Morrison Sts.

Time from 88th St	24 Minutes
Time from 69th St	18 Minutes
Time from 13th & Hall	17 Minutes
Time from 11th & Yamhill Sts	12 Minutes

PHONES: Water & E. Morrison, Grand Ave. & Morrison, 39th & Belmont and 60th & Belmont.

SITTING DOWN LIMIT: East of Grand Ave. and South of Yamhill St.

TOILET FACILITIES: Rear of Real Estate Office, E. 88th & Yamhill Sts.

NO STOP TRAINS:

Commencing with Train 5 leaving 11th & Yamhill Sts. at 4:59 p.m. to Train 5 leaving 11th & Yamhill at 6:17 p.m., inclusive, all trains and trippers will carry dash signs "No Stops West of 50th St."

Steam Road crossing East First and Morrison must be flagged by conductor when regular flagman is absent, 10:00 a.m. to 2:00 p.m. and 7:00 p.m. to 6:00 a.m. Reliefs made at 27th and East Morrison.

MT. TABOR SATURDAY SCHEDULE NO. 3
EFFECTIVE AUG. 1st, 1914.

Form of Schedule for Individual Lines

and inspectors' peak-load slips is converted into graphic form, a separate chart being made either for individual lines or for overlapping routes on which a certain combined headway is desired. In the latter case, as illustrated, different styles of dash and dotted lines are used to differentiate the routes.

The chart just referred to is made out on cross-section paper, on a scale of one cross-section to the minute horizontally and one cross-section to the passenger vertically. The seating capacity of different styles of cars is also shown by horizontal broken lines. Thus the schedule department can see at a glance whether the service is according to the standard set by the management. The traffic chart after preparation is sent to the division superintendents for comment, then to the schedule department for further comment, and finally to the superintendent of transportation for approval.

This standard briefly is: Seats for all passengers during the normal or off-peak hours, assuming no serious interruptions in schedules or unusual traffic conditions; sixty-seven seats for each 100 passengers at peak-load points during the morning rush hour; sixty-three seats for each 100 passengers at peak-load points during the evening rush hour.

To reconcile these standards with the requirements of the public and of the employees is the most important work of the schedule department. It is necessary, therefore, to make a detailed study of the traffic characteristics of each line and the habits of the riders. The peaks of some lines do not coincide with others, and again the crosstown main lines may be overloaded for the very short distances between transfer points. The frequency of the off-peak schedule is determined by the class of riders, for while we aim to give a seat to every passenger, it would be poor policy to space the cars with the expectation of getting a full seated load for each. Furthermore, in a well-to-do district frequent service which will insure freedom from crowding will discourage a lot of walking and increase shopping travel.

In the Business Heart of Portland

In taking care of the men we are fortunate in being able to supplement the earnings of the tripper men, especially, by assigning them to other duties during the off-peak period. This outside work includes the distribution of lighting bills, at a saving over mail, the cleaning of cars, the taking of Ohmer register readings, removal of transfers from transfer boxes, and other miscellaneous duties.

This plan of handling the tripper problem serves two important purposes: It is no longer necessary to run cars for no other end than to give a platform man a reasonable day's work, and we attract and retain in the service a higher grade of men. The result is reflected by the fact that 31.3 per cent of the men in the employ of this company at the present time receive the maximum rate of pay.

A schedule covering a given line is divided vertically to show the following data in order: Sets of double columns show the starting time from each terminal for the train number which is written horizontally above and across the time figures. These double columns of assigned regular and tripper trains are continued to the end of the day's schedules. Below these columns the assignment of runs is shown. This states clearly when the crews holding the runs listed are to report, the figures being five minutes in advance of the time they are to take out their first car of the day. The relief time is also shown, together with the total working hours of each crew. Below the list of run numbers is miscellaneous information such as minimum running time between time points; peak-load points for the use of the conductor; location of private telephones for use in case of emergency; limits in which motormen are permitted to sit; location of toilet facilities (as arranged for by this company); location of all flagging crossings; period in which certain cars will operate as no-stop cars.

The reference to minimum running time is explained by the fact that a little more leeway is allowed during the congested periods than during the off-peak hours, when traffic conditions are such as to permit operation with the least possible delay.

Departmental Work Planning System at Portland

Self-Devised Modifications of the Taylor System Have Been Successfully Applied to Several Departments—Complete Records of All Work Instantly Available

By F. P. MAIZE

Master Mechanic Portland Railway, Light & Power Company

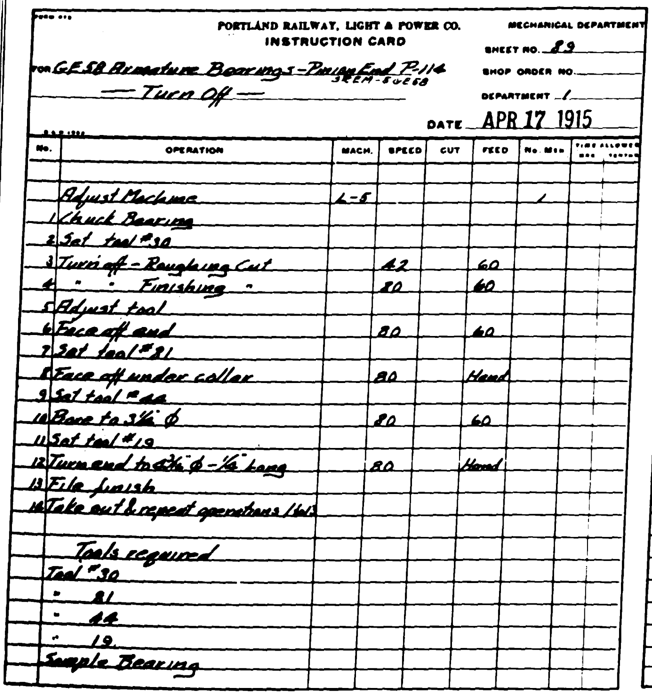
Time Clerk Answering Telephone, Stamping Time Card and Putting It in Pigeonhole

IN February, 1914, the Portland Railway, Light & Power Company, at the suggestion of our general manager, F. W. Hild, introduced a self-devised modification of the Taylor system in its car maintenance line, power and transportation departments. The company is also planning to inaugurate similar methods in the line and track department.

As master mechanic of this company, the writer was assigned the task of working out the general details of the system so far as car maintenance was concerned. After conference with the executive and clerical staffs, the first step was to examine a number of Taylor systems in manufacturing shops with a view to seeing how we could take advantage of their experiences. We then prepared the forms necessary to cover the change in the system of working.

Under the old system, the individual foremen had entire charge of the assignment of work. The only absolute check on the men was the time clock record of "in" and "out" type. The details of the jobs done were made out on a separate time card by the men themselves. Under the present system all work is planned at the office of the master mechanic, the responsibility of the foreman being limited to general supervision of the work and to the instruction of new men.

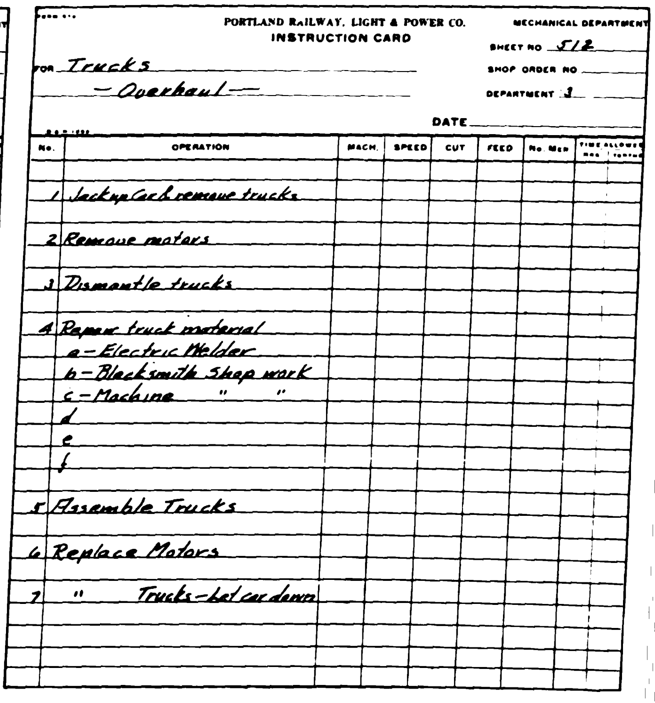
The routeing of a given car overhauling job is now as follows: When the car has made its mileage it is called in by the notification of the chief clerk to the foreman of the carhouse affected. Upon delivery of the car with the foreman's defect slip, the latter is turned in to the master mechanic's office as a notification of delivery. Next the chief clerk orders the car to be placed on a specified track.



PORTLAND RAILWAY, LIGHT & POWER CO.
INSTRUCTION CARD
MECHANICAL DEPARTMENT
SHEET NO. 89
SHOP ORDER NO.
DEPARTMENT 1
FOR GE 58 Armature Bearings – Pinion End P-114
3REM-5GE58
— Turn Off —
DATE APR 17 1915

No.	Operation	Mach.	Speed	Cut	Feed	No. Men	Time Allowed Hrs.	Tenths
	Adjust Machine	L-5				1		
1	Chuck Bearing							
2	Set tool #30							
3	Turn off – Roughing Cut		42		60			
4	" " Finishing "		80		60			
5	Adjust tool							
6	Face off end		80		60			
7	Set tool #81							
8	Face off under collar		80		Hand			
9	Set tool #44							
10	Bore to 3⅛" ϕ		80		60			
11	Set tool #19							
12	Turn end to 3⅝" ϕ – ½" long		80		Hand			
13	File finish							
14	Take out & repeat operations 1 to 13							
	Tools required							
	Tool #30							
	" 81							
	" 44							
	" 19.							
	Sample Bearing							

Instruction Card Showing How to Turn Off a Specified Bearing



PORTLAND RAILWAY, LIGHT & POWER CO.
INSTRUCTION CARD
MECHANICAL DEPARTMENT
SHEET NO 512
SHOP ORDER NO
DEPARTMENT 3
FOR Trucks
— Overhaul —
DATE

No.	Operation	Mach.	Speed	Cut	Feed	No. Men	Time Allowed Hrs.	Tenths
1	Jack up Car & remove trucks							
2	Remove motors							
3	Dismantle trucks							
4	Repair truck material							
	a – Electric Welder							
	b – Blacksmith Shop work							
	c – Machine " "							
	d							
	e							
	f							
5	Assemble Trucks							
6	Replace Motors							
7	" Trucks – let car down							

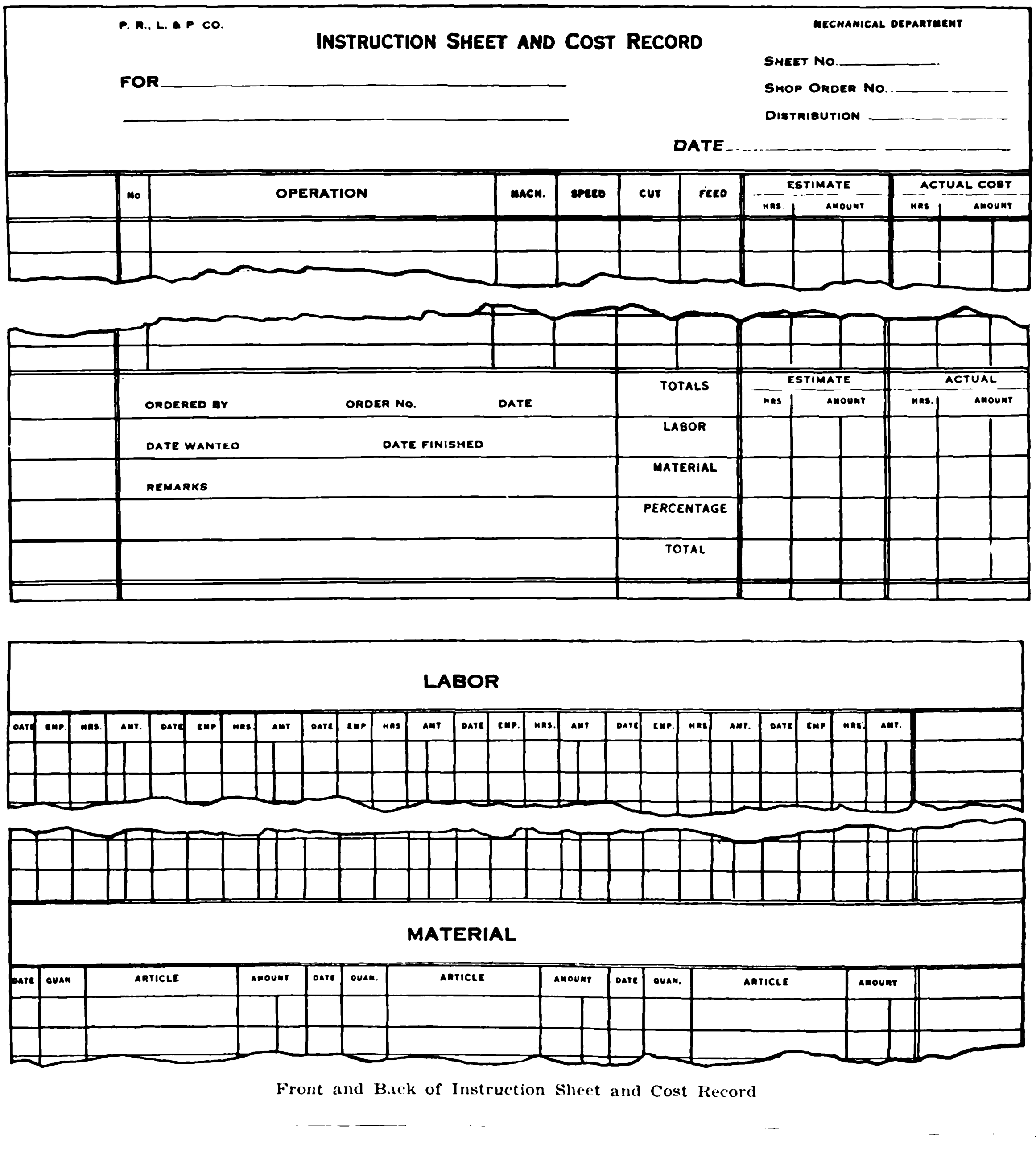
Instruction Card Showing Order of Work in Truck Overhauling

Cars are overhauled according to a standard schedule, which comprises air brakes, body, trucks, motors, and electrical equipment (control, contactors, etc.). These are subdivided into operations which have proved to be most efficient. Thus, in overhauling a truck the work is done as follows:

Operation 1—Jack up car and remove trucks.
Operation 2—Remove motors.
Operation 3—Dismantle trucks.
Operation 4—General repair to truck. This is subdivided in turn as follows:
  Operation 4a—Spot-weld and plug truck material (as specified on instruction card).
  Operation 4b—Forge new parts and repair truck material (as per instruction card).
  Operation 4c—Drill and machine truck parts (as per instruction card).
Operation 5—Assemble the trucks.
Operation 6—Replace motors.
Operation 7—Replace trucks under car.

Instruction sheets of the type described are kept by the routeing clerk as a guide and check on the work performed and in making out time cards and instruction cards. Both of these cards are distributed to the individual workmen by placing them in numbered pigeonholes. When a workman takes out his time card he telephones the time clerk, who makes a record of the time on his duplicate of the time card. The time card, if the job is a simple one, carries the instructions directly in words; if it is not a simple one, the card carries the numbers of the appropriate instruction cards. For accessibility, these instruction cards are kept in pigeonholes directly under those which hold the time cards.

To avoid waste in the use of instruction cards those regularly used by the men are shellacked and



P. R., L. & P. CO.
INSTRUCTION SHEET AND COST RECORD
MECHANICAL DEPARTMENT
SHEET NO.
SHOP ORDER NO.
DISTRIBUTION
FOR
DATE

	NO	OPERATION	MACH.	SPEED	CUT	FEED	ESTIMATE		ACTUAL COST	
							HRS	AMOUNT	HRS	AMOUNT

ORDERED BY ORDER NO. DATE
DATE WANTED DATE FINISHED
REMARKS

TOTALS	ESTIMATE		ACTUAL	
	HRS	AMOUNT	HRS.	AMOUNT
LABOR				
MATERIAL				
PERCENTAGE				
TOTAL				

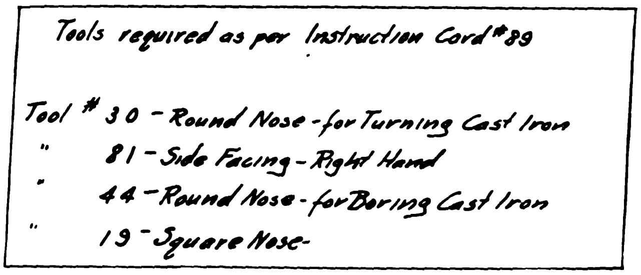
LABOR

DATE	EMP.	HRS.	AMT.	DATE	EMP	HRS.	AMT	DATE	EMP	HRS	AMT	DATE	EMP.	HRS.	AMT	DATE	EMP.	HRS.	AMT.	DATE	EMP	HRS.	AMT.

MATERIAL

DATE	QUAN	ARTICLE	AMOUNT	DATE	QUAN.	ARTICLE	AMOUNT	DATE	QUAN.	ARTICLE	AMOUNT

Front and Back of Instruction Sheet and Cost Record



Tools required as per Instruction Card #89

Tool #30 - Round Nose - for Turning Cast Iron
" 81 - Side Facing - Right Hand
" 44 - Round Nose - for Boring Cast Iron
" 19 - Square Nose -

Schedule of Tools Referred to by Number

varnished to insure long life. Outside of those in general use, one set is kept by the routeing clerk and the master set is kept on file in the office of the master mechanic.

When the workman has completed the job assigned he calls up the time clerk again to give his time for the given shop order number. The clerk then stamps this finishing time on his own copy of the time card with a Calculagraph which prints the elapsed time directly in hours and tenths as reproduced.

Should a car damaged in an accident be sent in for repair, the record will begin with the report of the local carhouse foreman to the chief clerk. The latter will then order the delivery crew to place the car in the shop as in ordinary overhauls. Each foreman is then notified to inspect the car and make a report of the repairs necessary. Upon this combinations of regular cards are made out to cover the case. A similar procedure is in vogue for painting jobs.

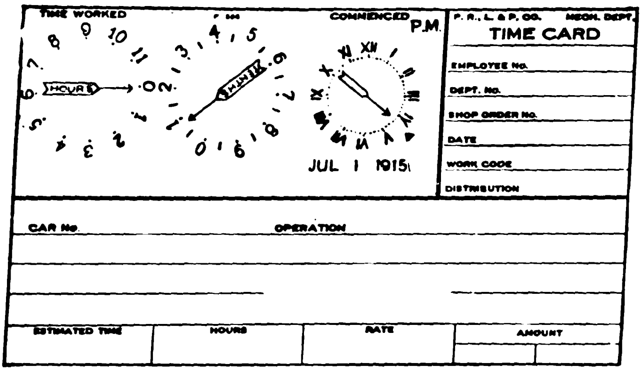
In case the job to be handled is manufacture, the chief clerk will receive an order from the purchasing department for the parts wanted. For such jobs we also have regular instruction cards. If, for example, the order is for 100 cast-iron armature bearings, pattern 114, the workman will get a time card with the appropriate instruction card reference number. The first instruction is the adjustment of the machine, the latter being identified by its number. The steps of the work are then specified as follows:

1—Chuck bearing.
2—Set tool No. 30.
3—Turn off—Roughing cut (with speed and feed).
4—Turn off—Finishing cut (with speed and feed).
5—Adjust tool.
6—Face off end (with speed and feed).
7—Set tool No. 81.
8—Face off under collar (with speed and feed).
9—Set tool No. 44.
10—Bore to 3¼ in. (with speed and feed).
11—Set tool No. 19.
12—Turn end to 4 3/16 in.-¼ in. long (with speed and feed).
13—File finish.
14—Take out and repeat operations 1 to 13.

TOOLS REQUIRED

Tool No. 30.	Tool No. 44.
Tool No. 81	Tool No. 19.

Sample bearing (for information of new man).



HOURS
TENTHS
JUL 1 1915

TIME WORKED
COMMENCED P.M.

P. R., L. & P. CO. MECH. DEPT.
TIME CARD
EMPLOYEE No.
DEPT. No.
SHOP ORDER No.
DATE
WORK CODE
DISTRIBUTION

CAR No. OPERATION

ESTIMATED TIME	HOURS	RATE	AMOUNT

Time Card with Calculagraph Record

Our methods as shown by the instruction cards are the results of stop-watch tests continued until the best way had been found. Therefore, the individual workman loses no time in determining what to do next.

To be fair to the men, the possibility of exceptions to the rules must be taken into consideration. Should a workman, for instance, find that a casting is too hard to be handled efficiently at the designated speeds and feeds, he is privileged to call the attention of the foreman to that fact. The foreman will then decide upon the proper speed and feed, notifying the chief clerk accordingly.

Since the ability of the men is gaged by the time they require for specific operations, it is desirable to provide workers on like jobs with exactly the same tools. Therefore, all grinding is done by one man in the toolroom and according to standard instructions.

Perhaps the largest saving in time is made by the system of routeing supplies. When the men begin a job they make a list of everything to be repaired and all material to be ordered. This list, after being checked off by the foreman, goes to the routeing clerk who calls for the necessary requisitions and makes out the routeing. Therefore, the men do not start to assemble a job until all the material is at hand. Comparison of time cards has also shown us what losses in time occur when the work is not properly laid out, such as putting too many men on one job and assigning men to jobs in which they are not at their best; or again, that the machine used is not suitable for the work.

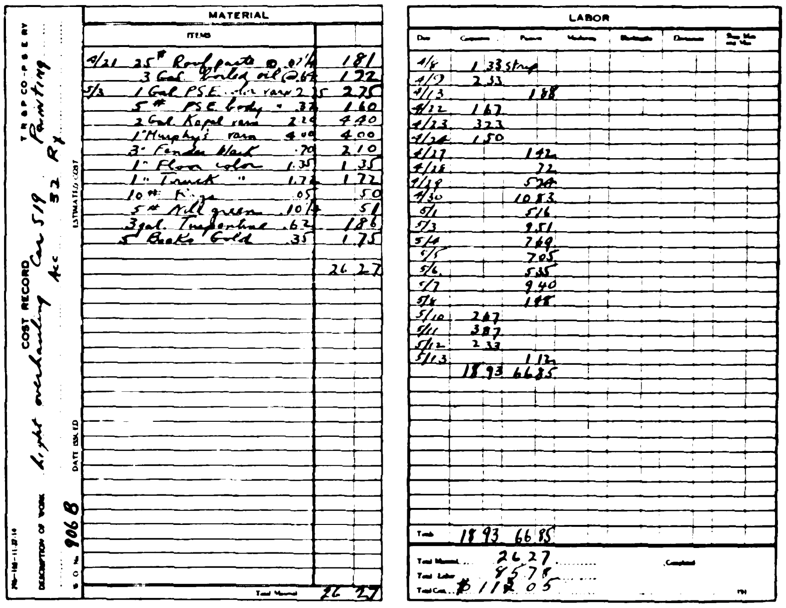
In view of the fact that efficiency systems are often accompanied by a large increase in the clerical staff, it is interesting to point out that we had to add only one clerk, whereas the shop forces were reduced from 130 to 92 men for the same output. This result was due, in part, to the transfer of clerks from the individual departments to a central office and to the addition of a Calculagraph, but the principal cause was a detailed preliminary study which extended over five months.

Car Maintenance on a Definite Cost Basis

A Central Feature of the Maintenance Records Is the Practice of Showing All Labor and Material Costs for Each Car Overhauled

By K. C. SCHLUSS

Superintendent of Power and Equipment Puget Sound Electric Railway, Tacoma



COST RECORD

Car 519

Painting

Light overhauling

Acc 32 Ry

W. O. No. 906 B

MATERIAL

ITEMS	
4/21 25# Roof paint @ .07¼	1 81
3 Gal. Boiled oil @ .64	1 92
5/3 1 Gal P.S.E. varn 2.75	2 75
5# P.S.E. body @ .32	1 60
2 Gal. Kopal varn 2.20	4 40
1 Murphy's varn 4.00	4 00
3 Fender black .70	2 10
1 Floor color 1.35	1 35
1 Truck " 1.72	1 72
10# Rags .05	50
5# Nile green .10¼	51
3 gal. Turpentine .62	1 86
5 Books Gold .35	1 75
	26 27
Total Material	26 27

LABOR

4/8	1 33 strip	
4/9	2 33	
4/13		1 88
4/22	1 67	
4/23	3 23	
4/24	1 50	
4/27		1 42
4/28		72
4/29		5 24
4/30		10 83
5/1		5 16
5/3		9 51
5/4		7 69
5/5		7 05
5/6		5 35
5/7		9 40
5/8		1 88
5/10	2 67	
5/11	3 87	
5/12	2 33	
5/13		1 12
	18 93	66 85
Totals	18 93	66 85

Total Material 26 27

Total Labor 85 78

Total Cost $112 05

Detail of Painting Material and Labor, Constituting One of a Set of Cost Record Cards (Front and Back)

THE primary purpose of car maintenance records is to secure knowledge of the behavior of equipment and the cost of upkeep, but such records are also of value in many other ways. They help to maintain the morale of the shop force by presenting a readily accessible record which acts as a check on the thoroughness of the work performed by each branch of the maintenance staff; they afford to the claim department information which may be worth thousands of dollars; they give many data of value in making appraisals, either by the company or commissions, because they show the cost of betterments and renewals, and they make it possible to forecast with reasonable accuracy the cost of maintenance and renewals for the ensuing fiscal year.

We do not treat a car as an entity, but as made up of separate units such as car body, trucks, painting, air, light and heat wiring, all electrical squipment except motors, motors and, finally, air equipment.

Car Inspection and Overhauling

City cars are inspected every 900 miles and interurban cars every 1200 miles. All inspection that is carried out at the Tacoma shops is done during the day time, the only night work being the setting-up and releasing of brakes and the correction of minor defects reported for immediate attention. Motormen on turning in their cars must also submit a statement on the carhouse register that their cars are either O. K. or defective. In the latter case, each defect must be specified. The practice of reporting O. K. acts as a check on the motorman should he make a false report in an accident case concerning the previous condition of the car. The car inspection reports are filed in calendar order for reference only as they have no connection with the maintenance records.

Cars are overhauled about every 80,000 to 100,000 miles or at approximately two-year intervals. If in overhauling a car we find that certain parts are not due for overhauling, because of transfers from one car body to another, we simply give these parts a casual inspection. Since individual records are kept, however, it is feasible to bring the car in later for the purpose of replacing such parts only.

To identify such parts in our records, every truck, as well as air compressors, wheels, gears, pinions, etc., receives a number. Individual record cards for the parts named are kept to show the numbers of the successive cars on which the part has been used, the dates "in" and "out," the reason for removal and the character of repair.

System of Work Order Numbers

Independent of these equipment card records, all body work, painting, air, light and heat wiring, trucks, electrical equipment except motors, motors, and air equipment are handled under a general master work order number which covers all car overhauling for the year. Each job is differentiated, however, by the addition of the car number. A placard bearing both numbers is posted on the car and orders are issued to all the foremen concerned. The overhauling work charged against the car as such does not include traction armatures, wheels, axles, air compressors and controllers. Should the cost records be used for appraisals or maintenance estimates, the excluded items enumerated would be cared for by taking their average value for any class as a whole.

It will be seen, therefore, that we do not saddle on the car the cost of maintaining equipment which is changed and overhauled at frequent intervals. For example, if a gear is replaced on account of wear we would not charge it against the overhauling cost of the car, but if the gear ratio is changed we would do so. All of the work done which is done in the shop for the mechanical department and outside departments of the company, except running repairs, is charged to standard or special work orders.

Work Order 906 Car No. 519 Light Overhauling

	Material	Labor	Total
A—Body	$91.11	$126.86	$217.97
B—Painting	26.17	85.78	111.95
C—Trucks	10.87	31.36	42.23
D—Air, light and heat wiring	9.40	11.35	20.75
E—Electric equipment	2.94	12.90	15.84
F—Air equipment	.42	2.89	3.31
Total	$140.91	$271.14	$412.05

Complete May 14, 1915.

A—Body had light overhauling. Following new material used: four steps complete, twelve metal step plates, two side vestibule doors, all vestibule window stops, roof canvas on upper deck, twenty-four pieces siding, eight iron grab handles, water drip over end doors, 12-ft. apron, flooring in toilet, four hooks on vestibule door. Following repairs: lowered sign rack, removed end toilet window and filled space with siding and panel inside, straightened No. 1 iron bumper, installed Ohmer register.

B—Car revarnished.

C—Trucks not overhauled. Light repairs to brake rigging; new bolster No. 2 truck.

D—Inspected all wiring and moved light switch. Installed new receptacles.

E—New third-rail beam.

F—Air equipment inspected.

Summary of Work Done on a Car During Light Overhauling

COST OF CAR OVERHAULING

The data covering the cost of a car overhauling are compiled from time and material slips turned in by the workmen, who state the nature of the work done, the work order number, and the car number.

The prices of material received by the workman for a given car are extended on the storeroom requisitions by the storekeeper and turned over to the cost clerk for entry on cost cards. The cost card for overhauling any car, when completed, shows the cost of all material and labor. It also bears a summary of the work performed. At present we file these cost cards consecutively by car number.

It will be understood, of course, that the records mentioned above bear no relation to the standard classification of accounts, although the postings for each account are taken from the same labor and material slips.

To my mind this practice of showing exactly what is done on a car during an overhaul is the only fair way for making comparisons with the overhauling costs of other railways. If a superintendent of equipment is not obliged to show the work in detail it is very easy for him to make a record for economy that will prove very costly for the company in the end. Aside from this feature, such detail of cost keeping permits forecasting the cost of overhauling from year to year, and has other advantages which are mentioned earlier in this article.

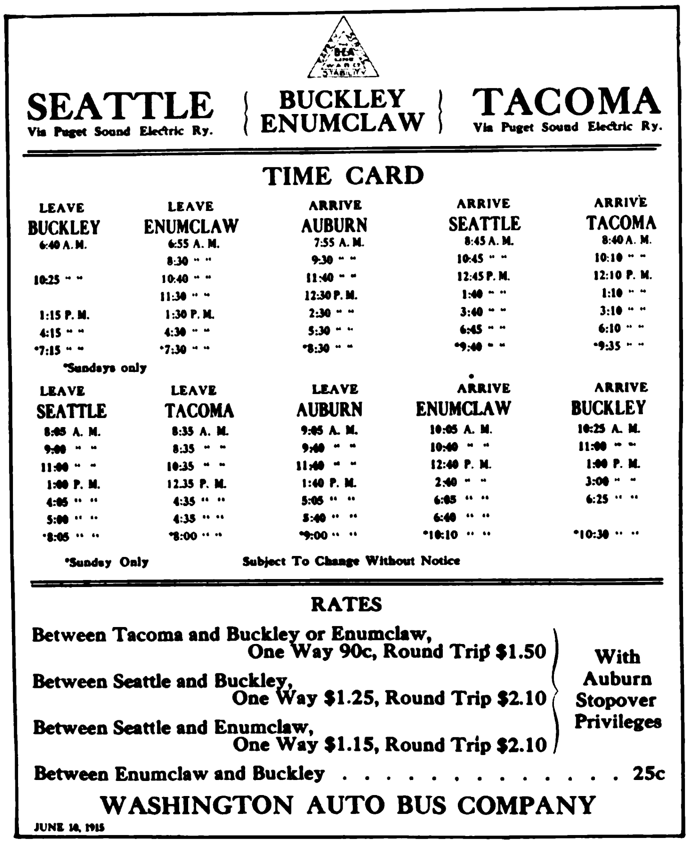
Mount Ranier, Regarded by All Good Tacomans as Their Personal Property

The Auto-Bus as an Auxiliary to Interurban Railways

Three Auto-Bus Lines Have Recently Been Established as Feeders to Existing Interurban Railways at a Fare of 3 Cents Per Mile

By A. W. LEONARD

President Puget Sound Traction, Light & Power Company, Seattle



SEATTLE Via Puget Sound Electric Ry. { **BUCKLEY ENUMCLAW** } **TACOMA** Via Puget Sound Electric Ry.

TIME CARD

LEAVE BUCKLEY	LEAVE ENUMCLAW	ARRIVE AUBURN	ARRIVE SEATTLE	ARRIVE TACOMA
6:40 A. M.	6:55 A. M.	7:55 A. M.	8:45 A. M.	8:40 A. M.
	8:30 " "	9:30 " "	10:45 " "	10:10 " "
10:25 " "	10:40 " "	11:40 " "	12:45 P. M.	12:10 P. M.
	11:30 " "	12:30 P. M.	1:40 " "	1:10 " "
1:15 P. M.	1:30 P. M.	2:30 " "	3:40 " "	3:10 " "
4:15 " "	4:30 " "	5:30 " "	6:45 " "	6:10 " "
*7:15 " "	*7:30 " "	*8:30 " "	*9:40 " "	*9:35 " "

*Sundays only

LEAVE SEATTLE	LEAVE TACOMA	LEAVE AUBURN	ARRIVE ENUMCLAW	ARRIVE BUCKLEY
8:05 A. M.	8:35 A. M.	9:05 A. M.	10:05 A. M.	10:25 A. M.
9:00 " "	8:35 " "	9:40 " "	10:40 " "	11:00 " "
11:00 " "	10:35 " "	11:40 " "	12:40 P. M.	1:00 P. M.
1:00 P. M.	12.35 P. M.	1:40 P. M.	2:40 " "	3:00 " "
4:05 " "	4:35 " "	5:05 " "	6:05 " "	6:25 " "
5:00 " "	4:35 " "	5:40 " "	6:40 " "	
*8:05 " "	*8:00 " "	*9:00 " "	*10:10 " "	*10:30 " "

*Sunday Only Subject To Change Without Notice

RATES

Between Tacoma and Buckley or Enumclaw, One Way 90c, Round Trip $1.50
Between Seattle and Buckley, One Way $1.25, Round Trip $2.10
Between Seattle and Enumclaw, One Way $1.15, Round Trip $2.10
} With Auburn Stopover Privileges

Between Enumclaw and Buckley 25c

WASHINGTON AUTO BUS COMPANY

JUNE 14, 1915

Schedule Card of Auburn-Enumclaw Bus Line Showing Connections with Seattle-Tacoma Interurban Railway

THE Washington Auto Bus Company, a subsidiary of the Puget Sound Traction, Light & Power Company, has recently begun the operation of auto-buses as feeders of the interurbans operated by some of the railway subsidiaries of the Puget Sound Company. At this time we are operating three lines of buses as follows:

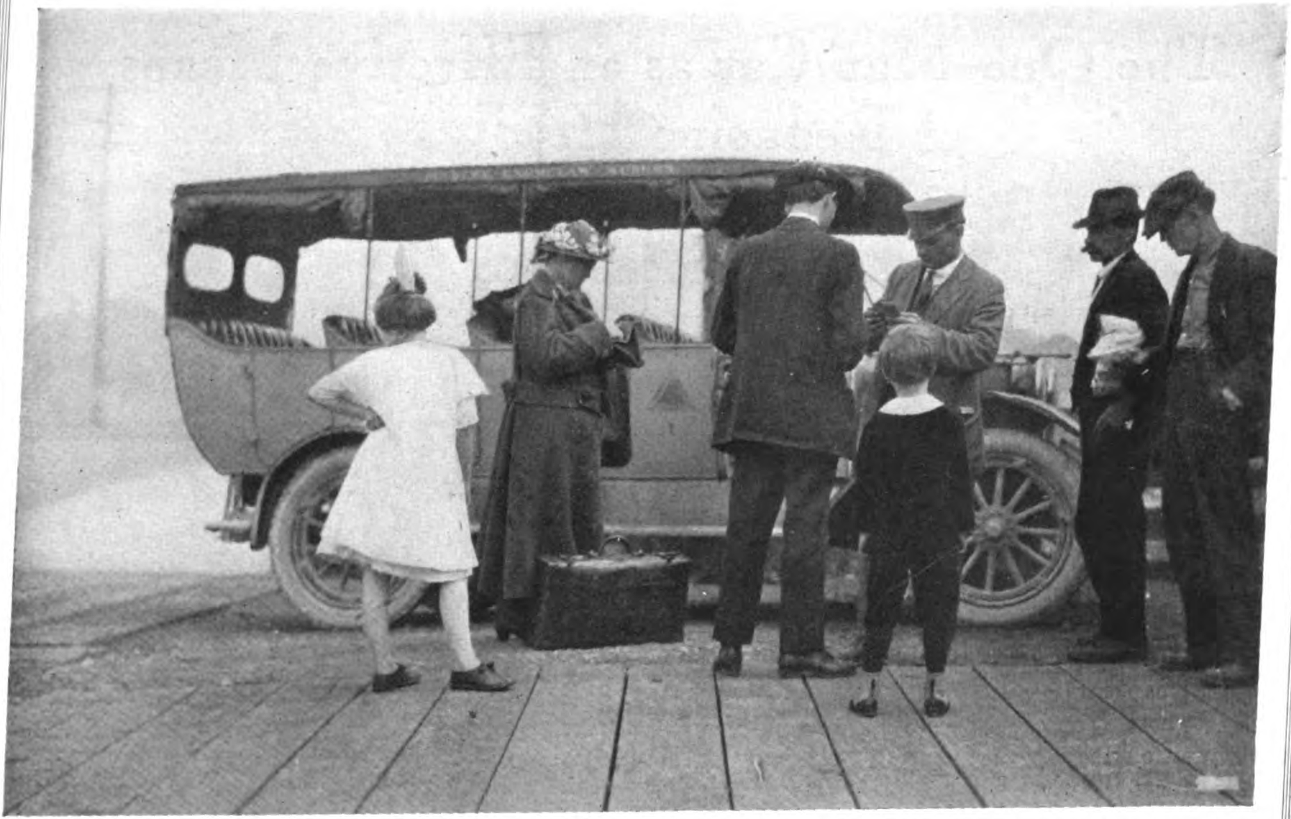
Between Auburn and Enumclaw, 22 miles, running at right angles to the Seattle-Tacoma Interurban Railway, making connections at Auburn. Three twelve-passenger Studebaker cars are used to give the service which is laid out to make connections with the interurban trains. Two-part coupon tickets are sold to cover combination interurban and auto-bus trips, each ticket showing the name of the issuing company. The bus fares are invariably figured at 3 cents per mile, whereas the interurban straight railway fare is sometimes as low as 2 cents per mile, and commutation rates are even less.

Between Edmonds and Seattle Heights, 3 miles, feeding the Seattle-Everett line of the Pacific Northwest Traction Company, making connection at Seattle Heights, two eleven-passenger Studebaker cars are operated. Tickets and rates of fare are on the same plan as the Auburn-Enumclaw line.

Of course, all of the vehicles enumerated are for one-man operation. The chauffeur acts as ticket seller as well as collector. International neck registers are used for the collection of cash fares.

In addition to the foregoing two lines, we have several other routes in prospect, but will do nothing with them until further experience is gained.

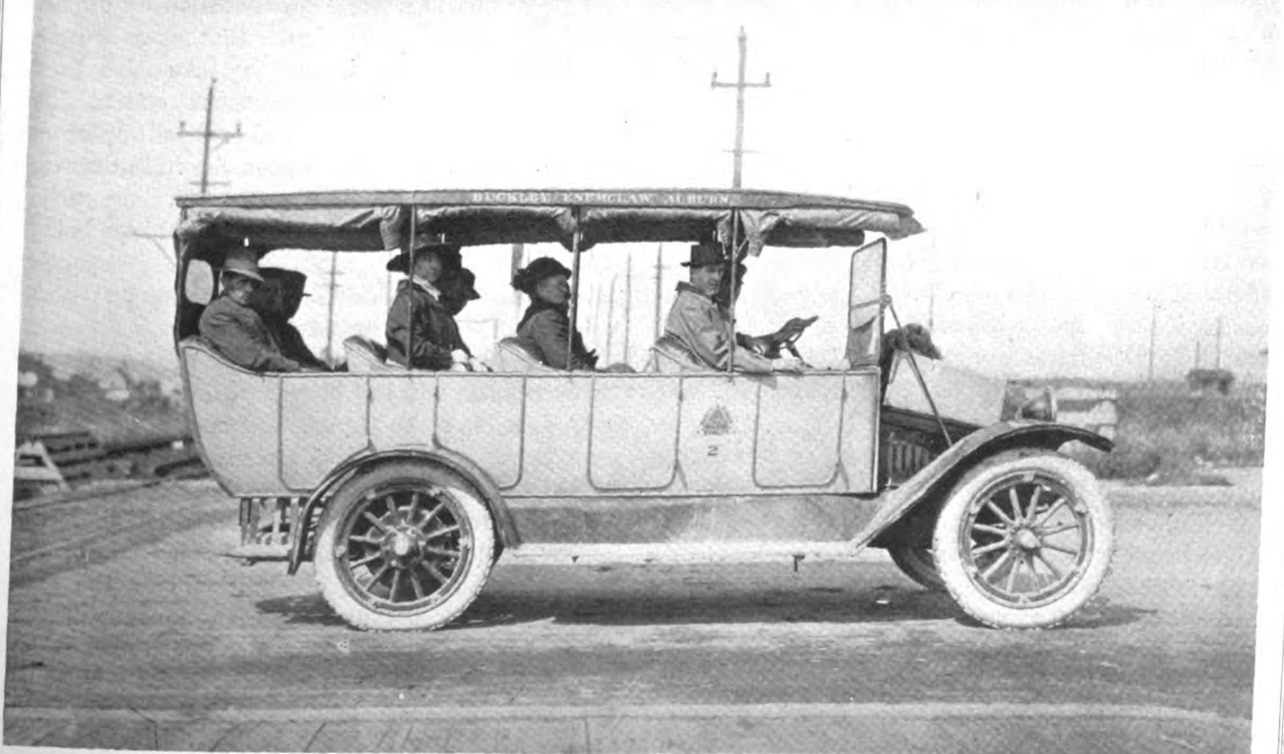
We look upon the auto-bus as the only practicable means for developing communities adjacent to but not served by the interurban railways. Such service is the direct result of improvement in automobiles and highways. We feel, too, that it is not only proper to give the public all possible transportation service, but also to do it before the revenues of existing lines are jeopardized by the competition of independent auto-buses.



The Auto-Buses of the Washington Auto-Bus Company Feeding the Electric Railway Are Handled by One Man

Auto-Buses as Feeders of the Puget Sound Traction, Light & Power Company

Auto-Bus with Pneumatic Tires in Service Between Buckley, Enumclaw and Auburn



The One-Man Car as an Effective Means of Reducing Headway

The Author Suggests the Possibility of Interpolating Short-Line, Short-Headway, One-Man Cars on Through Routes

By G. A. RICHARDSON

Superintendent of Railway Puget Sound Traction, Light & Power Company, Seattle Division

Second Avenue, Seattle

THE one-man car is not a new proposition in itself, for first we had the bob-tail car of horse days, and in very recent years electric cars have been designed specially for such operation. The general idea has been that the one-man car was particularly suitable for small towns where the difference between one and two men on a car is the difference between profit and loss. However, it is the writer's belief that there is also a field for the one-man car in cities of medium size not only for shuttle, crosstown and feeder service but for short-line or turn-back cars on trunk lines. For example, if eight cars are operated on a line on a seven and a half minute headway over the entire length of a route which takes sixty minutes for the round trip, two of these through cars might be taken off, leaving six cars for the through service and releasing four trainmen for one-man car short-line service operation. The result would be six-car ten-minute headway over the entire route, with four-car ten-minute headway over the business section of the route, giving a combined headway of five minutes against seven and a half minutes with the present form of operation, with no additional cost in platform expense. A frequent short-line service is the most effective way to meet the jitney.

This proposition is doubtless a radical one, but radical diseases call for radical remedies. Hitherto electric railway operating men have been obliged to look very closely at the item of platform cost because two-men operation often made the cost of a short headway prohibitive.

The operation of jitneys has shown that many people are likely to take the first transportation means offered because they want short-headway operation. It has also been shown in the case of the larger or bus units that the traveling public has no intrinsic objection to public vehicles being operated by one man.

A transition period, during which we must modify some of our former standards, is now upon us, and if the jitney accelerates the use of the one-man car its coming will not have been in vain.

We now have one shuttle line operated with the one-man car, and are considering seriously its gradual extension into the field outlined above. Our present one-man car is a single-truck type with folding gates, the only change for one-man operation being the locking of the doors on the rear platform. As has already been announced, the Stone & Webster Management Association has designed a light one-man car particularly suitable for the conditions described.

The Use of Coasting Recorders Results in Economies at Vancouver

Although the Saving of Electrical Energy Is Not a Vital Point on This System, the Use of Coasting Recorders Has Been Found Advantageous for Operating and Maintenance Reasons

By W. G. MURRIN
General Superintendent British Columbia Electric Railway, Vancouver, B. C.

One Girl Using Adding Machine and One Girl Recording Coasting Records

OUR preliminary studies with Rico coasting recorders were made on both city and interurban lines early in 1913. Altogether seven clocks were used, and their records were supplemented with watt-hour meters and ammeters, in addition to which one man rode each test car simply to check the running time. The cars were operated by our regular motormen subject to the instruction of the engineers of the Railway Improvement Company, but the records were taken by our own engineers. After several days' run on one group of cars, the instruments were placed on a second group and so on until all important local lines had been tried. We did not make any tests on our long interurban lines as we did not believe that their operating conditions, involving the use of heavy trains, would permit the most effective use of recorders.

As a result of these tests it was decided to equip the Vancouver city lines, numbering about 200 cars. We also installed the Rico terminal clocks on the same lines. This work was completed in the fall of 1913.

In addition to special instruction in coasting, the motormen were invited to meetings at which the coasting clock was fully explained.

At first the records of coasting were maintained by a separate department, numbering five girls, an outside traveling inspector who examined clocks, and the head of the department. This department has since been merged with the transportation department under the superintendent. The only employees who give their time exclusively to this work are two girls, this being made possible through their increased experience and the use of a Comptometer and slide rule. Instead of employing a special inspector, the mechanical department looks after the clocks like any other piece of equipment, special investigations being made only on daily reports from the transportation department that certain clocks require attention. The traffic inspectors now do the coaching formerly done by the coasting clock inspector.

The coasting records of the individual men are posted every two weeks at each carhouse. In addition, educational bulletins are posted from time to time. Men who show poor records are subject to personal interview with the superintendent.

COMPARISONS AND BENEFITS

In February, 1914, the company, for its own satisfaction, made tests on eight different routes with recorders checked by watt-hour meters. A special inspector with a stop-watch rode on each run to get the actual running time. When averaged these tests showed conclusively that the least energy was used by the best coasters, and that the drop in energy was proportional to the gain in coasting. A summary of the test is appended.

As experience with the clocks increased and the follow-up work was pursued, the coasting for the entire system rose to 31.2 per cent during the summer of 1914, and we were hopeful that an average of 35 per cent was attainable, although our stops are exceptionally frequent because of very short blocks. Late in 1914, however, about 650 jitneys made their appearance on the streets of Vancouver, and this made it desirable to speed up the lines as much as practicable. Consequently, coasting has been cut down to an average of 22.3 per cent, but at the same time we are giving many more car-miles without any appreciable change in the power bill and at a reduction in platform expense per car-mile from 8.27 cents (June, 1914) to 7.31 cents (June, 1915).

In short, the use of coasting recorders revealed the possibility of higher speeds and therefore of greater ultimate economies than the mere saving of energy where coasting is worked to the limit.

The disciplinary value of the coasting recorder would appear from the fact that despite an increase of speed, front-end accidents are no more numerous than at the lower speed.

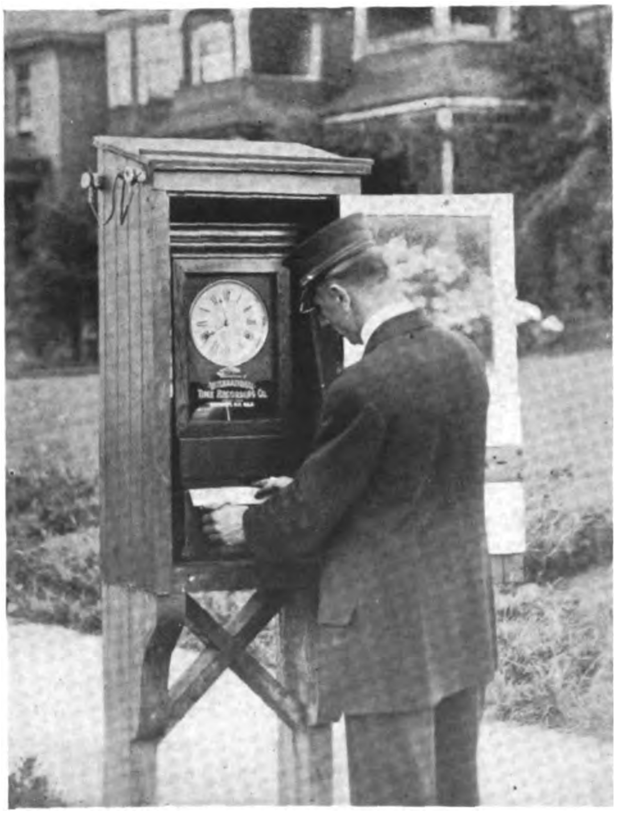
Maintenance per car-mile has decreased about 40 per cent during the period since the coasting recorders were installed. Of course, we cannot credit the recorder alone with this reduction because our cars are now inspected at shorter intervals, brake-shoes have been changed from plain iron to the reinforced steel-back type, much equipment has been standardized and other improvements have been made. At the same time we feel satisfied that skillful coasting does not injuriously affect the maintenance of equipment.

RELATION OF COASTING TO ENERGY USE
Tests of Feb. 2 to May 12, 1914

Number of cars in test	4
Number of routes	8
Number of days	22
Four days on two lines	—
Two days on others; and some odd trips	—
Number of motormen in test	45
Total number of individual runs	63
Average of All High Men vs. Low Men	
Difference in coasting percentage	11.868 per cent
Difference in kilowatt-hours per car-mile	12.542 per cent
Or approximately in the ratio of	1:1
Average coasting	30.3 per cent
Average energy consumption in kilowatt-hours	3.27
Three cars with quadruple Westinghouse 101-B equipments geared	15.69
Two cars with quadruple GE-67 equipments geared	17:67
Average weight of cars in tons	23

TERMINAL CLOCK

The terminal clock has proved a most useful auxiliary of the coasting recorder and also as an aid to inspection service. We do not place the terminal clocks at the terminals but at points five to seven minutes therefrom. This practice eliminates both running ahead of time and loafing at the terminal so that the men naturally try to get over the line in exact time. The result has been that we have been able to reduce our staff of inspectors to half the original number and yet operate at higher speed and efficiency than before.



Use of Terminal Clock

Removing Coasting Slip

Electric Railway Journal

Published by the McGraw Publishing Company, Inc.
Consolidation of Street Railway Journal and Electric Railway Review

Vol. XLVI NEW YORK, SATURDAY, SEPTEMBER 18, 1915 No. 12

SAN FRANCISCO A. I. E. E. MEETING

The American Institute of Electrical Engineers held two conventions this summer, one at Deer Park, Md., in June, which complied with the constitutional requirements that the annual convention be held prior to Aug. 1, and the other in San Francisco this week. At both meetings papers of great value and immediate interest to electric railway men were presented. All of these indicated that the electrical engineering problems of street and interurban railway and steam railroad electrification are not all solved by any means. And the solutions of these problems affect not only the electrical engineers but they reach out into all branches of the transportation business. It is therefore very desirable that the electric railway industry as a whole keep closely in touch with the experiments and achievements of electrical engineers in this field. At San Francisco two papers were presented which are so directly of an electric railway character that we have abstracted them at length elsewhere in this issue. One of these is commented upon below and the other, by E. W. Allen and Edward Taylor on automatic substations, is discussed more at length on page 576.

PREVENTION OF OVERHEAD ELECTROLYSIS

In his A. I. E. E. paper on this subject, S. L. Foster showed that stray currents can cause trouble elsewhere than underground. The operator of an electric railway which is within reach of salt spray must insulate his overhead construction to prevent surface leakage current as well as against disruptive discharge. This is a lesson learned from the experience described by Mr. Foster. The operation of the laws of electrolysis is as sure as fate. Given two metal surfaces connected by an electrolyte and subjected to a difference of potential sufficient to overcome the chemical affinity of the constituents of the electrolyte, and decomposition is bound to follow. Every ampere-hour of electricity will produce a definite effect in accordance with known laws. It is probable that the experience described by Mr. Foster is unusually severe for, to produce the effect described, there must be a more or less continuous supply of moisture. However, if insulators became coated with salt it would be expected that this material would retain moisture and furnish a conducting path. At any rate, Mr. Foster has shown that recognition of electrolytic laws is the first step in preventing the deleterious effects of electrolysis. The paper illustrates the importance of a knowledge of science in solving practical problems.

APPLYING THE TRAFFIC STUDY

Mr. Doolittle in his concluding article on the subject of traffic surveys, published on another page of this issue, discusses in a clearly detailed and illustrated way the methods of constructing schedules. Although traffic studies may serve as bases for rerouteing cars, adjusting transfer points and finding the solution of similar problems, the formation of schedules constitutes on the whole the most important and most practical outcome of such work. This fact is now more widely recognized than formerly in the electric railway field, for most present-day managers have come to see the superiority of scientific operating methods over methods devised by the rule-of-thumb. Perhaps the details of Mr. Doolittle's schedule-making will not be used—circumstances alter local cases—but the principles underlying his plan are an absolute necessity in modern operation. It may be well to note, however, that the operating problem does not end with the completion of the schedule chart, for even then the manager is confronted by the daily task of making trainmen observe their time points and maintain the proper headway, without which a technically perfect timetable would be vitiated. This, of course, is not a traffic survey problem; we mention it only to show that traffic studies are not *per se* a panacea for operating ills unless the conclusions derived therefrom are carried out in an exact and sustained regularity of operation.

PUBLIC OPPOSITION TO THE SKIP STOP

The opinion of C. B. Wells, expressed in last week's issue, to the effect that the skip stop ought to be a prime factor in the solution of the urban transportation problem is very much to the point. It is utterly absurd to call the service that is given in some communities by the name of rapid transit, and where the street cars crawl along at the rate of 7 m.p.h. or even less the public can hardly be blamed for complaining. Of course, it is true that the public is primarily responsible for such conditions because of an almost invariable and utterly reactionary opposition to rerouteing and to the elimination of stops—remedies which would cure some 90 per cent of all dragging schedules. But on the other hand the public can hardly be expected to know enough of transportation problems to grasp these facts instinctively, and herein the responsibility is shifted onto the shoulders of the railway officials. It should not be difficult to educate the public in the simple facts that every stop costs about fifteen seconds in lost time and that the elimination of, say, six stops would save a minute and a half per mile, increasing a 7-mile schedule speed by more than 20 per cent. The man that has been accustomed for years to boarding his car at the nearest corner to his house will naturally complain when he is obliged to walk farther. The only remedy is to explain to him carefully and patiently that to stop at the corner of every short block is nearly as bad as to stop in front of every house when a person wished to board or leave a car, and that the only way to have real rapid transit is to have the stops a reasonable distance apart.

AUTOMATIC APPARATUS IN SUBSTATIONS

The A. I. E. E. paper by Messrs. Allen and Taylor describes an interurban railway system in which the substation apparatus is automatically connected to and disconnected from the a.c. and d.c. lines. The directing agency is the variation in the d.c. voltage which, everything else being equal, is an indication of the demand for power. If such a system should become popular it would revolutionize electric railway power distribution practice; hence it is most important that the merits and shortcomings of the plan should be carefully investigated. The present experiment has been made possible through the co-operation of Bion J. Arnold, who has always sympathized with attempts to apply remote and automatic control devices. The Arnold plan of power station layout, providing flexible connection of engines and generators, will be remembered as an example of this in the early days of power-plant history. A later example is seen in the Grand Trunk Railroad power plant at Port Huron, Mich., in which the variation in steam pressure due to the fluctuating demand for electric power was utilized to stimulate or depress the activity of the power plant through changes in the speed of stokers, fans, etc.

Of course, the first objection that will be raised in connection with any scheme of automatic control is its complication. This objection will not hold as it might have done in some instances twenty years ago for the reason that power plants and transmission and distribution systems are already to a large extent dependent for satisfactory and safe operation upon automatic devices. The automatic relay is to-day an almost absolutely reliable device, for it simply had to be made reliable. Nearly twenty years ago the critics predicted failure for Frank J. Sprague's multiple-unit train control system because it was so complicated, but he knew that if the apparatus was well made and the wiring carefully installed it was bound to work, and it did work. In the case under discussion we have no doubt as to the ability of engineers to make the automatic substations operate successfully, particularly in the field of interurban railway service with long headway between cars, where it seems to offer the most advantages. A few practical demonstrations like the one described in the paper will supply much desired data as to the actual savings produced by the automatic substation. The number of substation movements per failure should be stated, together with the cost of the equipment and the net savings. It is important to note that after a half year of operation with one trial equipment the two remaining substations on the line were made automatic. Undoubtedly the automatic substation has its limitations, for reliable operation must depend ultimately upon the human element. If it is injured the automatic station can only put itself out of commission and wait patiently for repairs, although it can in the meantime call for help.

DEVELOPMENT CHARGES

"The law which governs the value of a railroad, as well as every other undertaking for investment, is that it shall yield a profit equal to a fair interest on the whole amount of its cost."

The sentence just quoted sounds as if it had been taken from the brief of an attorney for a railway company in a valuation case now before the court. But it is not. It is found in a book entitled "Street Railways," published by Alexander Easton of Philadelphia in 1859 at a time when horse railways were just beginning to replace omnibuses in New York, Philadelphia, Boston and other large cities, and was in part the answer to the question propounded by the author at the beginning of his chapter "Does the Stock of Street Railways Afford a Secure and Profitable Investment?"

A perusal of this little book, written nearly sixty years ago, is extremely instructive. A large part of it is devoted to proving the superiority of the street car over the bus, its greater economy of time and space on the street, and its higher degree of safety to passengers and pedestrians, all of which is extremely interesting at this time when there is a movement to return to bus operation. We may have occasion to refer again in these columns to some of these early arguments in favor of the street car but will skip over that part of the book now to touch upon some of the managerial and financial questions which it discusses and which, in a way, help us better to understand the genesis of some of the industry's present-day problems.

In the first place, in reading this little book one is struck by the similarity between many of the questions even in those early days and those at present. Thus we find a strong plea for lighter cars in the following words: "Let the purchaser of equipment be guided by a judicious consideration of the local requirements of the business, instead of blindly following the custom adopted by other companies. In the construction of cars the proportion of the paying weight to the dead weight, although in some instances not excessive, in many other is susceptible of material modifications and economy." There is then a calculation of the cost of hauling for a day the excess weight on a car equal to that of a passenger. "The manager must look after these [transportation] matters himself, take his stand on what he thinks is right and insist upon having it," sententiously remarks the author. "The directors of street railways are usually entirely ignorant of the details of the matters over which they have authority;

and even if it were otherwise they could not personally superintend the work under their charge." Again, he says, in speaking of the importance of the selection of an able manager: "Gratuitous services are but temporary and generally terminate in disappointed expectations. Skill and executive labor must be adequately paid for, if expected to be constantly and usefully exerted, and if so exerted, the price is no consideration when compared with the advantages derived." Another statement which throws light upon the early financial practices of the companies reads as follows: "The practice of misapplying capital for the payment of dividends and the charging of current expenses to the account of capital cannot be too strongly condemned. Cases have occurred where the future profitable working of roads has been endangered for years under this system—which, however, suitable as it may be for the convenience of speculators, is fatal to the interest of those who invest permanently."

But perhaps the most interesting part of the book is that relating to the accounts of some of the early companies, including the Sixth Avenue Railroad of New York, Brooklyn City Railroad, Third Avenue Railroad of New York, Cambridge Railroad, Union Railway of Boston, Metropolitan Railway of Boston, and Malden & Melrose Railroad of Boston, all of whose reports and statements of cost of equipment are published. Among the latter are some items which are usually not associated with the earlier developments of horse railroads. Thus the Sixth Avenue Railroad includes in its cost of road and equipment "land damages," and the author speaks as if in a number of cases the railway companies, before building their lines, had to buy up the omnibus interests. Indeed, he says of the Third Avenue Railroad that "the original proprietors of this road are supposed to have bought out five lines of omnibuses at a cost of about $400,000." Nevertheless, speaking of roads as a whole, he says that "The investments have yielded large and regularly-paid dividends, even on amounts of capital charged to construction, which was partly consumed in the purchase of imaginary omnibus rights and other expenses, amounting in total to nearly treble the actual cost for which the roads without grading and bridging can now be built." In some of the recent electric railway valuation cases before commissions, railway companies have been criticised for including in their statements of cost the purchases which they undoubtedly made of the old horse-car lines. But it seems that they were moderate in their claims and that they might fairly have included omnibus rights for which at an earlier date their predecessor horse-car lines paid substantial sums.

The rates of fare on these early lines varied, being 5 cents on the short lines, but 10 cents was charged for a long ride, as from Boston to Cambridge, and 15 cents was charged between Boston and Mount Auburn or Watertown. Even at these rates capital was not easy to obtain. As an example the author cites the Cambridge Railroad, which he says was the first horse railway built in New England. To raise the money to pay for the construction of this road the promoters experienced great difficulty, but finally after much exertion subscriptions to the amount of $43,000 were secured. As this was all that could be obtained the contractor agreed to receive this amount on account of his contract and to take the balance in stock and bonds. The author continues, "By the original terms of subscription each subscriber had the right to take either stock or bonds for the amount of his subscription, but so little faith had the subscribers in the success of the project that of the $43,000 paid in cash, $37,000 was taken in bonds and only about $6,000 in stock."

We have quoted from this early history of street railways not only because of the curiosity of the information but because it shows that street railways even in large cities in those early days were not considered "sure investments," as some would have us now believe. They were not only speculative, but capital was raised only with great difficulty, and the roads had development expenses which are now forgotten or ignored.

AUTOS AND THE ELECTRIC CAR

A few weeks ago we published the results of a census taken in Denver of the number of persons entering and leaving the business district of that city by automobiles, on foot, by horse-drawn vehicles, on bicycles and in the street cars. The striking fact of the study was that 13 per cent traveled by autos, or just about one-fourth as many as traveled by electric cars. The automobiles were all private conveyances, as there are no jitneys in Denver. This is undoubtedly a larger percentage than would be found in most cities as the streets in Denver are well paved and there is an auto for every thirty-six people in the city, but the same condition—that is, an increasing use of the automobile for trips for which the electric car was commonly used—is evident in many cities.

The question is how to combat it, and this Mr. Beeler is doing in part by explaining the facts to the citizens of Denver. His statement, published elsewhere in this issue, discusses the higher cost of automobile transportation and at the same time impresses patrons and possible patrons of the company with their absolute self-interest in supporting and sustaining a first-class electric railway system. It is a strange coincidence that in Denver, as brought out by Mr. Beeler, the estimated annual expense of operating the automobiles, including interest and depreciation, is practically the same as the gross receipts of the electric railway company, yet the automobiles carried only about 18,000,000 whereas the tramway company carried 75,000,000. The main points driven home in the article are that no amount of automobile service can satisfactorily and completely supplant the electric car and that every person who uses an automobile in preference to the electric car does so to the detriment of himself, his neighbor and the city at large. Undoubtedly the automobile has come to stay in every city, but the facts set forth in Mr. Beeler's article are incontrovertible and ought to be realized by every automobile user.

Car Design from a Service Standpoint

General Dimensions of the Cars Recently Placed in Operation by the Empire United Railways Were Established by the Maximum Weight of Body Which Could Be Hauled on a Given Schedule by Arbitrarily Selected Motors and Trucks

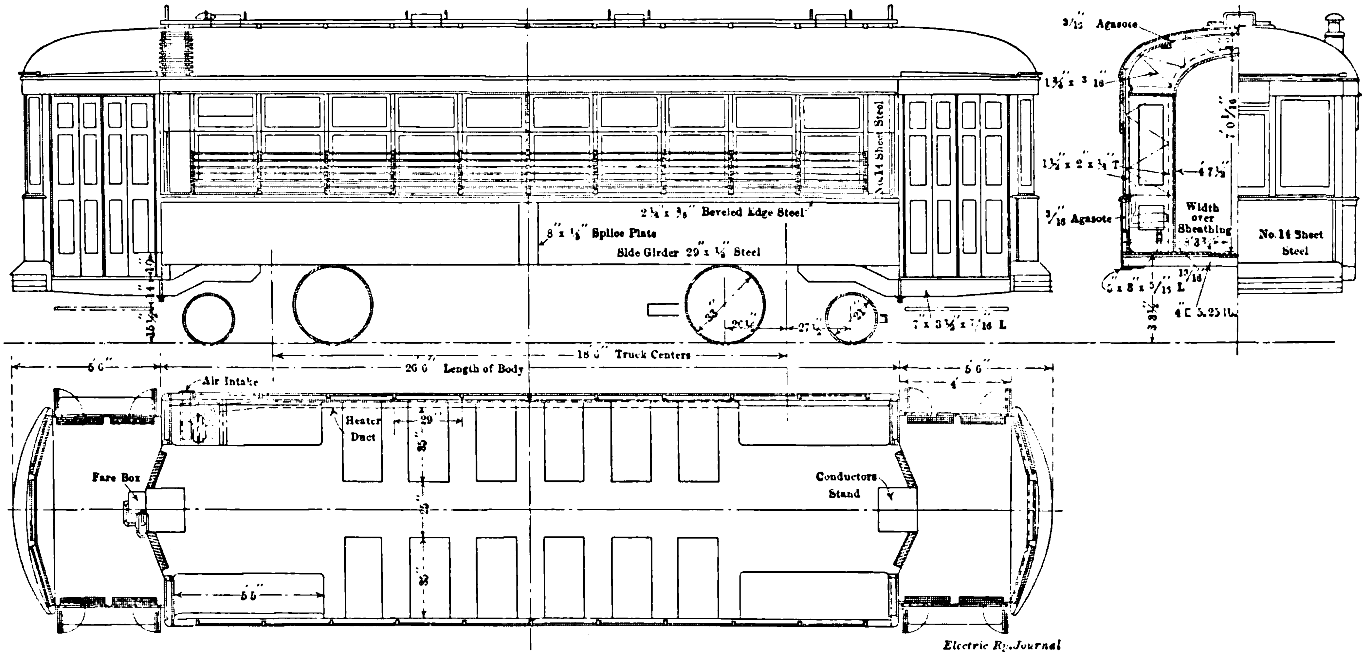
The semi-steel cars which have recently been placed in service by the Empire United Railways on its city lines were designed under somewhat unusual circumstances, and the methods used by the company in determining the character of the various general features of the construction possess no small degree of interest on account of their originality. Primarily the design of the car was made dependent, not upon the peculiarities of the existing service, but rather upon those of a proposed service which would give fewer stops and a higher schedule speed together with a materially lower consumption of power.

Within the last few years the urban lines in all three of the cities in which the Empire United Railways are operating, namely, Auburn, Oswego and Fulton, N. Y., were absolutely unprofitable and barely paying their operating cost. The city service was being taken care of by the ordinary 20-ft. single-truck closed cars and by single-truck open cars in the summer time. In order to rehabilitate the existing service it was considered of primary importance to do away with single-truck car operation and to provide a new type of car which would be of such superior construction that it would, in itself, be an invitation to ride. Furthermore, it was desirable for this car to be able to make a higher schedule speed, thereby reducing the number of cars required.

At the same time the management wanted to lengthen the headway between cars somewhat, although reducing the frequency of cars is, of course, a hard task at any time, being especially difficult in small cities. The new cars, therefore, helped to make the change more agreeable, although the new equipment alone was considered to be justified even without that.

METHOD OF GENERAL DESIGN

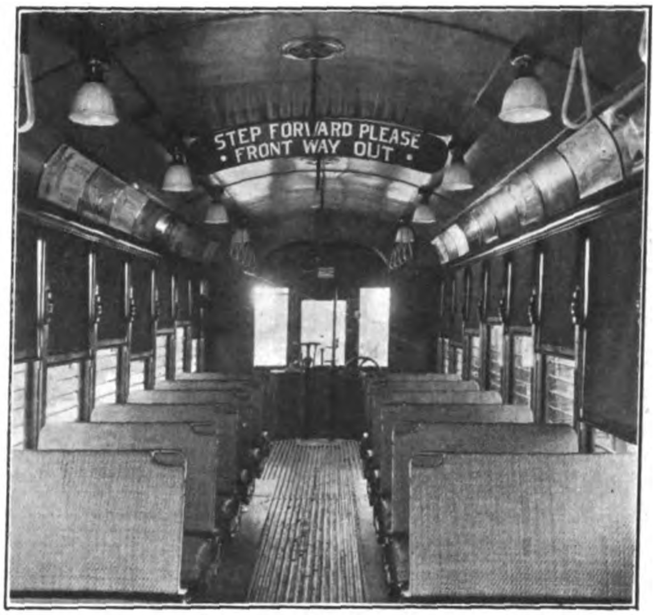
After the purchase of new cars was finally decided upon the first thing done was to determine the best type of car, and in connection with this, power consumption was a vitally important factor. The Empire Railways Company purchases power from the Niagara, Lockport & Ontario Power Company under a flat kilowatt-hour contract without a peak charge or a maximum demand of any kind. Therefore, economy of current consumption is particularly desirable, because every kilowatt-hour saved means saving the full price of the unit of energy and not merely its cost at the coal pile. The management, therefore, determined arbitrarily the size and type of the motor which was best suited to the proposed service, finally concluding to use two-motor equipments of GE 200 motors, which are rated at 33-40 hp. It was also decided to raise the voltage from an average of 525 volts to 600 volts at the car by using boosters where necessary. The decision on the motor largely determined the design of the truck, and the weights of the trucks and electrical equipment could then be estimated.



EMPIRE UNITED CAR—GENERAL PLAN OF CAR

The desired schedules were then planned out in detail. No lay-overs whatever were provided and the motors were calculated to be in service practically continuously for about seventeen hours per day. The average schedule speed was established at approximately 10 m.p.h. After going over the figures several times and consulting the manufacturers it was finally decided that a car body weighing 16,000 lb. was the greatest weight that could be handled by the motor which had been selected under the conditions of voltage and schedule speed which had been agreed upon. At that it was found necessary to reduce the number of stopping points which had been rather too frequent originally, the intervals being cut down to approximately 440 ft., giving about twelve stops per mile as an absolute maximum.

When the car-body weight had been established the car manufacturers were requested to bid on the biggest body they could build and keep within that weight. In answer to this, propositions were received which covered cars approximately 38 ft. long over all and seating forty people, and the order for such equipment was placed with the St. Louis Car Company. These cars are now in operation, and while they have not been in service long enough to prove all the contentions which were made when they were designed, it is reported that there is every indication that the conditions will be met satisfactorily.



EMPIRE UNITED CAR—INTERIOR VIEW, SHOWING OPEN BULKHEAD

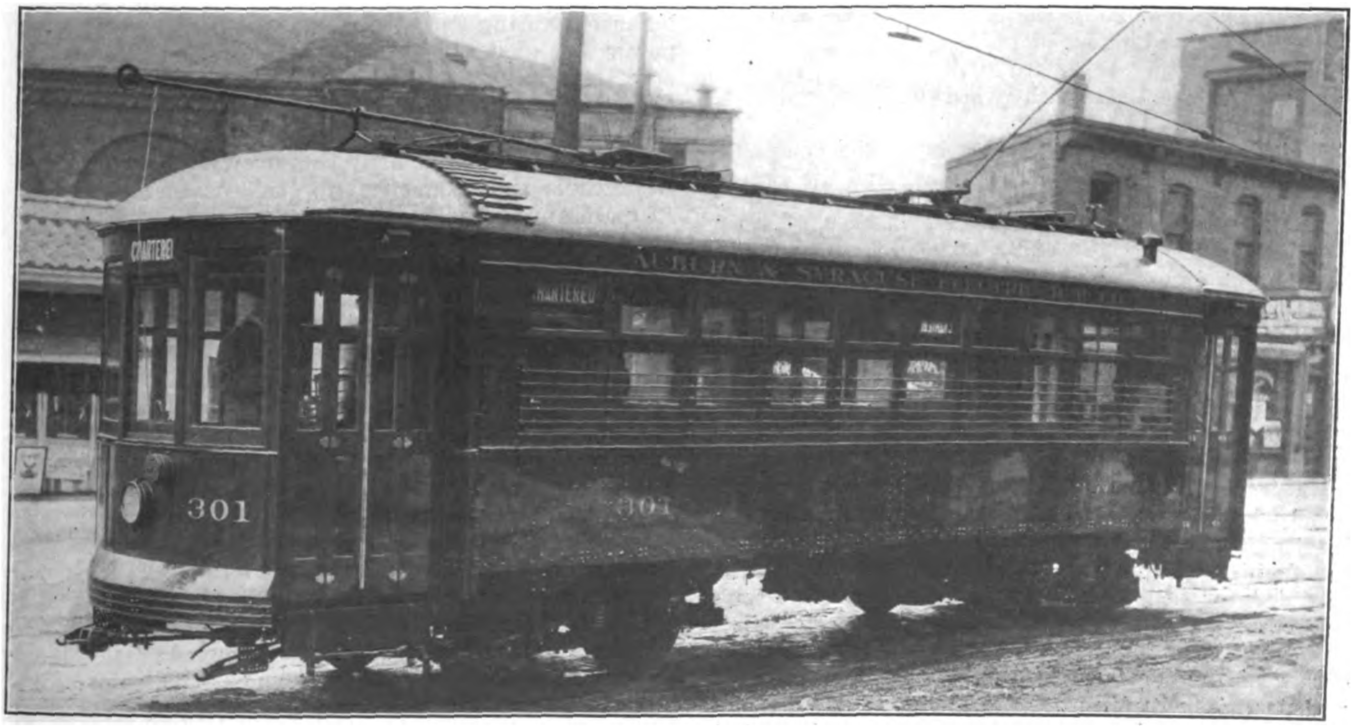
OTHER CONSIDERATIONS

It will be noted from the illustrations that end platforms have been used, and in connection with the use of this general design as opposed to the center entrance it is of interest to note the following remarks of Ernest Gonzenbach, general manager Empire United Railways, who planned the new cars: "We seriously considered the center-entrance car, but we abandoned the idea for several reasons. One is that our overhead work is not yet in good enough condition so that we dare put the conductor in the center of the car too far away from the trolley rope. Another reason is that the center-entrance car is, according to my opinion, not so fast in loading and unloading as the end-entrance car in which the rear door is used as an entrance and the front door as an exit. Furthermore, the end-entrance car with front exit automatically distributes the standing load over the entire car, whereas with the center-entrance car a standing load is hard to move away from the door. Again, in small towns where there are many unpaved streets, and where a car must stop with the rear platform clear of the street line, the center entrance will cause the public to get in and out in the mud if the street is not paved."

In connection with the general design it may be said that the company spent a good deal of money in investigating the new types of single trucks with radial axles. These met with considerable favor, but it was not thought that the art was sufficiently advanced to put too much faith on this design with the prevailing poor track conditions in the cities in which the company operates. On the other hand, the double-truck car had the faculty of smoothing out and remedying some of the track inequalities that would produce a very pronounced effect with a single-truck car.

In general, the new car may appear to be somewhat small in view of the fact that a larger car might just as well have been built. As opposed to this, however, the company would have had to put on a larger motor, and inasmuch as the rush periods in the small cities where the cars operate are exceedingly brief it was proved that it would be more wasteful to haul around the extra weight in motors and car during the non-rush hours than it would be to handle the peaks with trippers. The latter have to operate only for approximately 3 per cent of the time, as peak conditions exist for only three-quarters of an hour in the cities in question.

Simultaneously with the retirement of the closed



EMPIRE UNITED CAR—EXTERIOR VIEW, SHOWING FOLDING DOORS AND STEPS single-truck cars, the company has retired from service all of its single-truck open cars and will hereafter run nothing in the cities except the new closed cars and double-truck fourteen-bench and fifteen-bench open cars for summer service. Every car operated in city service will be provided with air brakes. The company plans also to adopt in its city service a scheme which has turned the tide on other unprofitable city properties. Each car will be equipped with a clock in front of the motorman which will give time points, and the city schedule will be as rigidly adhered to as if it were that of the "Twentieth Century Limited." Furthermore, time-tables will be published showing the schedule time for every street corner past which the cars operate. By thus keeping the public informed, there has been built up in other cities traffic which has been two and three times what it was before such service was inaugurated, and it is fully expected that the same thing will be done on the properties under discussion.

DETAILS OF CONSTRUCTION

In general the arrangement of the car body conforms to the customary standards of the pay-within type for double-end operation. The car construction is of the side-girder type with drop platform, open bulkheads, continuous T-bar side-posts, plain arch roof with detachable bonnets and closed vestibules.

The steel framework includes side sills of 5-in. x 3-in. x 5/16-in. angles made in one piece and bent around the corner posts and spliced at the center line of the car to form the end sill. The side-sheathing which forms the steel girders is 29 in. high and ⅛ in. thick. This also is bent around the corner posts and extends inward as far as the bulkhead post. The side plates are spliced at the middle of the car, but the belt rail is made of 2¼-in. x ⅜-in. bevelled-edge steel in one continuous piece.

The flooring is of 13/16-in., tongued-and-grooved maple nailed to white-oak nailing pieces which are bolted to the cross-bars of the steel underframe, the floor of the car body extending out into the vestibule to form the conductor's stand. The side posts are made of 1½-in. x 2-in. x ¼-in. T-bars running in one continuous piece from side sill to side sill and forming the carlines. These are spaced on 29-in. centers and they are anchored at the side sill and girder plates below the windows and bolted to a wooden letterboard at the top. The roof and bonnets are sheathed with wood and covered with painted canvas.

The weights of the various parts of the equipment which go to make up the complete car and the general dimensions are as follows:

Weight of car body	16,000 lb.
Weight of trucks	10,500 lb.
Weight of electrical equipment	4,500 lb.
Weight of air-brake equipment	900 lb.
Total weight	32,000 lb.
Length of body over corner posts	26 ft. 6 in.
Length of body over bumpers	37 ft. 6 in.
Width over drip rail	8 ft. 6 in.
Height to top of roof	11 ft. 3⅝ in.
Height of rail to floor	3 ft. 3½ in.
Distance between truck centers	18 ft. 6 in.
Diameter of wheels	33 in.

The capacity of forty is provided for by longitudinal seats seating sixteen at the ends of the car body and twenty-four transverse seats in the center portion, the longitudinal seats having been introduced to increase the facility of entering and leaving the car, as it is intended for double-end operation. One of the longitudinal seats has a removable section so that a Consolidated hot-air ventilator stove can be installed at one corner of the car in winter time, this being sheathed with transite when in place.

The platform door openings are 4 ft. wide and the doors are of the double-folding type on both sides of each vestibule, the upper half of each being glazed with clear glass and the lower half with wire glass. They are all manually operated, a handle at the conductor's stand controlling the rear entrance and another handle convenient to the motorman controlling the front-exit door.

Railway Signal Association Convention

Switch Indicator Practice, Economics of Signal Maintenance and Principles Governing Capacity of Single Track Discussed

The annual convention of the Railway Signal Association was held in Salt Lake City on Sept. 14-16, 1915. Reports were presented by eight standing committees and two special committees, among them being several that are of special interest to electric railways. The committee on signaling practice included in its report a statement to the effect that either conveniently located signals or switch indicators on single track may serve the same purposes as switch indicators that are installed on roads of two or more tracks. The following statements of switch indicator practice on single track were also submitted: Where signals governing movements in both directions are located so near a switch that trainmen at the switch can observe their indications, such signals will give the necessary information and switch indicators are unnecessary. Where a signal governing in one direction is located as above, and a signal governing in the opposite direction is not so located, a switch indicator may be used to give the information not obtainable from the signal. Where signals governing in both directions are not located as above two switch indicators may be used, one for each direction. Each switch indicator may, as to trains in one direction, serve the purposes and be controlled in the same way as on lines of two or more tracks. In the case of a system in which a train moving beyond one passing siding controls signals governing opposing movements between that passing siding and the next, a switch indicator may be so controlled as to indicate the approach of a train at and from the signal located adjacent to the next passing siding.

The report took up also the economics of signal maintenance, stating that, because the main controlling power of signal apparatus is electrical and because the special training required is special, a combination of signal and track forces is not to be recommended as a means of obtaining economy and efficiency in signal maintenance. Occasionally, however, it will be found practicable and economical to combine forces engaged in maintaining various electrical features on a railroad with those maintaining signals. But as a general proposition, economy and efficiency will be produced to a higher degree by co-operation and by combination, and this rests entirely with the officer in charge in the arrangement of the forces available.

An extended discussion on the laws affecting the capacity of single track was submitted also in the report. Among the several fundamental rules that were developed was one to the effect that the maximum capacity of a railroad with a given number of passing sidings is reached when the sums of the schedule times of the east-bound and the west-bound trains between each pair of passing sidings are all equal. This rule applies whether or not the speeds are uniform, and it will determine the best location for passing sidings to produce maximum capacity. Another rule that was developed was that the maximum number of trains of one class that can be run in twenty-four hours over a piece of railroad equals 2880 multiplied by the number of passing sidings plus 1, divided by the sum of the running times of an east-bound and of a west-bound train over the road plus the number of sidings plus 1 multiplied by the delay caused by a train taking the passing sidings. This formula is expressed as follows:

$$T = \frac{2880\ (N+1)}{E + W + \ (N+1)a}$$

Of course, if a single-track line is short, a greater number of trains can be moved by utilizing the road for trains in one direction only for part of the day and in the other direction for the other part of the day. This is not, however, ordinarily practical and need not be considered. If it should happen that traffic in one direction is greater than the other it is perfectly practicable, if suitable signaling is provided so that the following distance between trains is not too great, to run trains in one direction in two sections and in one section in the opposite direction. This gives the following formula in which T equals the number of trains per day, W equals the time of the west-bound train over the road, E equals the distance of the east-bound train over the road, N equals the number of sidings, a equals the delay caused by a train taking the passing sidings, and f equals the spacing between the parts of trains run in two sections:

$$T = \frac{A\ 320\ (N+1)}{W + E + (N+1)\ a + (N+1)\ f}$$

With regard to the effect of the number of passing sidings upon the capacity of the road it may be said that in a time that is equal to the sum of the running time of two opposing trains over a certain territory there will always be space on the track for two more trains than twice the number of passing sidings. But, while the capacity increases with the number of passing sidings the time required to cover the territory is rapidly increased. If trains are run in two sections in one direction the average running time per train is:

$$R = \frac{W + E + (N+1)\ a + N f}{2}$$

If the trains are run in two sections in both directions the formula becomes:

$$R = \frac{W + E + (N+1)\ a + N\,2 f}{2}$$

All of the foregoing formulas apply only to conditions where trains are of a single class, and they assume that the sidings are so spaced as to provide equal running time between each pair of sidings all over the road. In practice, however, sidings are not equally spaced and under these conditions the traffic situation on any piece of road may be analyzed by setting down the full schedule running time (including delays due to taking sidings and other causes) in a series and adding the west-bound and east-bound schedule times between each pair of sidings. The maximum sum in the list will establish the capacity of the road. For example, if the maximum sum of the east-bound and west-bound schedule time between any two sidings is fifty-three minutes there will be two trains passing in each fifty-three minutes, or fifty-four trains per day.

It is obvious, of course, that if this maximum sum can be decreased, the number of trains moved over the line will be increased. This result may be accomplished by moving nearer together the two sidings between which the maximum running time takes place. It will not pay, however, to move the sidings more than enough to decrease the sum of the schedule times below the next highest in the list, as the next highest would then become the limiting point. To arrive at the maximum theoretical capacity, of course, it would be necessary to move all sidings so that the sum of schedule times between each pair was constant, and where the actual sums of the schedule times between sidings is even approximately equal this would not pay. The report shows a case wherein the minimum sum was thirty-one minutes and the maximum forty-two minutes, but the theoretical maximum capacity is only six trains per day or about 9 per cent more than the actual capacity.

The committee on electric railway and a.c. signaling stated that Western railroads were progressing with the installation of alternating-current signaling and submitted brief descriptions of a number of alternating-current installations on steam and electric railways, all of the latter having been mentioned from time to time in the ELECTRIC RAILWAY JOURNAL. Specifications for reactors for line and track surface were also submitted by this committee.

A special committee on electrical testing submitted a progress report which was abstracted in the ELECTRIC RAILWAY JOURNAL for May 29, 1915, and requested further discussion of a constructive nature on the subject for the guidance of the committee so that its efforts toward future work might be productive of the best results. Another special committee, that on lightning protection, presented requisites for lightning arresters for signaling and requisites for choke coils for signaling, as well as specifications for vacuum-gap lightning arresters.

The Auto-Train at the Exposition Grounds

Descriptive articles of the Fadgl Auto-Train trackless system of transportation in the exposition grounds at San Francisco were contained in the ELECTRIC RAILWAY JOURNAL for April 17 and July 10. Twenty trains, each consisting of an automobile tractor and three trailers seating 1200 passengers in all, are in regular operation through the exposition grounds daily. Two terminals are maintained, one at the Fillmore Street entrance and the other at the Massachusetts State building at the end of the Avenue of Nations and the Avenue of States.

The schedules are worked out and operated in regular electric railway style. The fare from terminal to terminal and intermediate points is 10 cents, the schedule being such that passengers who desire to do so can travel continuously around the grounds for a rate of about 50 cents an hour, additional fares being collected at each terminal.

The high carrying capacity and economy of the Fadgl trackless train is shown by the fact that a three-car train will carry as many passengers as sixteen jitneys in one-fifth of the space with about the same expense for tires and gasoline and with but one chauffeur and one conductor instead of sixteen drivers. The seats on the train can be made crosswise, although the type in use at the exposition has longitudinal seats. This system is believed to have good possibilities for operation elsewhere than in fair grounds and parks alone. For example, one steam railroad is considering it as a feeder from cities several miles distant from the main line. Certain suburban applications also appear feasible. The Fadgl auto-train is even being considered for service in the narrow streets of Asiatic cities.

The general shop force of the Illinois Traction System at Decatur, Ill., is planning to lay out a park on the east side of the shops. A flagpole was raised recently on this plot and a baseball diamond will soon be marked out.

Electric Railway Papers at A. I. E. E. Panama-Pacific Convention

Electrolytic Corrosion of Overhead Material in Damp Locations and the Automatic Substations of the Elgin & Belvidere Electric Railway Were Among the Topics Discussed—Abstracts of Papers on These Topics Are Given

A special convention of the American Institute of Electrical Engineers was held in San Francisco from Sept. 16 to Sept. 18, immediately preceding the International Engineering Congress. Twenty-six papers were presented, including those delivered before joint sessions of the Institute and the Institute of Radio Engineers and the Institute and the American Electrochemical Society. Two papers of immediate interest to electric railway men were those on "Automatically Controlled Substations" by E. W. Allen and Edward Taylor of the General Electric Company, and "Overhead Electrolysis and Porcelain Insulators," by S. L. Foster, chief electrician United Railroads of San Francisco. Other papers of great value and interest, of a more general nature, were one by B. G. Lamme on "Physical Limitations in D. C. Commutating Machinery" and the symposium on "Inventories and Appraisals of Properties" by C. L. Cory, W. G. Vincent and W. J. Norton. On account of space limitations only the two papers first named will be abstracted here.

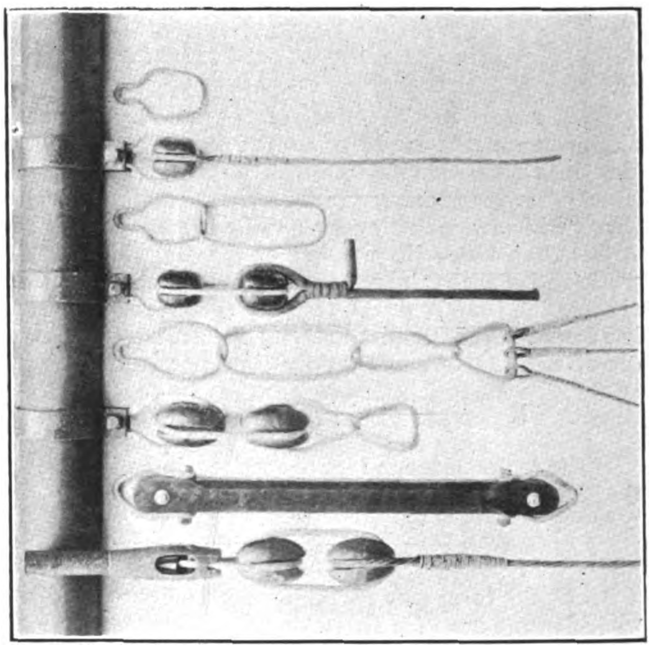
OVERHEAD ELECTROLYSIS AND PORCELAIN STRAIN INSULATORS

In his paper on the above subject Mr. Foster stated that in electric railway construction in damp climates, and more or less in all climates, there is some leakage of current from the trolley wire to the earth through the insulated supports. This current produces corrosion of span wire and insulators through the separation of water into oxygen and hydrogen, and the attacking by the oxygen of the metal immediately adjacent to the insulation. In the case of galvanized iron the zinc covering is soon removed and the iron is acted upon vigorously by the oxygen. This effect is seen on the bolt that fastens the trolley ear to the trolley hanger, the threaded lower end being badly corroded even though smeared with thick oil on installation. The electrolytic action is also seen in the film of green copper salt that spreads from the head of the brass ear over the lower surface of the cone to the iron hanger, in cap and cone construction.

The mechanical effects of the corrosion are also important, the cap and cone insulator being split in various directions and having its insulating value destroyed. This splitting of the cap has been reduced by hot-dip galvanizing of the stud before the insulation is pressed upon it in the process of manufacture.

Creepage-electrolysis effects are also seen in globe strain insulators which, when exposed in a damp climate for a few months as the only insulation between an uninsulated curve hanger and the pole, even in the case of a wooden pole, will show a heavy ring of iron rust around the shank of the eye on the end of the insulator toward the trolley wire and a white zinc efflorescence on the end toward the pole. The interior, upon crushing, will be found to be clean and intact. In time this oxidation will split the spherical composition insulation open in cracks at the end toward the trolley wire. It seems to be due to simple electrical leakage over the surface of the insulator, the current being too small to be measured with an ammeter and the leakage causing no "hot" poles or open circuit breakers.

Another phenomenon of an electrolytic character appears in connection with the leakage of current along span wires and guys. The current seems to pass off from the exterior of the live wire, first removing the galvanizing and then attacking the iron. In moist climates and especially where exposed to salt spray, extra or double-galvanized strand, when used where leakage current along it is possible, rapidly becomes denuded of its covering, gets red with rust, becomes pitted and quickly loses its tensile strength as if the wire, being positive to the earth, were discharging to the moisture of the atmosphere throughout its whole length. A partial remedy for this is painting. The same kind of corrosion occurs when bare copper is used for guys and spans unless the wires are oiled or painted. That the trolley wire does not show effects of the action is supposed to be due to its being protected by a film of oil thrown upon it by the passing trolley wheels.



STRAIN INSULATORS

In order from top down—Single link for small porcelain insulator; single link, small insulator and span wire installed on pole band; double link for small insulator; double link, small insulators and No. 0000 standard copper feed-in or tap-off cable used as a span wire; triple link with triangular link for large insulators at pull-off or strain poles, used to support overhead curves; same in position on poles; long wood strain insulator used in fog-exposed locations; double link and large insulators used in dead-ending and insulating 1,000,000-circ. mil cable.

These points seem to teach that it is not only the ability to pass high insulation, puncture and flash-over tests of the trolley wire devices, nor the crushing strength of the composition, that is important, but the securing of a creepage distance proportional to the conditions met with, so as to stop the flow of current around the outside of the insulating parts. It seems clear that the surface exposed for creepage is not enough under fog conditions in our present standard devices. The hanger insulation should be reinforced by a generous amount of permanent creepage distance in the span-wire insulation.

The insulation of the iron pole in its concrete setting helps to neutralize the results of creepage. Leakage is not confined to iron poles, but occurs on wooden poles on which there should always be a sufficient strain insulator in the span wire at either end. In the case of iron poles if one strain insulator does not suffice two should be used, one about 2 ft. from the trolley and one 6 ft. from the pole. If two do not check the corrosion, insulators with more creepage distance, as, for example, long wooden insulators, should be used. The latter, however, lack the tensile strength and interlinking feature of the disk, cubical or "goose-egg" porcelain insulator.

Some companies give two coats of linseed-oil paint, applied by dipping, to all galvanized-iron strand intended for overhead use in connection with electric railway work. It costs far less to apply the paint by immersion than with brushes after the wire is in place. All joints made by linemen in galvanized wires or cables should receive at least one coat of paint. All overhead parts should be painted before installation, and when poles are painted all wire and cable joints, strain insulators, etc., within reach of the painters should be covered liberally.

Another form of overhead electrolytic action met with in railway work is caused by the use of dissimilar metals in contact. Galvanized-iron cables attached to the brass eyes of curve hangers, of spherical strain insulators, etc., are rusted off at the points of contact. The sulphuric acid found in the air of cities from the combustion of coal and from the escaping fumes of chemical works, the salt spray and ozone from a near-by ocean, etc., are thought to be the electrolytes that serve to start a local battery action. This action probably explains some of the corrosion at the threads of the hanger bolts which results in loose hangers in the ears. The logical remedy for this is to use similar metals in contact. Galvanized-iron parts should be used for all overhead trolley work. Applying a heavy oil to the thread of the hanger bolt is a palliative.

Still another form of probable electrolytic corrosion is seen in the wasting away of iron poles at the top of the concrete setting. Exceptionally rusty pole bases should lead to investigation of the condition of the insulation in the span wire and at the ear.

EXPERIENCE IN SAN FRANCISCO

In San Francisco problems involved in the above considerations presented themselves early and have been solved one after another, producing not only improved conditions electrically but increased strength mechanically, reducing original and maintenance costs, and yielding greater safety for the workmen and greater rapidity of work.

Electrolysis from the combination of the brass eye in the strain insulator and the galvanized-iron strand was remedied by using galvanized iron eyes. These are stronger and last longer. The failure of strain insulators formerly resulted in the first rain storm of winter being a source of dread to the linemen on account of the "hot" poles. Between the years 1893 and 1901 every kind of strain insulator on the market was tried, and in the latter year a porcelain cubical or "goose-egg" insulator was adopted, since which time there has been no trouble. Where there was little or no fog a single porcelain insulator was used at each end of the span wire, but where the fog was heavier or there was a feeding cable from a feeder used as a span wire, two insulators were used instead. On particularly exposed lines along the cliffs around the Golden Gate even two insulators of a larger size did not suffice and long wood strains had to be substituted.

The porcelain insulators used are of two sizes. In connection with them hot-dip galvanized wrought-iron welded links are used in the following form: single links for pole band attachment, double links for feeding at the pole or feeder cable dead-ends, triple links with triangular bull-rings for curved pull-off poles. The links for the small insulators were made of ⅜-in. round Norway iron and those for the large ones of ½-in. round Norway iron. The triangular bull-rings were made of ⅝-in. steel.

The small insulator has a diameter of 2¾ in., a length of 3½ in. and stands a dry flash-over test, when new, of 10,000 volts. The large insulator is 3¼ in. in diameter, 5 in. long and tests dry to 30,000 volts. The small insulator is used in all spans and guys except those under extraordinary strain, such as dead-ends for trolley wires, 1,000,000-circ. mil cables, etc.

Experience has shown that for all 500-volt d.c. electric railway strain insulator work, except under extreme fog condition, it has been proved that in San Francisco practice, where there is neither snow, ice nor sleet and but little lightning, porcelain is the best material. It is incombustible, nearly indestructible, invulnerable to atmospheric action, requiring no original or subsequent preservative treatment, painting, testing or other attention and having high compressive strength combined with small dimensions, etc.

In San Francisco fog practice the size of the span wire has been increased from ¼ to 5/16 to ⅜ in., and of guys from 5/16 in. to ⅜ in. to ½ in., in order to lengthen the life of these cables. On the cliff line the overhead strand formerly lasted only about two years. When one large porcelain insulator did not answer two in series were tried on this wood-pole construction. Then wood-strain insulators 5 in. between heads were tried, only to have the iron heads corrode off rapidly. Wood-strain insulators 15¾ in. between heads seem to increase the life of the galvanized strand, although the heads toward the trolley wires show the characteristic electrolytic action. Home-made wood-strain insulators 24 in. between conductors are now being made and are expected to insure reasonable durability of the exposed, extra-galvanized cables which had been given two coats of heavy linseed-oil paint previous to being put in place. The insulators are of maple, are boiled for twenty-four hours and cooled in linseed oil before painting, and are 2½ in. in diameter, octagonal in section. They test to 5000 lb. without showing signs of distress.

AUTOMATICALLY CONTROLLED SUBSTATIONS

WITH PARTICULAR REFERENCE TO THEIR APPLICATION TO INTERURBAN ELECTRIC RAILWAYS

In their paper under the above title Messrs. Allen and Taylor described a substation of the Elgin & Belvidere Electric Railway connecting Elgin, Marengo and Belvidere, Ill., in which substation the rotary converter is automatically started and put into service, and stopped and disconnected from the line through the agency of the variation in voltage. Automatic equipment was installed in the Union substation in December, 1914, and in August, 1915, the remaining two substations of the railway were equipped with automatic control. In rough outline the operation of the equipment is as follows: For automatic control, the main a.c. and d.c. circuits are opened and closed by contactors which are directly operated through a motor-driven drum controller, which in turn is controlled by other contactors and relays, the ultimate control residing in a contact-making voltmeter and its accompanying relays. Lowering of line voltage causes the putting of the substation into commission, while raising of the voltage shuts it

AUTOMATIC SUBSTATIONS—EXTERIOR OF UNION SUBSTATION

down. The details of the operation are described later in this abstract.

In introducing their subject the authors pointed out that there is an essential difference between an automatic equipment and a remotely-controlled system with a separate feeder to each machine. In the latter the operation of starting and stopping the machines is performed by an attendant in the station from which the power is supplied. Automatic-control devices are already in satisfactory use and electrically operated switches are reliable devices, careful inspection at regular intervals being sufficient to insure their successful operation. The authors therefore conclude that it is practicable to dispense with the services of an attendant in many railway substations and, proceeding for the moment on the assumption that it is practical to do this, they enumerated some of the effects of automatic control.

ADVANTAGES OF AUTOMATIC CONTROL

The necessity for having two or even three shifts of skilled attendants, as heretofore, influences the number, size and location of substations, and these have in turn affected the amount of feeder copper and consequently the choice of trolley voltage. It is desirable to increase the number of stations and to decrease the relative size of the machines if they are automatically controlled. If the buildings are designed with particular reference to their ability to house apparatus and without regard to the comfort and convenience of the operator, it is probable that their total cost will be no more than for fewer stations designed to meet both of these conditions.

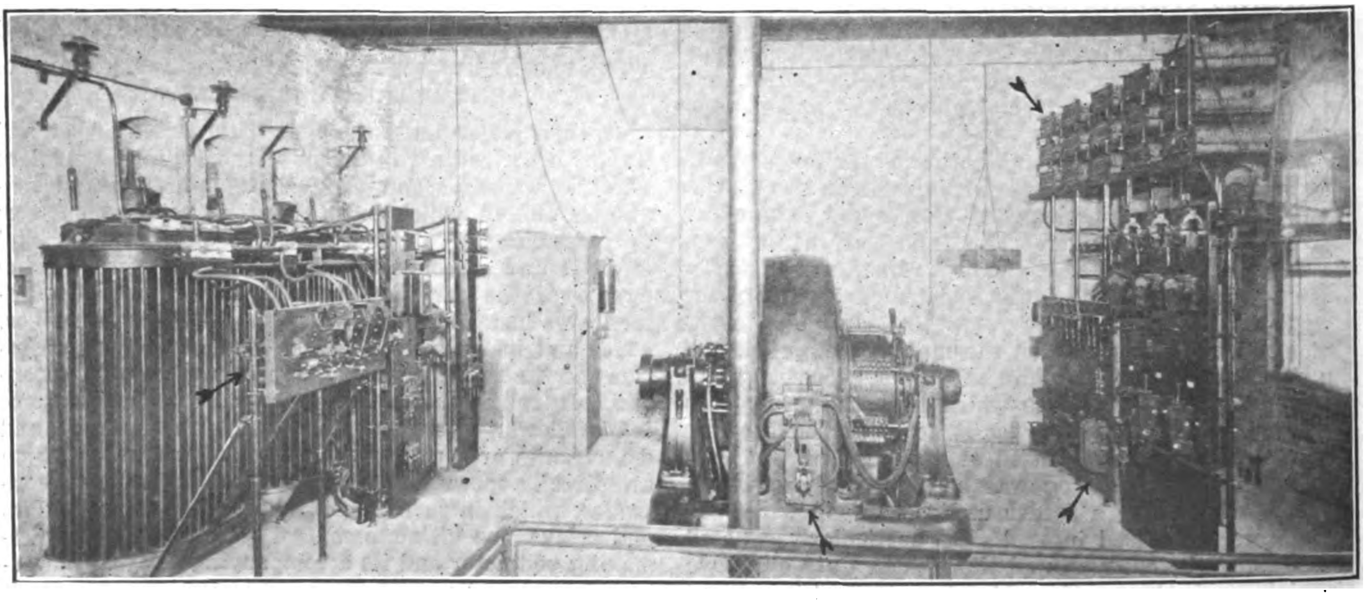
There will be a saving in feeder copper resulting from the shorter distance between substations and also from the better distribution of load. The following example illustrates this: Assume a single-track road 32 miles in length, using 40-ton cars, each equipped with four 75-hp. motors, capable of making a maximum speed of 30 m.p.h. and a schedule speed of 24 m.p.h. with one stop per mile and a rate of acceleration of 1.1 m.p.h.p.s. Assume also that the track is laid with 70-lb. rails and that a No. 0000 trolley wire is used. It is estimated that with three-hand-operated 500-kw., 600-volt stations located 12 miles apart and with 4-mile stub-end feeds, 262,000 lb. of feeder copper will be needed. If six automatically controlled substations, each of 250-kw. capacity, were used, no feeder copper would be required.

In the automatically controlled substations there are also operating advantages in connection with the short feeders, which advantages are increased by the practice of cutting resistance into the circuit to limit the substation output instead of allowing the circuit breakers to open, as is usually done. The authors state that a 500-kw., twenty-five-cycle synchronous converter may be readily started from rest and connected to the line in thirty-five seconds and a 300-kw. unit in twenty-five seconds, while induction motor-generator sets, in capacities below 1000 kw., may be started in considerably less time than is required to start synchronous converters of corresponding size..

The light-load losses are a fairly high percentage of the total energy supply to substations on a system having infrequent car service. It is estimated that ½ kw.-hr. is required to start and connect to the line a 300-kw., twenty-five-cycle, 600-volt synchronous converter. The running-light losses of this machine are 0.34 kw.-hr. per minute. The load conditions in the substations of a single-track road having a ninety-minute car service often justify shutting down a 300-kw. synchronous converter twelve hours during each day. Automatic starting will, therefore, save the running light losses and, if the passenger and freight business at a substation requires the services of an agent, will give him more time for other duties.

DETAILS OF TYPICAL AUTOMATIC SUBSTATION

The Elgin & Belvidere Electric Railway operates a standard-gage single-track 600-volt system and purchases energy from the Aurora, Elgin & Chicago Railroad at 26,000 volts, three-phase, twenty-five cycles.



AUTOMATIC SUBSTATIONS—INTERIOR OF UNION SUBSTATION, AUTOMATIC EQUIPMENT INDICATED BY ARROWS

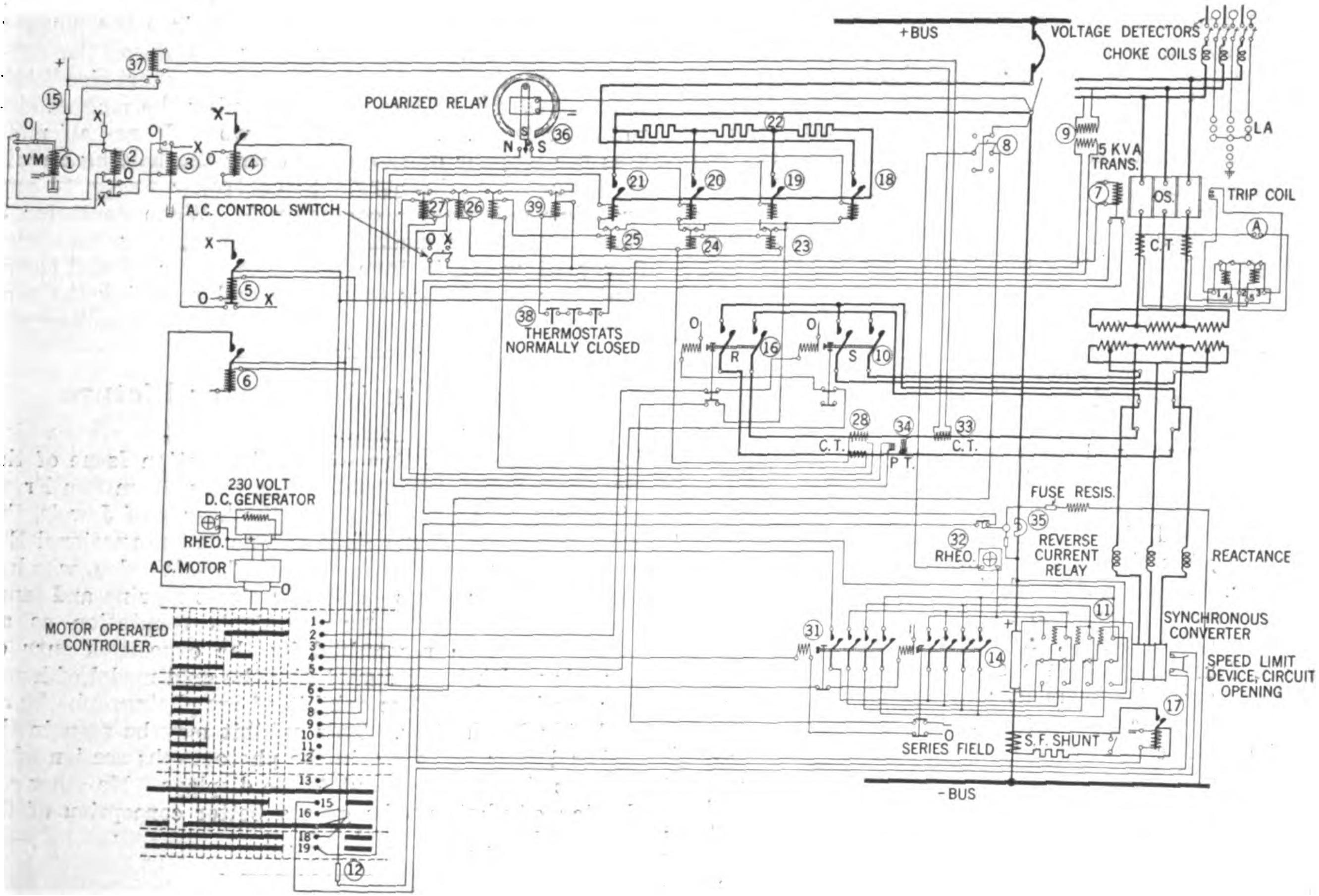
Each of three substations contains a standard 300-kw., 600-volt, twenty-five cycle, three-phase synchronous converter, three 110-kw. converter transformers, a reactance coil, a high-tension panel and switching equipment, and three low-tension panels. The equipment of one substation, including automatic apparatus, is shown in an accompanying illustration. The diagram reproduced herewith shows the complete electric circuits, the connections for hand operation being at the right, and those for automatic operation at the left. A double-throw switch, 8, permits change-over from one method of operation to the other, being thrown up for automatic and down for hand control.

As previously stated, the ultimate control is in a contact-making voltmeter, 1 in the diagram, permanently connected from the overhead trolley line to the negative rail. It is provided with a moving plunger connected to a pivoted contact arm which moves between upper and lower studs. The contact arm touches the top stud in the low-voltage or open-circuit position, and the closing of this contact is the initial movement for starting the rotary converter. The arm does not leave the upper post until the voltage exceeds 500. The lower stud is the cut-out position and the movable arm reaches it when the trolley potential exceeds 600. The contact arm as shown in the diagram is in the mid-position and indicates approximately 550 volts. A dash pot connected to this arm retards its movement about six seconds and prevents it responding to momentary fluctuations in the voltage. In circuit with the voltmeter winding is a high resistance tube, 15, normally short-circuited by the auxiliary contact of current relay 37. If more than a predetermined amount of current flows through this relay its plunger and disk are raised, removing the short-circuit from the high-resistance tube and placing this resistance in circuit with the magnet coil of the voltmeter. This action is equivalent to a condition of low voltage.

THE STARTING OPERATION

The operation of starting the substation is briefly as follows: When a car or train enters the zone of the substation the trolley potential will gradually be reduced to 500 volts. The voltmeter arm will touch the upper stud and complete a circuit through the magnet coil of relay 2, short-circuiting its contact studs. It should be noted that, in the diagram, the authors have for simplicity used the symbols *X* and *O* to indicate that the circuits return to the a.c. control switch, while the symbols + and — indicate that they lead to the rotary d.c. terminals.

The upper disk of relay 2 closes a holding circuit for its plunger, while the lower disks energize the magnet coil of relay 3. Relay 2 serves the double purpose of



AUTOMATIC SUBSTATION—COMPLETE ELECTRIC CIRCUIT DIAGRAM OF SUBSTATION

Key to Symbols. X and O refer to a.c. control switch. + and — refer to rotary d.c. terminals.

1. Contact-making voltmeter.
2. Double contact relay
3. Dash-potted relay (two and one-half minutes)
4. Contactor
5. Master contactor
6. A.C. motor contactor
7. Electrically operated oil switch
8. D.P.D.T. change over switch
9. 5-kva. transformer
10. Converter starting a.c. contactor
11. Synchronous converter
12. 3000-ohm resistance
14. Field break-up switch.
15. 1000-ohm resistance
16. Main running contactor
17. Series field shunt contactor
18. Solenoid-operated line switch
19. Load-limiting contactor
20. Load-limiting contactor
21. Load-limiting contactor
22. Cast-grid resistance (0.7 ohm)
23. Instantaneous-current limit relay
24. Instantaneous-current limit relay
25. Instantaneous-current limit relay
26. Pair inverse time-limit overload relays
27. A.C. low voltage relay
28. Current transformer
29. Current transformer
31. Four-pole field exciting contactor
32. Field rheostat
33. Current transformer
34. Potential transformer
35. Reverse-current relay
36. Polarized relay
37. Current-holding relay
38. Thermostats
39. Thermostat relay

removing the arc from the contacts of the voltmeter and acting as a switch for completing the circuit for relay 3. The latter is so constructed that the plunger drops slowly for two and a half minutes without opening its top contacts so as to provide against the station being shut down when the only car in its zone ceases to take energy and stops for a short time to load freight or receive train orders. When this relay is energized the plunger rises instantly and completes a circuit through the interlocks of relays 26, 27 and 39, the functions of which will be described later. It also excites contactor 4 which supplies current to one of the main studs of contactor 6 and to finger 14 of the drum controller.

This controller drum is divided into four sections insulated from each other, the contact segments on each being electrically connected. In the off position of this controller, as shown in the diagram, finger 14 is in contact with finger 17 through which the magnet coil of contactor 6 is energized.

When contactor 6 closes, current is supplied to the a.c. motor used for driving the drum controller. This motor operates only during the time the converter is being brought up to synchronous speed and connected to the line, requiring about thirty seconds. As the controller drum is rotated toward the right, the short segment opposite finger 16 makes momentary contact with its finger and energizes the magnet coil of contactor 5. The closing of contactor 5 energizes controller finger 1 and completes the circuit for closing the high-tension switch by means of coil 7. Contactor 5 is in reality a master switch, all of the circuits required for operating the main solenoid switches being supplied through its main contacts. When it is opened all of the main solenoid switches immediately resume their normal or open positions. Contactor 5 can be closed only when finger 16 engages the short controller segment opposite. Contactor 5 may, however, be held closed, although it will not pick up through the segment which bears upon controller finger 15. It is important to note that the starting position is definitely fixed by the length and location of the short segment opposite finger 16, and that at no other position of the controller can any device be closed unless finger 16 has first been energized and coincident with this an uninterrupted circuit has been established through finger 15.

As the motor-operated controller is rotated by the motor the following operations ensue: When finger 16 was energized, finger 2 was also energized from finger 1, closing the circuit to the magnet coil of the double-pole a.c. contactor marked *S*. The closing of *S* places half voltage on the slip rings of the converter. The armature then starts, reaching synchronous speed in about fourteen to fifteen seconds. Controller finger 4 then engages its segment and energizes the four-pole contactor, 31, closing it and momentarily placing the field of the converter across the terminals of the d.c. exciter, and fixing the polarity of the converter. Segment 4 runs off in four seconds, dropping contactor 31, but finger 3 engages its segment and closes field break-up switch 14, placing the shunt field of the converter directly across its own armature. Finger 2 then disengages and finger 5 engages a segment, contactor *S* being opened and contactor *R* closed and full a.c. voltage is applied across the slip rings. Contactors *S* and *R* are electrically and mechanically interlocked.

Full d.c. voltage is now available and finger 6 of the controller is energized from the positive terminal of the converter. Contactor 17 is closed by finger 12 and the circuit closed to the series field shunt. The moving contact of polarized relay 36 closes the circuit through finger 7 and energizes the magnet coil of contactor 18. If the contact circuit is complete, contactor 18 connects the positive side of the converter to the positive bus through a cast grid of 0.7-ohm resistance, which resistance is cut out in steps.

The drum controller has now advanced to its full running position and finger 17 has disengaged its segment and opened the holding circuit of contactor 6, stopping the motor.

PROTECTION DURING OPERATION

The diagram shows the connections of the protective devices. Relays 23, 24 and 25 open on 700, 800 and 900 amp. respectively, cutting in the resistances previously cut out. It will be observed that contactors 19, 20 and 21 take the place of the standard circuit breaker. A short-circuit in the machine operates inverse time-limit, overload relay 26, which opens contactors 4 and 5 in turn. Low-voltage, a.c. relay 27 breaks its auxiliary contact if the voltage falls more than 10 per cent below the normal value. The thermostats marked 38 afford protection from overheating. The thermostats are located in the bearings and in the air currents from the armature ventilating ducts. Reverse-current relay 35 opens master contactor 5, which is also opened by the mechanical, speed-limiting device on the converter armature shaft.

OPERATION OF SHUTTING DOWN

The substation automatically shuts down as follows: When the current decreases so as to drop the plunger of relay 37, the voltage now being 600 above, the voltmeter arm engages the lower contact short-circuiting the magnet coil of relay 2 and opening the magnet circuit of relay 3. At the end of two and one-half minutes the plunger of the latter opens the holding circuit of contactor 4, de-energizing controller finger 14 and dropping out master contactor 5. When contactor 5 opens the lower contacts close, energizing controller finger 19, which in turn energizes finger 18 and closes contactor 6, starting the motor and restoring the controller to the original position as shown in the diagram.

The Golden Gate Cover Picture

The remarkable photograph of the Golden Gate which forms the cover design of the Convention Issue of the ELECTRIC RAILWAY JOURNAL was taken from San Francisco Bay at a point opposite the Tower of Jewels, the central feature of the Panama-Pacific International Exposition. It is the work of Willard E. Worden, who has specialized for years in Pacific Coast marine and landscape photography. Mr. Worden's reputation as an artist has been recognized by the exposition jury of awards which has granted him the gold medal of honor for the best collective exhibit of art photographs by an individual exhibitor. This exhibit may be seen in the Liberal Arts Building, in the photographs section adjacent to the Eastman and Ansco displays. No other collection of photographs give a better conception of the rugged beauty of California.

The bureau of franchises of the Board of Estimate and Apportionment for New York City has issued a 184-page report for the year 1914. It reviews all the franchise decisions made by the board for the year and gives the present status of all unsettled questions for street railways and other utilities within the city. It also contains an appendix giving the report of the bureau of franchises to the franchise committee on the form of a motor bus franchise and proposed routes in the Borough of Manhattan, as well as the proposed draft itself of the motor bus franchise.

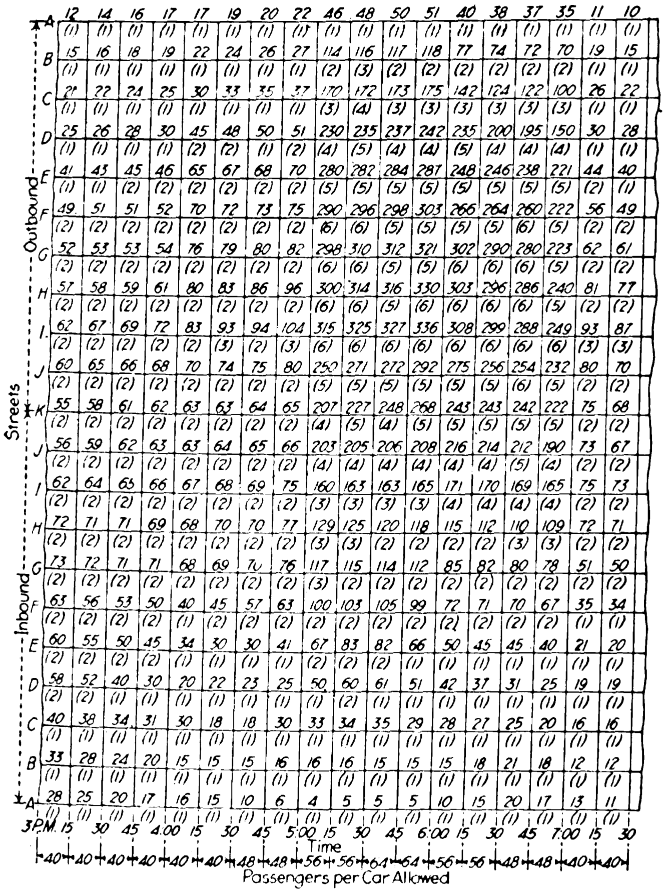
From Traffic Study to Time-table

In This Concluding Article Methods Are Described and Illustrated for Constructing Schedules on the Basis of the Information Collected During the Study of Traffic

BY F. W. DOOLITTLE, DIRECTOR BUREAU OF FARE RESEARCH, AMERICAN ELECTRIC RAILWAY ASSOCIATION

The previous articles under the general head of traffic studies have dealt with the need for accurate knowledge concerning the distribution of traffic over the lines of an electric railway and have discussed the systematic and accidental variations in this traffic from hour to hour and from day to day. Something has been said as to the extent of the data to be gathered and the frequency of traffic surveys, together with reference to the departmental organization which should have charge of the work. The article in the ELECTRIC RAILWAY JOURNAL of Aug. 21 discussed the problem of fitting car-miles to passenger-miles in the light of the fact that rush-hour service is more expensive than service at other times during the day. The present and concluding article relates to the methods of constructing schedules based on the information collected in the study of traffic.

On lines where traffic is light the determining factor in schedule making is, in most cases, the required minimum frequency of service. The headway may be prescribed by ordinance or may be adopted by the management as the minimum headway necessary to develop the traffic. On single-track lines as the amount of traffic increases the schedules are still controlled by a definite headway determined by the location of passing tracks and intersections. To meet further increases in traffic trippers are run, which in effect increase the capacity of the regular cars but do not alter the headway materially. With double track lines, the schedules become more elastic but still tend to follow the form developed under single track operation. Eventually, with the growth of communities, the making of schedules outgrows the rules of practice inherited from simpler conditions, and, as has been previously pointed out, there arises the necessity for traffic studies as a means of fitting the service rendered to the demand for such service.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A
(1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
Outbound
Streets
Inbound
3 P.M. 15 30 45 4:00 15 30 45 5:00 15 30 45 6:00 15 30 45 7:00 15 30
Time
40 40 40 40 40 40 48 48 56 56 64 64 56 56 48 48 40 40
Passengers per Car Allowed

CONSTRUCTING SCHEDULES—FIG. 1—DIAGRAM SHOWING PASSENGER TRAFFIC AT CHECKED STREETS AND NUMBER OF CARS REQUIRED BY STANDARDS FOR FIFTEEN-MINUTE PERIODS

On lines of considerable traffic density, the starting point in schedule making is the determination of the number of cars required under existing service regulations to carry the passengers moving in the controlling direction and past controlling points on the line during the heavier fifteen or thirty-minute periods of the day. With these requirements determined, the next step of the process is the scheduling of the required cars for earlier and later periods, or until such a time as they are not required by traffic conditions. The cars must be scheduled back to the time when they must leave the carhouses and scheduled ahead until they can be returned to the carhouses.

The applications of traffic requirements, as measured in cars required to cars scheduled, are largely mechanical, but must be supplemented by certain adjustments made in the light of experience to permit of the practical operation of the schedule. A typical illustration, developing a schedule for a single line,* will explain the process. The illustration must be followed with important qualifications in mind. Schedule making is too complicated to lend itself to fixed or rigid rules. The location of carhouses, transfer points and traffic hazards are some of the factors that require judicious treatment in each case. The illustration deals only with general principles and only passing reference is made to certain complications encountered in a simplified application.

Assume as a typical case a line four miles long for which the traffic count has been made and for which the normal number of passengers passing a number of points during each fifteen minutes of the day is accurately known.

Fig. 1 is a diagram representing, along the horizontal axis, the time of day, and along the vertical axis, distances. The horizontal lines indicate the street intersections at which traffic counts were taken, and the vertical lines divide the time into fifteen-minute periods. As originally drawn, this figure and the following ones included the entire twenty-four hours, but for larger scale and simplicity the diagrams reproduced have been abbreviated to include a few hours only. The larger numbers in Fig. 1 represent the number of passengers carried from each point during each fifteen-minute period, as determined by averaging a number of observations. The smaller numbers (those in parentheses) represent the number of cars required by the standards of service under which the company is operating. It will be noted from figures below the base line that the allowed number of passengers per car varies, the assumed service standards permitting an average of sixty-four passengers in a car seating forty-four during the rush hour, and an average of only forty passengers through the middle of the day or non-rush period. The standard permits a gradual adjustment of service to traffic during the periods preceding and following the time of maximum loading. The numbers representing the cars required in each fifteen-minute period were determined by dividing the corresponding numbers by the allowable number of passengers per car.

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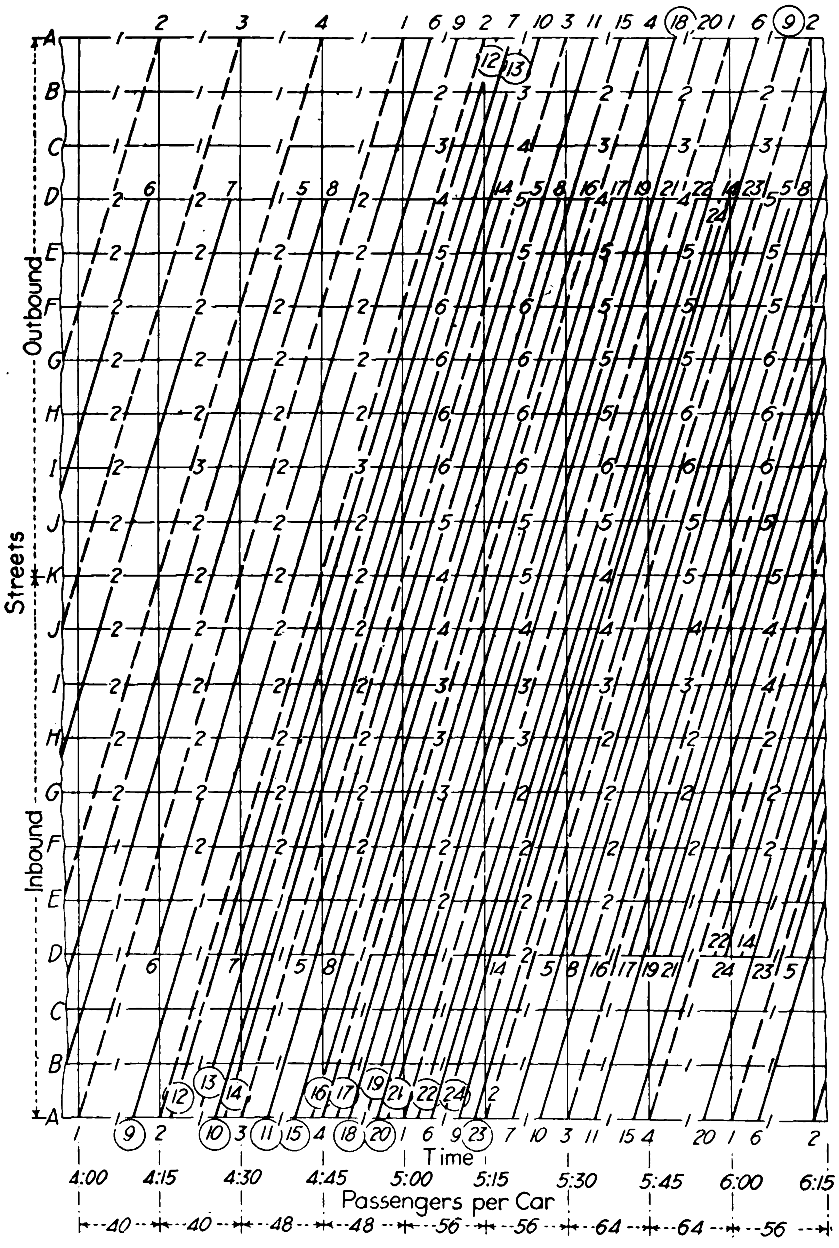
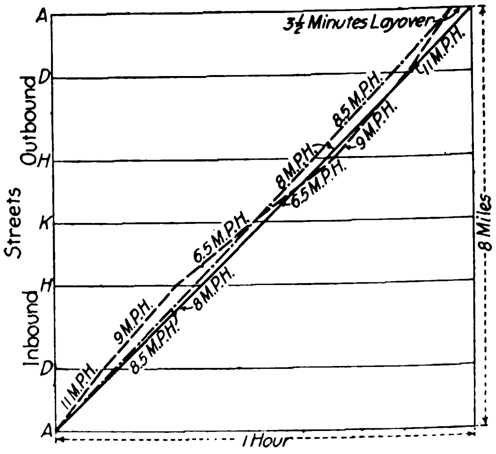
*When cars on more than one route operate over the same track for a part of their journey, the case may be treated by considering the track used jointly as a separate line, or by dividing the local traffic over this part of the line between the two routes and then handling each route separately. Before decision is made as to the best method of handling such jointly operated track, it is well to examine the whole of each route separately to see if the controlling points do not occur elsewhere.

Fig. 2 shows in diagonal lines the second step in determining the service to be furnished. The figures inset in the horizontal lines correspond to the number of cars required under the service standards as shown in Fig. 1. The figures at the ends of diagonal lines represent runs, and when the run number is inclosed by a circle the run begins or terminates at that time. The dotted lines represent cars run under the assumed requirements that the maximum headway on this line shall be fifteen minutes. Cross-overs are located at Streets D and I and are used to short-route cars in either direction. From Fig. 1 it is evident that five additional cars must pass Streets I, H and G during each fifteen minutes from 5 to 5.30 p. m., and these are therefore indicated in Fig. 2. The construction of the schedule is begun at this point, it being here that the maximum traffic demand is found. These cars are scheduled before and after this time to the point at which they are no longer needed and can be returned to the carhouses, which have been assumed to be located at Street A. Cars are short-routed at Streets D and I wherever possible, thus permitting the minimum mileage* for the service rendered. Short-routeing occurs chiefly at Street D both in the morning and in the evening, but also at Street I during the morning rush hours.

In drawing Fig. 2 an average speed of 8 m.p.h., including lay-over, was assumed as the result of experience. Speed will be different over different parts of the run, and this variation will next be taken into account. Observation and experience, it will be assumed, have indicated that while the run from Street A to Street K and return, 2 miles, can be made in one hour, the average speed between Streets A and D will be 11 m.p.h.; between Streets D and I, 9 m.p.h., and between Streets I and K, 6.5 m.p.h.† The straight diagonal lines of Fig. 2 will then have to be warped and time points and the final schedule subsequently determined. Fig. 3 indicates how the average speed of 8 m.p.h. is obtained under typical conditions. The schedule thus devised is based on traffic requirements, but modified to take into account possibilities of short-routeing, ordinance re-



CONSTRUCTING SCHEDULES—FIG. 2 —DIAGRAM SHOWING NUMBER OF CARS REQUIRED AND NUMBER ACTUALLY OPERATED DURING FIFTEEN-MINUTE PERIODS OVER DIFFERENT PARTS OF ROUTE



CONSTRUCTING SCHEDULES—FIG. 3—DIAGRAM SHOWING HOW AVERAGE SCHEDULE SPEED IS OBTAINED

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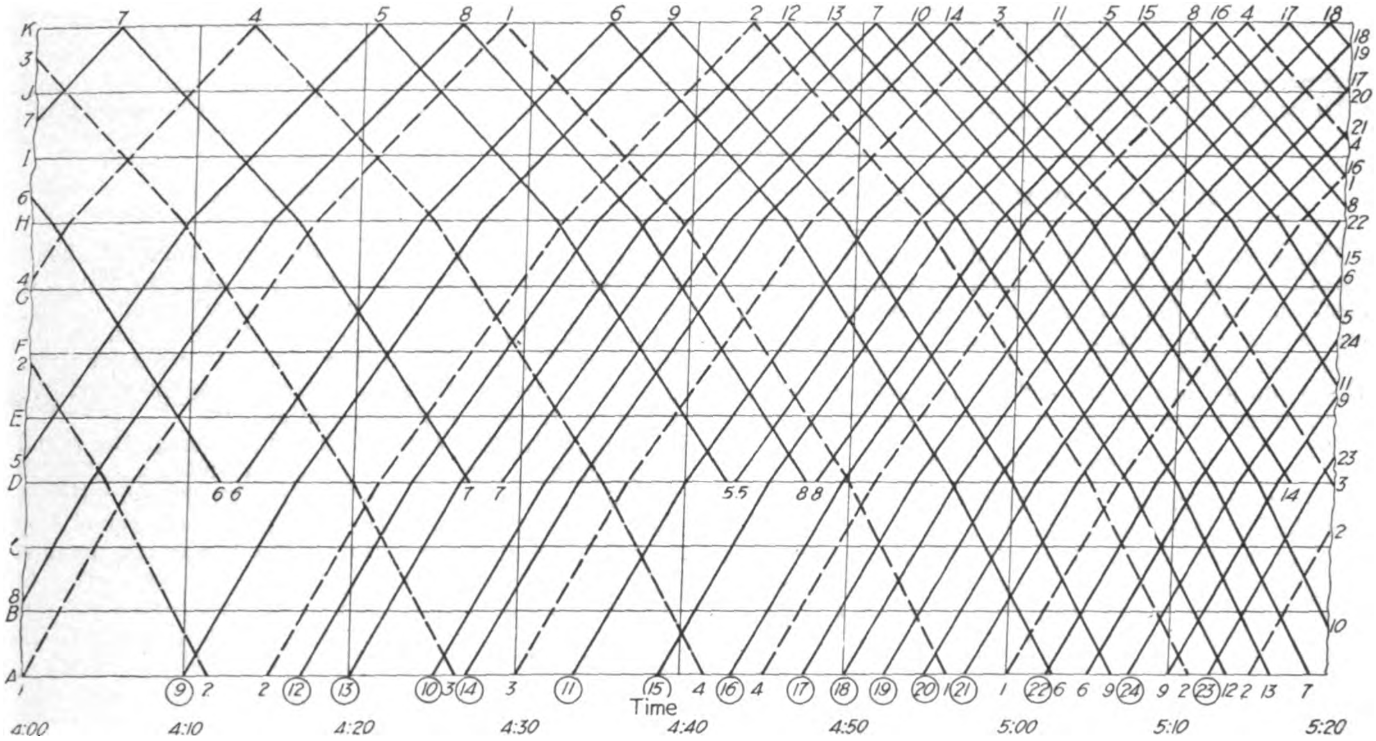
*It must be borne in mind, of course, that the minimum mileage here indicated cannot generally be realized completely, as it is unwise to ask passengers to transfer to the car following in all cases where that car normally would have room for them. Some consideration must be given to diversity of traffic, in addition to the consideration already given to this factor in fixing the off-peak capacity of cars at less than the number of seats.

†Variation in speed from hour to hour during the day will necessitate the use of several average and several specific speeds to complete other parts of the schedule.



CONSTRUCTING SCHEDULES—FIG. 4—DIAGRAM SHOWING IN MORE COMMON WAY PART OF GRAPHIC SCHEDULE OF FIG. 2, ADJUSTED TO MEET OPERATING CONDITIONS

quirements as to headway, location of carhouses and variable speeds throughout different parts of the route.‡

Fig. 4 corresponds to a portion of the graphic schedule shown in Fig. 2 adjusted to meet operating conditions. In Fig. 1 and Fig. 2 the movement of a car from Street A to Street K and return to Street A is indicated by a line passing from the bottom to the top of the figure, these extreme lines representing the same street. Fig. 4 is of the type more generally used to represent schedules. In it in-bound cars are indicated by lines sloping upward to the right, while out-bound cars are represented by lines sloping downward to the right. Although Fig. 4 is the more common form, on account of the difficulty of showing thereon the number of cars required in two directions and the confusion resulting from the many intersections of lines the form used in Fig. 1 and Fig. 2 appears to be preferable for preliminary work. Time-tables of the usual types can now be taken off without difficulty, and from the graphic chart the trainmaster can at all times determine the location of all equipment in service and can see most readily the possibilities of expansion and contraction of service as traffic requirements vary.

No attempt has been made to indicate assignment of crews, as this will depend upon agreements in effect locally as to hours of service and as to the relation between "lay-over" and "running" time. The illustration shows the more important practical application of the traffic study, although it should be remembered that in addition to the construction of time-tables the traffic study serves as the basis for rerouteing of cars, adjusting transfer points and solving similar problems.

Attractive Shelter at Glasgow

The accompanying engraving shows a very attractive waiting room and shelter recently erected for passengers at the corner of Grange Road and Battlefield Road, Glasgow, Scotland, an important junction point for the tramways in that city. After the decision that a shelter of this kind should be erected, an advertisement was published for competitive designs. Twenty-nine designs were received, and finally the one submitted by Frank Burnet of Boston was accepted.

The waiting room, which occupies the center or main portion of the building, is 45 ft. x 25 ft. Lavatory accommodation is provided at the north end of the building, and the south end is fitted up with a neat and attractive newspaper and confectioner's shop, surmounted by an octagonal tower with a gilt dome. The exterior walls are faced with Doulton's carrara wear. The roof is finished with red tile, and the woodwork is of red pine throughout. The cost, approximately, was £1,800 or about $8,460.

VIEW OF NEW WAITING STATION IN GLASGOW

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‡A very complete analysis of these factors and others which make necessary in particular cases a departure from a schedule conforming precisely to the occurrence of traffic, as determined by check, is contained in a paper read before the Public Service Railway Section of the American Electric Railway Association on April 16, 1914, by Alexander Jackson, head of the time-table department of the Public Service Railway, Newark, N. J. (ELECTRIC RAILWAY JOURNAL, April 18, 1914). Such factors as make it necessary to vary from the service indicated by a traffic count are encountered in any scheme of schedule construction and are not to be considered as discounting the value of the traffic study, but rather as emphasizing its value by fixing definitely the required service and avoiding the possibility of adjusting the service away from rather than in accordance with the requirements of the traffic.

Autos and the Electric Car*

A Discussion from the Standpoint of the Public of the Advantages to the User and to the Community of Automobiles and Street Cars

BY JOHN A. BEELER, VICE-PRESIDENT AND GENERAL MANAGER DENVER TRAMWAY COMPANY

The results of the street traffic count and survey recently compiled by the Denver Tramway Company[1] disclosed many features which we believe are of interest to the company's patrons and the public generally. The most salient features of Denver's local transportation situation are briefly set forth, together with estimates of comparative cost of auto and street car service.

PASSENGER MOVEMENT.

After eliminating all traffic in connection with freight and merchandise deliveries, the total volume of passenger traffic, including pedestrians, counting each person in or out of the business section as one, then adding to this the total number of passengers carried by the tramway company within the city on this day was, in even figures:

	Persons	Per Cent
In tramway cars	184,000	51
Pedestrians	103,000	28
In passenger autos	47,000	13
On bicycles	21,000	6
In horse-drawn vehicles	4,000	1
On motorcycles	4,000	1
Total	363,000	100

Compared with a similar count taken in May last year, the startling feature is that the number of passengers carried by the auto has increased 50 per cent during the year, while the number of street car patrons has diminished 9 per cent. Other movements showed comparatively very little change, bicycle and motorcycle increasing slightly, while horses and pedestrians decreased.

NUMBER OF AUTOS AND THEIR COST

The number of passenger auto licenses for use in Denver on Jan. 1, 1915, was 5580, or a total of 6120 including dealers' licenses and trucks. The total in the State was 18,433 and in the United States 1,755,000. This is an average of one auto for every thirty-six people in the city, one for every forty-five in Colorado, and one for every fifty-two in the United States.

The average cost new of each passenger auto in the United States for the last year was approximately $1,000. At this rate, the 5580 passenger machines in Denver cost $5,580,000. Interest at 6 per cent and depreciation based on an average life of eight years, totaling 18 per cent, equals in round figures $1,000,000. (The figures used here in are based upon the average of all autos in Denver last year.)

Assuming that the average maintenance and operating expense of each machine, including gasoline, tires, repairs, garage and other expenses, for city service averages $1 per day per car, the total annual operating expense for the machines in Denver equals $2,000,000. This, added to the $1,000,000 interest and depreciation cited above, gives a total annual outlay of practically $3,000,000 for Denver's passenger autos.

As shown by the traffic survey, 13 per cent of the total daily traffic is by autos, which is equivalent to about 18,000,000 passengers per annum. This, divided into the $3,000,000 expense, would indicate that each one-way trip averaged about 17 cents per passenger.

Assuming that each auto will make annually about 5000 miles in city service (or nearly 14 miles daily), a total of 28,000,000 miles is the annual result. This, divided into the total annual cost of $3,000,000, results in a cost of about 11 cents per mile (7½ cents for tires, gasoline, repairs and other operating expenses and 3½ cents for interest and depreciation).

Each of the 5580 cars was found to average two round trips daily. This, for 365 days, results in 4,000,000 round trips annually. Divided into 28,000,000 miles, it indicates that the average length of each round trip was 7 miles, or 3½ miles for each one-way trip, against 4.82 miles for each one-way trip on tramway cars. At 11 cents per auto-mile, the cost of the 3½-mile one-way trip equals 38 cents, or 19 cents per passenger per trip, which tallies closely with the estimate of 17 cents.

TRAMWAY PERFORMANCE

During the past year the tramway company carried 75,000,000 passengers on its city lines, for which it received a revenue of approximately $3,000,000, or about 4 cents per passenger per trip, or less than one-quarter of the cost per each auto passenger per trip. Or the tramway, at a total cost to its patrons of $3,000,000, transported 75,000,000, while the auto at a like total cost transported but 18,000,000 people.

Had there been no autos, and had these 18,000,000 passengers availed themselves of the tramway company's transportation facilities, the total cost to them would have been about $700,000 instead of $3,000,000, thereby effecting an economic saving to the community of $2,300,000, or nearly $400 each to the 5580 auto owners.

Four hundred dollars is a considerable annual outlay to most families, and even with the more general use of cheaper and lighter machines and a reduction of this amount by 25 per cent, or even 50 per cent, the required annual outlay for a machine should deter many from investing in an auto, especially if living in a community where good street car facilities are maintained.

The tramway plant and equipment is sufficient not only to move the entire population daily but to care for large crowds of strangers, big conventions, etc. If the auto were to supplant the street car, to take care of the entire population of Denver would require about eight times as many, or from 45,000 to 50,000 machines.

A "GIFT HORSE"

The auto owner who picks up a stranger waiting for a street car and transports him, gratis, to or from the residence section, may labor under the delusion that he is a good fellow and doing a kindly act. Possibly he knows that each pound of weight added to his machine increases his expense for gasoline, tires, etc., but does he realize that he is doing both himself and his neighborhood an injustice?

The apparent favor is in fact no favor at all, but a detriment to all concerned, for the reason that the street railway operates its cars on schedules adjusted to care for the volume of traffic on the various lines in order properly to serve the different localities. Reduced patronage eventually results in reduced car service. This is the economic sequence; otherwise, the company operating upon the narrow margin it does, could not continue to exist.

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*Abstract, from advance copy, of article prepared for general circulation in Denver.

[1] See ELECTRIC RAILWAY JOURNAL, Aug. 21, 1915, page 309.

With reduced car service, lower realty values follow, and increased difficulty in obtaining help and servants in the home is experienced. Therefore, the injury is not confined to the local transportation company but extends to the community generally.

With the continued increase in the use of the auto, many new problems will have to be met. The capacity of the streets may be reached. The wear and tear on the pavements will be greater than ever. More money will be required for their upkeep. The burden of the cost of construction and maintaining paving, viaducts, and other public improvements heretofore largely borne by the street railways, will of necessity have to be partially or wholly shifted to some other source, or provided for by general taxation.

SCORE FOR THE BUZZ-WAGON

The advantages claimed for the auto are:

1. Time waiting for car is saved.
2. Conveys one direct from home to office, avoiding the necessity of a walk to and from car line.
3. Intermediate stops are unnecessary, thus saving time.
4. Operation at higher speed, even though it may be contrary to law.
5. Can avail itself of most direct route and reach places remote from car lines.
6. Is more exclusive.

THE STREET CAR HAS A FEW GOOD POINTS

Some of the advantages claimed for the automobile and mentioned above are good ones; others are more apparent than real, especially when all the advantages of a first-class street car system are considered with reference to both the individual and the community as a whole. Those for the car are:

1. The more substantial car insures greater safety, there being fewer accidents to patrons and less danger to pedestrians.
2. Cheaper by about 1 to 4, or 75 cents out of each $1 saved.
3. It is always on the job, rain or shine, snow or mud.
4. Continuous service is furnished for at least eighteen hours daily. Therefore, it is not necessary for all members of the family to go at the same time.
5. Reduces congestion. One street car is capable of handling from ten to twelve times the capacity of an auto.
6. Patrons are relieved of all responsibility for the operation of the car, the trainmen shouldering that.
7. No road troubles, blow-outs, punctures, faulty spark plugs or broken connections to annoy the rider.
8. No time required for overhauling, cleaning and repairing car (which is a considerable item where one takes care of an auto). Tramway employees attend to that while you sleep.
9. Increased comfort, less dust in summer, warm stormproof cars in winter and inclement weather, and always smoother riding.
10. No joy riding or improper behavior.
11. The street car company wears out its own rails, not the pavement as the auto does, thus effecting a saving to the economical benefit of the community.
12. If you are late, you can always blame it on the tramway, but where is the man who will acknowledge that there is anything wrong with his buzz-wagon?

FORECAST AND THRIFT

The greatest future market for the auto will undoubtedly be for the low-priced, light-weight car, for use especially in the country districts. Assuming, however, that the day should come when every family has an auto, what would be the result? The modern family does not all go at once. They usually, except on Sundays, holidays and special occasions, go one at a time. Therefore, those who figure that all the family car fare will be saved are doomed to disappointment. The increased number of autos and increased danger in the streets will tend to check their use within the more congested districts as time goes on.

The damage done to a machine by leaving it in the street in all kinds of weather is an item of considerable expense and can be likened to that resulting from the practice of the farmer who leaves machinery out in the open the year around, subject to destruction by the elements.

There are many instances where you can save money daily by leaving the auto in the garage and patronizing the tramway company, especially when going to and from the business district, whether it be to the store, office or theater.

DIVIDENDS TO PATRONS

By patronizing the street car, you render possible the only permanent and continuous means of transportation. The less patronage the less frequent the service. Therefore, if you will ride on the tramway whenever it will serve you equally as well as your automobile, you benefit your community, and at the same time save your own money.

The community that fails to render sufficient support to a street car company to enable it to render good transit facilities will in the end suffer as much from the curtailment or withdrawal of the service as the company.

The fact that every section of the city of Denver is served by the tramway has been one of the most important features in Denver's development. That this has been no small task is illustrated when Denver's area is compared with that of other cities. Denver stands nearer the head of the list as to area than it does to population. This has required more trackage, and consequently a larger outlay on the part of the tramway, than would have been necessary had the city been smaller and more compactly built. Following is a list of the principal cities in the United States, showing number of square miles of territory within their limits, with population as per census of 1910, and miles of street railway track per 1000 population. Denver has a mile for each 1000, while the average of the other cities is less than a half mile.

	Square Miles	Population	Miles of Track per 1000 Popuation
Greater New York	77	4,766,883	0.10
St. Louis	61	687,029	0.50
Washington, D. C.	60	331,069	0.47
Denver	58	213,381	1.00
San Francisco	46	416,912	0.50
Cincinnati	42	364,463	0.60
Buffalo	42	423,715	0.51
Pittsburgh	41	533,905	0.52
New Orleans	41	339,075	0.55
Cleveland	40	560,663	0.39
Boston	38	670,585	0.66
Detroit	36	465,766	0.43
Baltimore	30	558,485	0.40
Milwaukee	22	373,857	0.41

CROWDED CARS

When you see the cars crowded, remember that there are many times when trip after trip is made at different periods of the day and night when the conductor is a very lonesome individual. The company would be much better off if there was a steady, even travel, only sufficient to fill the seating capacity of the cars.

The handling of the rush-hour period in most cities is not only a vexatious problem, but a costly operation. Most people ride during the daily rush hours, of course. This problem has been successfully met in Denver by the employment of large, commodious trailers, seating more than the motor car. Thus seats are provided for the great majority of patrons, even during this period. Standing idle all of the time except for a few hours daily service, these trailers are maintained in order to provide greater comfort to the traveling public.

SAFETY FIRST

The modern street car, operating upon substantial tracks, is yet by far the most economical, safe, reliable means of city transportation, and will undoubtedly continue so, but the quality of the service and the frequency of the headway are entirely dependent upon the patronage.

Both the management and the employees extend a most cordial invitation to all to make greater use of the tramway, thus making it possible to continue to improve the service. After all is said and done, the best way to help yourself is by first helping others.

COMMUNICATIONS

Girder and High T-Rail Renewals

TWIN CITY RAPID TRANSIT COMPANY
MINNEAPOLIS, MINN., Sept. 10, 1915.

To the Editors:

Referring to article on page 179 of the ELECTRIC RAILWAY JOURNAL of July 31, 1915, the wear or service that can be obtained from rail in the paved streets of our cities is an important matter for all street railways. This article is the best study of the subject the writer has seen. To decide when the rail on certain streets is worn out is a common problem for all maintenance engineers, and the article will be helpful in its solution.

While the construction of joints has been improved, the writer believes that it is still true that the condition of the joints is a large factor in deciding the remaining wear life of the rail. In the case of T-rail the maximum amount of wear that can be obtained theoretically will be when the rail is worn so far that it is no longer strong enough to sustain the weight of the cars. In practice the observation of the writer is that before this theoretical limit is reached generally some parts of the rail are worn, either from joint troubles, corrugation, flange wear, or defects that develop in the rail, so far that it is considered reasonable to renew it if the finances of the company will permit.

It often occurs that where track needs to be rehabilitated the rail is taken up, the ends cut off to remove poor and worn parts, after which it is relaid when the street surface is renewed, or in some instances, the old rail is relaid on lines in outlying districts with lighter traffic, if the company has such new track extensions where it may be used. Some companies find that taking up and relaying rail after cutting off the ends is entirely practical. In this way the theoretical amount of wear that can be obtained from the rail will be approximately reached. The wear of the rail head does not take place uniformly to a level line across the head, as shown on some of the diagrams, but to a sloping surface. Considerable wear usually takes place along the gage line that appears to be caused by irregularities developing in grade of rail or surface of track, by nosing of car trucks, difference of hardness at different spots in the rails and other reasons. Corrosion of web and base of rail may affect the life of rail, but in paved track it is the experience of the writer that this is not a determining factor.

The point is well made in the article under consideration that the question of pavement renewals will often decide the question of rail renewals. If a new and expensive pavement is to be constructed in the place of a worn-out pavement, it will often be economy to renew the track even if the rail has several years of life remaining. To leave the old rail in place would, in many instances, hasten the deterioration of the adjoining pavement, and the expense of maintaining paving and track would be more than the saving in rail to obtain its extreme life. In this connection it must be also considered that public authorities are demanding a higher standard of track maintenance, especially in connection with new and expensive pavements.

The author's method of arriving at the annual charge of maintenance of old rail and annual cost of new rail is ingenious, but it will seldom occur that the time of renewal can be fixed by these mathematical considerations alone. Such information is of value to assist in making a decision as to renewals and is one of the conditions to be considered. The main factor in arriving at a decision will be the financial situation. When there is necessity for small expenditures, rail and track will be worn as long as possible. When finances will warrant and the company and public desire tracks and pavements to be kept in first-class order, rail renewals will be made sooner and the wear obtained will be less than the possible maximum indicated in the article.

Many companies, if financially able, put down new, expensive track, while the actual maximum life of the old rail has not been reached. The writer has seen many instances where good rail was removed from the track and scrapped, and new rail substituted. This change usually takes place when new pavements are constructed, and in fact it might be said that a very large part of the wear remaining in rails of street railway tracks when the rail has been scrapped, has been lost on account of the civic improvements and the desire of companies to comply with the request of public authorities that the tracks shall be renewed when new pavements are installed. The actual maximum life of the rail in connection with the modern and expensive type of track has not yet been determined.

GEORGE L. WILSON,
Engineer Maintenance of Way.

NEW YORK STATE RAILWAYS
SYRACUSE, N. Y., Sept. 2, 1915.

To the Editors:

I have read with much interest the article on "Girder and High T-Rail Renewals" in the issue of the ELECTRIC RAILWAY JOURNAL of July 31, 1915. The principal causes for rail renewals are clearly presented and a formula derived which should give results in many cases. There will be, of course, many instances where other considerations will enter the problem, such as city ordinances which will render any mathematical calculations of no real value.

I consider the assumption of an average life of thirty years for track in paved city streets of over 100,000 population to be entirely too high. Sixteen to twenty years would be nearer correct in small cities, and fifteen years in larger ones. The life of the rail, I believe, will ultimately be determined by that of the joint, and this will, of course, depend on how well the joint is maintained. It has been my experience with the older types of 9-in. and 7-in. girder rails that after fourteen or fifteen years' service under heavy traffic, even though the joints may still have considerable life left, or it is possible to cut off the ends to make new joints, the rails are generally surface bent and kinked so that a good paved track cannot be built. It might be possible on light traffic lines to obtain thirty years' life by maintaining the joints as long as possible, and when this no longer can be done because the rail ends have been ground thin on the head, the ends can be cut off and new joints installed. I have done this on several light traffic streets but have not attempted it under heavy traffic.

To estimate the average life of rail for the next twenty years based on rails laid fifteen to twenty years ago is erroneous. In general, rails laid twenty years ago did not carry heavy double-truck cars until about ten years later, and the number of cars operated and speeds have also increased rapidly since then. I have observed track that was in almost perfect condition after ten years' operation with light single-truck cars practically fail after five years more service with heavy double-truck cars operated at a closer headway. Hence, in spite of improved rails and joints, I do not believe our modern rails will last any longer, if as long, as those laid fifteen years ago, due to the increasing weight, speeds and headways in our city streets. Moreover, municipal authorities are requiring a higher degree of paving maintenance than ever before. I believe that some of the older rails gave twenty years' service simply because the streets were not paved and maintenance consisted only in keeping the track safe for operation.

As regards the modern 7-in. T-rails now being so widely used, I believe that the life in paved streets will be determined by the joint and surface bending and not by the amount of metal worn off the head between joints. What has happened to a rail in the past ten years I do not believe can be used as a basis to determine, with any degree of accuracy, what will be its condition at the end of the next ten to twenty years, except, possibly, the amount of metal which will be worn off the head.

E. P. ROUNDEY,
Engineer Maintenance of Way.

The Vienna-Pressburg Electrification

VIENNA, AUSTRIA, July 31, 1915.

To the Editors:

I notice the author of a letter published in the Communications Department in your issue of May 22 refers to the 15,000-volt, single-phase overhead line of the Vienna-Pressburg Railway as apparently fitted with the Fischer-Jellinek suspension. This is incorrect, but the writer is correct in stating that this form of suspension involves wear of the trolley wire at the clamps. I would refer you to the extended statement in Nos. 32, 33 and 34 of the 1914 issue of *Elektrische Kraftbetriebe und Bahnen* and to my article entitled "Ueber Hochspannungs-Leitungsanlagen für Bahnen" (Concerning High-Tension Transmission Systems for Railways) published in Nos. 8 and 9 of the *Electrotechnische Zeitschrift*, Berlin. These show the feature of the A. E. G.-Union-Vienna systems is to secure theoretically correct regulation without the defects of the Fischer-Jellinek suspension mentioned.

I must deny absolutely, however, that it is indifferent whether the trolley wire hangs in a series of festoons or whether it is carried as close to a perfect horizontal plane as possible. The long life of the bows on the Vienna-Pressburg Railway, up to 42,000 locomotive-kilometers, proves that the best results are obtained with the trolley wire in a horizontal plane.

I also notice the letter from W. K. Archbold in the same issue of your paper and would be glad to become better acquainted with the Northern Ohio Traction & Light Railway's system, as mentioned by him.

The triangular arrangement of the A. E. G.-Union system has the advantage that it permits no pulling or pressing out from its proper position of the working conductor, a condition which is unavoidable where vertical hangers are used.

The tower construction used on the Vienna-Pressburg Railway is in accordance with the calculations and factors of safety required by the Austrian Railway ministry, and they offer ample safety.

DR. ING. E. E. SEEFEHLNER,
Director A. E. G.-Union Elektricitäts Gesellschaft.

Permissible Difference in Wheel Diameter

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
EAST PITTSBURGH, PA., Sept. 13, 1915.

To the Editors:

Supplementing my article which appeared on page 452 of the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 11, the following statements may be of interest.

In any given case the permissible difference in car-wheel diameter depends upon a number of factors. Several of these are as follows:

1. The margin in temperature rise which the motors have, if all the motors divide the load equally. If the motors are running quite cool a certain difference in heating is not so objectionable as when the motors are running hot.
2. The relative number of motors on the car with the large and small wheels. If a car has three motors with large wheels and one with smaller wheels, the condition is not as serious as though the car was equipped with three small sets of wheels and one larger set.
3. The speed at which the car operates most of the time. If the service is such that the motor operates much of the time at heavy loads, the difference in wheel diameters permissible will not be as great as though the motors were in service where most of the running is at high speed.
4. These curves are based on the assumption that the motors have identically the same speed curves but in commercial production due to variation of materials, machinery, etc., the speeds of different motors may vary as much as 5 per cent. If the motor which is mounted on the larger wheel rotates at higher speed for the same amperes than the motor on the smaller wheel the difference in loading and heating will be in excess of that given by the curves.

Figs. 2 and 3 reproduced with the article will be found useful in arriving at a solution.

A. L. BROOMALL,
Railway Engineering Department.

Picnic Park as Traffic Accelerator

In spite of the cool summer the Louisville & Northern Railway & Lighting Company, New Albany, Ind., which operates Glenwood Park, near New Albany, reports excellent success with the property. The annual Chautauqua brought out large crowds, while other special events have proved successful in developing traffic. Louisville people have been educated to use Glenwood Park for picnic purposes. On Labor Day an especially large picnic was held, and on the following day a musical event out of the ordinary drew several thousand people.

The success of the park, as a traffic proposition, is indicated by the fact that while many of the regular amusement resorts in the Louisville district closed late in August, Glenwood was expected to close on Sept. 15.

A company in Cuba, reported as the Oriente Fruit Company, according to unconfirmed information is said to be considering plans for the construction of a 20-mile heavily graded electric railway in Cuba for the transportation of bananas and coffee, the motor equipment to be of the three-phase induction type. Inquiries for certain accessory car equipment for 253 cars have been received in New York City.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 to 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

Additional List of Reservations for the "Red Special"—Change in Los Angeles Program of Entertainment—Award in Accountants' Course—Manila Company Section

THE "RED SPECIAL"

H. G. McConnaughy, director of transportation of the American Electric Railway Manufacturers' Association, reports that the "Red Special" train, which will leave New York on Sept. 23 for the San Francisco convention, is now oversubscribed. There will be twelve cars in the train and it will weigh more than 1000 tons. Two cars will come from Boston, one car from Cleveland and one car from Chicago. The other cars will leave from New York. The train will be made up of all standard steel Pullman equipment, all sleeping cars being stateroom and drawing-room cars only.

The following are some of the additional reservations for the train, made since the publication of the list in the issue of Sept. 4.

Miss Annie R. Almy
F. W. Coen
J. J. Dempsey
Mrs. Dempsey
C. R. Ellicott
A. H. Ford
Mrs. Ford
W. G. Gove
Mrs. Gove
Mrs. John M. High
John M. High, Jr.
Miss Florence Hedley
C. B. Keyes
T. P. Kilfoyle
J. C. McQuiston
W. B. Potter
Mrs. Potter
E. O. Shyrock
John J. Stanley
Mrs. Stanley
Miss F. E. Stanley
Miss B. Tompkins
H. R. Trainer
Mrs. Trainer
W. S. Twining
Charles S. Waring
Mrs. Waring
Miss Edith Waring
T. Walley Williams

CHANGE IN LOS ANGELES PROGRAM OF ENTERTAINMENT

Owing to the fact that the special train will arrive at San Fernando at 9.30 a. m. on Tuesday, Oct. 12, instead of on Oct. 13, as expected by the committee, a slight change has been made in the program of entertainment at Los Angeles from that mentioned on page 446 of the issue of last week. In consequence, Transportation Day at Universal City will be Tuesday, Oct. 12, and Catalina Day on Santa Catalina Island will be Wednesday, Oct. 13. Oct. 14 will be an open date at Los Angeles so far as the morning is concerned, giving the members and their families an opporunity to visit any special places of interest in the city, which they will leave at 3 p. m. for San Diego. The San Diego days will be Friday, Oct. 15, and Saturday, Oct. 16, and the party will leave San Diego at 1 a. m. on Sunday, Oct. 17, for Riverside.

AWARD IN ACCOUNTANTS' COURSE

As announced last year provision was made in planning the educational course of the Accountants' Association for the awarding of a prize of $50 for the best paper on the eighth lecture submitted to the instructor, Prof. J. R. Wildman. This award will be made at the Monday (Oct. 4) session of the Accountants' Association at the convention, immediately following the presentation of the report of the committee on education by George G. Whitney.

The fortunate recipient of the $50 in gold will be E. C. Stothart, auditor Charleston Consolidated Light & Power Company, Charleston, S. C. First honorable mention will be accorded to Albert L. Good, civil engineer Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., and second honorable mention to H. F. Van Wye, clerk American Railways, Philadelphia, Pa. The announcement of this award will be a reminder to those who have not yet registered for the 1915-1916 courses.

MANILA COMPANY SECTION

The eighth monthly meeting of joint company section No. 5 was held in Manila on Aug. 3. H. P. L. Jollye, assistant auditor Manila Electric Railroad & Light Company, spoke on "The Essentials of Fare and Bill Collecting." Most of the discussion centered in the second part of the topic.

Mr. Jollye said that the conditions in connection with fare collection in Manila are quite different from those of other countries as there are nineteen grades of cash fares, ten first-class and nine second-class, ranging from a scholar's ticket of 2½ cents on the suburban line to the first-class cash fare of 12 cents. In addition there are first-class and second-class complimentary employee's tickets. For a street railway with 52 miles of track this produces accounting complications. Both the old type and the pay-as-you-enter type of cars are used, and the latter is preferred as giving the most accurate check upon conductors, with less opportunity for conductors or passengers to defraud the company.

After quoting at length from the report of the 1913 committee of the association on fares and transfers, to show the unsettled condition of the fare collection situation, Mr. Jollye emphasized the importance of the conductor in determining the success of any system, as follows: "The conductor is the representative of the company, the one who comes in contact with the public more than all others, and by him and his conduct toward the public will the company be largely judged. A conductor must be a man courteous by nature, with the patience of Job, always ready to assist the passengers in any difficulty, to be able to firmly but politely refuse a transfer a week old, or a scholar's ticket from a man in his second childhood. During the busy hours of the day he has to work at high speed and any mistakes he makes he has to pay for, and all this time he gets little consideration from the public and is expected to give much."

Purpose of American Association of Engineers Outlined

At a booster dinner of the American Association of Engineers, an organization drawing members from all branches of the engineering profession, Prof. F. H. Newell, head of the department of civil engineering at the University of Illinois, outlined the purpose of the new association. The organization is designed to promote the interest of the average engineer by affording means for the interchange of information, maintaining a service clearing house, furnishing advice on patent and legal matters and supervising legislation by proper publicity.

A national convention of this association is to be held at the La Salle Hotel, Chicago, on Dec. 10 and 11, 1915. The offices of the association are at Room 1056, 29 South La Salle Street, Chicago, Ill.

Promoters of the extensive club grounds, amusement park and speedway plans for Overland Park, on the Kansas City-Olathe Electric Railway are urging upon federal officials the designation of Overland Park as the site for a military aviation station. Aviation exhibitions are held at Overland Park now each Sunday.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

New Method to Determine Railway Motor Speeds with Varying Voltage

BY A. M. BUCK, ASSISTANT PROFESSOR OF RAILWAY ELECTRICAL ENGINEERING, UNIVERSITY OF ILLINOIS

It is frequently desirable to obtain characteristics of railway motors when operating under abnormal conditions, as, for example, when a certain amount of resistance is inserted in the circuit, or when the motors are working at pressures differing from the standard. A method by which the desired characteristics can be found from the normal performance curves furnished by the manufacturer is of considerable value in the engineering department of any railway company, even though it be only a moderate-sized road.

One way of getting the performance of the series motor under varying conditions has been suggested by F. Castiglioni, in an article in the ELECTRIC RAILWAY JOURNAL for March 13, 1915, page 515. His method, in brief, consists in using the well-known relation

$$\frac{S_2}{S_1} = \frac{E_2 - Ir}{E_1 - Ir} \qquad (1)$$

to plot a series of charts giving the relation between S_1 and S_2 for a large number of values of terminal potential, currents and motor resistances. It is evident that any such chart becomes quite complicated if it is to cover more than a limited range of conditions.

In the issue of Feb. 13, 1915, the writer presented an article on the determination of railway motor resistances, giving a volt-ampere diagram for facilitating the calculation. This same chart can be used, with a slight modification, for finding the speed under abnormal conditions of potential and resistance in the motor circuit, so that it makes available a simple graphical method for computing motor speeds under nearly all variations which are liable to be met with in practice.

In order to make this clear, the portion of the diagram referred to is reproduced in Fig. 1, to show the relation between the current and the *Ir* drop in a motor under ordinary conditions of service. Inspection of the figure will show that the total pressure at the terminals is divided into two parts, the counter-emf. and the *Ir* drop. The sum of these two must always be equal to the constant terminal voltage. Suppose that the line pressure is changed to some abnormal value, as to one-half (for example, when two motors of an equipment are placed in series). This alters the terminal voltage, but, as shown in the figure, does not affect the *Ir* drop. The ratio between the two values of counter-emf. is likewise the ratio between the two speeds. If, then, we can get a graphical method of establishing a proportion between the two quantities, the speed under the abnormal conditions can be found directly.

One arrangement for doing this is given in Fig. 2. At the right is shown the volt-ampere diagram of Fig. 1, and beside it is drawn the speed curve for the motor, as determined from test, the axes of abscissae being in the same line. The current scales need not, however, bear any definite relation to each other. Consider the speed S_1 of the motor at the terminal pressure E_1. It is desired to find the speed S_2 at the same value of current. Through *A*, corresponding to this current on the right-hand scale, and through S_1 draw a straight line cutting the axis of abscissae at *K*. From *K* draw the line *KB*, intersecting the current value on the speed diagram at S_2. This locates a point on the new speed curve corresponding to the current *I*. This must be true since, by similar triangles,

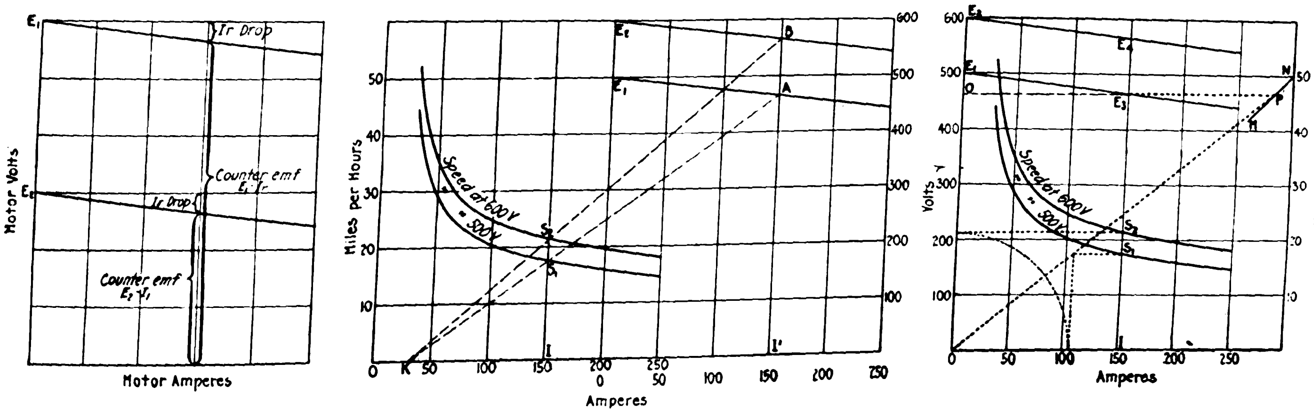
$$\frac{IS_1}{IS_2} = \frac{AI'}{BI'} \qquad (2)$$

It has already been shown that *AI'* and *BI'* are the values of counter-emf. for the corresponding pressures E_1 and E_2 respectively.

The diagram is equally good if it is necessary to find the performance with external resistance in the circuit. The only change is to locate the correct slope for the *Ir* line at the proper terminal pressure and use intercepts on this for drawing the lines as AS_1K.

It is, perhaps, unnecessary to state that a different point *K* is located for each value of current.

In some cases it is convenient to make the construction complete on the speed-current curve itself. This is shown in Fig. 3. Here the volt-ampere diagram is drawn to the same scale as the speed curve, and the proportion is obtained by swinging one of the values of counter-emf. through an angle of 90 deg., that is,



RAILWAY MOTOR SPEEDS—FIG. 1, DIVISION OF VOLTAGE BETWEEN COUNTER-EMF. AND *Ir* DROP; FIGS. 2 AND 3, NEW GRAPHICAL METHOD OF SPEED CALCULATIONS

$OP = E_4$. The intersection of the two projections of counter-emf. will be at some point, such as P, and a line connecting this with the origin will divide the ordinate and abscissa at any place along it proportionally to them. If then the speed at E_1 volts is projected on this line, the speed at E_2 volts will be given by the corresponding co-ordinate, and may be swung back through 90 deg. to be plotted on the original scale. This is, of course, simply a geometrical device for locating S_2 so that $S_2:S_1 = E_4:E_3$.

An inspection of the diagram shows that the values of P for all possible values of current will lie along the line MN, which makes an angle of 45 deg. with the axes. This relation must be correct, since the Ir drop is the same, no matter what the terminal pressure. It is, therefore, unnecessary to swing the values of counter-emf. through 90 deg. to locate the points P. Draw the line MN through the intersection of the lines corresponding respectively to E_1 and E_2 at zero current (i.e., without any Ir drop). The projection of the Ir drop line on MN will then give the point of intersection P without going through the preliminary construction.

In case the performance must be found when an external resistance is inserted, the slopes of the two Ir lines will not be the same and the line MN will be at a different angle. Since the drops are proportional in the two cases this will merely mean the determination of the proper slope of the straight line MN after which the procedure is as before.

The principal advantage of these methods of calculating speeds under abnormal conditions is that they are so simple that there is little chance of making an error in the computation; and, since the construction can be repeated for any desired conditions, the application is not limited to a comparatively few cases for which charts have been figured out. It is believed that they will be of considerable aid in the solution of such problems.

The two methods of calculating speeds graphically were worked out independently, the one shown in Fig. 3 by the author, and that in Fig. 2 by S. Sekine, a graduate student at the university, working under the writer's direction.

Turntable for Painting Car Sash

BY R. E. HEWITT, MASTER MECHANIC SOUTHERN PACIFIC COMPANY ELECTRIC LINES, WEST ALAMEDA, CAL.

The scheme illustrated in the accompanying halftone was devised by an old practical painter in the employ of the Southern Pacific Company. In order to facilitate the painting of sash two turntables are located on the main table, making it possible to work two men at sash painting when necessary.

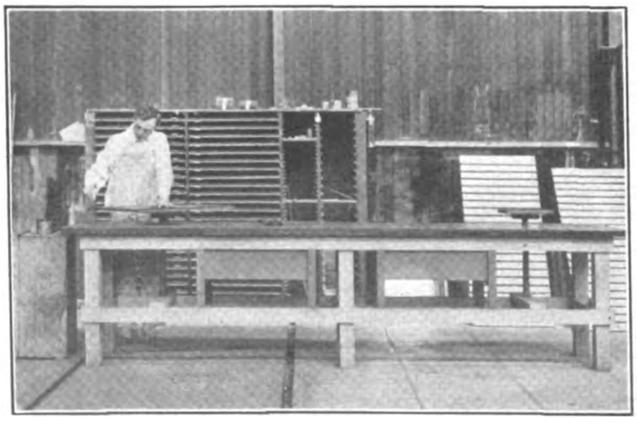


TABLE WITH TWO TURNTABLES FOR PAINTING SASH

The sash is laid on the top of the turntable and turned around until all four sides are painted, then it is turned over and the other side is painted. Directly behind the painter is a cabinet for storing the sash until dry. It will also be noted in the illustration that there are beveled strips nailed fast to the partitions of the cabinet parallel to one another. This method of support makes it possible to slide the painted sash in with the extreme edges of the latter only touching the strips.

The tops of the turntables are 12 in. square and faced with ¼-in. felt, glued on. The openings in the top of the main table through which the shafts of the turntables pass are bushed with pipe of suitable diameter. Should the main table be required for any other work the turntables can be removed by simply lifting them out.

Timekeeping and Cost Records for Way Department

BY S. GAUSMANN, BROOKLYN, N. Y.

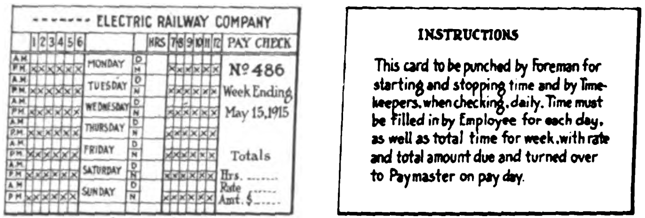
Too much care cannot be exercised in the selection of timekeepers for the maintenance of way department, and the payment of a sufficient wage to them to guarantee their honesty. With the class of men generally employed in gangs, if the timekeeper is paid insufficiently for his services he will endeavor to make a little extra when the opportunity so easily presents itself. This opportunity is afforded in many ways and no matter what the system loopholes will occur.

The only remedy is in checking the men from independent sources and by involving as many in the checking of their time as possible, all such checks being entirely separated from each other. The more checkers involved the less the chance of making a questionable transaction.

While the introduction of time clocks has done much to correct abuses of this kind where men are continually employed, or start and end the day's work at the same time, the use of clocks in track gangs is impracticable on account of the quantity required, their liability to injury outdoors, the frequent shifting of gangs, and the expense of maintaining clocks owing to impossibility of obtaining suitable locations and the rough handling they would receive.

The practice of having a foreman check the time of his gang, except in the case of small section gangs, should not be considered, as it takes too much of his time, diverts his mind from his regular work and is unsuitable for the average foreman, who, although he may be a first-class man in his chosen vocation, is not adapted for clerical work.

More territory is usually assigned to a timekeeper than he can properly cover. While he should check his men at least twice a day he is often unable to do so more than once under these conditions. This might do for regular work and with gangs in which no changes occur, but it will not do for the usual large construction or reconstruction gangs, where a different class of men are employed and are changing daily. A timekeeper should not be expected to keep the time of more than 200 men unless the gangs are close together, where too much time is not employed in traveling from one to the other. One general timekeeper should be employed who has jurisdiction over all the others and who should check the gangs, but intermittently, varying his routes daily so that the other timekeepers and men will never know just when he may appear. Timekeepers should not be expected to do too much clerical work. Keeping a timekeeper on one route continuously breeds too much familiarity. These routes should be varied, the oftener the better, so that every man employed would



------- ELECTRIC RAILWAY COMPANY

PAY CHECK

Nº 486

Week Ending May 15, 1915

MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
SUNDAY

Totals

Hrs. ....

Rate ....

Amt. $........

(FRONT)

INSTRUCTIONS

This card to be punched by Foreman for starting and stopping time and by Timekeepers, when checking, daily. Time must be filled in by Employee for each day, as well as total time for week, with rate and total amount due and turned over to Paymaster on pay day.

(BACK)

SAMPLE PAY CHECK FOR WAY DEPARTMENT EMPLOYEES

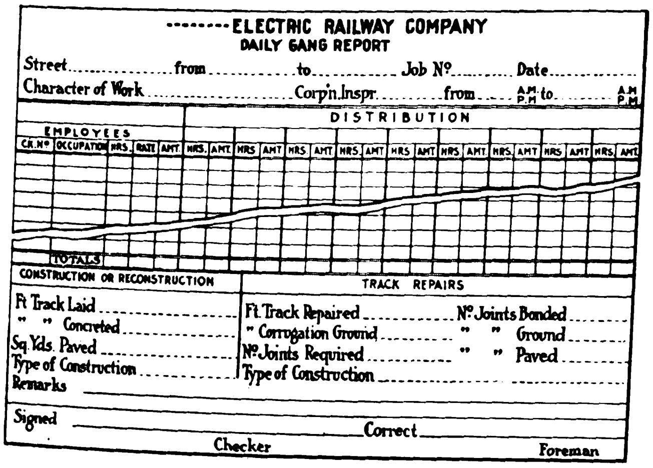
be checked by every timekeeper at some time throughout the week.

While the brass check system, much in vogue, is simple, it is very unsatisfactory. Without some further check, it is not at all certain that the timekeeper visits the work as expected. A card check system, where too much information is desired on the time card, to cover distribution of labor, etc., requires that a clerk be made of the timekeeper, and takes much of his time on work not entirely in keeping with his intended duties. If he is kept at timekeeping as long as he should be he will be employed at this other work long after hours, he will consequently be dissatisfied and, regardless of accuracy, will get through with it as soon as possible.

The use of daily individual time cards serves no purpose whatever, but necessitates the employment of an unnecessary clerical force to prepare the cards and distribute thereon the account numbers to which the various classes of work are charged, to say nothing of the number of cards required when there are 500 to 1500 or more employees.

Timekeeping and the distribution of labor and cost records should be kept separately and in such a manner as to be a mutual check on each class of work. In the larger gangs a checker should be employed continuously in each gang, working with the foreman and independent of the timekeepers, and rendering each day a report, to be described later, which should be checked against time turned in by timekeepers. These reports should be taken care of by foremen in the smaller gangs, assisted by a checker who should cover several of these gangs instead of being kept with one, as in the case of the larger construction or reconstruction gangs. Any clerical work in connection therewith should be done by a clerk in the office, thereby leaving the timekeeper to take care of timekeeping only.

The pay card furnished the men should be of a different color for each week of the month to facilitate the work of paymasters and so arranged that it will show the time of the daily checks of the timekeeper by punch marks with a verifying punch mark of the foreman for the starting and stopping time. All these punches should be of a different character so that the user could be easily identified. The card should have a space for the total hours each day and should be turned in to the paymaster, with extensions filled out by the employee, when pay is drawn.



--------ELECTRIC RAILWAY COMPANY

DAILY GANG REPORT

Street..................from..................to..................Job Nº..........Date..................

Character of Work..............................Corp'n Inspr...............from.......A.M./P.M. to.........A.M./P.M.

EMPLOYEES					DISTRIBUTION																	
CK. Nº	OCCUPATION	HRS.	RATE	AMT.	HRS.	AMT.	HRS	AMT	HRS.	AMT.	HRS.	AMT.	HRS	AMT	HRS.	AMT.	HRS.	AMT	HRS	AMT	HRS.	AMT
	TOTALS																					

CONSTRUCTION OR RECONSTRUCTION

Ft. Track Laid..............................

" " Concreted..............................

Sq. Yds. Paved..............................

Type of Construction..............................

TRACK REPAIRS

Ft. Track Repaired..................Nº Joints Bonded..................

" Corrugation Ground.................. " " Ground..................

Nº Joints Required.................. " " Paved..................

Type of Construction..............................

Remarks

Signed ______________________ Correct ______________________

Checker Foreman

SAMPLE WAY DEPARTMENT CHECKER'S REPORT

A card suitable for this purpose is illustrated herewith, on which the sequence of the days of the week can be changed to conform to the payroll week of any company. The "D" and "N" shown are to be punched out to indicate the period the man worked, whether day or night. The instructions on the back should be printed in both English and Italian, or such other language as is most generally spoken by the men employed.

The timekeeper should distribute these pay cards on the first day of the week to all men working, thereafter using them for identification only, and entering time daily in his own time book. On the last day of the week he should verify the total time as punched on the cards and turn in his book with the total time entered for the purpose of making up the payroll.

While this system would permit the men to know the amount of time turned in each day by the timekeeper, which is objected to by some companies, it would prevent many errors in keeping the time and would more easily verify any claim for shortage, as well as prevent any overpayment. Otherwise whenever the ordinary laborer is supposed to state the amount of time worked by him without any verification by the timekeeper he will invariably ask for more time than he is entitled to, and a considerable amount is lost to the company in this manner.

The question as to who should have jurisdiction over timekeepers and timekeeping is one worthy of discussion, as there is no doubt a diversity of opinion on this subject, but the most reasonable solution is that the auditing department should assume all responsibility for the proper taking of the time, the making up of the payrolls, the checking on the work and obtaining of unit data, as well as the distribution of the labor taken care of by representatives under the head of the way department. This method clearly defines the work of each and furnishes the independent check required without providing useless data for one department which is of value to the other.

While this method may have some disadvantages these are reduced to a minimum if each department will keep in touch with the other so that the correct locations of all gangs will be known, otherwise much confusion and inaccuracy in payrolls will soon result.

While many may believe that the head or sub-head of the way department should assume responsibility for timekeeping he should not be expected to do so unless he takes charge of it in its entirety. Much better results can be obtained by adopting the plan as suggested making the general timekeeper, with headquarters in the way department office, the representative of the auditing department.

Although unit labor costs for the various operations of track work are directly connected with the distribution of labor, still more information is required to make these units of any value, and where but one item will suffice in the distribution to cover an account number this will at times include as many as fifteen or more units for this one account. To expect a timekeeper to keep this, as well as the time, accurately is unreasonable. It is therefore advisable to have checkers, as previously mentioned. Since checkers are only required during the busy season good results are obtained by the use of young men from schools and colleges, who are of a class to take an interest in obtaining the results desired. These checkers render daily reports, which show the number of men employed on the work, the rate of pay of each, the hours put in at any particular class of work, with the total hours per day. While printed forms may be supplied for this purpose they cannot show all of the information desired without containing it on a large and bulky form, but the most frequent jobs can be shown, leaving blank columns for the others to be filled in as required.

Much better results, however, can be obtained by leaving the headings of all columns blank, to be filled in by the checker, the items either being designated by a full description or a number for each item desired, these numbers to be obtained from a key to be furnished each checker. A key of this character in any event is necessary, as hardly any two checkers would use the same description for a piece of work. They would often so word a description that it might apply to more than one class.

In obtaining unit costs there are practically six general divisions of labor to be considered; preparing, handling material, laying, concreting, paving and miscellaneous, which may be designated as 1, 2, 3, 4, 5 and 6 respectively. These may be subdivided under various units as follows:

1.—Preparing.
1-A. Removing and loading old pavement.
1-B. Excavating and loading dirt or concrete.
1-C. Removing and loading track material.
1-D. Grading.

2.—Handling Material.
2-A. Loading and unloading new track material.
2-B. Loading and unloading new paving material.
2-C. Loading and unloading concrete material.
2-D. Transportation of material to work.
2-E. Transportation of material from work.

3.—Laying.
3-A. Laying and spacing ties.
3-B. Laying and spiking rail.
3-C. Installing joints.
3-D. Installing tie rods.
3-E. Installing or repairs to special work.
3-F. Installing bonding.
3-G. Surfacing and lining track or special work.
3-H. Grinding or rasping joints.

4.—Concreting.
4-A. Handling material to machine.
4-B. Mixing.
4-C. Placing in track.
4-D. Ramming.

5.—Paving.
5-A. Handling material to pavers.
5-B. Laying pavement.
5-C. Mixing and placing rail filler.
5-D. Mixing and placing grout.
5-E. Tar and graveling.

6.—Miscellaneous.
6-A. Corporation inspection.
6-B. Miscellaneous inspection.
6-C. Watchmen and flagmen.
6-D. Tool repairs.
6-E. Temporary crossings for vehicle and foot traffic.
6-F. Installing temporary cross-overs for diversion of car traffic.
6-G. Switchmen and maintenance of cross-overs.

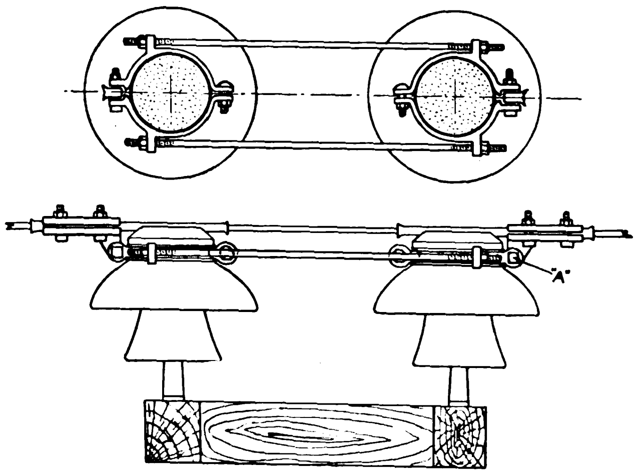
While the above cover the units most required many of these may be combined without particular detriment to the results desired.

For obtaining these results a form similar to the one illustrated herewith is desirable.

While the keeping of the time and unit costs by this method naturally entails some expense and more than would be the case where there is no check on the timekeeper and he makes up the distribution the results obtained more than warrant any additional cost.

Overhead Straight Line and Angle Protective Crossing Clamps

The accompanying illustrations show types of straight line and angle protective crossing clamps manufactured by Edwin G. Hatch, engineer, New York, N. Y., which are designed to meet the precautions necessary to prevent telephone, telegraph or other lines falling on railroad right-of-way that they cross. The clamps are especially constructed so as not to strain or injure the line or insulator, and two insulators are located each side of the crossing, the extra insulator being used to provide a factor of safety. As a further precaution the crossing insulators should preferably be designed for considerably higher operating voltages than the ordinary line insulators.

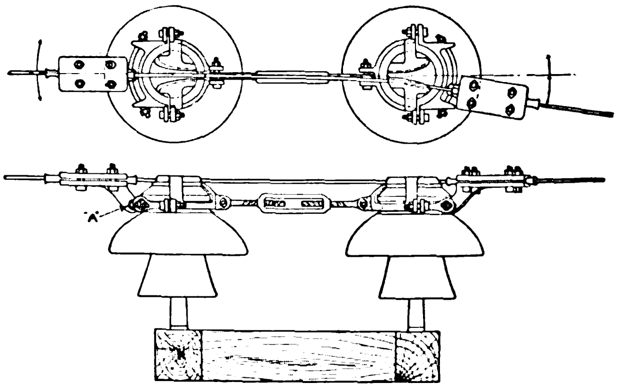


OVERHEAD STRAIGHT-LINE CROSSING CLAMP

In the case of the clamps illustrated herewith, the line-gripping parts are not rigidly connected to and do not form part of the insulator-gripping part, but are capable of independent action and adjustment and are free to float with the line and assume any vertical angle the line may take. This prevents likelihood of kinks forming, of the "working" or "crystallizing" of certain sections and of breaks. The line-gripping parts are pivoted at *A*, so that they will always take the line angle readily and without straining the line. There is also provided at *A* a slot to allow for any small variation in the size of the insulator head, and to make certain that the weight of the line will come directly on the top of the insulator head as it should.

Where clamps consisting of two rigid members bolted together and fastened directly to the line and insulator have been used it sometimes happens that the line is carried entirely above the insulator top, or else the line may be carried by the insulator top but may be badly pulled down into the gripping members and kinked. Either occurrence is likely to prove injurious to line or insulator, or possibly to both. Furthermore, in the type of clamp described, which is meant to fit both the line diameter and the diameter of the insulator neck, it has been found that either one or other thread will be tight while the other will be naturally loose. If the line is not firmly gripped the value of the clamp is lost. At best, owing to the fact that neither the hard metal insulator-gripping clamp nor the insulator presents a uniform section, the clamping stress is likely to be exerted at a few points only. This tends to injure the porcelain. To prevent this it is well to insert a thin strip of lead or rubber between the two, assuring a good tight fit and a much more even distribution of stress over a greater surface.

In all clamps there should be an easy means of tightening up or adjusting the distance between the two



ANGLE PROTECTIVE CROSSING CLAMP

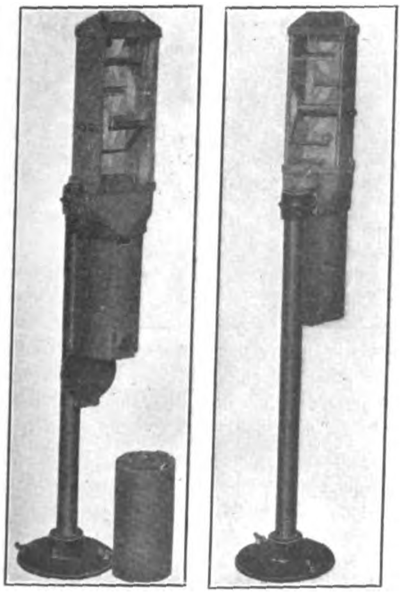
insulators. In most cases the turnbuckles shown in the illustrations afford a quick and effective means of doing this.

Split bushings are provided to prevent any possible abrasion of the line by the gripping members. The clamping bolts straddle the line, which assures good clamping action. The line-gripping parts, extending well out beyond the insulators, act as arcing shields and protect the conductor in case of flash-over. Provision is made against these members falling down against the insulator when the line breaks.

In the case of the clamp for use where the line crosses at an angle, shown herewith, wherever this angle is considerable it is good practice to divide the angle so that one-half will be handled at each end of the clamp. The clamp shown will take a total angle of very nearly 90 deg. without any special construction.

Safe Deposit Fare Box

The latest fare box manufactured by the Ohmer Fare Register Company, Dayton, Ohio, contains certain marked improvements over the earlier type of Ohmer fare box, while all the good points of the latter have been retained. In developing the new type, the ideas and suggestions of electric railway men who have devoted much attention to the subject have been carefully considered, this being shown by the position and shape of the hopper which add materially to the efficiency of the machines. The locking devices for preventing the removal of the insert until all the fares have been dumped into it has been improved, and all interlocking parts have been strengthened so that the box is strictly foolproof. The upper part is square, while the insert is cylindrical in shape. The box is 26 in. high and 5 in. square at the top. It will be found to meet every possible requirement where a non-registering box is desired.

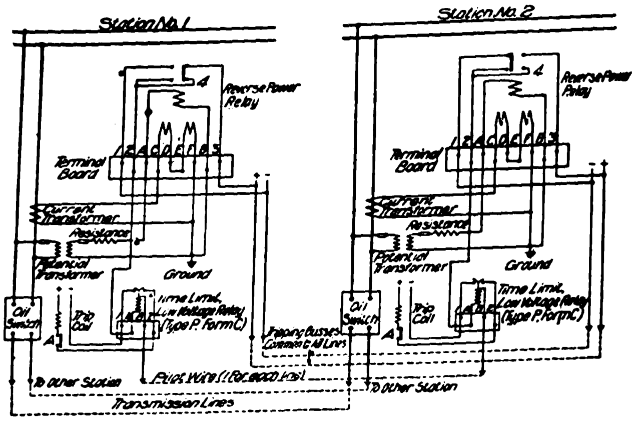


NEW FARE BOX

Relay for Protecting Single A. C. Tie Lines

Single-pole, double-throw relays of the type illustrated have recently been developed by the General Electric Company to provide a simple and effective means of isolating trouble automatically on a single tie line joining parts of an a.c. system. Two relays connected together by pilot wires are required on each end of a three-phase tie.

Under normal conditions, irrespective of the direction of the power, which may reverse at any time over the entire tie line, depending on the distribution of the load and the characteristics of the system, the relays have no effect on the oil switches. When the energy reverses over the entire line the relay contacts of the relays on both ends of the line swing over but do not trip the oil switches, because in each oil-switch tripping circuit there is included a low voltage time delay relay connected as shown in the wiring diagram given directly above. The time delay feature is introduced to insure sufficient delay to allow the reverse power relay contacts to swing over on the occurrence of a normal reversal of energy in the tie line.

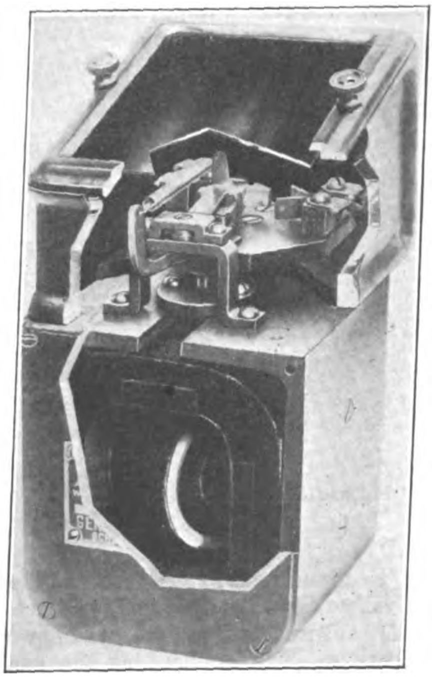


SINGLE-PHASE CIRCUIT DIAGRAM SHOWING PRINCIPLE OF APPLICATION OF REVERSE POWER RELAY

If, however, a short-circuit occurs in the tie line while power is being fed from one part of the system to the other, this power will go directly into the "short," while the power in the tie between the "short" and the part of the system previously receiving power will reverse and also feed into the "short." This will operate the contacts of the relay in the reversed portion of the line, which will result in opening the circuit of the time-limit low-voltage relays, the falling of whose plungers will close the oil-switch tripping circuits and cause the oil switches on both ends of the line to trip and isolate the line from the rest of the system. After the reverse power relay has operated by reason of a fault, the contacts will remain in the position which caused the switch to open, and before the oil switches are again closed this set of contacts should be reset by the knurled button on the front of the relay.

The accompanying half-tone shows the general construction of the relay. The contact arm is operated by a crank on the rotating shaft through a tension spring, which normally maintains contact, and also snaps the wedge to the other side when the crank moves past the center. The thumb nut on the center of the relay provides a means for throwing manually the contacts to either side.

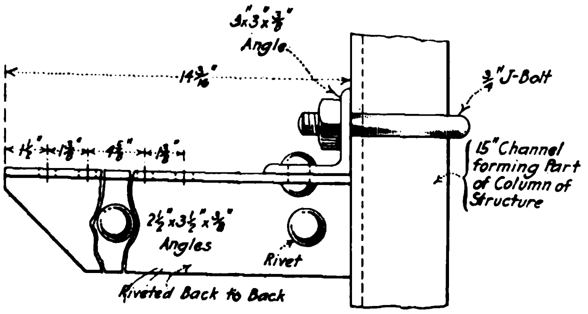
The rotating shaft is pivoted on an adjustable ball bearing, which greatly reduces friction. The fixed current coil consists of two coils which are usually connected in series, while the movable potential coil is fastened to the rotating shaft and operates the contacts on the re-



REVERSE POWER RELAY, SHOWING PRESSURE AND CURRENT COILS AND CONTACT MECHANISM reversal of power. The relays will not operate on overload or on trouble on other lines unless accompanied by a reversal of power only on one end of the line which they are meant to protect. They will, however, operate on very little reverse power, even at low voltage and low power factor.

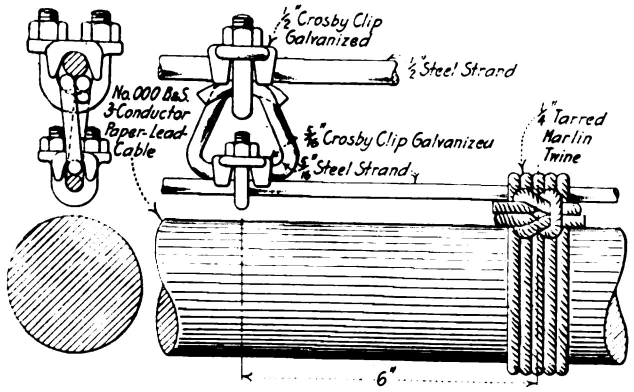
Flexible Support for Lead-Covered Cable

Recently the Transit Development Company, Brooklyn, N. Y., installed on the elevated structure on Pitkin Avenue, Euclid Avenue and Liberty Avenue, from Shepherd Avenue to Ocean Avenue, No. 000, three-conductor, 11,000-volt, paper-insulated, lead-incased cable, weighing approximately 8¾ lb. per foot. The cable was hung from angle-iron brackets attached to the elevated structure at the transverse girders, approximately 50 ft. apart, by means of a catenary messenger cable. The messenger cable was a ½-in. Siemens-Martin steel strand, composed of nineteen No. 8 wires and having a breaking strength of 11,000 lb. It was attached to the brackets by means of Crosby clips. Details of a sample bracket are shown in an accompanying diagram.



FLEXIBLE CABLE SUPPORTS—SAMPLE BRACKET AND METHOD OF ATTACHING IT TO ELEVATED STRUCTURE

Hung from the messenger wire at 10-ft. intervals by means of hangers like those shown in the second illustration was a 5/16-in. steel strand composed of seven No. 10 wires, to which the lead-covered cable was lashed at 12-in. intervals by means of five strands of ¼-in. tarred marlin twine.


1/2" Crosby Clip Galvanized
1/2" Steel Strand
No. 000 B&S. 3-Conductor Paper-Lead Cable
5/16" Crosby Clip Galvanized
5/16" Steel Strand
1/4" Tarred Marlin Twine
6"

FLEXIBLE CABLE SUPPORTS—CATENARY HANGER AND TWINE LASHING

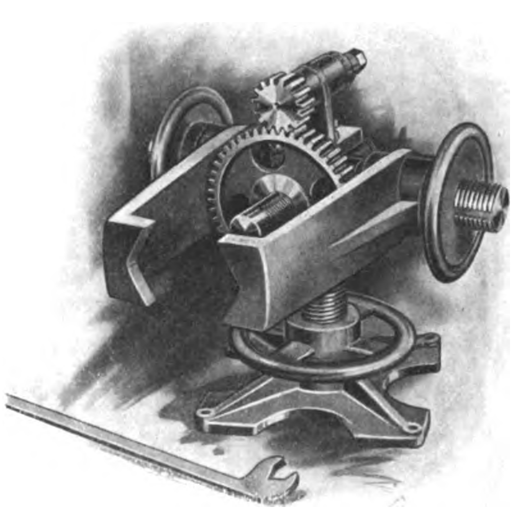
Each hanger except the middle one consists of two Crosby clips of appropriate sizes connected by a loop of 5/16-in. steel strand, as shown in the second illustration. The support at the center span is a single clip, hangers like those shown in the illustration being used 10 ft. on each side of the center and still longer ones 20 ft. on each side of the center.

This method of support affords a very flexible suspension and minimizes the liability of damage to the lead sheath of the cable on account of the vibration to which the structure is subjected during train operation.

New Pinion Pulling Machine

The Electric Service Supplies Company, as exclusive selling agent, has placed on the market a new pinion-pulling machine of the Peerless type, which is designed to overcome all objectionable features found in many of the designs now in use. As shown in the accompanying illustration, the jaws are adjusted to suit the size of the pinion by means of hand wheels having square threads and are therefore locked in position. The pull is always in a straight line.

A very desirable feature of the machine is found in the operating head which can be raised or lowered to bring the center of the plunger level with the center of the armature shaft instead of blocking up the armature, a frequent necessity in machines without this feature. Other features are found in the plunger which does not revolve and thus prevents any injury to the armature shaft or its center. The plunger nut is back geared 3½ to 1 so that only a short wrench is necessary for easy and rapid operation. Every part of the machine is steel except the plunger nut, which is phosphor bronze, and the base, which is cast iron.



NEW PINION PULLER

Canadian Railway Employees Purchase Machine Gun

The *News-Telegram* of Calgary, Alta., has received a check for the sum of $800 from the employees of the Calgary Municipal Railway, with which to purchase a machine gun for the Fifty-sixth Battalion. This contribution was raised from the employees of the Calgary Street Railway under the auspices of the Calgary Municipal Railway Social Insurance & Sick Benefit Association. In these days the street railway men are working, in many cases, on short time and upon a reduced schedule. Many of the former colleagues of the street railway men are wearing the king's uniform, especially in the Fifty-sixth Battalion, and when the subject of a machine gun was mentioned the campaign for funds was carried on by a committee of the men.

News of Electric Railways

SAFETY PRECAUTIONS IN NEW YORK SUBWAY

Extended Report on This Subject Made to the Mayor by the City Fire Department

An extended report on means to prevent fire in the subway and to suggest other fire precautions has recently been made by the Fire Department of the city of New York at the request of the Mayor following the fire which occurred in the subway near Fiftieth Street on Jan. 6, 1915. The report is signed by John Kenlon, Putnam A. Bates and Joseph O. Hammitt.

Among the recommendations made under the heading of "Fire Prevention" are the following: the substitution of steel cars for combustible cars; the isolation of all buildings in the subway by fire walls, with standard fire doors at all openings and all show windows in the subway stations cut off by fire walls in the stores back of them and equipped with automatic sprinklers; electric wiring installed in a fireproof manner throughout and oil-filled transformers of the signal system kept free from oil on the exterior; the replacement of wooden switch cabinets by metal cabinets; the use of a slow burning wood in the third-rail guard when renewed; the use of metal for all news stands with self-closing doors in the lower portions and automatic covers held by fusible links over the upper or display portions; the covering with metal of all wooden doors to toilets, porter and transformer rooms; the use of metal for lockers; the use of waste cans in workshop and locker rooms with good housekeeping conditions; careful safeguarding of all highly inflammable liquids and solids kept in the subway, and the filling of buried kerosene tanks from the streets.

Under the subject of "Segregation of Electric Wiring Systems" the report recommends the following: a source of current supply for lighting, power, ventilating, signaling, fire-alarm and telephone systems independent of the source of power current; the complete isolation of the electric wiring of each system from that of all others; the installation of a system of emergency of pilot lights preferably fed from storage batteries; the duplication of the source of current supply of the general lighting system, so that in case of the failure of one source of supply, an emergency source will automatically be utilized; the installation of a fire alarm system connecting with fire headquarters; the installation of a telephone system separate from that now installed in the ticket office at each station with a series of telephone stations located every 500 ft.; a suitable form of signal lights to show the location of each fire alarm station, telephone station and exit, the circuit being independent of the general subway lighting system and capable of connection to the emergency source; adoption of vapor-proof type of rigid fixture for ali electric lights throughout the subway except at stations; reconstruction of splicing chambers to secure complete segregation of electric wiring systems and prevent the escape of smoke or gases in the subway; a careful system of battery inspection and of the emergency lighting in each individual car, and the equipment of each car with portable electric lamps.

Under the heading of "Adequate Means of Escape" the report recommends the following: the division of the subway into two or preferably four separate tubes by longitudinal walls wherever the space between the tracks admits of such construction without seriously increasing the danger to gangs of trackmen and others whose duties require them to work in the subway, with openings through the walls for exits every 500 ft. and an exit to the street at each station from each tube thus formed; additional openings to the street at several locations with fans to increase rapidity, of ventilation in case of emergency; two 5-ft. iron stairways to be placed at each ventilating chamber, and where gratings are used over ventilating chambers they should be so designed as to be easily opened either from the chamber or from the street.

Under "Training of Employees" the committee recommends the following: train crew should test emergency lighting of trains before each trip; they should become familiar with the use of the portable electric lights, ladders, extinguishers, fire alarm, and telephone systems, and location of exits; the Fire Department should be called immediately in case of fire.

REPORT OF PUBLIC UTILITY COMMISSIONERS OF NEW JERSEY

The Board of Public Utility Commissioners of New Jersey has issued its fifth annual report, for the calendar year 1914. A summary of the board's activities for this period was published in the ELECTRIC RAILWAY JOURNAL of Jan. 16, 1915, page 148. The volume contains a record of the commission's decisions with respect to applications for approval of securities, ordinances, leases, mergers and sales. Full details are also published of the inspections made of utility properties during the year. No decision upon the hearing of complaints are included, for these will be included in a separate volume. The record of accidents on electric railways for the year showed a total of twenty-two killed and 272 injured, as compared to 333 killed and 544 injured on steam railroads during the same period.

AMALGAMATED IN CONVENTION IN ROCHESTER

The fourteenth biennial convention of the Amalgamated Association of Street Electric Railway Employees of America was opened at Rochester on Sept. 13. The first day was given over largely to the work of organizing and to the presentation of the address of President W. D. Mahon. Much had been said in regard to the attitude of certain factions with respect to arbitration. Mr. Mahon said:

"In some cases of arbitration we have been sadly disappointed and our membership affected by the awards very much dissatisfied. And, because of these disappointments and dissatisfaction, there are those who advocate the repeal of our laws on this subject and the abandonment of arbitration entirely. Upon this proposal I would request you to consider well every phase of the proposition before you take any such action."

On the evening of Sept. 14 the delegates attended a dinner at the Powers Hotel. On Sept. 15 the jitney bus and the question of relations with the Brotherhood of Locomotive Engineers were considered. A report was also presented on wages in Europe. The only session on Sept. 16 was in the morning. The question of strike arbitration was referred at that session to the committee on law. A resolution was adopted by the convention providing that the Amalgamated use its influence with legislatures against measures aiming to establish a State constabulary.

FIRST REPORT OF PENNSYLVANIA COMMISSION

The Public Service Commission of Pennsylvania has issued its first annual report, for the year from July 27, 1913, to June 30, 1914, together with the report of the preceding State Railroad Commission from Jan. 1, 1913, to July 26, 1913. Of the fifty-one pending cases turned over to the Public Service Commission, forty-five were finally closed by the latter commission after its organization. Since June 30, 1914, 251 complaints have been filed with the new commission, of which 129 have been finally decided. Nearly all of the remaining ones await the filing of pleadings or the convenience of parties and counsel in arranging times for the hearings. On account of the newness of the commission, the report does not contain any financial statistics of electric railways, but it does include all complaints and orders received and issued during the year.

On the street railways 3161 persons were injured, of which number 170 were killed, the fatalities including fifteen employees, nineteen passengers, twenty trespassers and 116 others. These figures compare with 10,190 persons injured on the steam railroads, of whom 991 were killed. Included in the total number of accidents are twenty-nine persons killed and 222 injured at grade crossings of steam railroads and two killed and seventy injured at grade crossings of street railways. The commission abolished entirely sixty-one grade crossings and in six cases established undergrade crossings and in eight overhead crossings.

SUPERVISOR VOGELSANG AND PRESIDENT LILIENTHAL ON MUNICIPAL OWNERSHIP

The Question of the Purchase of the United Railroads Discussed by the Supervisor—Mr. Lilienthal's Attitude

Supervisor Alexander Vogelsang, chairman of the public utilities committee of the City Council of San Francisco, Cal., was quoted in part as follows in the San Francisco *Examiner* of Sept. 1:

"I believe that the city should take over not only the United Railroads but the California Street line. Let us have it all and have a thorough experiment in municipal ownership. We could do it if the people were willing. We have no definite plan now, but will get together after the election.

"The plan, of course, will take a lot of sound business judgment. We are bound to have trouble. I have had ideas on this subject for a long time. We should have one system in the city. It will save us much trouble in the long run, as the franchises run out in fourteen years, and we will have to prepare to do something then.

"I have no idea of issuing bonds for this project. It will take a charter amendment to permit the city to enter into an agreement with the United Railroads whereby the city might take over immediate operation. It would be my proposal, in a general way, to pay for the system out of the earnings of the lines.

"We might have a commission appointed to determine the value of the physical properties that the city would need and try to determine the value of the unexpired franchises. The aggregate would be the purchase price. If we could get control we could pay off this principal and interest out of the money taken in. We could not permit the road to become a burden to taxpayers."

Jesse Lilienthal, president of the United Railroads of San Francisco, was quoted on the same day in the same paper as follows:

"I have said before that a street railroad is a natural monopoly. I know the city would not feel inclined to sell out to the United Railroads. The alternative is for the United Railroads to sell to the city. As a private citizen I have favored the purchase, just as I favored the Spring Valley purchase. I believe a price could be fixed by some agreement acceptable to both parties if the question were properly approached. There is bound to be trouble as long as the present arrangement is in existence. It would be bad taste for me to offer the United Railroads for sale to the city. But, when the people of San Francisco actually want to go ahead and purchase the United Railroads they will find my door wide open."

NEW YORK LEGISLATIVE INQUIRY

The Thompson legislative investigating committee, which adjourned over the summer, resumed its work of inquiry into the Public Service Commissions of New York on Sept. 8. On that day the members formulated their plan of procedure and began the examination of witnesses on Sept. 9. Referring to the plans of the committee, Senator Thompson, the chairman, said: "We have come here to continue the investigation for which we were appointed, to make an examination of the public service law and transportation acts in order to report to the Legislature. The public service idea of supervision and regulation seems to be an established function of the State. The only way our act has been amended has been by adding new subjects for regulation. Whether public service regulation has been a success is very important to the State. We are anxious to make clear to the public just what our real function is—that it is to give as perfect regulation of public service corporations as is possible."

On Sept. 9 Chairman McCall of the Commission for the First District was questioned about the details of the construction and operating contracts under the dual system. Referring to the extent of the new system Mr. McCall expressed doubt about a 5-cent fare proving adequate. While the present Interborough lines were highly profitable, with the new system in operation the maximum haul would be three times as long as in the present subway. He thought that within five years after the completion of the present extensive system, the city would again begin to feel the inadequacy of the transportation means in some sections.

DISTRICT OF COLUMBIA POWER ORDER

As a result of the hearings conducted by it on Aug. 25 and 26 into the inter-corporate relations of the Washington Railway & Electric Company and the Potomac Electric Company, the Public Utilities Commission of the District of Columbia is of the opinion that, pending the complete returns from the valuation of the properties now under way, the Washington Railway & Electric Company should among other things be ordered to discontinue the sale of power and the appropriation of revenues therefrom; that the company be ordered until further notice to pay the Potomac Electric Company a reasonable compensation for the power used by it in the operation of its railways based on the contract between the companies dated 1906; that the Potomac Electric Company be ordered to file with the commission rates for the sale of power to all other utilities than the Washington Railway & Electric Company; that the Potomac Electric Power Company be ordered to charge to railways other than the Washington Railway & Electric Company the scheduled rates for power furnished to them, collect the revenue therefrom, and include it in their revenues under the prescribed accounts; that the Potomac Electric Power Company be ordered to reduce its rates to consumers other than public utilities by an amount that will offset the increased amount received from the public utilities under the present proposed order.

It was the opinion of the commission that both companies should have an opportunity at a further public hearing to show cause why orders in conformity with the opinion in the case should not be made by the commission. It was voted by the commission to serve a copy of the opinion on the companies on Sept. 4 and to set a date by Sept. 15 for a further hearing.

WORK BEGUN ON NEW PHILADELPHIA SYSTEM

On Sept. 11 Mayor Blankenburg of Philadelphia turned the first shovelful of earth in the excavation for the Broad Street subway. In the course of his speech the Mayor said:

"We are making history here to-day. The turning of the first shovelful of earth, and thus taking the initial step in the development of our new subway system, appeals to me as one of the most important acts of my official life, for this great engineering work which we to-day inaugurate begins a new era in the life of Philadelphia."

A Merritt Taylor, Director of City Transit, said in part:

"We are gathered here formally to begin the construction of a complete system of rapid transit lines for Philadelphia. The city is committed to the construction of this Broad Street subway and the Frankford elevated by contracts which have been executed. Public necessity will require proper terminal facilities for the gathering and distribution of Broad Street subway traffic, which can only be provided by the construction of a delivery loop.

"The city is committed by force of public necessity and by the requirements of fairness to the people of two important sections to build: A subway leading from the City Hall station of the Broad Street subway northwesterly beneath the Parkway connecting with the North Twenty-ninth Street elevated to be extended to Roxborough. An elevated railway from Thirty-second and Market Streets in West Philadelphia southwestwardly through the Woodland Avenue district.

"You will vote upon the proposed constitutional amendment relating to the city's borrowing capacity at the forthcoming election on Nov. 2. The question of how and by whom these lines will be equipped and operated must soon be determined. It is our plain duty first to offer the right to equip and operate these lines to the Philadelphia Rapid Transit Company upon terms which will protect the existing net income of that company against loss resultant from its co-operation with the city. One great machine will thus be established which will transport passengers quickly and conveniently between all points on the combined system in Philadelphia by the joint use of the surface system and the high-speed system for one 5-cent fare."

PROSPECTS OF NEW DES MOINES GRANT

Final settlement of the Des Moines street car franchise question now seems likely. The question of capitalization, a rock which wrecked the ship of negotiations several times before, is to be left out of the new franchise. The city has agreed to approve a franchise and submit it to the people without fixing the total amount of capitalization if the company will put in the franchise a clause guaranteeing service equal to the best in the country for a city of the size of Des Moines, regardless of whether or not the company can pay dividends.

Emil G. Schmidt, president of the Des Moines City Railway, made a verbal proposition of this nature while in conference with the City Council, and Mayor Hanna, who has fought the franchise, immediately declared it would be satisfactory if such a clause could be inserted. Mr. Schmidt said the franchise already made such provision and, such being the case, the settlement requires only the insertion of a specific clause covering ground already provided for in the present draft. The new grant was recommended to the City Council by a committee of the Des Moines Chamber of Commerce and is in many essentials like the draft which the company proposed to submit to the people last winter but was not voted upon because Mayor Hanna confused the issue with so many technicalities that the legality of the election would have been in question.

It is expected that the Council will be ready to submit the new franchise to the voters within a few weeks. Mr. Schmidt announces that business fell off during the State Fair this year as compared with last. The jitney practically has disappeared from the streets of the city and that institution has passed into history at Des Moines after a checkered local career of about six months.

RHODE ISLAND ARBITRATION HEARINGS

The Rhode Island Company has continued the presentation of evidence in its behalf in the arbitration hearings conducted at Providence. R. Roscoe Anderson, superintendent of transportation, discussed the cost to the company of guaranteeing a seven-hour day for extra men at the minimum rate demanded by the union. The difference in hours between the actual platform time for all extras and trippers and seven hours is 1086.5 hours daily. This at the minimum rate demanded would amount to $325.95 a day, or $118,971.75 a year. It is estimated by the transportation department that from 10 to 15 per cent of this increased outlay could be eliminated with revision of assignment schedules, making $101,126 the net increase in yearly cost on the basis of 15 per cent reduction.

The difference between the amount of work for "report" men and a guaranteed seven-hour daily minimum is 507.5 hours a day. This at the minimum rate demanded would amount to $152.25 a day, or $55,892.51 a year. By rearrangement it is estimated that this increase could be reduced 75 per cent or to $13,892.81, making the total minimum yearly cost to the company in granting the union's demands for a seven-hour daily guarantee for extras, trippers and report men, $115,019.

C. A. Babcock, controller of the company, submitted a statement showing that in 1915 the motormen and conductors were paid in wages 24.7 per cent of the passenger receipts as compared with 20.98 per cent in 1908. Another exhibit showed that the average wage of 107 power house employees for the year ending June 30, 1915, was $16.23 a week, compared with $15.07 for 109 men in 1912. The average weekly pay of fifty-four linemen in 1915 was $17.81, compared with $14.38 in 1912 for forty-nine men. The average pay of motormen and conductors of all classes for the week ending Oct. 9, 1914, was $14.62 for conductors and $13.95 for motormen. The same comparison as of April 9, 1915, showed $15.24 for conductors and $14.83 for motormen. Mr. Babcock stated that the company's operating revenue for 1915 was much lower than for the two previous years, while its operating expenses were practically the same as in 1914. The surplus was $116,000 less in 1915 than in 1914. Since 1908 the company has expended $4,518,200 in the improvement of its physical property. Another statement showed a reduction in traffic on the Pawtucket division by 230,000 revenue passengers from 1913 to 1914, although the transfer passengers had increased by 157,000. On this division, in 1915, there were 7,335,142 revenue passengers and 1,609,701 transfer passengers, so that in the past two years on that division alone the revenue passengers have dropped off by 317,000 and the transfer passengers have increased by 200,000.

In the last fiscal year the company gave its employees 2,199,260 free tickets, a substantial factor in their living cost. An exhibit was also presented showing increased earnings for spare conductors and motormen on thirteen divisions. For the week ended Oct. 9, 1914, 164 spare conductors earned an average of $11.25 and 168 spare motormen earned an average of $11.10. For the week ended April 9, 1915, 151 spare conductors averaged $12.82 and 142 spare motormen $14.18. The passenger income fell off $267,000 this year and freight earnings dropped $9,000. The percentage of freight revenue paid motormen, conductors and trainmen in that department was higher in 1915 than ever before, and the wages paid other employees of the freight and express department are the highest in the company's history.

REPORT OF GEORGIA RAILROAD COMMISSION

The Georgia Railroad Commission during its forty-second year of activity, ended Dec. 31, 1914, made final disposition of 598 petitions, complaints or subjects requiring formal action or order, this record showing a decrease of twenty cases as compared to the preceding year. This decrease is said by the commission to be caused by two factors—namely, the lessened volume of business done by utilities during the last four months of 1914 on account of the general business depression brought about by the European war, and to the much improved and more cordial relations now existing in Georgia between public utilities and the people served.

The net earnings of all public service corporations in Georgia for 1914 exceeded those of 1913 by $1,773,713. The depressing effects of the European war were appreciably felt by all public service corporations, although not to the extent experienced by steam railroads. The financial returns of street railway, power, gas and electric light companies for 1914 showed an improvement, although the extent to which these companies shared in the general improvement is not capable of determination on account of the lumping of the statistics.

The street railways in the State carried 105,585,000 passengers during the year, without one passenger or employee being killed. Nine other persons were killed and 302 injured, however, while 994 passengers were injured and 129 employees injured, a total accident list of 1434, as compared to 1435 in 1913. The total number of persons killed and injured on steam railroads during 1914 was 1281 as compared to 2713 in 1913.

Seattle City Railway Transfer Plan Vetoed.—Mayor Gill of Seattle, Wash., has vetoed the ordinance offering transfers between Division A of the municipal car line and a private auto bus line running beyond the outer end of the line. The Mayor declared that the scheme would only add to the losses of the city car line, and make the city liable for damages incurred on the buses.

Alexandria Line Formally Taken Over by City.—The city of Alexandria, La., which recently purchased the Alexandria Electric Street Railway from the receiver has assumed charge of the system, which will be under the immediate supervision of Commissioner of Streets and Parks Irving McGinnnis. Superitendent I. B. White, who has heretofore had the management of the system, will be retained as manager.

Automobile Chamber of Commerce on Jitneys—At a meeting of the Automobile Chamber of Commerce in New York the traffic committee rendered a report of the shipment of cars during August, indicating that almost double the number of the previous year left the factories in that month. The figures were 15,141 carloads for last month, as compared with 8352 in August of last year. One account of the meeting says: "It was shown that the so-called jitney bus is a convenience that the public appreciates and a number of the street car companies are themselves organizing jitney bus lines as feeders to their regular traction business.

Conditions in Mexico City.—The New Orleans *Picayune* says that Francisco Villavicencio, Constitutionalist consul in that city, has received a cablegram from Mexico City, Mex., as follows: "The employees of the Mexico City Tramway have been granted an increase of 31 per cent in wages and all cars in the city are now being operated. The Constitutionalist government advanced the company the funds necessary to meet the increase in wages for one month. The government will examine the company's books to ascertain if a permanent increase in wages is warranted by the revenues. Credit for the settlement of the strike is due entirely to Gen. Pablo Gonzales."

Municipal Ownership of Ontario Lines Recommended.—Definite steps for the acquisition of the street railway lines in Windsor, Walkerville and Sandwich, Ont., by the municipal interests will shortly be taken if a recommendation of the Ontario Hydroelectric Power Commission meets with the approval of the Councils of the three townships. The commission recommends that no further franchises be granted, and has urged that the construction of additional lines on streets where no franchises exist be commenced as early as practicable, these lines to be used at hydro-radials until the existing system has been taken over.

Massachusetts Companies Ordered to Give Notice of Changes in Signal Practice.—The Massachusetts Public Service Commission has ordered each railroad and street railway within its jurisdiction to give the board formal notice whenever such a company (1) purposes to install interlocking, block or special signals at any point on its lines in Massachusetts, stating the location and type of signal proposed; (2) whenever it is proposed to make any change in the location or type of interlocking, block or special signals, stating the location and change proposed; (3) when it is purposed to make any changes in the rules or regulations governing the use and operation of interlocking, block or special signals.

Supplementary New Haven Bill.—A supplementary bill of particulars has been filed by Assistant United States Attorney General Frank M. Swacker, in compliance with Judge William H. Hunt's order of Aug. 24, in the Federal District Court. The supplementary bill was requested by William Rockefeller and twelve other officers and directors of the New York, New Haven & Hartford Railroad so as to enable them to answer the indictment charging them with engaging in a conspiracy to monopolize interstate trade and commerce in violation of the criminal provisions of the Sherman anti-trust law. It is said that the government expects to bring the case to trial at the October term of the criminal branch of the United States District Court.

Toledo Rail-Light Team Holds Brooklyn Scoreless.—The fast Toledo Rail-Light Club, composed of employees of the Toledo Railway & Light Company, Toledo, Ohio, had the distinction on Sept. 10 of holding the pennant-chasing Brooklyn National League Club to an eleven inning scoreless tie. Jimmy Baxter, who pitched for Toledo, went the entire distance. He allowed only four hits and had eight strike-outs to his credit. Twice when the Brooklyns had men on third base with two out, Baxter whiffed the third man. Toledo was given a chance to see the veteran Coombs in action for Brooklyn. He pitched three innings. Dell and Appleton also were on the mound for Brooklyn. Nearly all the Brooklyn regulars were in the line-up.

Service on Electrified Philadelphia Line.—Regular electric service on the main line of the Pennsylvania Railroad between the Broad Street station, Philadelphia, Pa., and Paoli, was successfully inaugurated on Sept. 11. The first passenger train in the new service left Paoli at 5:55 o'clock in the morning, reaching Broad Street three-quarters of an hour later, on schedule time. Only one electric train will be operated on the line for the present. It will make four round trips every day. Electrification of the Chestnut Hill Line will begin immediately. The training of men for the Paoli service was described and illustrated in the ELECTRIC RAILWAY JOURNAL of May 22, 1915, page 970, while the installation itself was dealt with in an illustrated article which appeared in the issue of this paper for April 18, 1914, page 860.

Cleveland Smoke Abatement Report.—E. P. Roberts, engineer and former smoke inspector of Cleveland, Ohio, reported to a Council committee on smoke prevention recently that it would require betwen $20,000,000 and $30,000,000 to electrify the railroads in and near Cleveland. P. T. White, division superintendent of the Big Four Railroad, told the committee that the smoke nuisance was due more to industrial plants than to the railroads. While Cleveland was a growing city, the railroads could not authorize the expenditure of such a vast sum of money as would be required to electrify them. S. D. Robertson, division superintendent of the Pennsylvania Railroad, said there are three industrial locomotives to one road locomotive in Cleveland. J. J. McNeil, representing the Erie Railroad, stated the attitude of that company.

Light Signals for Chicago, Milwaukee & St. Paul.—The Chicago, Milwaukee & St. Paul Railway has recently awarded a contract to the Union Switch & Signal Company for 130 miles of single-track, a.c., track-circuit signaling in Montana between Lennep and Three Forks, and between Piedmont and Finlen—these being portions of the new 3000-volt electrified territory. The signal transmission line is to be 4400 volts, 60 cycle, and will be supplied with power from three substations in the Lennep-Three Forks section, and from two substations in the Piedmont-Finlen section. Light signals with the lowest lens 16 ft. above rail level will be employed, these being of the Model 14 type with 10-in. lenses, giving indications by colored lights. Of the signals, 109 will have three lenses, and fifteen will have two lenses. The impedance bonds will have a capacity of 500 amp. per rail except at special locations where 1500-amp. bonds are to be used. The track relays will be of the new two-element, Model 15 vane type. Preparations for the installation of this material are now under way.

Trainmen Participate in Cash Distribution.—J. R. Harrigan, general manager of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., announced in July that $100 would be distributed to trainmen from whose cars no accidents were reported during August. During the previous months the business of the company suffered through excessive rainfall and high water; but in August, with fair weather, the gross receipts were $65,525, the largest in the history of the road. Despite this large business there were only four minor accidents. All but eight of the trainmen, therefore, participated in the distribution of the $100, which was divided under a plan based on the number of days each trainman had worked. The amounts received varied from $1.24 to $2.53—not very much, perhaps, but gratefully received, and a definite reward for extra care. A standard of accident-avoidance was set, to which the attention of the trainmen was called in September, with the suggestion that certainly they could do as well again. The distribution of money was confined, however, to August.

Pacific Electric Railway's Attitude Toward Elevated.—Paul Shoup, president of the Pacific Electric Railway, Los Angeles, Cal., asked the Board of Public Utilities for sixty days in which to ascertain whether he can raise the money to build the proposed elevated track from Los Angeles to San Pedro Street. The cost of the proposed elevated is estimated by the company at $250,000. Mr. Shoup said that the company now faces obligations for street improvements amounting to $514,000. Before the end of the year he declared this amount would probably be swelled to $700,000. That the earnings of his company were but $6,875,000 for the fiscal year ended June 30, 1914, as against $7,328,000 for the year ended June 30, 1913, was stated by Mr. Shoup as proof of the concern of the company about making outlays for improvements. The Board of Public Utilities has issued what is in effect an ultimatum to the Pacific Electric Railway to build the elevated track from the rear of its station at Sixth and Main Streets, extending from Los Angeles to San Pedro Streets, to connect with the municipal railway, which the board wants the railway company to use more freely for an outlet for its interurban lines now run over Main and Hill Streets.

$860,000 Station Finish Contract.—The Public Service Commission for the First District of New York has awarded the contract for station finish on the Jerome Avenue and White Plains Avenue rapid transit lines to the Altoria Realty & Construction Company, the lowest bidder, for $860,636. The Jerome Avenue line is a three-track elevated railroad branching off from the Lexington Avenue subway at 138th Street and Park Avenue and running north through River Avenue and Jerome Avenue to Woodlawn Road. It will also be connected with the west side elevated system by a line to be built through 162nd Street and eventually will be operated both by trains from the elevated lines and trains from the Lexington Avenue Subway. The White Plains Road line is a three-track elevated extension of the Lenox Avenue branch of the existing subway and runs from Bronx Park or 180th Street north through White Plains Road to 241st Street, near the northern boundary of the city. The steel structure on both lines is more than half completed and ready for the station finish. Both lines will be operated by the Interborough Rapid Transit Company under the dual system contracts. The contractor is allowed six months to finish each station, but muust begin work within thirty days after notification by the commission's engineer that a station is ready for the finish.

Yonge Street Case Decided.—The Ontario Railway & Municipal Board has handed down a decision in favor of the Toronto Railway in the Yonge Street extension case. The board issued an opinion to the effect that the company had the right to extend its Yonge Street tracks north from the present terminal to the much contested point above the Canadian Pacific Railway tracks. The chairman, in the judgment, states that the opinion of the board will be backed up by an order requiring the company to lay tracks on Yonge Street to cover the space caused by the removal of the Metropolitan Railway tracks by the city. The board finds that as a fact that the equipment, appliances and service of the Toronto Railway in respect to the transportation of persons along the portion of Yonge Street shown on the plans filed are inadequate, and the board is of the opinion that the Toronto Railway should be required to construct, maintain and operate an extension of its existing lines northerly on Yonge Street with facilities for branching at Woodlawn Avenue, as shown on the plans filed. On June 29 the Board of Control of Toronto instructed Works Commissioner Harris to tear up the remainder of the tracks of the Toronto & York Radial Railway's Metropolitan Division on Yonge Street south of Farnham Avenue, claiming the franchise had expired and that the sale of the Metropolitan to the Toronto Railway included only physical property. The case was referred to at length in the ELECTRIC RAILWAY JOURNAL of July 3, page 36.

PROGRAMS OF ASSOCIATION MEETINGS

Illinois Electric Railways Association.

The regular meeting of the Illinois Electric Railways Association which was to have been held on Sept. 17 has been postponed until a date not yet fixed, but which will be after the San Francisco convention of the American Electric Railway Association. It is planned to review at the Illinois association meeting some of the subjects discussed at the national convention.

Colorado Electric Light, Power & Railway Association

The following program of papers of interest to electric railways has been announced for presentation at the meeting of the Colorado Electric Light, Power & Railway Association at Colorado Springs on Sept. 23, 24 and 25:

"Valuation of Public Utility Properties," by F. J. Rankin, engineer of the Colorado Public Utilities Commission, Denver, Col.

"A Uniform System of Accounting," by Fred W. Herbert, auditor of the Colorado Public Utilities Commission, Denver, Col.

"The Indeterminate Franchise and the Certificate of Public Convenience and Necessity," by M. H. Aylesworth, member and attorney of the Public Utilities Commission of Colorado.

"Depreciation as Affecting Valuation and Assessment," by Daniel W. Knowlton of Smith, Knowlton & Hatch, attorneys, Colorado Springs, Col.

"Present-Day Street Railway Problems," by W. N. Casey, Denver (Col.) City Tramway.

All of these papers will be presented at the sessions on Sept. 24.

Financial and Corporate

ANNUAL REPORTS

Third Avenue Railway

The consolidated comparative statement of income, profit and loss of the Third Avenue Railway, New York, N. Y., for the years ended June 30, 1914 and 1915, follows:

	1915	1914	Change
Operating revenue:			
Transportation	$10,565,027	$10,456,705	+$108,322
Advertising	95,250	103,000	—7,750
Rent of equipment	16,470	27,280	—10,809
Rent of tracks and terminals	73,441	72,882	+558
Rent of buildings and other property	84,710	85,447	—736
Sale of power	50,959	112,900	—61,941
Total operating revenue	$10,885,859	$10,858,216	+$27,643
Operating expenses:			
Maintenance of way and structures	$925,973	$1,012,646	—$86,672
Maintenance of equipment	678,573	713,003	—34,429
Depreciation accruals	562,958	511,250	+51,708
Power supply	779,458	779,130	+327
Operation of cars	2,914,525	2,849,929	+64,595
Injuries to persons and property	602,798	614,609	—11,810
General and miscellaneous expenses	511,890	526,466	—13,576
Total operating expenses	$6,976,179	$7,006,035	—$29,855
Net operating revenue	$3,909,680	$3,852,180	+$57,499
Taxes	731,034	730,784	+250
Operating income	$3,178,646	$3,121,396	+$57,249
Interest revenue	81,127	75,215	+5,912
Gross income	$3,259,773	$3,196,611	+$63,161
Deductions from gross income	2,565,730	2,570,305	—4,575
Net income	$694,043	$626,306	+$67,737

NOTES:

Interest on certificates of indebtedness of the Dry Dock, East Broadway & Battery Railroad has not been included in the accounts since Feb. 2, 1908.

Operations of the Mid-Crosstown Railway are included for the entire fiscal year ended June 30, 1915, and from April 17 to June 30, 1914.

Operations of the Pelham Park & City Island Railway are included in the fiscal year of 1915 only.

The net earnings for the last two years have been less than could have been reasonably anticipated. First, because in the last two years there was an abnormal series of snow storms, which cost the company at least $300,000, and in the year which has just expired there has been a decrease caused by the general depression of business and the necessity which the people feel for economy. This is further evidenced by the fact that the applications for employment during the year were at least twice as large as during any previous year in the present administration and as a whole from a better class of men. Nevertheless, the fact that the earings should have reached in these two unpropitious years so large a sum justifies the conclusion that the interest on the adjustment bonds may be considered hereafter as certain to be earned and paid by the company.

The report contains interesting statements showing the amount of expenditures which can be immediately foreseen, nearly the whole of which should theoretically be expended during the year 1916. They aggregate a very large sum and only a small part of the expenditures put down for 1915 have as yet been made, though it must be added that ultimately all of them must be made. An examination of these budget statements will show that they embody (a) the cost of certain extensions, $560,000 for upper Broadway and $250,000 for an extension of the City Island line. (b) The cost of certain new cars. (c) The cost of repaving and relaying the tracks in certain streets under which the city has been building subways. (d) The cost of relaying the track and repaving part of Third Avenue and Fifty-ninth Street, which has been or will be ordered by the Public Service Commission, and, like the previous item, is compulsory. President Whitridge includes these figures because it is not generally understood how powerless a street railway company is to control its own expenses and because so much has been said about dividends.

In regard to dividends President Whitridge says:

"If those budget statements were to be taken literally it would seem to be impossible that the expectations the stockholders have entertained in respect to dividends should not be disappointed. They are not, however, to be taken literally, because they are based, in a large part, upon the work proposed to be done by the city, and what the city officials say they are going to do and what the city actually does are found to be quite different things. In the long run the company would probably be better off if all of these expenditures were paid out of the earnings of the company and if no more money were borrowed through the issue of bonds. In last year's report it was said that dividends should only be paid when the money is in th bank with which to pay them, and there is no immediate prior claim upon it. I think that this condition will be met within a measurable time, and I hope and expect that if there be no material decrease in net earnings it will therefore be possible to declare and pay a dividend within the next twelve months."

The benefit association after six years of existence has to its credit in cash and securities $86,198. During the year ended Dec. 31, 1914, there was paid out to 625 members for relief $13,702, and during that period the association physician treated more than 1300 cases. Since the insurance feature of this work went into effect on Dec. 25, 1913, there have been twenty-six deaths, the beneficiary in each case receiving $1000.

Interborough Rapid Transit Company

The comparative statement of income, profit and loss of the Interborough Rapid Transit Company, New York, N. Y., for the years ended June 30, 1914 and 1915, follows:

	1915	1914
Gross operating revenue	$33,433,742	$33,515,395
Operating expenses	12,941,314	12,902,053
Net operating revenue	$20,492,428	$20,613,342
Taxes	2,133,980	2,081,948
Income from operation	$18,358,448	$18,531,394
Non-operating income	623,631	612,852
Gross income	$18,982,079	$19,144,246
Income deductions	10,913,595	11,119,666
Net corporate income for the year	$8,068,484	$8,024,580
Surplus, June 30, 1914, and June 30, 1913	15,214,403	13,072,956
Tax refunds and other credits	17,477	23,059
Totals	$23,300,364	$21,120,595
Taxes prior years, amortization, capital retirements and other charges	$791,255	$656,192
Dividends	7,000,000	5,250,000
Total appropriations	$7,791,255	$5,906,192
Profit and loss—surplus	$15,509,109	$15,214,403

The gross earnings for the fiscal year ended June 30, 1915, were substantially the same as last year. The present year witnessed the first interruption in the annually recurring increases in the gross earnings since the opening of the subway for operation. This was caused by the general business depression of the country. The gross operating revenue for the year was $33,433,742, as compared to $33,515,395 last year, a decrease of $81,652, or 0.24 per cent, the result of a gain on the subway division of $283,237, or 16.1 per cent, and a loss on the Manhattan Railway elevated division of $364,889, or 2.29 per cent. The increase in the earnings of the subway division was largely caused by a substantial gain in traffic in that portion of Bronx Borough served by this division, and also by the increased business in the shopping and amusement district at Grand Central and Times Square Stations. The decrease in the earnings of the Manhattan Railway elevated division was caused by the general depression in business conditions throughout the city; the curtailment of activities among manufacturing establishments along the Second and Third Avenue lines and the falling off of foreign travel which especially affected the Ninth Avenue line.

The operating expenses were $12,941,314 as compared to $12,902,053 last year, an increase of $39,261, or 0.30 per cent, the result of an increase on the subway division of $31,252, or 0.50 per cent, and an increase on the Manhattan Railway elevated division of $8,008, or 0.12 per cent. The amount charged to operating expenses and credited to depreciation reserve was $230,719 more than the previous year, whereas the expenditures for maintenance showed a decrease of $152,467, resulting in a net increase in charges for both depreciation and maintenance of $78,252. Owing to the changing conditions in the distribution of the density of traffic, throughout the non-rush hours on both the subway and elevated divisions, it was found necessary and expedient in furnishing service amply sufficient to meet the needs and comfort of the traveling public to increase the car mileage on the subway division to the extent of 2,010,943 car miles, and on the elevated division by 551,202 car miles. This increase in car mileage was responsible for an increase in the cost of transportation amounting to $89,142.

The net operating revenue was $20,492,428, as compared to $20,613,342 last year, a decrease of $120,913, or 0.58 per cent, the result of a gain on the subway division of $251,984, or 2.21 per cent, and a loss on the Manhattan Railway elevated division of $372,898, or 4.04 per cent. The total amount of taxes was $2,133,980, as compared to $2,081,948.43 last year, an increase of $52,031, or 2.50 per cent, the subway division showing an increase of $56,183, or 14.55 per cent, and the Manhattan Railway elevated division a decrease of $4,151, or 0.24 per cent. The long litigation involving the constitutionality of the State tax law, which had been held to impose a tax upon the company with respect to its subway operation, measured by a percentage of its earnings from that operation, was concluded this spring by a decision of the United States Supreme Court upholding the statute in question as constitutional and confirming the assessments. The taxes due under the disputed provision had been paid, however, so that this adverse decision made no unexpected drains upon the treasury.

The income from operation decreased $172,945, or 0.93 per cent, there being a gain on the subway division of $195,801, or 1.78 per cent, and a loss on the Manhattan Railway elevated division of $368,746, or 4.90 per cent. The non-operating income increased $10,778, or 1.76 per cent, principally because of the increase in interest on bank balances and loans. The gross income decreased $162,166, or 0.85 per cent, the result of a gain on the subway division of $127,166, or 1.10 per cent, and a loss on the Manhattan Railway elevated division of $289,333, or 3.81 per cent. Income deductions decreased $206,070, or 1.85 per cent, a variation incident to the refunding operations effective Nov. 1, 1913.

The surplus over dividends of 20 per cent (including extra dividends of 10 per cent) on the capital stock was $1,068,484. On the basis of 10 per cent dividends for one year the surplus for 1915 would be $4,568,484, as compared with $4,524,580, a gain of $43,904 in surplus over the previous year. The directors declared extra dividends amounting to 10 per cent during the year payable out of surplus, notwithstanding which there was an increase of $294,705 in the profit and loss surplus during the year.

The number of passengers carried was 647,378,266 compared with 651,886,671 last year, a decrease of 4,508,405, or 0.69 per cent, the result of a gain on the subway division of 5,172,646, or 1.52 per cent, and a loss on the Manhattan Railway elevated division of 9,681,051, or 3.11 per cent. The subway division continues to reap the benefit of real estate development along streets and avenues contiguous thereto, while the traffic on both divisions reflects the prevailing business depression.

For maintenance of the structures and roadway of both divisions the sum of $1,545,949 was expended. This compares with $1,758,051 thus expended in 1914. The expenses for maintenance of equipment totaled $2,002,095 for the last year as compared to $1,942,461 for the preceding year. The total maintenance appropriation, including depreciation, was $4,109,260 in the last year and $4,031,008 the year before. Expenditures for additions and betterments during the last year aggregated $24,274,028, including payments made during the year on account of construction and equipment of new subways and elevated third-tracking, extensions and power plant improvements.

In an interesting summary the annual report states that since 1908 the gross earnings have increased from $24,699,505 to $33,433,742 in 1915, or $8,734,237, equal to 35.36 per cent. The net operating revenue has increased from $13,976,810 in 1908 to $20,492,482 in 1915, or $6,515,618, equal to 46.62 per cent. The net corporate income has increased from $3,700,659 in 1908 to $8,068,484 in 1915, or $4,367,825, equal to 118 per cent. For 1908 the ratio of net corporate income to gross earnings was 14.99 per cent. For the year 1915 it was 24.13 per cent, a gain of 9.14 per cent. Expressed in terms of dollars and cents this means that in 1908 out of each $100 of gross earnings $14.99 was saved for net corporate income, while in 1915 out of each $100 of gross earnings an amount of $24.13 was saved for net corporate income.

This result has not been attained at the expense of "upkeep" of the property and rolling stock, for the following table reflects the amount of money appropriated for this purpose out of each $100 of gross earnings for each fiscal year since 1908.

1908	$12.75	1912	$14.27
1909	11.56	1913	13.85
1910	11.00	1914	12.03
1911	13.92	1915	12.29

The large appropriation for maintenance for 1911, 1912 and 1913 was caused by the fact that during this period $1,005,050 was absorbed in the operating expenses of the subway division for the installation of electro-pneumatic brakes, new drawbars, coasting recorders and for reinforcing copper sheathed cars, and $286,000 was spent on the elevated lines for installing line switches, conductors, emergency valves and coasting recorders. In addition to taking care of these extraordinary expenditures in maintenance expense, there has been set up a reserve for depreciation out of operating expenses, since 1909, amounting to $2,292,637.

During this period of eight years the cost of production, as measured by the ratio of transportation expense to gross earnings, has been reduced as follows:

	Per Cent		Per Cent
1908	25.89	1912	23.50
1909	24.43	1913	22.80
1910	23.24	1914	22.46
1911	23.89	1915	22.79

This reduction in relative cost of operation has been accomplished notwithstanding that during this period the rate of pay of practically all employees was substantially increased, while the cost of material has also shown a general upward trend. This improvement resulted from improved train service and the economies which have followed the installation of improved machinery and certain improvements to the physical property, making possible the operation of ten-car trains.

The ratio of fixed charges (including taxes) to gross earnings has been reduced from 43.95 per cent in 1908 to 39.02 per cent in 1915, as follows:

	Per Cent		Per Cent
1908	43.95	1912	41.54
1909	44.57	1913	40.58
1910	42.45	1914	39.39
1911	42.32	1915	39.02

This reduction in relative fixed charges was, in a large measure, caused by the increasing density of traffic with its resultant increased earnings per train and car mile. When such reduction, however, is considered in conjunction with the marked reduction in cost of production, as measured by transportation expenses, it illustrates that such additional capital expenditures as have been made for improving the property and equipment have contributed their full quota of economies to the general result that has been obtained.

The payments in claims, suits and judgments were $320,660 in 1915 and $296,414 in 1914, while the expenses of the claim department totaled $195,056 and $160,148, making the respective totals $515,716 and $456,563. The increase over last year ($59,153) is approximately the same amount as the decrease ($58,995) of 1914 under 1913. The total disbursements for 1915 ($515,716) were exactly $158 more than the total for 1913 ($515,558). The number of actions against the company continues to increase notwithstanding the policy of settlements without litigation. While the plaintiffs in these suits were successful in even a smaller percentage of the cases tried this year than last, the expenses necessarily increase in proportion to the volume of cases tried. The disbursements for claims, suits and judgments amounted to 0.96 per cent of the gross operating revenue and the expenses were 0.58 per cent, making an aggregate for the year of 1.54 per cent as compared with percentages amounting to 1.36 last year and 1.58 the year before.

EARNING POWER ESTIMATED

United Railways Investment Company Shows Increased Earnings as Based on Equities in Estimated Surplus of Subsidiaries

As the annual report and other statements of earnings of the United Railways Investment Company, San Francisco, Cal., include in income only the actual dividends received on securities owned, the real earning power of the company is not actually shown as would be the case were it an operating instead of a holding corporation. It owns the entire equity in the United Railroads of San Francisco, but as this company pays no dividends, the earnings being used to pay off underlying bonds, the surplus earnings do not show in the income statement of the holding company. The United Railways Investment Company also owns a large part of the equity in the Philadelphia Company, Pittsburgh, Pa., and its subsidiaries, but in this case also there is shown only the amount actually received in dividends, and not the large equity in the annual surplus of the Philadelphia Company remaining after dividends have been paid.

As an indication of this earning power, an income statement of the United Railways Investment Company has been prepared for the year ending March 31, 1916, based on its equity of approximately 62 per cent in estimated earnings of the Philadelphia Company, as follows:

	1916	1915
Earnings on Philadelphia Company stock owned*	$3,146,000	$2,347,400
Other dividends, interest, etc.	176,510	176,510
Total income	$3,322,510	$2,523,910
Expenses	77,737	77,737
Net earnings	$3,244,773	$2,446,173
Interest charges	1,182,168	1,182,168
Preferred dividends	800,000	800,000
Balance for United Railways Investment Company common stock	$1,262,605	$464,005

*Partly estimated. Includes four months' actual earnings.

This would indicate that from its equity in the Philadelphia Company and the latter's subsidiaries and other dividends and interests, the United Railways Investment Company would earn on its $20,400,000 of common stock for the year ending March 31, 1916, about 6.2 per cent. The large gains shown in the earnings accruing from the Philadelphia Company and its subsidiaries arise from the increased revenue coming to these companies from the material improvement in the industrial situation in the Pittsburgh district. It is stated that if the equity in the earnings of the United Railroads of San Francisco were included in the above estimate, the showing for the stocks of the United Railways Investment Company would be much larger. It is believed that its securities have an intrinsic value well in excess of their present market value, and that in time a plan will be evolved which will permit funding of the dividends now in arrears on the company's preferred stock, so that it may be placed in position again to receive regular dividends.

PRELIMINARY STATEMENT ISSUED

A preliminary income statement of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., for the year ended June 30, 1915, shows a decided falling off in revenue as compared with the preceding fiscal year. The annual meeting of the company will be held Oct. 19, when a complete report of the operations for the year will be presented. For the fiscal year the gross earnings decreased $130,483, and the net earnings were lower by $92,248. Taxes and interest charges increased $13,038 and the charges for amortization and depreciation were $45,569, as compared with $4,236 the preceding year. There was a balance for dividends of $165,565 as compared with $312,184 for the preceding year. The balance was equal to 5.34 per cent on the $3,100,000 of preferred stock, on which quarterly dividends of 1½ per cent are being paid, so the company had to encroach slightly on its accumulated surplus to provide for the distribution on the preferred.

GALVESTON-HOUSTON PASSES DIVIDEND

Generally Unsatisfactory Business Conditions, Jitney Competition and Damage Done by Recent Storm Lead Company to Conserve Cash Resources

The directors of Galveston-Houston Electric Company, Galveston, Tex., have declared a semi-annual dividend of $3 per share on the preferred stock, payable on Sept. 15, 1915, to stockholders of record on Sept. 11, 1915. The dividend normally payable on the common stock on the above date, however, has not been declared. Since March, 1914, semi-annual dividends of $3.50 per share have been paid on the common stock.

According to an official statement from the board of directors, the passing of the dividend on the common stock at this time is chiefly caused by the loss in earnings on account of the operation of jitney buses in Houston during a period when business conditions have been generally unsatisfactory. Another burden has been added by the recent storm which swept the Texas gulf coast cities, causing an interruption of service which will be reflected in a temporary reduction of the company's earnings and necessitating unusual expenditures for rehabilitation.

In the directors' opinion a careful study of jitney operation throughout the country gives every indication that such cars, under fair and reasonable regulation, cannot be operated permanently and profitably in competition with street railways. Jitney operation in Galveston has been negligible and a regulatory ordinance is being enforced. In Houston jitneys have been operating without regulation for about nine months, rapidly increasing in number until during the last three months more than 750 automobiles have been in operation. A regulatory ordinance was passed in June, but was not enforced until Sept. 1, since which date the number of cars in operation has decreased materially.

In regard to the recent storm, the directors state that the damage was more serious to the interurban line than to the properties in Galveston and Houston. Service in Galveston and Houston is now practically normal. On the interurban line, while the concrete arched section of the causeway across Galveston Bay remained intact, about a mile of that portion constructed of concrete side walls with sand filling was destroyed. This caused a suspension of through service into Galveston for sixteen days. A two-hour schedule, however, is now being maintained over temporary trestles, and it is expected that normal hourly service will be re-established shortly. Reconstruction is progressing as rapidly as possible.

The company is said to be at present in a strong position financially and it has a substantial cash balance and practically no floating debt. With the enforcement of the regulatory ordinance in Houston and the resumption of normal through service on the interurban line, the earnings should show gradual improvement. Under present conditions, however, the directors felt that the cash resources should be conserved.

Ashland Light, Power & Street Railway Company, Ashland, Wis.—The Wisconsin Railroad Commission has authorized the Ashland Light, Power & Street Railway Company to sell $100,000 of first mortgage 5 per cent bonds at not less than 75 to defray the cost of building a 1500-kw. turbine plant in Ashland.

Electric Investment Company, New York, N. Y.—On Sept. 1 a deed was filed in the office of the county recorder at Boise, Idaho, conveying the property formerly owned by various subsidiaries of the Idaho Railway, Light & Power Company to the Electric Investment Company, into which all the large power, light and transportation interests in Idaho except the Boise Railroad were recently merged. The Electric Investment Company was incorporated under Delaware laws in January, 1915, with $50,000 of authorized capital stock, all of which is owned by the National Securities Corporation. This latter company, which is controlled by Electric Bond & Share Company interests, is the one that was authorized by the Idaho Public Service Commission to effect the amalgamation of the various properties in Idaho, as mentioned in the ELECTRIC RAILWAY JOURNAL of June 19. The property of the Idaho Railway, Light & Power Company was sold under foreclosure sale in Boise on June 14 for $4,542,759, the upset price, to the Electric Investment Company, the purchasing corporation for the National Securities Corporation. Among the properties now transferred by deed are the Boise Valley Railway properties, the Boise & Interurban property, the Nampa-Caldwell extension and the Caldwell offices, station and grounds.

Hudson & Manhattan Railroad, New York, N. Y.—The Hudson & Manhattan Railroad has been authorized by the Public Service Commission for the First District of New York to issue $615,000 of first lien and refunding mortgage bonds of 1913 to reimburse the treasury for expenditures made for additions and betterments, $212,000; to retire underlying mortgages, $50,000, and to make payments on rolling stock, $255,000. The commission closed the hearing on this petition and reported favorably in the record time of half an hour.

Phœnixville, Valley Forge & Stafford Electric Railway, Phœnixville, Pa.—At a meeting on Sept. 4 stockholders representing 75 per cent of the shares agreed to the sale of the Phœnixville, Valley Forge & Stafford Electric Railway to the Philadelphia & Western Railway, Upper Darby, Pa. It is said that work will be begun soon on the building of a line from Valley Forge to Bridgeport, where it will connect with the Philadelphia & Western Railway's line to Sixty-ninth Street.

Portland Railway, Light & Power Company, Portland, Ore.—Completion of the refinancing plan of the Portland Railway, Light & Power Company, whereby $1,250,000 of new capital is obtained by the withdrawal of common stock and the issue of preferred in its place, was marked by a certificate issued on Sept. 2 by Corporation Commissioner Schulderman, authorizing the plan. A. T. Huggins, treasurer of the company, stated that all the holders of common stock had completed their payments of $25 per share on the stock canceled, and had received the like amount of preferred at the premium stated. "The commissioner's certificate is the final step," said Mr. Huggins. "The negotiations for the new money were practically completed on June 30, but about $200,000 of stock was still outstanding. This was taken up by a syndicate, however, which allowed the program to go forward until all the stock to be retired was sent in." The readjustment plan was described in detail in the ELECTRIC RAILWAY JOURNAL of May 1. The plan involved the cancellation of $5,000,000 of the $25,000,000 common stock issue and the authorization of $5,000,000 of first preferred and $5,000,000 of second preferred stock, half of each to be now retained in the treasury.

Tulsa (Okla.) Traction Co.—The Tulsa Traction Company, incorporated in August with $100,000 of capital stock to succeed the Oklahoma Union Traction Company, which as stated in the ELECTRIC RAILWAY JOURNAL of Feb. 13 was sold at receiver's sale on Feb. 5, has completed its reorganization of the city lines in Tulsa, according to A. J. Biddison, vice-president of the company. In the charter obtained by the reorganized company it is set forth specifically that the main purpose of the corporation is to extend the lines of the company to Sapulpa, Collinsville and Okmulgee. The line to Okmulgee will go by the way of Bixby, and from there a branch line will be extended to Broken Arrow. By the terms of the charter the company also is authorized to operate street car lines in Sapulpa, Okmulgee and Collinsville. The company now operates 6 miles of single track and reaches Orcutt Lake. The officers are G. C. Stebbins, president; A. J. Biddison, vice-president; I. F. Crow, secretary, and B. C. Redgrove, superintendent.

Union Traction Company, Santa Cruz, Cal.—W. R. Porter, W. J. Dutton, Fred Beaver, all of San Francisco; W. T. Netherton, San José, and J. W. Forgeus, Williams, have been appointed as the protective committee for the bondholders of the Union Traction Company. A previous item regarding this company was published in the ELECTRIC RAILWAY JOURNAL of Aug. 28. It is reported that the company defaulted in the payment of interest on $613,000 of bonds, due the first of this month.

Wilmington Southern Traction Company, New Castle, Del.—It is reported that E. Clarence Jones has again assumed control of the Wilmington Southern Traction Company. Three years ago Mr. Jones sold this property to the Wilmington, Newcastle & Delaware City Railway, but the terms of the contract of sale were not complied with and it now reverts to its former owner. In the future the two companies will be operated independently, although an arrangement for the exchange of traffic which is now operated will be continued. The Wilmington Southern Traction Company comprises 6.7 miles of line between Wilmington and Newcastle, while the Wilmington, Newcastle & Delaware City Railway operates a 10.5 mile line between Delaware City and Newcastle.

DIVIDENDS DECLARED

Brockton & Plymouth Street Railway, Plymouth, Mass., 3 per cent, preferred.

California Railway & Power Company, San Francisco, Cal., 1¾ per cent, prior preference.

Capital Traction Company, Washington, D. C., quarterly, 1¼ per cent.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred.

Galveston-Houston Electric Company, Galveston, Tex., 3 per cent, preferred.

Illinois Traction System, Peoria, Ill., quarterly, 1½ per cent, preferred.

Manila Electric Railroad & Light Corporation, Manila, P. I., quarterly, 1½ per cent.

Philadelphia (Pa.) Traction Company, $2.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.

West End Street Railway, Boston, Mass., $1.75, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.					
1m., July, '15	$187,488	$116,815	$70,673	$40,440	$30,233
1 " " '14	216,747	121,007	95,740	40,013	55,727
BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.					
1m., July, '15	$91,244	*$62,182	$29,062	$17,021	‡$12,159
1 " " '14	97,654	*80,929	16,725	16,921	†‡87
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO.					
1m., July, '15	$44,653	*$21,780	$22,873	$11,087	$11,786
1 " " '14	45,282	*21,945	23,337	11,095	12,242
7 " " '15	224,392	*128,190	96,202	76,811	19,391
7 " " '14	232,351	*123,755	108,596	77,028	31,568
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO					
1m., July, '15	$113,039	*$75,868	$37,171	$27,651	‡$9,622
1 " " '14	117,667	*72,992	44,675	27,351	‡17,324
7 " " '15	696,181	*474,259	221,922	192,411	‡30,206
7 " " '14	714,513	*472,822	241,691	191,239	‡50,452
COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO					
1m., July, '15	$239,594	*$146,303	$93,291	$40,232	$53,059
1 " " '14	241,965	*156,675	85,290	37,741	47,549
12 " " '15	3,057,558	*1,816,271	1,241,287	470,860	770,427
12 " " '14	3,065,769	*1,966,740	1,099,029	482,188	616,841
CONNECTICUT COMPANY, NEW HAVEN, CONN.					
1m., July, '15	$806,482	*$474,989	$331,493	$98,265	‡$256,409
1 " " '14	798,767	*571,741	227,026	97,329	‡151,582
NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.					
1m., July, '15	$49,783	*$30,801	$18,982	$8,000	‡$11,053
1 " " '14	49,667	*30,940	18,727	7,876	‡10,918
NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.					
1m., July, '15	$42,612	*$43,288	†$676	$8,346	†‡$6,677
1 " " '14	37,199	*42,357	†5,158	5,000	†‡8,310
PORTLAND (ME.) RAILROAD					
1m., July, '15	$115,100	*$63,272	$51,828	$20,166	$31,662
1 " " '14	116,551	*92,740	53,811	20,462	33,349
12 " " '15	1,042,284	*648,128	394,156	261,434	132,722
12 " " '14	1,043,214	*646,655	396,559	249,998	146,561
RHODE ISLAND COMPANY, PROVIDENCE, R. I.					
1m., July, '15	$472,148	*$319,415	$152,733	$120,284	‡$33,749
1 " " '14	535,578	*354,101	181,477	116,264	‡67,608
WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.					
1m., July, '15	$26,016	*$22,718	$3,298	$1,590	‡$1,738
1 " " '14	27,198	*23,456	3,742	1,198	‡2,554

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*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

JITNEY JOTTINGS

The Jitney Before the Pennsylvania Commission—Developments in Houston and Dallas

Steps to settle immediately the status of jitneys as public utilities in comparison with the rights of incorporated common carriers are to be taken at once by the Public Service Commission of Pennsylvania. The decision as to whether jitney service may be started without first receiving permission from the commission in the form of a certificate of public convenience will be State-wide in effect. The Scranton Railway, of which C. L. S. Tingley is vice-president, raised the issue in three cases, alleging that M. J. Walsh, Forest City; S. Wilson and F. Williams, Vandling, and W. H. Owens, Scranton, are illegally operating jitney lines between towns covered by its system. It is charged that they cover the same road as the electric railways; that they divert business from the electric railways, and that they cause loss to the company besides operating without State approval. Chairman Ainey of the commission directed that the persons complained of be notified and asked if they desire to join issue. If answers are filed, hearings will be held soon, probably in Scranton.

The provision of the jitney ordinance of Houston, Tex., requiring an indemnity bond has been eliminated and the petition for a referendum election has been withdrawn. The ordinance requiring a license fee of $72 went into effect on Sept. 1 and there are now only about half the number of jitneys in use as were formerly in operation. There has been some agitation in favor of placing a reduced bond requirement in the ordinance, but the City Council opposed this. Commissioner Pastoriza, who recently returned from the Pacific Coast where he studied the jitney, said that bonds had a tendency to increase the recklessness of the drivers, as they seemed to feel that there was no necessity for careful driving as long as the bonding companies paid for the damage inflicted. Mayor Campbell stated that since the present ordinance had been accepted by the jitney men in good faith he did not favor any change unless the measure should prove inadequate after trial.

The jitney drivers of Dallas, Tex., members of the chauffeurs' union, have given to the press for publication a set of resolutions containing a general denouncement of the so-called compromise ordinance and claiming that the destruction of the petition bearing the names of more than 4000 voters for an initiative election on a new ordinance was never agreed to by the jitney drivers. The work of getting the necessary number of signatures on a petition for a new ordinance will be undertaken at once.

A suit to break the newest jitney ordinance was filed with the County Clerk of Multnomah County, Portland, Ore., recently by A. A. Theilke, et al, against Mayor Albee. The complaint asks a temporary injunction restraining the city officials from enforcing the ordinance during the pendency of the suit. It is contended among other things that the measure is void because an emergency clause was attached, doing away with the right of the people to submit it to a referendum vote, and that it is class legislation because it requires a license fee, whereas taxicabs, hotel buses, sightseeing cars, private automobiles and street cars do not pay a license and are not required to be examined regularly. Mayor Albee of Portland, Ore., has instructed the police department to enforce the provisions of the new jitney ordinance prohibiting the carrying of more than one passenger in the seat with the driver and prohibiting any person from riding on the running board, steps or doors of the cars.

Ordinances prohibiting the jitney buses from operating in the district bounded by Fourth, C, Sixth and E Streets, requiring them to maintain regular schedules and to stop on the far side of street intersections to let off and take on passengers, have been approved by Mayor Capps of San Diego, Cal. Being emergency ordinances, they became effective immediately. At the time he signed the ordinances mentioned the Mayor still had under consideration the ordinance requiring jitneys to operate eighteen hours a day six days a week.

The Auto Transit Association of Spokane, Wash., composed of jitney bus operators of the city, propose to test in court the city ordinances compelling jitneys to maintain a regular run for eight consecutive hours a day.

A new jitney ordinance is pending in Topeka, Kan., with additional restrictions which experience has indicated are necessary for the regulation of traffic and the protection of the public interests. Under this ordinance the license fee of $10 payable semi-annually will be increased to $25 for a five-passenger car, $35 for a seven-passenger car and $50 for cars seating more than seven. The fee must be paid in advance, and no part will be returned if the owner ceases business. No bond will be required. The windshield must bear indication that the car is a jitney, and must show the rates to be charged, which cannot be exceeded except by special agreement with passengers. Each licensed jitney must operate twelve hours a day. Any violation of the regulations of the license ordinance may cause revocation of the license.

CITY'S POWERS BROADER THAN COMMISSION'S

So Holds the West Virginia Public Service Commission in the Charleston Jitney Case

The Public Service Commission of West Virginia has dismissed without prejudice the petition of James Smith et al. charging certain jitney operators of Charleston with unlawful discrimination in the carriage of passengers, and has also similarly dismissed the petition of the Charleston Interurban Railroad charging the same defendants with unlawful discrimination, etc., and asking supervision and regulation of the jitney business in Charleston. In concluding its opinion the commission said in part:

"There is no just reason why the jitney bus business should not be subjected, like other common carriers of persons, to reasonable regulations.

"The Council of Charleston passed the jitney ordinance on June 28. Said ordinance makes it unlawful for any person, firm or corporation, either as principal, agent or employee, to use or occupy any public street in Charleston, with a motor vehicle, in the manner defined in the ordinance, without a permit or license. It imposes an annual license tax of $24 for each vehicle, requires bond in the penalty of $2,500, conditioned that the operator will not violate any of the provisions of the ordinance and that he shall pay any and all lawful claims for damages for injury to persons or property sustained by passengers in such vehicles, or by any other person or persons that may be killed or injured or suffer damages to property by reason of the operation of said motor vehicles. It requires the vehicles to be operated by experienced drivers; designates the section of the city where said vehicles shall operate, requires them to operate certain hours of the day and not less than six days in each week, and requires them to carry any and all persons, indiscriminately, that offer themselves for carriage and tender the fare. Said ordinance contains many other requirements and restrictions not hereinbefore enumerated, which said ordinance under the provisions of the charter of said city became effective July 28, 1915—five days after the hearing of these cases before the commission.

"The powers of regulation over the operation of the business under consideration, granted by the Legislature to the city of Charleston, are much broader than those granted the commission. In addition to this fact, the municipal authorities, under whose constant observation a business is being operated, can regulate, control and supervise said business far more effectively than can a board or commission not so situated. The petitions in this proceeding were both filed after the passage of the said ordinance but before it went into effect and before it could possibly be known whether or not the provisions of this ordinance would operate so as to furnish proper and adequate regulation of the jitney business. It should not be, and it is not, the intention of the commission to interfere with the local authorities in the regulation of purely local matters, over which the local authorities have full and complete jurisdiction and control.

"It would appear that inasmuch as the matters in controversy are purely local, and that the local authorities have ample regulatory powers over the operation of the business in question, and are now regulating said business, that this commission should not interfere with the operation thereof, and that it should remain, for the present at least, under the supervision and control of the municipal authorities of Charleston.

"In regard to the complaint against defendants in refusing to carry passengers who were members of the colored race, the defendants by their answers have admitted that this was an unlawful discrimination and agreed to carry thereafter all persons, regardless of race, color or previous conditions of servitude. So, having conceded the relief asked for in this particular, it is unnecessary to enter into a discussion of this question.

"The commission is, therefore, of the opinion, for the reasons hereinbefore stated, to dismiss the petition of James Smith et al., and of the Charleston Interurban Railroad, without prejudice to the said petitioners to apply at any time in the future to said commission for redress of any grievances affecting them, or either of them, and it is accordingly so ordered. The commission does not deem it necessary at this time to promulgate any rules relative to the regulation of the jitney bus business."

COMMISSION WITHOUT POWER TO MODIFY FRANCHISE FARE PROVISIONS

The Public Service Commission for the Second District of New York has decided, in an opinion by Commissioner Frank Irvine, that it has no power to modify the terms of a franchise granted by a municipality. The New York & North Shore Traction Company, Flushing, Long Island, applied to the commission, asking that it determine that the just and reasonable fare between Mineola and Port Washington was 15 cents instead of 10 cents, to which the road is limited by the terms of its franchise granted by the Supervisors of Nassau County and the Highway Commissioners of the town of North Hempstead. The attorneys for the road contended that the power to grant franchises in a municipality was but a power delegated to the municipality by the Legislature and that the Legislature itself, or the commission, to whom the Legislature has delegated general power over rates, could amend the franchise. Judge Irvine in his opinion cited a clause in the constitution providing that no law granting a street railway franchise can be passed without the consent of the local authorities and the abutting property owners. He said that if the language of the public service commissions law giving the commissions power over rates were to be construed as giving the commission power to change the terms of a local permission, it would undoubtedly be unconstitutional.

SUCCESS OF BROOKLYN INSURANCE PLAN

More than 5200 employees of the Brooklyn (N. Y.) Rapid Transit Company had applied up to Sept. 15 for insurance under the plan of group life insurance which was announced to all the employees of the company on July 30. A notice has been sent to all employees that by arrangement with the Travelers Insurance Company, Hartford, Conn., through which the group contract is placed, the insurance will be effective upon all those who have applied for it at noon on Sept. 15. Out of approximately 8000 employees eligible for the group insurance, about 65 per cent filed applications within six weeks of the original announcement of the plan. Inasmuch as more than 5000 employees have applied for the insurance, there will be no necessity of the physical examination of these applicants. An arrangement has been made with the insurance company whereby those who are now eligible for the insurance as the result of having served two years in the employ of the company will be allowed until Jan. 1, 1916, to come into the group without physical examination. After Jan. 1, 1916, any employee who was eligible for the insurance prior to Sept. 15, 1915, will be admitted to the group only upon a physical examination. In the case of employees who become eligible for the insurance hereafter by the completion of their two years of service, the arrangement between the railroad company and the insurance company provides that such employees may be admitted to the group without physical examination if they apply for the insurance within six months after the date upon which they become eligible for the same. Any who do not apply within six months after the date on which they become eligible for the insurance will be admitted to the group thereafter only upon physical examination. The applications received up to Sept. 15 which constitute the initial group involve an aggregate premium of more than $56,000 a year. One-half of this is paid by the employees and one-half by the company. The terms of the insurance offer of the company to the employees were reviewed in the ELECTRIC RAILWAY JOURNAL of Aug. 7, page 252.

Safety First League for Louisville.—Plans for the organization of a safety first league, to be affiliated with the National Safety First Association, have been made in Louisville. Coroner Ellis Duncan started the movement, and railways, automobile and municipal authorities are participating in it. At a meeting held to discuss organization Coroner Duncan called attention to the great decrease in the number of accidents since the Louisville Railway began its safety-first work.

Electric Railway Scenarios Wanted.—The publicity department of the Illinois Traction System, Peoria, Ill., has announced the intention of having a moving picture made on the cars and in the stations of the company. In order to secure a plot that will work up into a good picture a contest will be held with prizes for the best stories submitted. The only thing taken into consideration will be the idea. If the scenarios warrant they will be turned over to some of the large picture houses to be worked up into a completed plot. A committee of Springfield newspaper men will pass on the stories and the announcement of the winners will be made after the State Fair. The successful stories will be published in papers throughout the State.

Collision at Corte Madera.—An electric train of the Northwestern Pacific Railroad consisting of three coaches and a steam train made up of three baggage cars with the engine reversed collided on Sept. 9 near the north portal of the tunnel at Corte Madera, Cal. Four persons were seriously injured and twenty others were slightly hurt. W. S. Palmer, president and general manager of the company, issued a statement in which he said: "The collision occurred on the only piece of single track on our suburban system. It is protected by automatic signals of the most approved type. The signals worked perfectly. The freight train got the signal that gave it the right of way through the tunnel, but for some inexplicable reason the motorman ignored the warning and went crashing into the freight train."

Mr. Dempsey Not Guilty.—Magistrate Dodd in the Adams Street Court in Brooklyn decided on Sept. 11 that John J. Dempsey, superintendent of transportation of the New York Consolidated Railroad (Brooklyn Rapid Transit System) was not culpable for disobeying an order of the Public Service Commission issued in 1912. On that date Mr. Dempsey was not manager of transportation and there was no evidence to show that any copy of the order had ever been served on him, was the basis for the ruling under which the official was freed on the misdemeanor charge. Mr. Dempsey was brought to the Fifth Avenue Court on June 5 last. Public Service Commissioner Hayward personally appeared against him. On Sept. 16 Mr. Dempsey was indicted by the Kings County Grand Jury on a misdemeanor charge in connection with his alleged failure to obey the order of the commission.

Pittsburgh Railways Folder at Pittsburgh Exposition.—The Pittsburgh (Pa.) Railways is distributing an extremely interesting folder at its exhibit space at the Pittsburgh Exposition. The scope of the folder is perhaps illustrated best by the table of contents which contains the following: "Some Things the Company is Doing to Improve Service," "Route Numbers," "Points of Interest in Pittsburgh and How to Reach Them," "Trolley Trips in and Near Pittsburgh," "Map of Pittsburgh and Vicinity, Showing Territory Served by the Company," "How to Reach Boroughs and Outlying Districts," "Washington and Charleroi Schedules," "Items of Cost," "Two Pittsburgh Railways Problems—the Rush Hour Traffic and Should Every Car Go to the End of the Line?" "Some Things the People Can Do to Improve the Service" and "Pittsburgh Railways Data in Round Numbers."

Personal Mention

Mr. Thomas B. Smith, candidate for Mayor of Philadelphia, appointed a month ago as a member of the Public Service Commission of Pennsylvania, has announced his resignation from the commission.

Mr. F. J. Stevens, formerly master mechanic of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has been appointed master mechanic of the Lansing division shops of the Michigan United Traction Company, Jackson, Mich.

Mr. Ralph W. Emerson, who recently assumed his new position of assistant superintendent of the Cleveland (Ohio) Railway, is a son of Mr. Frank A. Emerson, sales agent of the same company. He received his preliminary education at Lincoln High School, Cleveland, and was a member of the class of 1906 at the Case School of Applied Sciences, Cleveland, having taken a combined mechanical and electrical engineering course. Immediately after his graduation he secured a position in the power department of the Cleveland Railway and in 1910 he was sent to Long Island to install and operate the power plant of the New York & North Shore Traction Company. Later on he was made general superintendent of the road, a position which he held until he assumed his present post on Sept. 1 last.

Mr. Herbert Markle, the newly-elected president of the West Virginia Public Utilities Association, which is made up of the electric light, power and traction, artificial-gas, water and telephone companies of West Virginia, is a native of Indiana and a graduate of the school of electrical engineering of Purdue University, class of 1895. Following graduation Mr. Markle spent a number of years with the Jenney Electric Company of Indianapolis and later went with the Northern Electric Manufacturing Company as district sales manager, with headquarters at Chicago. For a few months he also served with the Fort Wayne Electric Company after the consolidation of the Fort Wayne and the Northern Electric companies' interests. Six years ago Mr. Markle joined the Byllesby organization and for three years was stationed at Stillwater, Minn., as manager of some of the Northern States Power Company's properties. For the last three years he has been general manager of the Appalachian Power Company, stationed at Blufield, W. Va.

Mr. Edward J. Haines has been appointed assistant superintendent of equipment of the Bay State Street Railway, Boston, Mass. Mr. Haines was graduated from Columbia University in 1905 with the degree of E. E. After spending four months in studying electric railway work in Europe, in which he traveled 25,000 miles and visited the principal installations in Great Britain and on the continent, he was employed in the shops of the Brooklyn (N. Y.) Rapid Transit Company for a year. Prior to graduation he worked in the offices of Mr. C. O. Mailloux, consulting engineer, New York, and was also employed by the General Electric Company. Mr. Haines entered the employment of the Bay State company in 1906 as inspector at the Campello (Mass.) shop. He was later transferred to the main offices of the equipment department at 84 State Street, Boston, and has since had an active share in the engineering work of the office, including tests, expert testimony in court cases, investigations, and supervisory duties in close association with the head of the department.

OBITUARY

Sir William C. Van Horne, a leading figure in transcontinental railroad development in Canada, died at Montreal on Sept. 11. He was in his seventy-third year. Sir William was born at Joliet, Ill. He received his title and was created a Knight Commander of St. Michael and St. Gregory in 1904. He was instrumental in making the Canadian Pacific one of the greatest railway systems in the world. After the close of the Spanish-American war he caused 300 miles of railroad to be built in Cuba. In addition to his many Canadian interests Sir William was president of the Cuba Company and the Cuba Railroad. Among the positions from which he had retired recently were directorships at the Rio de Janeiro Tramway, Light & Power Company, Ltd., the Equitable Life Assurance Society, New York, and the Winnipeg (Man.) Electric Railway.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Fort Wayne, Decatur & Southern Railroad, Decatur, Ind.**—Incorporated in Indiana to construct and operate an electric line between Fort Wayne, Decatur, Monroe, Berne, Ceylon, Geneva, Bryant, Portland, Winchester, Lynn, Fountain City, Richmond and all intervening towns. It is stated that this company has been organized to take over the property of the Fort Wayne & Springfield Railway. Capital stock, $10,000. Incorporators: Charles Oetting, Martin Gerke, Charles Dirkson, Henry Aumann and John H. Koenig.

***Chester & City Point Railway, Chester, Va.**—Incorporated in Virginia to construct an electric line from Chester to City Point and Hopewell, crossing the Appomattox River at or near Point of Rocks. Capital stock, $100,000; minimum, $1,000. Officers: H. D. Eichelberger, Chester, president; A. C. Buchanan, Chester, secretary, and Willis B. Smith, Richmond, general counsel.

***Richmond & City Point Transportation Company, Richmond, Va.**—This company will soon be chartered to operate a trolley, steam and ferry line between Richmond and Hopewell. No new line will be built or equipment purchased. The Virginia Railway & Power Company operates a car from Richmond to Chester and the company has agreed upon terms of contracts with the Tidewater & Western Railway which operates between Chester and Bermuda Hundreds and with the Furman Steamship Line which will operate a ferry between Bermuda Hundreds and City Point.

FRANCHISES

Sacramento, Cal.—The Pacific Gas & Electric Company has received a franchise from the Council to construct an extension on T Street, Upper Stockton Road, Cypress Avenue, Lower Stockton Road, Curtis Avenue, Whiskey Hill Road, Palmetto Avenue, Fifth Avenue and East Avenue, Sacramento.

Waukegan, Ill.—The Chicago & Milwaukee Electric Railroad has received from the Council a ninety-day extension of time on its franchise, pending the preparation and accepting of a new franchise.

Georgetown, Mass.—The Bay State Street Railway has asked the Council for a franchise to relocate its tracks on West Main Street from the entrance to York Grove to the Boston & Maine crossing on West Main Street.

Albany, N. Y.—The United Traction Company has asked the Council for a franchise to construct and operate a single track line on Madison Avenue from Trinity Place to Grand Street and on Grand Street to Hamilton Street, Albany.

El Paso, Tex.—The El Paso Electric Railway will ask for a franchise to construct an extension of its lines on Piedras Street from Alameda Avenue to the Boulevard.

Seattle, Wash.—The Council has adopted resolutions directing Corporation Counsel Bradford to instruct the holders of the franchise of the Seattle-Tacoma Short Line to comply with all its terms, and in the event of failure to proceed with the construction, to forfeit $13,500 deposited by them at the time their franchise was granted. (Sept. 4, '15.)

TRACK AND ROADWAY

Edmonton (Alta.) Radial Railway.—About 6400 ft. of permanent track is being laid by this company on Portage Avenue, Edmonton.

Phoenix (Ariz.) Railway.—An order has been issued by the corporation commission granting this company an extension of time until Nov. 1 to complete the construction of its railway loop on Monroe Street to Fourth Street and thence to Washington Street, and to abandon the Indian school line from a point between Third and Fourth Streets to the connection with the First Street line at Pierce Street.

Pacific Electric Railway, Los Angeles, Cal.—The Hermosa Beach Chamber of Commerce has taken steps to obtain a 5-mile right-of-way to build a railroad to connect with the line of the Pacific Electric Railway at Belvidere, thus leading into Los Angeles over the Gardena route. It is the intention of the Chamber of Commerce in case it is successful to donate the right-of-way to the Pacific Electric Railway for building the line. The proposed road would give two direct lines from Hermosa Beach into Los Angeles.

Quebec Railway, Light & Power Company, Quebec, Canada.—The Quebec City Council is considering steps to compel this company to extend its lines in Limoilou, Beauport and Charlesbourg.

Bristol & Plainville Tramway, Bristol, Conn.—This company will be asked to raise its tracks on North Main Street to conform to the grade necessary for the pavement about to be put down.

Connecticut Company, New Haven, Conn.—The Connecticut Company has awarded the contract for the grading for the new North End trolley line in Hartford to Lathrop & Shea, New Haven. The line will extend on Main Street, Grove Street, Broad Street, Washington Street, Farmington Avenue and Commonwealth Avenue.

Chicago, Ottawa & Peoria Railway, Joliet, Ill.—This company has awarded a contract to the Joliet Bridge & Iron Company for the construction of a bridge over the Vermillion River. The bridge will consist of two 26-ft. spans. The cost is estimated at $3,800.

Peoria (Ill.) Railway.—Work has been begun by this company on the double-tracking of its line on Frye Avenue from Wisconsin Avenue to Pacific Avenue and Adams Street from Abingdon Street to Camblin Street. The tracks will be of heavy steel and laid in concrete. New track is also to be laid on North Monroe Street. The company has completed the work of laying new tracks on Second Avenue from Franklin Street to State Street.

Kankakee & Urbana Traction Company, Urbana, Ill.—Work has been begun by this company on its 5-mile extension from Ludlow to Paxton. It is expected to extend the line from Paxton to Kankakee.

Keokuk-Jefferson City Electric Railway, Keokuk, Iowa.—Surveys have been completed of this company's line from Keokuk to Jefferson City and right-of-way secured as far as Shelbyville. As surveyed, it will pass through Kahoka, Williamstown, LaBelle, Newark, Bethel, Shelbyville, Shelbina, Paris, Long Branch, Mexico and Fulton. H. W. Knight, Chicago, is interested. (June 5, '15.)

Salina-Northern Railroad, Salina, Kan.—This road has been completed from Salina to Lincoln Center, 35 miles. An extension is being built to Corinth and Downs, 43 miles, and a branch from Corinth to Osborne, 10 miles. (Aug. 21, '15.)

Idlewylde Park Railway, Baltimore, Md.—Work will soon be begun by this company on the construction of its 1-mile line on Regester Avenue from the York Road to Idlewylde Park. This road will connect with the line of the United Railways & Electric Company. Harry E. Gilbert, 2 East Lexington Street, Baltimore, president. (July 31, '15.)

Springfield (Mass.) Street Railway.—Plans are being made by this company to relocate its tracks on Mill Street, Springfield, from West Silver Street to Court Street, from the center to the west side of the street.

American Traction Company, Minneapolis, Minn.—It is announced that the street and interurban railway connecting International Falls with Ranier, South International Falls and other points in the district has just been completed. A. L. Sorter, Minneapolis, president.

Electric Short Line Railway, Minneapolis, Minn.—This company has awarded a contract to H. F. Balch & Company, Minneapolis, for the construction of its 45-mile extension from Winsted to Hutchinson, via Silver Lake.

Nevada, Lebanon & Eastern Railroad, Nevada, Mo.—Plans are being revived for the construction of this company's proposed line between Lebanon and Nevada. Plans for financing the enterprise were interrupted when the St.

Louis & San Francisco Railroad went into receivership, several of its stockholders having been interested in furnishing capital for the new road. Several counties raised large bonuses, the notes being dated to expire in July, 1916. The subscribers will be asked to renew their pledges. S. W. Thompson and Andrew Thompson, Kansas City, are interested. (Jan. 25, '13.)

St. Louis, Lakewood & Grant Park Railway, St. Louis, Mo.—Members of the Lakewood Improvement Association of Lakewood, a suburb west of Gravois Avenue, are considering the question of urging this company to resume operating its cars between Gravois Avenue and Lakewood. The railroad has not operated since the flood of Aug. 20, which undermined the tracks in places along the River des Peres.

***Nye, Mont.**—Surveys have been begun for a proposed electric railway from Nye to Cooke City to provide transportation for minerals. Mayor E. A. Gerhart, Billings, is interested.

New York Consolidated Railroad, Brooklyn, N. Y.—This company has notified the Public Service Commission for the First District of New York that it will be ready to place in operation by Sept. 17 the local tracks in the Fourth Avenue subway from Fortieth to Fifty-ninth Streets. If the commission orders the use of the local tracks the operation from Fortieth Street on will be over them instead of the express tracks as heretofore and this will allow stops at the local stations at Forty-fifth and Fifty-third Streets. Through operation over the express tracks is still prevented by the reconstruction work at the DeKalb Avenue station where crossovers between express and local tracks are being installed.

***Catskill, N. Y.**—Plans are being considered by a Brooklyn syndicate for the construction of a railway from Catskill to Richfield Springs, via Middleburg.

Federal Light & Traction Company, New York, N. Y.—E. H. Sanderson, president of this company, which operates the local urban and interurban lines in Hoquiam and Aberdeen, Wash., states that the company contemplates the construction of a line between Willapa Harbor and Grays Harbor. It is estimated that the cost of this improvement will be about $1,000,000.

New York State Railways, Rochester, N. Y.—During the current year this company has expended $147,819 for betterments, renewals and replacements. The sum of $27,181 was spent in August for the same purposes.

Troy & New England Railway, Troy, N. Y.—This company, operating between Troy and Averill Park, suspended operations on Sept. 7. The road is leased by the Delaware & Hudson Company.

Tiffin, Ohio.—A bond issue of $2,000 has been asked from the Chamber of Commerce of Tiffin toward the cost of making a preliminary survey for the electric railway to be built between Tiffin and Bucyrus. A. W. Nyquist is interested. (July 17, '15.)

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—A report from this company states that it expects to rebuild 2½ miles of track. An order has been placed with the Lackawanna Steel Company for 500 tons of 70-lb. A. S. C. E. rail, 300 tons to be delivered at once.

Youngstown & Southern Railway, Youngstown, Ohio.—In return for certain right-of-way along its tracks for the southern district sewer, this company has asked the city to allow it to lay a double track from South Avenue to its station on Front Street, east of Market Street. The Council is in favor of permitting the double-tracking, but claims it has no authority to grant such permission, which must be gained from property owners along the right-of-way.

Southwestern Power, Light & Railway Company, Oklahoma City, Okla.—W. T. Croslen, president of this company, which is to build an interurban railway from Oklahoma City to Denison, Tex., via Sulpher, Okla., has announced that work on the hydraulic electric plants will begin in October. Work was begun on the line some time ago, but, after considerable grading, was discontinued. Three large water plants will be constructed at a cost of $1,000,000. The power plants will aggregate a total of 75,000 hp.

***Tulsa (Okla.) Traction Company.**—This company, which was recently incorporated in Oklahoma with a capital stock of $100,000 to succeed the foreclosed Oklahoma Union Traction Company, reports that a line will be built from Tulsa to Sapulpa, Collinsville, Bixby, Broken Arrow and Okmulgee. The company operates 6 miles of single track and reaches Orcutt Lake. Power is purchased from the Public Service Company of Tulsa. Officers: G. C. Stebbins, president; A. J. Biddison, vice-president; I. F. Crow, secretary, and B. C. Redgraves, superintendent, all of Tulsa.

Johnstown & Somerset Street Railway, Johnstown, Pa.—According to Engineer Wilbor of the J. A. Vandergrift Company, New York, which is financing and building the line from Johnstown to Rockwood, the catenary overhead system will be used to operate the road. Rails of not less than 70-lb. will be used. A block signal system will also be installed. [July 17, '15.]

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—It is reported that this company is contemplating the construction of an extension from Blue Ridge Summit to Thurmont or Emmitsburg, 8 or 10 miles.

Chester & City Point Railway, Chester, Va.—Preliminary surveys have been made of this company's line from Chester to City Point and Hopewell and it is expected to have the line completed by next spring. H. D. Eichelberger, Chester, president.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—A contract has been let by this company for a new freight depot on F Street, between Second and Third Streets, San Bernardino. The structure will be of reinforced concrete and will contain offices for the various freight and passenger officials. The cost is estimated at $20,000.

Norwich & Westerly Traction Company, Norwich, Conn.—This company has removed its main carhouse from Hallville to the one on Beach Street, Westerly. All the repairing will be done at the carhouse on Beach Street, the one at Hallville being used only for painting and storage.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—This company will build a new station in Waukegan where the new city line joins the west tracks of the through line.

Interborough Rapid Transit Company, New York, N. Y.—The contract for station finish on the Jerome Avenue and White Plains Avenue lines, Bronx, has been awarded by the Public Service Commission for the First District of New York to the Altoria Realty & Construction Company for $860,363.

POWER HOUSES AND SUBSTATIONS

Menominee & Marinette Light & Traction Company, Menominee, Mich.—A report from this company states that it expects to purchase a feeder panel for its power house and material for 6 miles of transmission line.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—A report from this company states that it expects to place contracts during the next three weeks for three 500-kw., 6600-230-volt transformers, three 1500-kw., 6600-230-volt transformers, two complete substations and lead-covered cable.

New York State Railways, Syracuse, N. Y.—This company reports that it has purchased one 1000-kw., six-pole, 600-volt, d. c., 25-cycle, 500-r.p.m. rotary converter from the General Electric Company; also three 350-kva., 11,000-430-volt O. I. S. C. transformers to be used for its Tracy Street substation.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—This company will purchase a 400-kw., d. c. motor generator set for installation at its substation at St. Joseph.

Charleston Interurban Railroad, Charleston, W. Va.—A report from this company states that it plans to purchase three 300-kw. ,750-volt rotary converters.

Ashland Light, Power & Street Railway, Ashland, Wis.—Plans are being made by this company to construct a 1500-kw. turbine plant in Ashland. The Wisconsin Railroad Commission has authorized the sale of $100,000 of first mortgage 5 per cent bonds at not less than 75 per cent to defray the cost of building the plant.

Manufactures and Supplies

ROLLING STOCK

Brantford (Ont.) Municipal Railway expects to purchase one snow sweeper.

Port Arthur (Ont.) Municipal Railway is building a combination snow plow and broom in its shops.

United Traction Company, Albany, N. Y., expects to issue very shortly specifications for fifteen new cars.

Springfield (Mass.) Street Railway has ordered one prepayment car from the Wason Manufacturing Company.

Charleston (W. Va.) Interurban Railroad expects to purchase within the next thirty days one 45-ft. express and freight car.

Havana Central Railroad, Havana, Cuba, has ordered an additional 60-ton electric locomotive from the General Electric Company.

Lincoln (Neb.) Traction Company, Lincoln, Neb., has purchased one single truck snow plow from the McGuire-Cummings Manufacturing Company.

Cassville & Western Railroad, Cassville, Mo., expects to purchase within the next few months a passenger and baggage car and possibly an electric locomotive.

San Francisco-Oakland Terminal Railways, Oakland, Cal., is working on specifications for twelve new cars for its Key Route. The date on which bids will be called has not yet been decided, but probably will be about Oct. 1. The cars are to be of the pay-as-you-enter type with side entrance and low step.

Cleveland (Ohio) Railway Company has ordered from the G. C. Kuhlman Car Company eighty new cars of the front-entrance, center-exit type, equipped with Westinghouse motors. The cars are duplicates of the fifty cars recently purchased. This company is also rebuilding fifty cars which have front and rear platforms, into the front-entrance, center-exit type. The new and the rebuilt cars, together with those now in service, will make a total of 180 cars of the front-entrance, center-exit type operated by this company.

TRADE NOTES

M. H. Hovey, Consulting Signal Engineer, has changed his address to 119 West Main Street, Madison, Wis.

Pyrene Manufacturing Company, New York, N. Y., has received a gold medal award at the International Exposition at San Francisco.

Arthur E. Duclos has been made representative in charge of the new Chicago office of the Standard Woven Fabric Company, 327 South La Salle Street, Chicago, Ill.

E. R. Mason Company, Inc., New York, N. Y., announces that it is no longer acting as Eastern sales representative for the Hunter Illuminated Car Sign Company, Flushing, N. Y.

American Steel & Wire Company, Chicago, Ill., has been awarded a Grand Prize by the Panama-Pacific International Exposition for the superiority of its products and the high character of its exhibit.

F. B. Cutter Company, 50 Church Street, New York, announces that it has been appointed exclusive selling agent for the many double and single truck open and closed cars recently retired from service by the Third Avenue Railway, New York, N. Y. F. B. Cutter, general manager, was formerly with the General Electric Company and has been for a number of years engaged in the machinery business.

Western Electric Company, New York, N. Y., has received an order from the Ogden, Logan & Idaho Railway, Ogden, Utah, for one complete train-dispatching system, including thirty way-station equipments, dispatcher's outfit and attendant telephone sets and material. The railway company feels that the new system will solve its dispatching problems and serve to increase its transportation facilities.

Roller-Smith Company, New York, N. Y., has added to its list of agents the Conant Electric Company, Equitable Building, Baltimore, Md. The Conant Electric Company will handle Roller-Smith instruments and circuit breakers and Columbia meters in the territory comprising the States of Maryland, Virginia, North Carolina, part of West Virginia and the District of Columbia. Associated with S. M. Conant is C. L. Ball, both of whom are well known in this territory.

U. S. Metal & Manufacturing Company, New York, N. Y., has appointed Walter H. Evans of Chicago as Western railroad department manager. Mr. Evans was recently manager of the motor gear department of the Edgar Allen American Manganese Steel Company, Chicago, and previous to his connection with this company was connected with several electric and steam roads in the capacities of master mechanic and superintendent of motive power. Mr. Evans will make his headquarters in the McCormick Building, Chicago, Ill.

Westinghouse Electric Export Company at a meeting of its board of directors in New York on July 28 elected the following officers: President, E. M. Herr; vice-president, L. A. Osborne; vice-president, Calvert Townley; managing director, Maurice Coster; secretary, J. C. Bennett; treasurer, H. D. Shute; auditor, F. E. Craig; assistant secretary and assistant treasurer, W. H. Jones. In addition the president announces the appointment of the following officers: Manager, E. D. Mills; European manager, E. R. Ellis; assistant export manager, H. F. Griffith.

Monarch Refillable Fuse Company, Buffalo, N. Y., has purchased 150 ft. of frontage on Leslie Avenue, running north from East Ferry, Buffalo, for the construction of a new factory, which includes a new experimental laboratory for the electrical devices which this company will manufacture. The new factory will not only give the company ample space for taking care of the greatly increased refillable fuse business, but will also give enough space to install its new machinery and equipment to manufacture, under recent patents issued to the vice-president of the company, the new Monarch soldering iron.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" headlights, has secured a complete equipment order from the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind. These headlights are of the recessed dash interurban type with flange which enables them to be mounted in the present headlight cases on the hood of these cars, without making any construction change whatsoever. They will use 6-volt, 18-amp. Mogul base concentrated filament bulbs, which in test enable observers to see a man on the track at a distance of from 950 to 1100 ft. and pick up signal and whistle posts at a distance of nearly one-half mile.

S. K. F. Ball-Bearing Company of Hartford, Conn., with a capitalization of $2,000,000, was incorporated on Sept. 4 for the manufacture and sale of ball bearings. The S. K. F. ball bearing has been handled in this country since 1910 by the American S. K. F. Ball Bearing Company, a selling organization for the Aktiebolaget Svenska Kullagerfabriken, Gothenburg, Sweden. An 8-acre site has been secured in Hartford and the erection of the first building will be shortly begun. It is intended to start the plant with about 300 men who will be able to produce only a part of the bearings sold in this country, the remainder for a time being imported. The Swedish factory has grown since 1907, when 100 men were employed, until at present 3000 are employed in the home factory exclusive of employees in European branches. The special Swedish crucible steel, known as S. K. F. steel, used by the parent concern, will be imported for use in the American-made bearings. The parent concern is placing its experience, special machines and all manufacturing facilities at the disposal of the American company.

NEW PUBLICATION

The Railway Library, 1914.—Compiled and Edited by Slason Thompson. Bureau of Railway News and Statistics, Chicago, Ill. 370 pages. Cloth, $1.

This volume contains the sixth series of addresses and papers on railroad subjects, delivered or published during 1914. The articles cover such topics as valuation, taxation, railway mail pay, government ownership, and the like. Considerable space is devoted to the part railroads are playing in the present European war. The concluding section consists of the annual report of the Bureau of Railway News and Statistics, in which is presented the latest financial and statistical information in regard to American and foreign railroads.

Electric Railway Journal

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SAVINGS OF ELECTRIFICATION

The latest report of the Norfolk & Western Railway is conspicuous for its statement in regard to the advantages that have accrued from the company's recently-completed electrification of its coal-gathering division in the famous Pocahontas region of the Alleghenies. In this President Johnson says that the traffic results already obtained from the substitution of electricity for steam "indicate that the capacity of the line has been doubled and that the operating cost per ton-mile will be materially reduced." Inasmuch as the cost of the electrification, including the period of trial operation, was $3,100,000 and the electrified route mileage 29.5, it is evident that these remarkable savings have been brought about through an expenditure of but $100,000 per mile. This route, it should be remembered, includes a great number of colliery sidings, passing tracks and yards which make the cost per track-mile something like $30,000. This is a truly negligible expenditure for doubling the capacity of a line through mountain country, especially when the same expenditure reduces operating expenses.

STARTING RESISTANCE OF ELECTRIC CARS

That the high starting resistance of railway cars is negligible in its effect on energy consumption has apparently been pretty thoroughly demonstrated, a very comprehensive review of this phase of the subject having been published in a recent communication signed by F. E. Wynne. The circumstances leading to this condition might be outlined by citing the fact that the change from a state of rest to one of motion which occurs when a street-car controller is moved to the first notch is, for all practical purposes, made instantaneously, and as time plays an equal part with force in the measurement of energy it is safe to neglect consideration of the friction of rest in so far as it affects the heating and the energy consumption of street car motors. However, as Mr. Wynne points out, there are certain cases wherein more data regarding starting resistance are greatly desired. One of these is where the motors are loaded up to the limit of their starting torque, as for example, in starting a freight train on a grade. Another is that very little information is available in regard to the apparent great increase of the starting resistance of motor cars over that of trail cars, either freight or passenger. Professor Ewing's tests on one particular car, published in the issue of Aug. 14, indicated the increase to be more than 100 per cent, and if this is to be the general rule more evidence regarding the fact and the reasons for it would be well worth digging out.

STANDARDIZATION IN CAR DESIGN

The communication by N. W. Storer on the subject of low-priced rolling stock, which appears elsewhere in this issue, as well as the recently-published letter of Ernest Gonzenbach, are notable contributions to a matter that ought to be of gravest interest to the electric railway industry. Both of our correspondents are in accord on the main point at issue, and this is that standardization in car design is a reasonable possibility and would be highly profitable. Their differences are on the reasons that have prevented the introduction of standards and may, perhaps, be caused to some extent by their different viewpoints. Be that as it may, electric railway car design is paying a daily penalty for its practical barrenness of standards, and with all the advantages of close organization which the industry possesses, this is rather a serious indictment. Of course, the adoption of standards does not mean that a single complete design with fixed over-all dimensions must be agreed on and adhered to until the end of time. In fact, as was pointed out in the ELECTRIC RAILWAY JOURNAL for Sept. 12 and Oct. 31, 1914, there are many details, such as side-post spacing, roof contours and the like, which need little more than official action for their standardization.

THE CONVENTION PROCEEDINGS

As a complement to the convention issue of the ELECTRIC RAILWAY JOURNAL which formed the second section of last week's issue, a convention report number will be mailed on Oct. 9. This will be the first full report of the convention proceedings available, and it will contain even an account of the exercises held in connection with the presentation of a commemorative plaque by the exposition company to the association on Friday afternoon, Eastern time. The discussion will necessarily all be sent by telegraph, the two sections of the editorial staff working in synchronism at the ends of the line. This will be no new experience for the editors, as each week's news is printed as received nearly up to mailing time. In the meantime Secretary Burritt has sent out a large assortment of reports and papers enabling the unfortunate ones who cannot attend the convention to digest them and to prepare written contributions to the discussion. It is especially important this year that such contributions be sent to the convention, as many of those who usually participate actively in verbal discussion cannot be present. Such unsolicited communications are the surest indication of vital and unselfish interest in the association of which the convention is such an important element. There is still time to send written discussions.

THE IDEAL ELECTRIC LOCOMOTIVE The outline specification for an ideal electric locomotive, which was included by E. H. McHenry in his paper before the International Engineering Congress this week, supplies much food for thought. This is not only because of its suggestions as to the imminence of a widening of the speed range at rating for electric engines and of a system for multiple-unit control for freight trains, but also because of the timely emphasis that is laid upon the necessity for reducing track loads. Mr. McHenry proposes to limit the weight on each driving axle to 20 tons, although maintaining a tractive effort of 10,800 lb., and in so far as the latter figure is concerned it is within easy reach to-day because this proportion of weight and power has been practically equalled already. With regard to the proposed weight limit per axle it would seem that this is a problem solely of mechanical design which ought to be met without difficulty. Certainly there is every reason for its establishment, as there is no question but that the strength of the roadway has by no means kept pace with the loads that have been placed upon it by the monster rolling equipments of the past few years. The rail, indeed, bids fair to-day to constitute an effective obstacle to further growth in rolling stock design, and as the electric locomotive can successfully surmount this by reducing wheel loads it would seem only logical to establish weight limits now and thus take at least one step toward the ideal machine that Mr. McHenry describes.

THE P. R. R. PHILADELPHIA ELECTRIFICATION

The unobtrusive manner in which electric operation has been inaugurated in suburban service on the main line of the Pennsylvania Railroad out of the Philadelphia terminal is characteristic of the gradual nature of the electrifications of the future. The railroad operating department realizes the change when electric are substituted for steam locomotives, or multiple-unit trains are added to the equipment, and the engineers of the country are interested to note the passing of another milestone on the path of progress, but otherwise the event attracts little attention. The travelers directly benefited appreciate the freedom from smoke and dust, but one trip accustoms them to the new conditions. The general public is as little concerned with the Philadelphia electrification as it is with many another great but non-sensational event in industrial progress. The Pennsylvania Railroad has been fortunate in not being subject to external pressure in electrifying so that time could be taken to eliminate the defects in the equipment before beginning full operation. There has, therefore, been no haste in the work and even yet but a single train is running. That this is wise is evident from an inspection of the overhead construction in the yard where a bewildering network of contact, messenger and span wires was necessary to electrify the numerous tracks, cross-overs and switches.

When one realizes that not only must the contact wires be held in place but they must be insulated for 11,000 volts with a liberal factor of safety he gains an appreciation of what has been accomplished in Philadelphia. If "overhead" can be kept in place and insulated under these conditions it can be kept so anywhere. While a very light electric service is to be furnished for the present the overhead for the entire terminal is completed so that it will be a comparatively simple matter to extend it. For this reason and also because the present construction is the result of exhaustive experiments superimposed on the accumulated experience from other electrifications we regard the Philadelphia electrification as far more significant than the present extent of the service would indicate.

THE LONDON TRAFFIC SITUATION

The urban transportation system in London, England, is one of the most interesting that there is for a number of reasons. One is on account of the magnitude of the problems in the world's largest city. Another is that owing to the clay foundations and liberal parliamentary enactments, the construction of underground railways is comparatively inexpensive, and, in consequence, the city has more miles of underground roads than any other. A third reason is the great development of motor-bus transportation, and its sharp competition with tramway service. Another is the fact that several of the trunk-line railroads entering London divert their suburban trains or part of them from the regular terminal stations and send them into the city through the rapid transit underground railways. They thus relieve these stations from the large commuter traffic and use the rapid transit system for distribution just as several of the outlying electric lines near Chicago use the elevated system in that city as a terminal and as the Arnold commission recommended in the case of the steam roads in that city. Still another reason why the London traffic situation is interesting to American readers is because Sir Albert Stanley, managing director of the London Underground Electric Railways Company, Ltd., and of a large proportion of the other transportation systems, spent many years in this country as a transportation manager. It is the problems connected with these systems which Sir Albert discusses in a paper presented at the International Engineering Congress at San Francisco this week.

The recommendations made in Sir Albert's paper are of interest to American as well as to British readers. Without going into the financial and legal aspects of the situation deeply it might be said that not only is the ownership of the traffic facilities in diverse hands but their regulation by the authorities is similarly diverse. Parliament, the Board of Trade, the County Council, the authorities of the municipal and suburban districts, the chief commissioner of police of the Metropolitan area, and the abutting property owners or "frontagers" on a proposed route, each have something to say or some veto power in regard to the construction or operation of one or more of the three principal means of transit, namely, railroad, tramway and bus. The necessary solution, in Sir Albert's opinion, is the establishment of an independent traffic board with jurisdiction over all of the means of transit with power to act, as was recommended by the Royal Commission on London Traffic in 1907. It is interesting to remember that this recommendation of the Royal Commission was based largely upon a study of American conditions of State regulation, especially in Massachusetts and New York, where large powers had been given to the Transit Commission in Boston and the Rapid Transit Commission in New York. Finally, the paper discusses the question of fares and reaches the conclusion that with the low fares now charged on the London transit systems, and seemingly necessary owing to the British system of coinage, an expansion of traffic is imperative. This, however, is not out of the question, as a comparison of the rides per capita in Greater London, at present 271, with those in Greater Berlin, 293, and those in Greater New York, 338, shows. To pay 4 per cent on the capital now invested in the London urban railways, that is, to realize a net earning value of £1,390,000 more, after allowing for increase in expenses, requires an additional thirty-six rides per capita at the present average receipts per passenger, and this, under the circumstances, does not seem impossible.

THE NEW BEDFORD & ONSET FARE INCREASE

The fare increase granted by the Massachusetts Public Service Commission to the New Bedford & Onset Street Railway in a decision abstracted elsewhere in this issue is another gratifying indication that the right of capital to a reasonable return is receiving important and continued official acknowledgment. Here was a solvent property unable even with unusually skillful and economical management to earn more than a meager return upon the investment, amounting in fact to only 3 per cent in declared dividends on four occasions in the company's history of fourteen years. With about 44 miles of single track and a permanent tributary population of 20,366, the road has been conducted on a self-supporting basis but has been unable to set aside a sufficient depreciation fund from earnings or to afford more than a pittance of reward to those who put their money into the property. In fact, the owners have waited ten years after the last increase in rates for traffic to develop to the volume requisite to compensate their faith in the enterprise.

Readers of the abstracted decision cannot but be impressed with the remarkably clean bill of health which the commission gave the management in its thorough inquiry into the handling of the property from its inception to the end of the 1915 fiscal year. Running through the finding one notes the constant efforts of the management to control expenditures and to increase revenue by every legitimate means. The company's new arrangements for power supply from the New Bedford (Mass.) central station company, with provision for the resale of energy above its own requirements to the Marion Gas Company are a bit unusual in their economic advantages. These and the policy of having car painting done and of purchasing supplies economically at the shops of the Union Street Railway in New Bedford and the advantageous traffic arrangements and executive direction common to the two companies were regarded by the commission as evidences of careful management. Few cases before the board have afforded so little ground for adverse criticism of methods of handling the property, and the clearly demonstrated inability of the company materially to increase its net earnings by further reduction in expenses was no mean factor in the commission's favorable decision, based as it was upon a minute and extended analysis of operations.

It is noteworthy that under the new rates the cash fare over the main line from Fairhaven to Monument Beach will be 48 cents, or 2.18 cents per mile, and that with the tickets to be sold at twenty for $1, this rate per mile becomes 1.8 cents. On the route from Middleboro to Monument Beach the cash fare will now yield 1.69 cents and the ticket rate 1.41 cents per mile. The commission allowed a main-line rate of 1.67 cents per mile in the recent Blue Hill Street Railway case and 1.75 cents on the Norfolk & Bristol road. It has been pretty well exploded now that a rate of 1 cent per mile or even of 1.25 cents will meet the financial needs of a carefully managed road of the rural and semi-interurban type such as the New Bedford & Onset and many other lines in Massachusetts, and after all, the per mile rates mentioned are fairly low in comparison with the cost of transportation by other agencies. The commission wisely refuses to carry the per mile comparison too far, however, in view of the difficulties of harmonizing the differing zone lengths on the so-called main line and Middleboro branch, and in its conclusions properly treats the road as a complete entity.

Time will be required to show the effect of a 6-cent fare unit on the traffic in the New Bedford & Onset territory, as in other cases. It is hoped that about $20,000 more revenue per year will result from the changes in rates, but the commission points out that if due provision is made for depreciation, the company can hardly realize a 6 per cent return on its investment even if the falling off in traffic as a result of the 6-cent unit is small. The probabilities are that in no great length of time the communities affected will respond to the increased rate without more than a temporary lack of patronage. Certainly the large summer population served in the Buzzards Bay district is unlikely to balk at the change in view of the thoroughness with which its necessity has been set forth by the commission, and the sale of tickets on the reasonable terms offered is sure to commend itself to both regular and summer patrons, although the proportion of cash fare passengers will doubtless decrease, at least temporarily, following the inauguration of the new rate.

Space will not permit further discussion of the case other than the remark that it called for a valuation by the commission's engineering staff, in view of the acquisition of a part of the property in past years on terms resulting from a receivership on that section of the system. The engineering and accounting studies made by the commission in these fare cases are valuable features of the proceedings, and throw not a little light upon the standards of technical administration which the board views with favor.

The Portland & Lewiston Interurban

This 40-Mile Line, Which Has Recently Been Put in Operation in Maine, Was Built Without the Issue of a Single Bond or Share of Stock

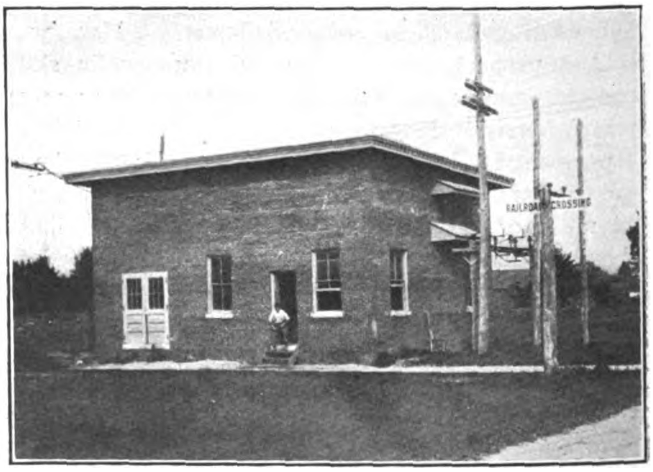
A year ago on July 2 a new high-speed electric line was opened for service between the cities of Portland and Lewiston, Me., by the Portland & Lewiston Interurban. The road is single track, occupying a private right-of-way about 30 miles in length and 50 ft. wide, its terminal connections covering 5 miles more in the cities of Portland, Auburn and Lewiston. The road was built without the issuance of a single bond or share of stock by Messrs. Libbey and Dingley of Lewiston, about four years being required for completion. Work was carried on only during the open season, with suspension of construction operations during the winter. The road provides an air-line route between its terminals and offers the public a schedule of one hour and fifteen minutes with ten stops over the 35 miles between Monument Square, Portland, and Lisbon Street, Lewiston, compared with a running time of three and one-half hours via the Portland-Brunswick trolley route. The running time between terminals in the center of each town is about the same as that of the Maine Central Railroad, and the fare on the new interurban is 75 cents, compared with 90 cents on the steam road.

Right-of-Way

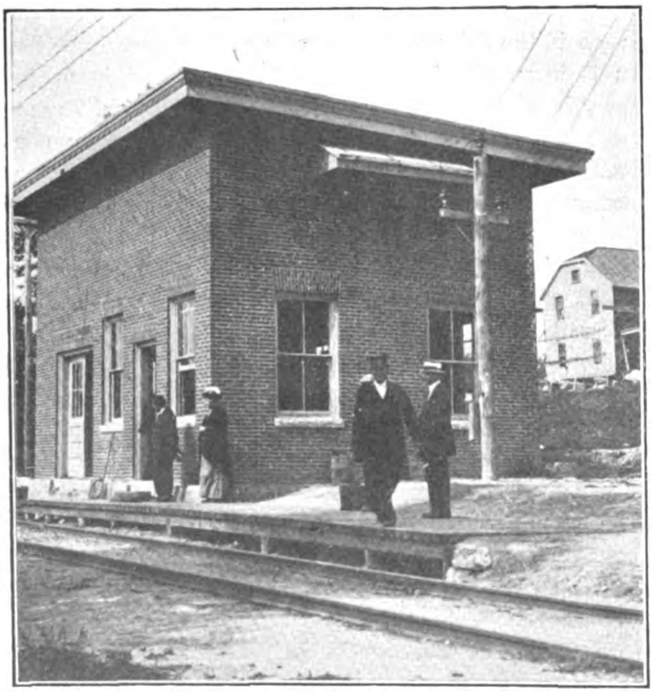
The track is of 70-lb. open-hearth T-rails laid in 33-ft. lengths with staggered joints and twin terminal copper bonds of American Steel & Wire Company's make. The company uses Duquesne joints, and the ties are of chestnut, 8 ft. 6 in. long, 6 in. x 8 in. in cross-section and laid 24 in. apart on centers. The conductivity of the bonds is equivalent to 2 ft. of rail. Gravel ballast was used throughout the private right-of-way. About 1 mile of the company's own line is located on the highway. The maximum grade is 4 per cent and the sharpest curve is 780 ft. in radius. Tie plates are used throughout. Eight reinforced-concrete bridges were built for the road, the largest being 200 ft. long, over the Presumpscott River. Two of the other bridges are 100 ft. long each. They were designed by Fred T. Ley & Company of Springfield, Mass., who also supervised their erection. All cattle passes on the road are of reinforced concrete, the pass being fenced by wire close to the top of the fill.

Power Supply

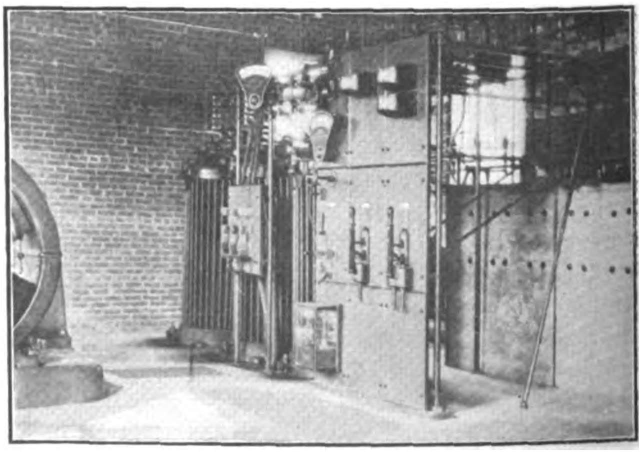
The power supply for the cars is 650 volts direct current, distributed from three rotary converter substations, located at Danville, Gray and West Falmouth. The generating plant is located at Deer Rips, on the Androscoggin River, and is supplemented by a steam turbine auxiliary station in Lewiston, both of these installations belonging to the electric service company of Lewiston and Auburn, which is owned and operated by the Androscoggin Electric Company. From Lewiston to Danville substation, a 10,000-volt, 60-cycle, three-phase line of No. 1 copper is used on account of the desirability of transmitting current at moderate voltage through Lewiston and Auburn, which occupy opposite shores of the Androscoggin River. At the Danville substation the pressure is raised to 33,000 volts for transmission to Gray and West Falmouth, this line also



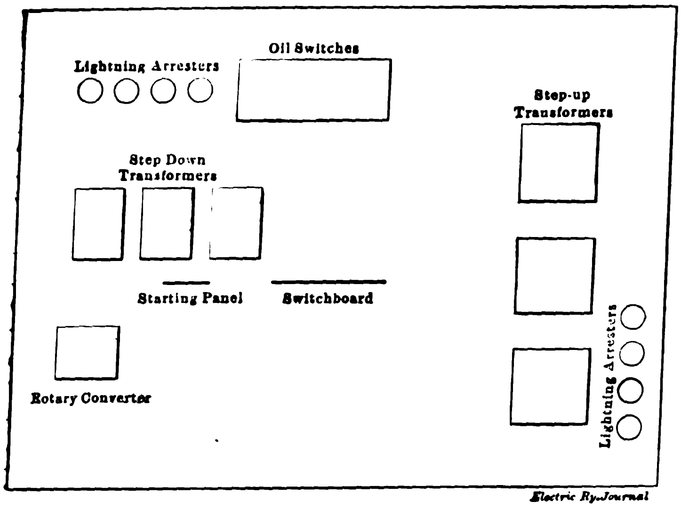
PORTLAND & LEWISTON—DANVILLE SUBSTATION



PORTLAND & LEWISTON—COMBINED PASSENGER STATION AND SUBSTATION AT GRAY



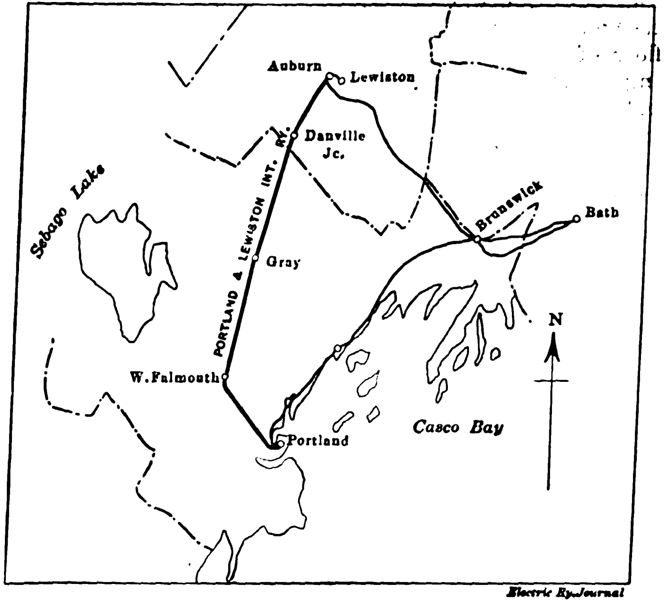
PORTLAND & LEWISTON—INTERIOR VIEW OF DANVILLE SUBSTATION


Lightning Arresters
Oil Switches
Step-up Transformers
Step Down Transformers
Starting Panel
Switchboard
Rotary Converter
Lightning Arresters
Electric Ry. Journal

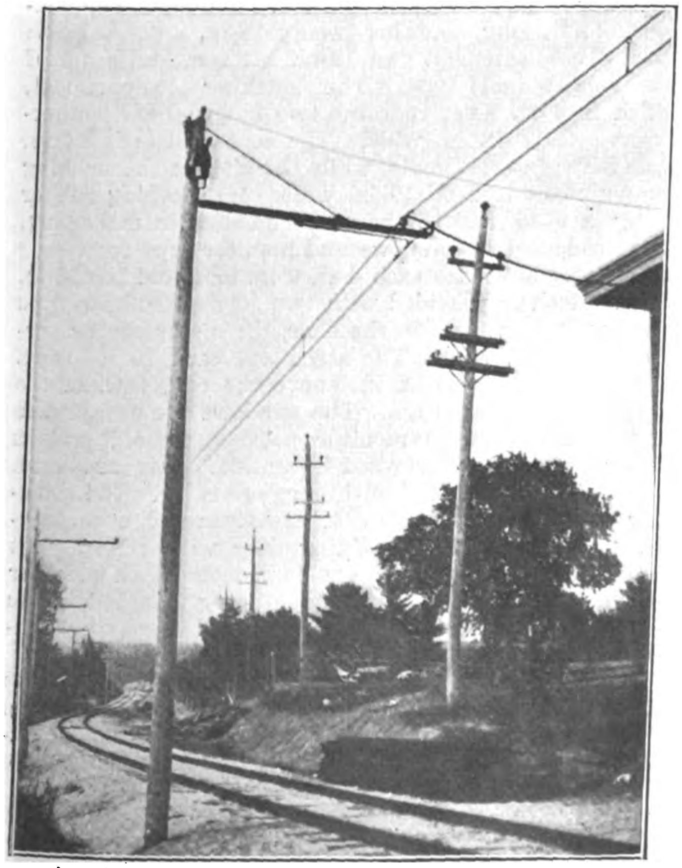
PORTLAND & LEWISTON—GENERAL ARRANGEMENT OF DANVILLE SUBSTATION

being a three-phase installation with No. 2 copper conductors mounted on pintype insulators and supported on 40-ft. chestnut poles. The 33,000-volt conductors are installed in a 42-in. equilateral triangle and the 10,000-volt line conductors have a 24-in. spacing. The transmission poles are set 6 ft. deep and are separate from the poles carrying the trolley brackets. No ground wire is installed. The high-tension lines loop through the intermediate substations.

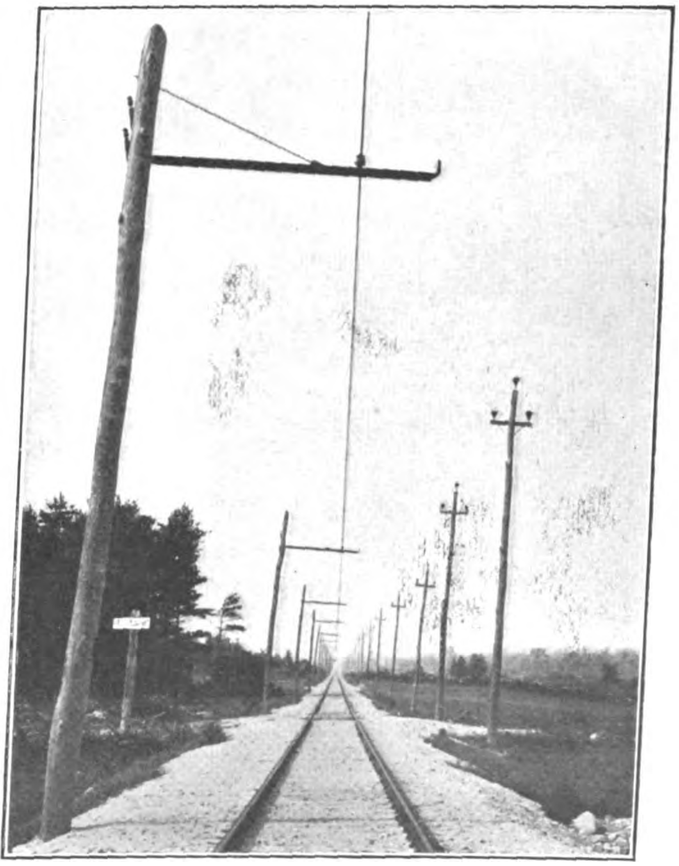
The Danville substation contains a 300-kw. rotary converter, three '100-kw. step-down transformers and three 200-kva. step-up transformers feeding the high-tension line, with the usual oil switches and lightning arrester equipment. The apparatus is housed in a brick building 27 ft. x 40 ft. in plan, with a single operating room 20 ft. high. The roof is of mill construction, pitched toward the rear, and the floor is of concrete. The 10,000-volt line from Lewiston enters the substation on the north side, passing through choke coils and terminating on horizontal buses carried on a pipe frame at the rear of the operating room. Taps are taken from these buses through disconnecting switches to automatic oil switches, one set being provided for each transformer bank. From the transformer secondaries in one bank leads are run under the floor in conduit to the rotary, low-voltage switching connections being provided on a rotary starting panel near the main switchboard. The other transformer secondary connections


Auburn
Lewiston
Danville Jc.
Sebago Lake
PORTLAND & LEWISTON INT. RY.
Gray
Brunswick
Bath
N
W. Falmouth
Portland
Casco Bay
Electric Ry. Journal

PORTLAND & LEWISTON—ROUTE OF RAILWAY WITH CONNECTING LINES

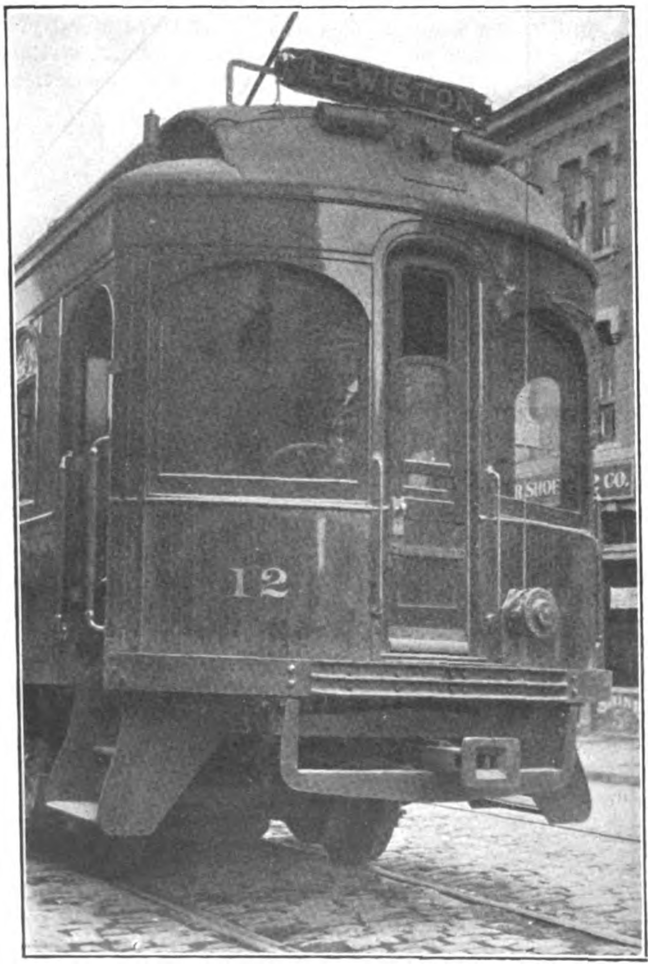


PORTLAND & LEWISTON—CATENARY TROLLEY ON CURVE



PORTLAND & LEWISTON—TYPICAL TANGENT TRACK lead out of doors to the southbound 33,000-volt line, electrolytic lightning arresters being mounted on the floor of the substation on the south side of the operating room. Horn-gap arrester connections are made outside the building, and the outgoing high-tension lines are hooded as they pass through the wall and attached to insulators on a cross-bar before being carried to the ordinary line poles, to insure increased mechanical stability. The second high-tension line shown in one of the illustrations is a power and lighting circuit having no connection with the railway service.

The main switchboard in the Danville substation consists of three panels. One of these is devoted to the direct-current side of the rotary converter and contains the usual equipment of a railway feeder panel. The others carry the oil switch handles, overload relays and ammeters required in handling the 10,000-volt circuits within the building, no oil switches being provided on the high-tension sides of the transformers feeding the line leading to the Gray and West Falmouth substations, although disconnecting switches are installed with the substation, and at the other substations this line may be cut open by oil switches. Electrolytic lightning arresters are also provided for the incoming 10,000-volt line at Danville. The rotary is started on 320 volts. The 10,000-volt oil switches are mounted in concrete cells occupying a total space of 5 ft. x 3 ft. 4 in. x 8 ft. 6 in., a clearance of 31 in. being allowed between the wall and the switch cells on the east side of the substation. Short levers connect the oil switch handles on the front of the main board with the cells, as shown in the interior view. The substation is lighted by twenty 16-cp. lamps mounted along the wall 10 ft. above the floor. Each of the other substations contains a 300-kw. rotary and three 100-kw. step-down transformers. General Electric equipment is used throughout. The Gray substation is 8 miles from that at Danville and the West Falmouth substation is 7½ miles south of Gray.



PORTLAND & LEWISTON—END OF CAR SHOWING DOOR IN VESTIBULE

OVERHEAD CONSTRUCTION

The trolley is installed with catenary suspension. To save line material the messenger wire is a No. 0000 copper conductor used as a feeder, the trolley, which is also of No. 0000 size, being attached to it by sherardized steel hangers 30 ft. apart. The trolley poles are 30 ft. long and are of chestnut, the spacing being 120 ft. Bracket suspension is employed, the messenger wire being laid upon porcelain insulators attached to 3-in. I-beams 8 ft. long, the bracket being stiffened by a ⅞-in. steel tie rod clamped to the pole. On curves a pull-off rod is used between the trolley and the bracket, as illustrated in one of the cuts. The use of a combination feeder-messenger wire saved the purchase and installation of a steel messenger, feeder insulated covering, cross-arms, brackets, tie wires and insulators. A private telephone line is carried on the trolley poles, and each car carries a portable Western Electric telephone set with jointed contact rod permitting the crew to communicate with headquarters at all times. The brackets are equipped at their outer ends with hooks to hold the messenger wire on the arms in case of a broken insulator. Six d.c. lightning arresters are installed per mile.

CARS AND EQUIPMENT

Eight passenger cars are at present owned by the company. These are of the double-truck, solid vestibule type; two were built by the Wason Manufacturing Company and six by the Laconia Car Company. The over-all length is 46 ft. and the width outside 8 ft. 8¾ in. The cars are of the semi-convertible type and are divided into two compartments in addition to the vestibules, one compartment being assigned to smokers and the other to passengers in general. The main compartment, 30 ft. long, contains twenty 19-in. x 31-in. green plush cross-seats and two 18-in. x 32-in. end seats of the longitudinal type. The smoking compartment, which is 6 ft. long, contains two longitudinal leather-covered seats 18 in. wide. The center aisle is 24 in. wide between cross-seats, while the aisle in the smoking compartment is 4 ft. 10 in. wide. Interlocking rubber tiling is used, and the cars are finished in mahogany, with leaded glass windows and monitor type roof.

The vestibules are each 4 ft. 6 in. long and 3 ft. 4 in. wide. Each is provided with two sets of Pullman type steps with trapdoors in the floor, three steps being provided in each case. The steps are each 10 in. wide. The bottom step is 22 in. above the rail, each of the risers being 10 in. high. The windows are designed to slide vertically into monitor pockets, no sill pockets being provided. Heywood reversible seats are used, and the cars are fitted with baggage racks. The smoking and main compartments are separated by a bulkhead having a central sliding door with ribbed glass panels. The end of each seat is provided with a leather ticket holder, eight holders also being attached to the inside sheathing, with four more in the smoking compartment above the seats.

The car lighting is accomplished by two 60-watt lamps in each vestibule hood above the steps, three lamps of this size in the smoking compartment and sixteen in the main compartment. The last-named are installed in three parallel rows.

Each car is equipped with four Westinghouse 304, 90-hp. motors, with type HL automatic air multiple-unit control, Westinghouse straight-air brakes and Baldwin and Brill trucks. The total weight of the car is 34 tons, and the motors are geared to a maximum car speed of 59 m.p.h. on the level. The wheels are of cold-rolled steel, 36 in. in diameter, with a standard M.C.B. flange and a 3½-in. tread. Each car is provided with two trolleys for double-end operation. Consolidated car heaters, Crouse-Hinds luminous arc headlights, and Westinghouse 15-B master controllers. In the front of each vestibule is a small door with a latch which can be opened from the outside only, to facilitate operating cars in trains.

Two brick carhouses, each 210 ft. x 75 ft., have been built at Portland and Lewiston for the use of the interurban. Each has four tracks with one inspection pit and concrete floors, and car-washing facilities.

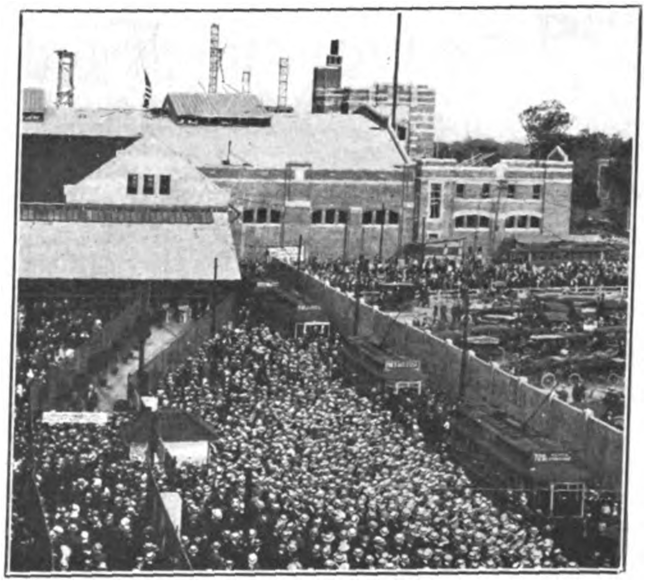
There are no 5-cent fares on the interurban line and at present a two-hour schedule is being maintained. The schedule of fares is as follows from Lewiston: Littlefields, 10 cents; Danville Junction, 20 cents; Upper Gloucester, 25 cents; Lower Gloucester, 30 cents; North Gray, 40 cents; Gray, 45 cents; West Cumberland, 60 cents; West Falmouth, 65 cents; Deering Junction, 70 cents; Portland, 75 cents. In the month of July, 1914, the company carried 20,000 passengers. The population of the three terminal cities is 106,000.

The officers of the company are: President, William T. Cobb of Rockland; general manager, Fred D. Gordon of Lewiston.

Handling Traffic at Largest Baseball Park

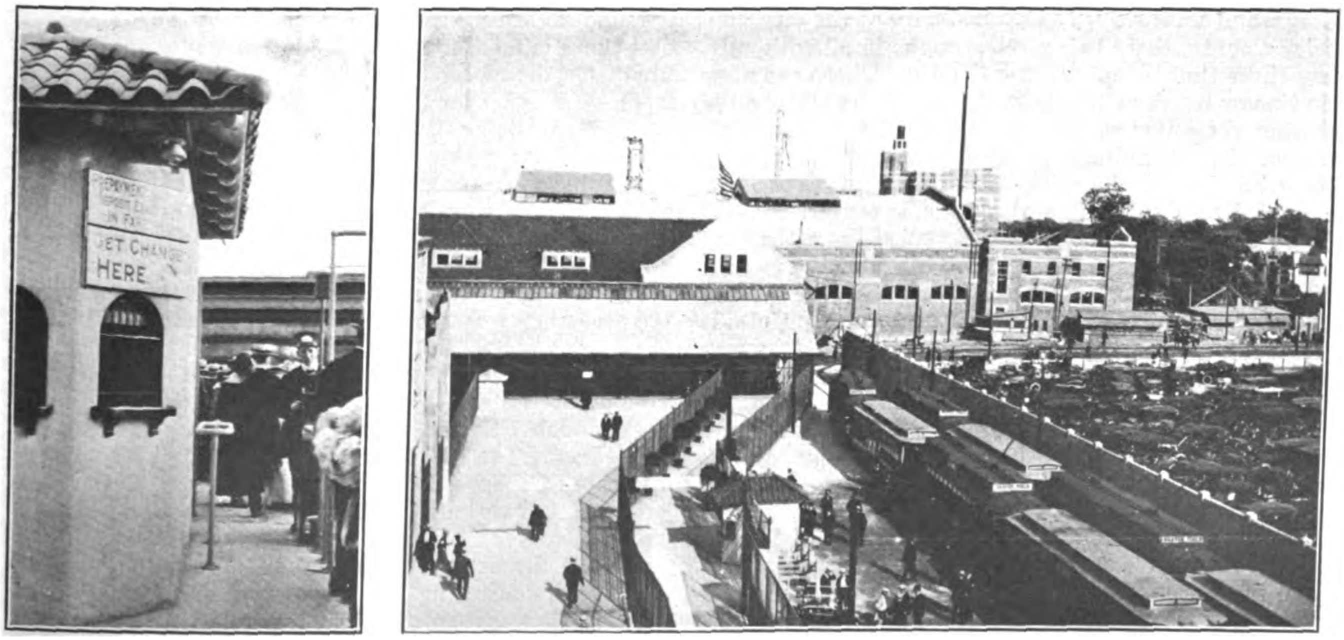
Arrangements Made by the Boston Elevated Railway to Accommodate the Immense Crowds Which Will Visit This Stadium

What is said to be the largest baseball park in the world was opened for business on Aug. 18 at Boston, Mass. On this occasion there was an attendance of almost 50,000 fans. The park, which is locally known as "Braves' Field," has been provided with transportation facilities consisting of a loop surface track that extends into the property from the Commonwealth Avenue line of the Boston Elevated Railway, and that company has arranged for the rapid handling of short-headway service, as illustrated in the accompanying views. Just outside the ball park proper and parallel to ramps leading from the grandstand is an inclosed area about 600 ft. long and 50 ft. wide, bordered on one side by a wire screen fence 10 ft. high and on the other by a concrete wall 12 ft. high and 6 in. thick. This area is utilized as a loading space and it contains two tracks capable of berthing about twenty cars of the semi-convertible, double-truck type.



BOSTON BASEBALL TRAFFIC—CARS AT "BRAVES' FIELD" ON OPENING DAY

Patrons of the game who desire to leave the park by trolley walk down one of the ramps to a prepayment station where change is made and then drop their fares directly into motor-driven International registering fare boxes which are located upon the platform, where cars are in waiting. Ten of these fare boxes are in service, and for the two prepayment stations there are six change windows, besides three more at other points along the platform. The leads for each fare box motor are run in conduit under the platform and are brought out at the box through a T-shaped fitting in one of the adjoining pipe standards. The prepayment stations are attractive semi-octagonal structures of concrete, 4 ft. 10 in. x 9 ft. 2 in. x 8 ft. in dimensions, with red tiled roofs. Incandescent lamps of 23 watt rating are installed in porcelain reflectors above the change windows for use in games that last until the late afternoon in the spring or fall.



BOSTON BASEBALL TRAFFIC—VIEW OF PREPAYMENT STATION AND BOOTH

International Engineering Congress at San Francisco

Traction in Its Broad Engineering Aspects Was Discussed at the Engineering Congress This Week by Sir Albert Stanley, E. H. McHenry, W. Barclay Parsons, Arnold Stucki, George H. Pegram, Prof. A. F. Ganz and Other Eminent Engineers

The International Engineering Congress of 1915 was held in San Francisco from Sept. 20 to Sept. 25. Partial summaries of the program were given in the issues of the ELECTRIC RAILWAY JOURNAL for Aug. 21, page 329, and Aug. 28, page 342. The congress was held under the joint auspices of the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers and the American Institute of Electrical Engineers. The proceedings of the congress will be issued in twelve volumes, to two of which each member is entitled, the index volume and any other one.

The following abstracts cover some of the papers on topics related most closely to the electric railway field.

LONDON TRAFFIC IN 1913

In this paper Sir Albert Stanley, London, England, gave a résumé of traffic conditions and traffic facilities in that city. He outlined first the geographical conditions existing in London, which is composed of a central core with a small permanent population but surrounded by the Administrative County of London with an area of 112 square miles and a population density of sixty persons per acre. Around the County of London lies a further ring known as Greater London with an area of 576 square miles and a density of population approximating seven and one-half persons per acre. Beyond this is a population clustering around the stations of the railways running out from London, yet looking toward London for its interests. This is known as the outer suburban ring. It has an area of 2115 square miles with a density of population of less than one person to the acre.

The author then discussed the traffic facilities, which include railroads, both underground and main-line, tramway or street car systems, and omnibus lines. The underground lines serve the central core of the city and London County, there being 180 stations in all with only thirty-three that lie outside the County. There are nine main-line or trunk railroads, which serve the whole city, including the outer suburban ring, with a total of 574 stations. The terminals of all of these railroads are detached and, with the exception of Charing Cross, are not located at a really immediate traffic center.

The tramways are practically excluded from the central area for reasons of convenience based on the unsuitability of the narrow thoroughfares, but in the County of London 145 miles of tramway are operated. Outside of London County there are 201 miles of tramway which have 2780 cars. None of these lines enter the City of London and the interurban railway is unknown. The motor-bus industry has spread a network of routes all over the area covered by Greater London and to parts beyond in the outer suburban districts. The number of buses owned approximates 3500.

With regard to the control and regulation of London traffic the author discussed at length the procedure involved in the construction of the railways and the tramways and in the licensing of motor buses. He outlined also the consequences of the unco-ordinated character problems of the city's traffic as being the isolation and lack of correlation between the urban and trunk-line railway systems, the conflict between the tramways and the motor buses, and the exposed position of the motor buses together with the conditions that would be attached to a franchise if one was obtained for them. To solve these problems the Underground Electric Company of London has undertaken to bring a number of the different facilities under a single control, and today it is responsible for the operation of 61 route-miles of electric urban railway, 123 route-miles of tramway, and practically all the motor buses of London.

Data regarding the volume of London traffic in 1913 were cited both in relation to the traffic facilities and in relation to the population, the total being divided almost equally between the railways, tramways and the motor buses and the average number of journeys per head of the population working out at 271 per annum. Fluctuations in the volume of traffic were also discussed, seasonal variations being said to be not of major importance but the fluctuations in the course of the day being extreme. The latter are accentuated because of the workman's tickets at a reduced fare which is established by law on the railways and tramways, these giving a morning peak of extraordinary severity which is escaped altogether by the motor buses.

With regard to the improvements in railway capacity, the introduction of electric traction and automatic signaling was covered briefly, together with the results of an elimination of grade crossings at junctions which had been undertaken about the year 1910. The problem of the rush hours, however, was not acute owing to the numerous lines of approach, and the author saw no reason to anticipate that density of traffic would ever become a critical factor in London.

The fare problem in London was discussed at considerable length, the traffic being classified and distributed according to the rate of charge. This showed that there is no "fares system" in London at the present time. On the motor buses more than 99 per cent of the traffic is carried on a straight ordinary fare, the average receipt being 2.66 cents per passenger. On the tramways there are the workmen's reduced fares and the ordinary traffic corresponding to that of the motor buses, the former being almost 10 per cent of the whole. Variable fares are the rule, the average receipt approximating 2 cents per passenger. On the railways there are three distinct classes of passengers, namely, the statutory workman's traffic, a commuter traffic traveling on special tickets and the ordinary traffic, the latter covering 76 per cent of the whole. The average receipt of the whole traffic on the underground line of the London Electric Railway alone was 3.36 cents per passenger. The key to the fare situation of London is the rate of charge for ordinary passengers, as the fares charged to workmen and other classes are placed in relation to the fare of the ordinary passenger.

In the discussion of the subject the author took up the factors affecting the amount of the ordinary fare, the existing system of coinage in relation to fares, and the cost of operation per passenger. The existing scale of fare was commented on at length. The author then took up the possibility of equalization of fares, speaking of the existing excessive differentiation between different rates of fare and upon the characteristics of a good fare system.

In conclusion, comment was made upon the heavy capitalization and low return from the traction enterprises in London, the only real remedy for this condition being expansion of traffic, and to this end the policy of advertising for traffic had been undertaken. This had been generally successful, but the solution of the London problem could never be conclusive unless to the detailed solution of the commercial and operating problems of the movement of traffic there could be brought a spirit of co-ordination and co-operation. Only in this way could the development of the traffic facilities be carried with economy, and the traffic conserved to afford opportunity for dividends on the money already sunk in their provision.

ELECTRIC MOTIVE POWER IN THE OPERATION OF RAILROADS

In this paper E. H. McHenry, McHenry & Murray, consulting engineers, traced the development and outlined the present status of heavy electric traction. He commented at length upon the advantages and limitations of electric motive power and discussed its adaptation to traffic requirements.

In connection with the future possibilities and tendencies of electric traction he spoke of the desirability of speed-torque control, believing that a better utilization of the possibilities of the electric locomotive is probable through this means. The radical difference in the speed-torque characteristics of steam and electric engines involves the necessity for closely designing electric locomotives for the service to which they will be assigned, as they cannot be operated above the critical speed corresponding to their horsepower rating without serious reduction of capacity. Nor can their effective adhesion be continuously utilized at lower speed without exceeding safe temperature limits.

However, a promising opportunity is presented for reducing and limiting the present rate of expenditures incurred for maintenance of equipment and for maintenance of way and structures by reducing axle loads of electric locomotives. The strength of rails and tracks on steam railways has not kept pace with increasing wheel loads, which, if not dangerous, certainly involve very costly construction standards and track maintenance. While the recent development of engines of the Mallet type permits lighter axle loads for equal tractive power it is not likely that such machines will long hold the field against their electric competitors in view of their disabilities of great weight, high machinery friction and costly repairs.

The author considered it probable that some form of multiple-unit control will be developed for the operation of freight trains. This would relieve and distribute the present excessive strains on draft rigging, tracks and bridges. The necessity for such equipment is close at hand in connection with similar requirements for electro-pneumatic brake control and the growing need for better means of communication throughout the length of great modern freight trains.

A set of specifications were submitted which were considered to provide ideal characteristics for an electric locomotive. While these were seemingly difficult of attainment there were no inherent difficulties in their way, and the author considered that such qualities would soon be forthcoming should the commercial demand for them become insistent. These ideal characteristics are shown in the accompanying table.

The author then took up the economic conditions suitable for the application of electric traction, covering such subjects as yield on investment, train frequency and speed, competitive conditions, multiple track levels, real estate and land values, track capacity, legislation, economic comparisons of steam and electric conditions, train mileage, helper engine service, terminal, yards and tunnels, length of division, engine fuel and repairs. In connection with this he cited a rule-of-thumb method for quick approximation of conditions suitable to electrification, to the effect that the fixed charges of an electric installation should not exceed one-half of the cost of engine fuel and engine repairs under steam operation plus 10 per cent.

Variable speed-torque control.	
Electric braking and power regeneration.	
No reciprocating parts.	
Rigid wheelbase not exceeding	8 ft.
Number of axles	Draft rigging limit
Weight on driving axle, per axle	40,000 lb.
Tractive power, 27 per cent adhesion per axle	10,800 lb.
Horsepower, continuous, per axle	720 hp.-864 hp.
Maximum speed, full traction rating	25-30 m.p.h.
Horsepower per ton weight on drivers	36 hp.-43 hp.
Horsepower per ton of total weight	30 hp.-36 hp.

The ratio of coal consumption of steam and electric engines was stated to vary in different classes and conditions of service, but as ascertained by experience on the New Haven road the ratio in passenger service is approximately 1 : 2, in freight service 1 : 2½ and in switching 1 : 3. Under normal conditions the cost of repairs per engine-mile will vary between one-third and one-half of the cost in similar service.

In conclusion the author stated that there were many existing opportunities for capital investment in electrification upon a large scale which will earn from 20 per cent to 10 per cent with reasonable certainty. There is little reason to doubt a continued development and further expansion in the field as soon as the financial and legislative conditions permit. The paper concluded with an extended bibliography on the subject.

RAILWAYS

This subject was discussed by W. Barclay Parsons in most comprehensive detail, the author tracing the development of steam traction from the time of its inception up to the present. Statistics covering the railway track mileage in existence in the various countries of the world were submitted in tabular form by decades from 1830 to 1910, this being supplemented by data which included consideration of area and population with regard to railway mileage.

With regard to the details of operation tables were submitted showing the length of line, capitalization, equipment, revenues and expenses, number of passengers carried, number of tons of freight hauled, average number of employees, etc., for the important countries of the world, these figures also being summarized for each decade since the introduction of the railway. This data showed the great extent of railways in the United States with regard to total figures and indicating in a most striking manner the way in which the railways of the United States exceed those of other countries in the volume of their freight traffic. This superiority, however, does not extend to the volume of passenger traffic either in the total number of passengers carried or in the number of passengers carried per mile of line, but does exceed any of the other countries in regard to the total number of passenger-miles. Data regarding the receipts per passenger-mile and per ton-mile were also submitted in detail, these showing that the cheapest travel is found in India and the most expensive in the United States. When the receipts from freight per ton-mile are considered India, Canada, Japan and the

United States are close competitors for the lowest charge.

Statistical tables regarding the development of the steam locomotive and the freight car were also submitted, including a particularly interesting curve showing the number of cars of various capacities in service in the United States by years from 1902 to 1914. This showed a constant increase in the number of 100,000-lb. cars, an almost constant increase in the number of 80,000-lb. cars, and a decrease in the number of 60,000-lb. cars since the year 1908. The 50,000-lb. and 40,000-lb. cars have decreased steadily since 1902. The subject of gage for track rails both in the United States and abroad was also discussed in considerable detail.

Elaborate statistics for the last four decades regarding the number of passengers and employees killed and injured on railroads were also included, the figures for the United States standing out with totals that, without explanation, are appalling, the number of injured increasing in a much higher ratio than the increase in killed. However, this does not mean that there has been so great an increase in persons injured but rather an increase in the number of injuries reported.

In regard to the matter of ownership and regulation the author stated that, while there was a great diversity in practice throughout the world, undoubtedly there was a steady tendency toward government ownership, or at least more rigorous government control. When railways were first projected in England and in the United States they were regarded much as turnpike enterprises —purely private concerns with no thought of participation by national or local government, either as part owner contributors or controlling agents. This policy, except as to some form of government control, has been adhered to in the United Kingdom but in no other country. There followed a statement covering the titles and powers of the various commissions in existence in the different States of this country which have jurisdiction over railways. In a discussion on taxation it was pointed out that, notwithstanding their private ownership and public regulation, the railways contributed to the State treasuries more than 50 per cent as much as was paid out in dividends during the year 1914, a ratio that has steadily increased since the year 1904.

TRACK AND ROADBED

In this paper George H. Pegram, chief engineer Interborough Rapid Transit Company, presented in tabular form data regarding the track construction of a number of prominent steam and electric railways, accompanying this with cross-sectional elevations of track to show the various arrangements of ballast and drainage. After briefly discussing the different designs the author took up the subject of cross-ties and fastenings in considerable detail as they constitute the largest item of track expense and conditions affecting their use are rapidly changing. He stated that the hardwood untreated cross-tie probably makes the best track that can be devised owing to its elasticity, facility for making fastenings, resistance to displacement in the ballast, insulation of electric currents and, especially, its ability to resist destruction by derailed wheels. It is harder, stronger and tougher than a treated tie of equally good material. However, the use of sawed cross-ties treated with creosote or zinc chloride is desirable in most cases, as this leads to the greater conservation of the timber supply. Tie plates should be used on all treated ties, these preferably being designed with a flat bottom so as not to cut into the tie and allow the entrance of water. Screw spikes are necessary with ribbed tie plates but time and experience are still wanted to prove finally the merits of the screw spike as compared with the cut spike. Cut spikes, when used with treated ties, should be driven in bored holes 7/16 in. x 4 in. but with hardwood untreated ties should be driven without previous boring. The present tendency is to use four-bolt joints, but six-bolt joints will ultimately prove better. In either case the bolts should be made of steel with a high tensile strength. Anti-creepers should be used on all tracks having one-way traffic, particularly on grades.

The author also advocated the use of rails of small section as these distribute the load over a poor roadbed with less proportionate stress because of greater flexibility and because the rail can be made of better quality, and submitted data to indicate that the performance of heavy sections from 85 lb. to 100 lb. is not as good as that of lighter sections ranging from 72 lb. to 80 lb. He considered that more attention should be given by the railroads to securing better wearing rails and that the carbon content of open-hearth rails can be increased to from 0.72 to 0.85 inasmuch as the phosphorous contents can be made considerably less than 0.04. He suggested also that it might be wise to lay rails normal to the coning of the wheel tread rather than normal to the axle, as at present, and thus getting more central pressure on the head.

In general the author considered that the mills were alive to the necessity for producing better rails and that it was in the mills that improvement must be made. The paper concluded with brief comments on alloy steel rails and on the composition of conductor or third-rails, a carbon content of 0.15 for the latter being possible without raising the conductivity ratio with copper above 7, thus giving a harder, more easily handled rail.

EFFECTS OF ELECTROLYSIS ON ENGINEERING STRUCTURES

This paper, which was presented by Albert F. Ganz, M.E., professor of electrical engineering, Stevens Institute of Technology, is an exceptionally complete treatise on the results of electrolytic action on various structures and the remedies that could be applied without making extensive changes in the near-by electric distribution systems. With regard to the effect of electrolysis on electric railway tracks and on iron or steel structures supporting them the author stated that, in future construction of elevated and tunnel structures, every precaution should be taken to maintain as high a resistance between the tracks and structure as possible. Where desirable, connections between structure and track may be made through suitable resistance at neutral points in order to avoid excessive potential differences between track and structure. These connections, however, should not under normal conditions carry substantial currents. Where the resistance between structure and track is low and cannot be adequately increased the most practical way to reduce the shunting of current through the earth is to reduce the track voltage drop.

With regard to the effect of electrolysis on underground lead-covered cable systems the author advocated the use of insulating joints installed in building laterals directly inside of the building wall. The cable ducts also should be constructed so as to be as nearly water-proof as possible and should drain to the manholes, the latter being drained to sewers wherever practicable. For main cable runs insulating joints may be installed in special cases to break up the electrical continuity of the lead sheath, but such joints must be installed only with great caution, and only where they do not cause the sheath on one side of the joint to become dangerously positive. Insulating joints cannot be generally applied to the sheaths of cable networks.

In discussing the effect of electrolysis on underground systems for gas or water the author pointed out the limitations of the drainage system as compared with its efficacy for use with cable sheaths. He advocated the installation of insulating joints at the entrances of pipes to carhouses and, in some cases, the use of insulating coverings of adequate thickness, although he considered the latter to be actually dangerous unless they were perfect at all points. He opposed metallic contacts between pipes and railway tracks or other structures of metal, such as bridges.

With regard to steel foundations of buildings and reinforced-concrete structures insulating joints were recommended for all pipe and cable sheaths in connecting the structure to outside piping systems. Damage to reinforced-concrete structures requires special situations; for example, where stray current is brought in by way of a service pipe or where there is a direct contact between the reinforcing steel and one side of a grounded d.c. lighting system. While negative connections to the reinforcing steel will prevent corrosion by electrolysis it may result in destruction of the bonds between the reinforcing and the concrete, as this results when current flows from concrete to steel.

A brief outline of the status of electrolysis in Great Britain and Germany was included in the paper together with a discussion on the probable future tendency in electrolysis mitigation, support being given to the insulated return feeder system in the latter section. The paper closed with a bibliography covering the subject.

SIGNALS AND INTERLOCKING

The author of this paper, Charles Hansel, member American Society Civil Engineers, discussed the use of a.c. track circuits for signals, stating that the development of the a.c. signal marked an epoch in safe and economic railway operation. He spoke also of the importance of the development which came with the introduction of the upper quadrant semaphore signal and commented at length upon automatic train control.

He considered that the use of an automatic control system as an auxiliary would constitute a prominent forward step which would increase the unit of safety even though but one locomotive and but one block were equipped. It is unnecessary to have a definite percentage of all locomotives equipped before the benefit of the apparatus is secured as in the case of the air-brake system. The failure of the automatic control system is not by any means as serious as the failure of the visual system because it is only an auxiliary. The engineer has to depend upon the indication given him by the visual signal to advance or stop, but there is nothing in the automatic control which authorizes him to advance.

The perfecting of a system of cab signaling and automatic control of trains was stated to be a duty which should not be left to the unassisted effort of the individual. It seemed reasonable to expect that the governing powers should join the railroads and offer such incentives as would stimulate practical work, thus hastening the day when the traveling public would be more fully protected.

ROLLING STOCK OTHER THAN MOTIVE POWER

Under this title Arnold Stucki pointed out the improvements made in car equipment during the past decade in the United States and Canada, calling attention to the modern provisions for the safety and comfort of passengers, for efficiency in handling freight and moving trains and for the protection of freight in transit. Credit, he said, was due to the Master Car Builders' Association for most of the progress that had been made along these lines, and the standards and recommended practices of that association were listed to show the scope of its activities. In connection with the development of special parts, attention was called to the modern brakes which will stop a train in 1000 ft. from a speed of 60 m.p.h.; to couplers which operate successfully under the most unfavorable conditions without the necessity for operators going between the cars; to the rapid introduction of electricity for train lighting; to the use of cast steel for bolsters and truck parts; to the friction draft gear which frequently provides capacity of 200,000 lb., and to frictionless side bearings and similar specialties.

Beginning with the all-steel cars built for the Erie Railroad in 1904 a history of steel passenger-car construction was outlined. Various types of freight cars were also described, special attention being given to the all-steel box cars which are rapidly coming into use. Various types of trucks for cars were also discussed, including the six-wheel freight-car truck used by the Norfolk & Western Railroad for its 90-ton coal cars. The paper was profusely illustrated with photographs of complete cars and trucks as well as drawings of details and it ended with a bibliography treating with modern railroad car design.

PRESERVATIVE TREATMENT OF TIMBER

The authors of this paper, Howard F. Weiss and Clyde H. Teesdale, presented a general review of the results of wood preservation obtained in the United States by showing the quantity of wood preservative used and the amount of timber treated annually, as well as the extent to which the various treatments have prolonged the natural life of wood. In addition a partial bibliography was appended covering American practice.

The authors' conclusions were that the wood preserving industry has become firmly established. This is shown by the fact that more than 150,000,000 cu. ft. of timber is being treated annually, the increase in the amount of wood treated between the years 1908 and 1913 being 230 per cent. The industry has made possible the use of quantities of non-durable timber which, without treatment, would be but little used, and it has relieved the heavy demand from a naturally durable woods which were rapidly becoming exhausted. Even when the more durable species are treated their length of service is increased.

The industry has materially lessened the drain upon the forests, especially in the case of the more valuable woods, because of the greater life given to timber that is subject to decay. The extensive practice of preservative treatment has been too recent to make its influence on forest demands apparent. It seems likely, however, that unless new systems are developed the demand for treated timber will ultimately decrease because replacements will be made less frequently.

Six impregnation practices are now in general use in this country. These are the Bethell (full-cell creosote), boiling, Burnett (zinc chloride), Card, Lowry and Rueping. Considerable quantities of telephone poles and construction timbers are also treated by the open-tank, kyanizing, dipping and brush methods.

The oldest records reported to the authors on the efficiency of treatment are on the full-cell creosote, Burnett and Wellhouse processes. It is reported that 150,000 pine ties treated with 10 lb. of creosote per cubic foot gave nineteen years of life on the H. & T. C. Railway; 12,000,000 Douglas fir ties treated with 0.27 lb. of zinc chloride per cubic foot gave from ten years to twelve years average life on the Southern Pacific Railway; 4,800,000 Douglas fir ties treated with 0.35 lb. to 0.50 lb. of zinc chloride gave from ten years to twelve years of life on the C., B. & Q. Railway; 5,600,000 hemlock ties treated with 0.50 lb. of zinc chloride by the Wellhouse process gave eleven years average life on the C., R. I. & P. Railway. Relatively little data are as yet available on the complete durability of timber treated by the Card, Lowry and Rueping processes as applied in the United States.

Experience has shown that timber improperly prepared for treatment is very liable to give unsatisfactory service. It is of prime importance to have timber properly peeled and seasoned before treatment, and also to be sure that it contains no advanced decay. In general the most approved method of treatment is in the open air. Conditions sometimes demand artificial seasoning, which is satisfactorily accomplished either by steaming or boiling in oil. High temperatures during artificial seasoning have been shown to injure the timber, and the best practice is not to exceed 260 deg. Fahr.

The following table was also included in the paper to show the status of the principal wood preserving processes now in use in the United States:

TABLE SHOWING THE PRINCIPAL WOOD-PRESERVING PROCESSES IN USE IN THE UNITED STATES

Name of Process	Preservative Used	Patent Number	Date Patent Was Issued	Company or Individual Controlling Patent
Bethell or full-cell	Creosote	Expired		Open to all
Boiling	Creosote	Expired	Aug. 27, 1895	Open to all
Burnett	Zinc chloride	Expired		Open to all
Card	Creosote and zinc chloride	815,404	March 20, 1906	J. B. Card
Kyanizing	Mercuric "	Expired		Open to all
Lowry	Creosote	831,450	Sept. 18, 1906	American Creosote Co.
Open Tank	Creosote	Expired		Open to all
Rueping	Creosote	709,799	Sept. 23, 1902	Lembcke von Bernuth Co.
Wellhouse	Zinc chloride, glue and tannin	Expired		Open to all

THE MECHANICAL PROBLEM OF THE ELECTRIC LOCOMOTIVE

The author of this paper, G. M. Eaton, engineer railway division, Westinghouse Electric & Manufacturing Company, confined his discussion closely to the side-rod type of locomotive in which the motor is connected to a jackshaft by rods and the jackshaft in turn is connected to the drivers by rods. The only type of locomotive of this design used in this country is that now being operated on the New York electrified zone of the Pennsylvania Railroad.

In the analysis of the stresses and strains upon the rods and bearings it was stated that the maximum stress would vary as an inverse function of flexibility, this constituting an argument in favor of the heat-treated and alloy steels since high-unit stresses and greater deflections were permissible. The maximum stress varies as an inverse function of the load, as a direct function of the speed (with motors of series characteristics) and as a direct function of pin and journal clearances.

A series of elaborate polar diagrams were included to indicate the force distribution on the crank pins and jackshafts and their bearings, these showing that the movements of the contact points in the bearings were extraordinarily irregular. The contact point at the jackshaft bearing moves in a direction in general opposite the direction of the shaft rotation, traveling around the shaft twice for every shaft revolution. It was shown that there was a tendency for the wear of the bearing brasses to be downward. During a hard start, however, the wearing tendency is practically the same in the upper and lower half of the bearing brass so that the nature of the actual wear becomes a function of the service. If the service is starting a train on a level and running at high speed for long distances the jackshaft bearing brass may be expected to wear downward. There is also a tendency for the shaft to pound in the bearing on one side. With the materials, proportions and clearances customary in electric locomotive practice in the United States and at 40 per cent rail adhesion, the maximum stress on either rod is about 115 per cent of that imposed with the cranks at the 90 deg. position. At maximum speed this maximum stress rises to 135 per cent.

MACHINE SHOP EQUIPMENT, METHODS AND PROCESS

In this paper E. R. Norris, director of manufacturing operations, Westinghouse Electric & Manufacturing Company, took up a number of the important recent developments in machine shop equipment and practice, discussing first the origin and present status of the high-speed-steel tool and outlining tests that could be made to determine the best steel for each purpose from among the many different makes of steel that were offered to the manufacturer. He stated that tests have been made on butt-welded tools formed by welding tips of high-speed steel to low-grade carbon-steel shanks, the process being quite successful, but though the initial outlay for the solid tool is considerably greater than that for the welded tip tool, the cost of upkeep increases the cost of the latter so much that in the end it does not constitute a real economy. In connection with the use of high-speed steel for dies it has been found that the costs of carbon-steel dies and high-speed steel dies for a given production are approximately as two is to one, the loss due to hardening being very small, or less than 1 per cent. The heat-treatment of tools was also discussed briefly.

The author commented upon a new substance that has been placed upon the market under the name of Stellite, which is not the steel but is a composition of cobalt, chromium, tungsten and iron with small amounts of nickel, manganese, silicon and molybdenum. This material cannot be forged, rolled or machined and must have the cutting edge well supported close to the work. Stellite tips may be brazed or electrically welded to shanks of carbon steel and may be reused until repeated grinding renders the cutting material very thin. Cutting speeds on machinery steel have been quadrupled over those of high-speed steel, thin cast-iron frames which were very hard because of a slight chill having been successfully planed at a cutting speed of 300 ft. per minute, whereas high-speed steel gave but 45 ft. per minute. In this case also the Stellite tool finished nine pieces for each grinding as against one piece finished for each grinding of the high-speed steel. On sandy brass castings the cutting speeds with Stellite have been doubled.

With regard to the selection of machinery for various machine shop purposes the process for manufacture of accurately finished steel shafts of medium size were outlined in detail and the advantages of milling under stream lubrication were discussed. There was mentioned also the continuous method of milling in which the work is mounted upon a circular table which has several independent chucks for holding different pieces of work, these being set under the tool in rotation, the operator having time to take out the finished casting and put in new castings while the cut proceeds. Comment on modern drills and drilling machinery was included, reference being made to the use of attachable multiple drill heads for machines which may even be arranged for drilling in five or more directions at one time.

In connection with grinding and grinding machines the author said that considerable saving is being effected by the use of disk grinders on many flat surfaces that were formerly milled, this being more noticeable in dealing with castings that are liable to be chilled and brittle. Grinding also possesses decided advantages where the shape of the casting is such that, in order to prevent springing, great care is necessary in chucking the work in the milling machines.

Among the grinding machines described was one where two cupped grinding wheels with parallel faces are used, the work being fed between them and thus being ground with parallel surfaces. This machine is used in advantage in finishing bosses on resistance grids, completing them at the rate of forty-five grids per hour. Ring wheels may be used to advantage for removing scale and for stock which is rough. They have the advantage of a much longer life than the steel wheels with abrasive circles of cloth glued to them. In the case of the resistance-grid grinder above mentioned, ring wheels 3 in. thick were ground down 1/16 in. on the face after one month's work, whereas two abrasive circles would usually be worn out by four days' work. Another form of dry disk grinder was described in which the wheel is horizontal and the work bears directly upon the abrasives, being ground by the pressure exerted by its own weight. This is especially suitable to frail castings which might spring while being clamped. For the production of true flat surfaces on hardened steel dies the vertical surface grinder was highly efficient, the work being held by means of a strong magnetic chuck. The vertical grinder has displaced the horizontal grinder in most cases, producing from 50 per cent to 75 per cent more work although the vertical grinder costs five times more than the horizontal machine in the upkeep of wheels. In connection with cylindrical grinding the advantages of the wide grinding wheel were outlined, as this eliminated lost time at the end of each pass of the wheel along the work.

Successful results in sharpening files by the use of the sand blast were also cited, the files being sharpened by being held in such a manner as to expose the backs of the file teeth to the cutting action of the sand. In conclusion the author commented upon electric drives for machine tools, and also upon the advantages of actual demonstration as a basis for selecting new machines.

NOTES ON THE PROCEEDINGS OF THE CONGRESS

Interest in the administration and technical features of the Panama Canal and in the development of the Diesel engine were the chief features of the sessions held prior to the recess on Wednesday afternoon. The session devoted to these subjects drew the largest attendance. Discussion, however, in all of the sessions was disappointing due to the limited advance distribution of papers. Furthermore, the authors in most cases were absent, a fact tending to suppress the questions which might ordinarily be put. The papers, however, a number of which are abstracted above, possessed unusual value. The first session, on Monday morning, was an impressive gathering fully befitting the magnitude of the work which occasioned the congress. On the platform with the honorary president of the congress, Major-General George W. Goethals, were the vice-presidents, the foreign delegates and the presidents and secretaries of the national engineering societies.

The real business of the convention began on Monday afternoon with a well-attended session on the Panama Canal. The papers were of a general rather than an engineering character. Technical details regarding the canal were treated in ten papers presented in two succeeding well-attended sessions. On Tuesday morning the congress split into sections with six to eight sessions in progress simultaneously. The second session on railways following the presentation of the paper by William Hood, chief engineer Southern Pacific Railroad, brought out a discussion on the extent to which practice for locating steam lines should be modified for a line to be operated electrically. It was advanced that the shorter wheelbase of the electric locomotive allowed the use of sharper curves, while its great overload capacity for shorter periods permitted steeper short grades than does the steam locomotive. Mr. Hood, however, was of the opinion that it is not advisable to locate a line on the theory that steam equipment will never be used on it as such an assumption is not likely to be borne out.

Discussion on transit problems at the first municipal session developed comment from M. M. O'Shaughnessy, city engineer of San Francisco, that in a very short time a system of elevated tracks would be necessary in that city. Preliminary studies that have already been made show that the double-track elevated line may be expected to cost $800,000 per mile, as against $3,500,000 per mile for a subway system. He estimated the construction of surface lines to cost about $215,000 per double-track mile. He pointed out that under present traffic conditions a trip to the western residence district during rush hours requires twenty minutes longer than would be required with an effective rapid-transit system, and that this time saving multiplied by the total number of passengers carried represented an annual saving warranting a considerable investment in a rapid-transit system.

Steam Railroad Earnings for 1915

According to the returns of the Bureau of Railway Economics for steam railroads operating an average mileage of 228,554 during the fiscal year ended June 30, 1915, the total operating revenues during the year amounted to $2,889,029,457, or an average of $12,641 per mile of line. Operating expenses amounted to $2,032,689,894, an average of $8,894 per mile, and net operating revenue amounted to $856,339,581, an average of $3,747 per mile. Compared with the fiscal year 1914, the current year shows a decrease in aggregate operating revenues of $163,404,055, or 6.3 per cent per mile; a decrease in aggregate operating expenses of $186,244,099, or 9.3 per cent per mile; a resultant increase in net operating revenue of $22,840,044, or 1.8 per cent per mile. Taxes decreased $2,765,192, or 3 per cent per mile, while operating income increased $24,991,787, or 2.6 per cent per mile. It should be noted that nearly half the decrease in expenses represents decreased maintenance expenditures, which in all probability are merely deferred.

Reduced to a per-mile basis, the operating revenues of the Eastern group of railways decreased 4.9 per cent; operating expenses decreased 10 per cent; net operating revenue increased 11.5 per cent; taxes decreased 1.9 per cent, and operating income increased 14.4 per cent. On a similar per-mile basis, the operating revenues of the Southern railways decreased 10.4 per cent; operating expenses decreased 10 per cent; net operating revenue decreased 11.3 per cent; taxes decreased 3.6 per cent, and operating income decreased 12.9 per cent. Again, on a per-mile basis, the Western railways show a decrease in operating revenues of 5.6 per cent; a decrease in operating expenses of 7.5 per cent; a decrease in net operating revenue of 1.6 per cent; a decrease in taxes of 3.7 per cent, and in operating income of 1.3 per cent.

The above figures are based upon monthly returns to the Interstate Commerce Commission of all steam railroad companies, including switching and terminal companies, having annual operating revenues above $1,000,000. The compilation covers about 90 per cent of the total mileage of the steam lines in the United States.

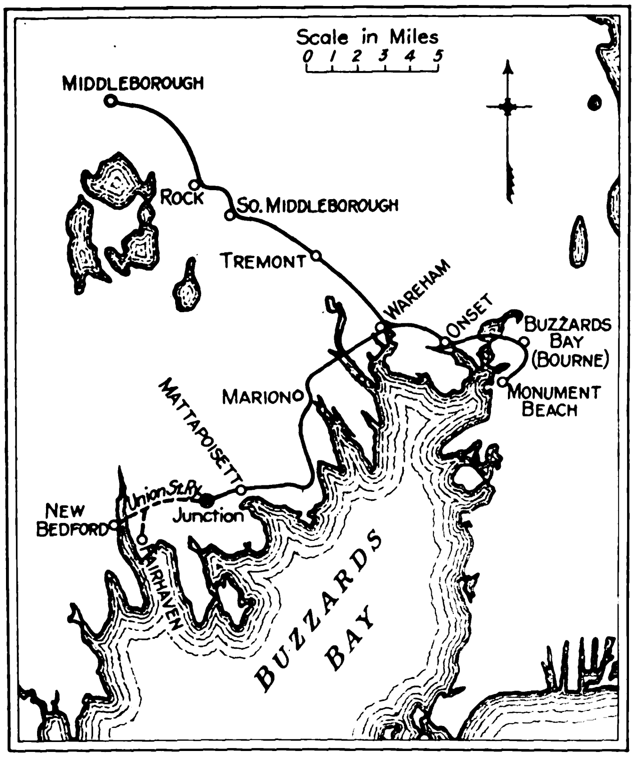
Another Six-Cent Fare Granted

Petition of the New Bedford & Onset Street Railway for Authority to Increase Fares is Granted in Its Entirety by the Massachusetts Public Service Commission—the Main Features of the Commissions' Decision Are Abstracted in This Article

The Massachusetts Public Service Commission on Sept. 8 unanimously authorized the New Bedford & Onset Street Railway, New Bedford, Mass., to revise its fares according to its petition of April 14. In this petition, which is to go into effect on Oct. 8, the company proposed: (1) To make the cash fare 6 cents for every ride within the limits of any fare zone, the previous cash fare being 5 cents. (2) To sell tickets at the rate of twenty rides for $1, the previous rate being twenty-four tickets for $1. (3) To sell special school tickets at the rate of ten for 30 cents to pupils entitled by law to half-fare transportation. The previous rate was ten tickets for 25 cents. A résumé of the decision now rendered is published below.

HISTORY OF COMPANY

The company was organized in 1900. The main line, about 22 miles long, runs from a connection with the tracks of the Union Street Railway of New Bedford at the Fairhaven-Mattapoisett boundary line through Mattapoisett, Marion and Wareham to Monument Beach in the town of Bourne, as shown in the accompanying map. The Union Street Railway and the New Bedford & Onset line are virtually under one management, and traffic in and out of New Bedford is handled by agreement. A branch of the New Bedford & Onset line, about 15 miles long, extends from Wareham through a corner of Rochester to Middleborough, where there is a connection with the Bay State Street Railway. The total single track mileage is 44.01 miles, of which 9.27 miles is on private right-of-way and the balance on the public streets. The population of the six principal towns served is now 20,366, an increase of 36.5 per cent over 1900. Comparatively little manufacturing is done, for the towns are mainly rural communities popular as summer resorts.



MAP OF NEW BEDFORD & ONSET STREET RAILWAY LINES

FARE ZONES

The road is divided into a system of overlapping fare zones, those on the branch line being somewhat longer. The fare from Fairhaven to Monument Beach is 40 cents. From Middleborough to Wareham it is 20 cents for 15.2 miles, while owing to the shorter zones on the main line the fare from Fairhaven to the same point, a distance of 12.4 miles, is 25 cents. On the original line the charge from Fairhaven to Onset Beach was at first 20 cents, but in 1904 the number of zones was increased, making the through fare 30 cents. The through fare from Middleborough to Monument Beach over the line originally operated by the Middleborough, Wareham & Buzzards Bay Street Railway (which went into a receivership in 1904 and subsequently became a part of the New Bedford & Onset system) was at first 25 cents. During the receivership it was increased to 40 cents, but after reorganization it was fixed at 35 cents; where it has remained. Since 1905 there have been no changes in regular rates of fare or in zones upon any parts of the system, except that the reduced rate tickets (sold at twenty-four for $1) have been introduced. In summer the company sells, in conjunction with the Bay State Street Railway, special excursion tickets good from Brockton to Onset Beach via Middleborough, at the rate of 40 cents, equally divided. The regular fare for that portion of the journey on the New Bedford & Onset system is 25 cents.

INVESTMENT RECORD

The assets of the company on June 30, 1915, totaled $993,921, the larger items being cost of railway, $598,614; cost of equipment, $117,299, and land and buildings, $215,948. The capital stock was $550,000 and the funded debt $280,000, current liabilities were $28,987, and accrued liabilities $7,257; sinking and other special funds amounted to $77,703 and the surplus was $32,299. The company asserts that it did not take over the mortgage debts of the Middleborough, Wareham & Buzzards Bay Street Railway, that it is the owner only of the equity of redemption in that property and that it pays interest merely to protect that ownership. The commission holds that for purposes of comparison these bonds should be included with the liabilities, and that the full book value of the Taunton & Buzzards Bay company (successor of the M., W. & B. B. line) should be included with the assets. The board finds the total capital investment to be $997,675. The company also has outstanding short-time notes to the amount of $19,500, which may represent in whole or in part additional capital investment.

By the accumulation of reserve funds since 1906 the company has been able to provide for all additions and improvements out of income, and at the same time to effect a considerable reduction in its floating debt. The table included in the report of the commission in the Blue Hill case, decided on July 31, 1915, shows that the $21,666 per mile book value of the company's permanent property is low in comparison with others in the State.

With allowance made for the fact that the returns do not include with the assets the real cost of the Taunton & Buzzards Bay property, the book value becomes $25,075 per mile, still a comparatively low figure. The cost of the original New Bedford & Onset line was about $40,000 per mile, owing to a high standard of construction and to the company's share in highway construction involved in its location grants.

REPRODUCTION COST

The company recently made an inventory of all its property, together with an estimate of the cost of reproduction new as of Dec. 31, 1914, and the accrued depreciation. The engineers of the commission carefully checked this inventory and also made an estimate of the reasonable original cost of the property as it existed on July 1, 1915, separating what was formerly the property of the Taunton & Buzzards Bay line from that directly constructed or acquired by the New Bedford & Onset company. The report of the engineers has been made a part of the record. The following table shows the various values:

	Reproduction Cost, New	Original Cost Estimate	Book Cost
New Bedford & Onset Line.....	$895,562	$795,711	$933,824
Taunton & Buzzards Bay Line.	421,023	354,045	190,902
Total	$1,316,585	$1,149,756	$1,124,726

In the case of the Taunton & Buzzards Bay line the engineers estimated, not its reasonable cost to the New Bedford & Onset company but the reasonable cost of construction. This portion of the road was acquired at a reduced price some years subsequent to construction after depreciation had set in. The total reasonable cost of all the property is estimated at $986,613, obtained by adding the estimated reasonable cost of the New Bedford & Onset road ($795,711) and the actual cost of the Buzzards Bay property ($190,901). This compares with a total capital investment of $997,675, exclusive of short-time notes, and the difference is nearly offset by the cash assets.

In their estimates the engineers included substantially the same overhead charges as appear on the company's books, and also allowed about $37,000 more than ordinarily would be reasonable for grading item, owing to the contention that the work was done largely in winter. An estimate of reasonable cost made some years after the construction period cannot be considered a wholly reliable guide, for legitimate items of cost entering into the construction of most railways are not apparent upon subsequent inspection of the property. The discrepancy between the estimate and the book figures, however, seems too great to be entirely accounted for in this way. The company's own estimate of replacement cost is about $40,000 less than the book figures. The evidence indicates that the reasonable cost of the property is at least equal to the proceeds of the bond and stock issues, and the amount upon which a fair return should be reckoned is not less than $997,675 (which does not include the short-time notes) unless deduction should be made for accrued depreciation.

DEPRECIATION

From 1902 to 1915 the yearly expenditures for maintenance and depreciation averaged $25,576, or 22.42 per cent of operating revenue. The greater part of these outlays were for maintenance, but the company has from time to time written off, through the profit and loss account, the value of items of property abandoned or destroyed. Moreover, in a sense, it made a partial provision against depreciation in the low cost at which it acquired the Taunton & Buzzards Bay property. While a company, if it purchases property at less than its original cost, is entitled to a return only upon the actual amount of its investment, it is fair that depreciation should be estimated on the basis of the original cost and that the low purchase price should be an offset to depreciation.

In its appraisal the company estimated the total depreciation at $421,109, making the present value $895,476. The commission's engineers placed the depreciation at $408,702, making the present value $741,053. Since the depreciation reserves and a portion of the unappropriated surplus have gone into the property, the latter present value shows a loss of about $256,000 from the investment of $997,675, represented by the stock, bonds and premiums on bonds. It seems clear that the company has not made sufficient provision for depreciation. Yet in view of the meager dividends paid, the efforts to increase revenues, and the low price at which the Taunton & Buzzards Bay property was acquired, it does not appear that this failure can justly be attributed to mismanagement. The return, therefore, should be figured upon the capital investment of $997,675, without deduction for accrued depreciation. As stated in the Blue Hill case, however, this must not be understood as a ruling that the company, if it earns the amount to which it is entitled, can properly pay dividends before past depreciation has been provided for.

RESULTS OF OPERATION

The company's operating records from 1902 to 1915 inclusive show operating revenues, $1,596,837; operating expenses, $1,070,514; net operating revenues, $526,323; no miscellaneous income; deductions from income, $356,997; net divisible income, $169,326; dividends, $66,000; surplus, $103,326; profit and loss adjustment (debit), $72,413. Dividends were paid only in four years, and then only to the extent of 3 per cent. Last year no dividends were paid. In the last ten years the net divisible income, without allowing for depreciation allowances or other necessary charges to profit and loss, has ranged from 0.63 to 3.72 per cent on the outstanding capital stock. Interest upon unfunded debt has been insignificant. It is clear that additional net earnings, either through a decrease in operating expenses or an increase in gross revenue, are necessary in order to yield an adequate return upon the stockholders' investment.

OPERATING EXPENSES

The commission finds no apparent indication of extravagance or unnecessary expenditures. The company may be criticised for its failure to secure any interest upon its bank deposits, though these returns would be small. Management expenses have been low, the salaries of the four principal officers in 1915 aggregating only $3,150. Wages of motormen and conductors increased from 2.71 cents per car-mile in 1905 to 4.24 cents in 1914, but no blame attaches to the company for this.

RELATIONS WITH THE UNION STREET RAILWAY

The New Bedford & Onset cars are taken at the Fairhaven line by the Union Street Railway and are carried into New Bedford over its own tracks, under its own power and with its own crews, or with New Bedford & Onset crews, which it pays while they are in its territory. The Union Street Railway keeps all the fares collected during this journey and grants the usual transfer privileges to all parts of its system. It pays the New Bedford & Onset company 3 cents a car-mile for the use of its cars and also 2 cents for every adult passenger delivered at the Fairhaven line and also 1 cent for every pupil riding on a school ticket. In 1915 the New Bedford & Onset company received $2,090 for the use of its cars and $3,557 for the passengers delivered. The car rental is a usual charge, but the payment for passengers delivered is unusual if not unique in the State. It is in the nature of a commission paid for new business furnished and is analogous to the division of joint freight rates in certain cases, where the company on whose lines the traffic originates receives the larger proportional share. The arrangement is distinctly favorable to the Onset company.

Power Requirements

The Union Street Railway also sells the New Bedford & Onset company power for use between the Fairhaven line and a point about 1.5 miles distant from Mattapoisett at the rate of 3 cents per car-mile with 1 cent additional when the cars are heated. For the small amount used this rate is not excessive. Until recently the New Bedford & Onset company generated its own power, with the exception of small amounts purchased, and sold its surplus to the Marion Gas Company. The station equipment was antiquated and inefficient, and the cost comparatively high. To remedy this situation the company contracted on May 1, 1915, for more than nine years with the New Bedford Gas & Edison Light Company for the supply of power. Under this contract the railway company has shut down its generating plant and has installed suitable converting apparatus. Power from the Edison company costs from 0.95 to 1.1 cents per kilowatt-hour, according to the amount supplied. The railway company sells energy to the Marion Gas Company at from 1.1 to 1 cents per kilowatt-hour. Under certain conditions the railway company makes a slight profit upon the power thus sold and under others none, but in no case does it lose. The arrangement, by increasing the quantity purchased from the Edison company, makes a lower cost possible to the railway. Under these contracts no transmission losses are assumed by the railway company except between its own substation and its cars. The contracts have been carefully examined by the commission's engineering staff and appear economical, but the board holds that the idle and antiquated equipment should be written off the books in a reasonable time.

Equipment Maintenance

The New Bedford & Onset cars are painted at the Union Street Railway's shops, and the former road buys from the latter certain materials and supplies which it cannot buy to advantage direct from the dealers. For all labor furnished in such cases the Union Street Railway charges cost plus 20 per cent. Materials and supplies are sold at cost plus 10 per cent. The percentages cover use of tools and shops, storage, purchasing department expense, etc., and the terms seem in line with the practice of other companies. The Boston Elevated Railway, for example, on such outside work charges cost plus 25 per cent for labor and cost plus 10 per cent for materials.

Maintenance Expenses

During the last few years maintenance expenses have increased rapidly, and in 1915 were higher than ever before. The inspection department of the commission reports that the track is in fair condition generally, about two-thirds of the original ties being in the ground. These should all be renewed within the next five years. Many of the original chestnut poles are still in use and should all be renewed within the next six or eight years. The company replaces the old 30-ft. poles with old 35-ft. poles. The department estimates that the average annual expenditure which should be made for the next few years to maintain the track and overhead structures is about $27,800. The average annual expenditure for the last five years has been $20,539, and expenses for maintenance of equipment in this period have averaged $14,729.

Proposed Change in Fares

There seems to be no reasonable prospect of an increase in net earnings through a reduction in operating expenses, except so far as the new contract results in saving in the cost of power. This will be relatively small, for the total net cost of power in 1915 was only $21,114. The company proposes, in brief, to increase the cash fare from 5 to 6 cents, to increase the ticket fare from 4.17 cents to a flat 5 cents, and to raise the rate for school children from 2.5 to 3 cents. In each case the increase would amount to 20 per cent. Under this arrangement the cash fare from the Fairhaven line to Monument Beach would be 48 cents, or about 2.18 cents per mile, while the ticket fare would be 40 cents, or about 1.82 cents per mile. From Middleborough to Monument Beach the cash fare would be 42 cents, or about 1.69 cents per mile, and the ticket fare 35 cents, or about 1.41 cents per mile. Undoubtedly the through cash fare on the main line would be high, as street railway fares go in the State. Under the new schedule recently allowed in the Blue Hill case the through cash fare on the main line is at the rate of about 1.67 cents per mile. The similar cash rate on the Norfolk & Bristol line is about 1.75 cents per mile.

What additional revenue the increase will produce is problematical. Last year the revenue passengers were divided into the following classes, according to the character of the fare paid:

Class	Number	Per Cent of Total
Cash fares	1,890,022	69.44
Ordinary tickets	678,811	24.94
School tickets	128,610	4.72
Excursion tickets	24,433	0.90
Total	2,721,876	100.00

With no decrease in traffic and the same relation between the classes of traffic, the increased fares would produce about $25,000 additional revenue. There is a decided possibility, however, that a decrease in traffic may result, and it seems probable that a larger percentage of passengers will use the reduced rate tickets. In the board's opinion the revenue realized from the increase will not exceed $20,000, and if jitney competition should be stimulated the results might be unfavorable.

Disposition of Possible Increase

The net divisible income for 1915 was $7,385, while the average net divisible income for the last five years was $15,111. If the company should secure $20,000 additional revenue from a fare increase, and should be able to save $5,000 on the cost of power (assumptions of doubtful certainty), its net divisible income would be $32,285 on the basis of last year's figures, or about 5.8 per cent on the capital stock without allowing for any depreciation or other necessary charges to the profit and loss account. Upon the basis of the average figures for the last five years, the net divisible income would be $40,111, or about 7.3 per cent on the capital stock, without depreciation and other allowances. Upon neither basis, the board is satisfied, would the company actually earn 6 per cent upon its capital stock if it made proper provision for the upkeep of its property.

Conclusion

In a proceeding like this the commission has no arbitrary power and it can refuse to allow a company to increase its rates only where the weight of evidence clearly indicates that the increase is likely to prove unjust and unreasonable. If results prove more favorable than anticipated and earnings become excessive, the opportunity to secure a reduction in rates under the statutes is always open. In view of the high mileage rate represented by the 6-cent cash fare, the board is of the opinion that every effort should be made to make the reduced rate tickets available to the regular patrons of the road and to facilitate their use. The tickets should be sold by conductors on the cars or at convenient points in each of the towns, and the fact that they are thus sold should be advertised in a conspicuous place in each car. It is also recommended that the company consider carefully the advisability of installing a system of collecting and registering fares whereby it will be possible to collect in one operation the fares of through passengers in two or more zones, so that the annoyance of paying additional fares at frequent intervals may be avoided.

Dynamite Explosion Causes New Subway Cave-In in New York

Subway Structure in the New Seventh Avenue Tube Is Weakened by Heavy Blast—Surface Car Filled with Passengers Drops into 30-Ft. Trench

Seven persons were killed at 8 a. m. on Sept. 22 in an extensive cave-in of the new Seventh Avenue subway in New York, between Twenty-fourth and Twenty-fifth Streets, when a dynamite blast weakened the temporary wooden roadway over the subway excavation, and precipitated the whole structure into a 30-ft. deep cut. More than twenty people were seriously injured, and about 100 were hurt in various ways.

As the roadway timbers for a distance of about 400 ft. collapsed a closed street car of the New York Railways, which was loaded with passengers, a large brewery wagon, and a few other small wagons and push carts were carried with it. A large number of employees who were on their way to work in the National Cloak & Suit Company, the building of which was located adjacent to the disaster, were also carried down. Beneath were about fifty workmen, some of whom were caught and killed by the débris.

For almost two blocks the excavation was a mass of splintered timbers, twisted water pipes, gas mains and trackage. The extent of the cave-in was remarkably well defined. The entire street section for a block and a half had fallen into the deep 30-ft. trench below, yet not any portion of the sidewalk pavement or of any buildings had collapsed owing to their solid rock foundations. Moreover, the caved-in section of the subway, which was composed of only the temporary wooden beam framing, was bounded at each end by sections which already had steel framing installed.

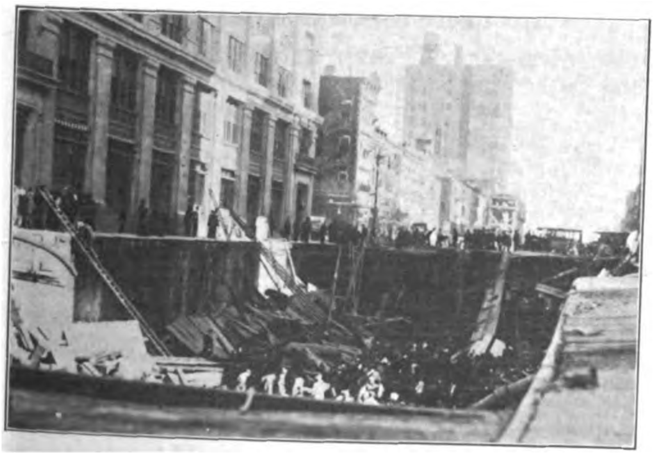
The ill-fated street car, the remains of which are shown in an accompanying photograph taken especially for the ELECTRIC RAILWAY JOURNAL, contained at the time of the accident about fifty passengers. When the street buckled under, the surface car tracks together with the intervening asphalt pavement and conduit contact rails and framing sagged down to the bottom of the great pit, but even then remained mostly intact. Notwithstanding this fallen position, the maximum-traction trucks of the fallen car continued to remain on the tracks, but the wooden body was ripped off in a distinct line just above its underframe, and bent over sideways. Its roof was flattened out. The wreckage of the street car was full of injured persons and two dead.

John Mayne, motorman of the car, who was taken to a hospital with a leg crushed, stated that the car sank just where he stopped it, when warned by a flagman. In substantiation of Mayne's story, an investigation showed that the brakes of the wrecked car were set and that the controller was off.

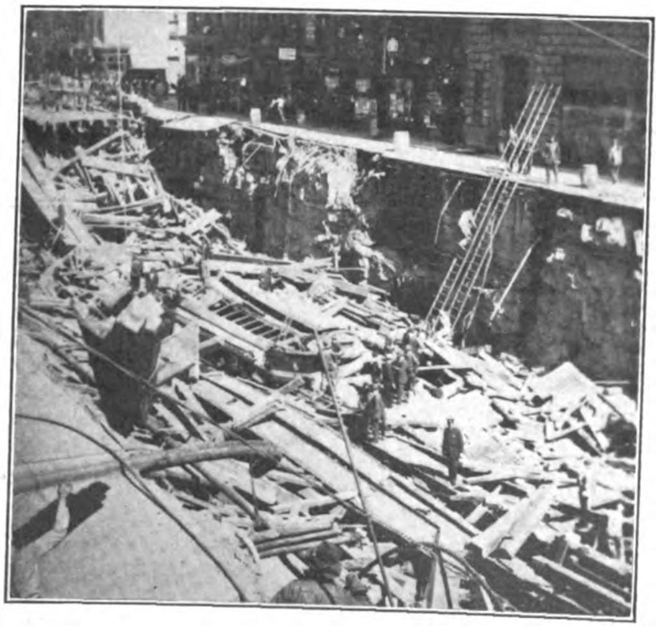
Immediately after the accident, all available ambulances, police reserves and fire apparatus were summoned. A smoldering fire which had started in the wreckage was quickly extinguished. Steps were taken to shut off all electric wire circuits and all leaking gas and water mains. The fire apparatus was put to work pumping out water from the excavation. As fast as bodies were released from the mass of wreckage they were carried up ladders to the street. Wrecking companies were soon on the spot with derricks, which were employed in lifting the masses of débris.

Shortly after the accident seven independent investigations to place the blame were under way. These inquiries were started by District Attorney Perkins, the Fire Department, the Public Service Commission, Coroner Feinberg, the contracting company, the State industrial commission, and the street railway company.

The following description of what took place immediately before the street deck dropped into the subway ditch was given by Augusto Mezzanotte, or August Midnight as he is known, the boss blaster who placed the fatal charge and ran away temporarily in a panic of fright after the accident.



NEW YORK SUBWAY CAVE-IN—VIEW OF TRENCH CAUSED BY EXPLOSION



NEW YORK SUBWAY CAVE-IN—VIEW SHOWING STREET CAR WHICH FELL 30 FT. INTO TRENCH

"I went to work at 7 o'clock in the morning with six drillers, a powder monkey and an assistant," Midnight stated in part. "We went to the magazine at Seventh Avenue and Twenty-third Street and got twenty-five 9-oz. sticks of 40 per cent dynamite, and before setting off any of it we prepared three blasts.

"The first blast was in only one hole at the bottom of the excavation, and I put three-quarters of a stick of dynamite into it. It was fired at about 7.50 o'clock and cracked the stone above slightly.

"The second blast was the one that preceded the cave-in. It was on the face of the rock, about 13 ft. from the bottom of the excavation, and for it four holes about 9 ft. deep were used. These holes included an area of about 13 ft. Three of the 9-oz. sticks were put into each hole. The third blast, which was never fired, consisted of two holes with three-quarters of a stick in each. Before we began to blast, after all of the holes had been loaded, the 'monkey' took the remaining dynamite and detonators back to the magazine.

"Before the second blast I sent two drill men down toward the Twenty-fourth Street end of the excavation to warn the men working there, and sent five men up with flags to stop street traffic. When I reached the street surface I saw the street car in Seventh Avenue. It is the custom to stop the cars and other traffic about 100 ft. away. I saw one of the flagmen stop this car at about that distance, or perhaps only 90 ft. away, and so I signaled the 'monkey' to fire the charge." The cave-in, according to Midnight, occurred immediately after the explosion of this charge.

When asked if any covering had been placed over the rock previous to the second blast, to keep the debris from flying out and striking the wooden structure, Midnight said it was not customary to cover the rock when such deep holes were used. It is the generally accepted theory that the blast hurled rock against the near-by structure and knocked several beams out of place, and that the others, interdependent upon one another for support went down like a row of dominoes.

By the terms of the contract with the constructing company the city is relieved from any burden of damages for injury to life or property by reason of the accident in the subway. The United States Realty & Improvement Company, which is constructing the subway under Seventh Avenue between Sixteenth and Thirtieth Streets, took the contract for $2,401,306.75 on Dec. 31, 1913. The work is now about 65 per cent completed. The contract provided that the company give a bond for $75,000 to insure the faithful performance of the contract, the terms of which protect the city from all liability for damages to persons or property.

The disaster, ghastly enough in its details, undoubtedly created an even more widespread apprehension as to the safety of persons possibly involved in it than the truth of the facts of the occurrence would warrant. Shortly after the accident newspaper extras were circulated, bearing reference in bold but intentionally ambiguous headlines to the "Subway Cave-in." Many readers of the extras believed that an accident had taken place in the present operating subway, rather than the new subway under construction. The misleading headlines naturally produced an epidemic of anxiety among thousands of friends and relatives of those accustomed to travel daily in the operating subway during the morning rush hour.

Ground was recently broken and tunnel work begun on a projected electric mountain railway from the city of Bergen, Norway, to the summit of Mt. Floien. The construction of this railway is estimated to cost $151,125.

Traffic Count on Chicago Streets

Bureau of Streets Takes Traffic Census of the Loop District in Waste Collection and Pavement Choice Study

To ascertain the effect of traffic density on street cleaning, and for its value in determining the kind of pavement which should be laid on certain streets, Chicago's bureau of streets made a traffic count of all vehicles passing through specified blocks in each direction. This count was made between July 13 and Aug. 17.

The field force used in making the count consisted of twelve men divided into six groups of two each, five squads being for actual service and one for relief. The men were all section foremen from the various city wards. Previous to commencing the work, they were cautioned as to the necessity of accuracy. A team of men was assigned to a block, one on each side of the street, to count the traffic in one direction only. Observations were made in forty-three different blocks, between the hours of 8 a. m. and 12 noon and 1 p. m. and 6 p. m., in rain or shine. On Saturdays the men worked from 8 a. m. to 2 p. m. This afforded a means of counting the noon-hour traffic.

Each traffic counter had a board on which were fastened pads of hourly counter sheets, one being to record rubber-tired vehicles and the other for iron-tired conveyances.

The following traffic statistics at different points in the downtown business and commercial districts were compiled for comparative purposes and show the variations in conditions encountered as well as the congestion at points.

THE DENSEST TRAFFIC IN CHICAGO

The census taken at the Rush Street bridge revealed the fact that at this point traffic is heavier than at any other point in the city. For the eight hours in which the census was taken, figures show that an average of 1700 vehicles per hour cross the bridge during the day, or a vehicle every 2.12 seconds. Between 5 and 6 p. m. the traffic reached the peak point, 2384 vehicles crossing the bridge; an average of a vehicle every 1.9 seconds. The trend of traffic during this hour is north-bound, 1872 conveyances passing over the bridge from the south. The difficulty which a pedestrian encounters in trying to cross the bridge during the rush hour can be imagined with a vehicle of some kind passing every 1.5 seconds. Traffic across the bridge was distributed as follows: Horse-drawn vehicles, 19 per cent; auto trucks of all kinds, 6.31 per cent; automobiles, 74.69 per cent.

THE BUSIEST STREET INTERSECTION

The intersection of State and Madison Streets was found to be the busiest crossing within the loop, an average of 1548 vehicles passing per hour, or one every 2.4 seconds. Street cars were found to run 11.8 seconds apart. Traffic was distributed as follows: Horse-drawn vehicles, 43.2 per cent; auto trucks of all kinds, 7.4 per cent; automobiles, 29.7 per cent, and street cars 19.7 per cent.

Of this traffic 75.7 per cent was on State Street and 24.3 per cent on Madison Street. Traffic north bound in the block between Madison and Washington Streets was 35 per cent heavier than that south bound, this despite the fact that there were 245 more street cars south bound than in any other direction. Figures taken at eleven different points on streets west of State Street show traffic to average 254 vehicles per hour. At eleven different points on streets east of State Street, the average per hour was 192 vehicles.

Between Lake and Adams Streets on State Street an average of 442 vehicles of all descriptions per hour were counted.

To ascertain the length of time spent by vehicles standing backed up to the curb in loading and unloading on South Water Street, and streets in the immediate vicinity, eighty vehicles of outside dealers were timed. These were found to stand at the curb an average of one hour and twenty-seven minutes, while ten other vehicles remained for an average of four hours and nine minutes. The vehicles used for hauling fruit and produce to the commission houses averaged fifteen to thirty minutes in unloading and departing, while a number owned by parties who do a cartage business, after unloading, remained backed up to the curb for an indefinite time.

STREET CARS 14.4 PER CENT OF ALL TRAFFIC

That the new style heavy double-truck street car is an important factor in traffic census as it is in street cleaning may be seen when it is considered that of all the conveyances counted, there were 26,995 street cars or 14.4 per cent of all traffic, and on the streets upon which there are trucks the street cars amounted to 21.1 per cent of the traffic. Of the streets upon which there are regularly routed street cars, Dearborn Street south of Monroe Street had the lightest amount of street car traffic. The greatest amount was found on the three-track State Street line, between Lake and Madison Streets, the street cars being nearly 26 per cent of the total traffic. At the intersection of State and Madison Streets there is an average of one car every 11.8 seconds in all four directions.

ELEVATED TRAINS

All elevated trains entering the loop run in the same direction around the loop. The trains were counted on Wabash Avenue at two points and at one point on Fifth Avenue. Trains were counted according to the part of the city to which they were destined. An idea of the volume of this traffic may be obtained from the tabulation made at the corner of Randolph Street and Wabash Avenue given below.

TABLE SHOWING TRAINS ON AUG. 23, 1915, AS COUNTED AT CORNER OF RANDOLPH STREET AND WABASH AVENUE

Time	Northwestern and South Side El. Rys	Metropolitan All Branches	Oak Park	Totals
7 to 8 a. m.	44	39	16	99
8 to 9 a. m.	52	44	24	120
9 to 10 a. m.	56	41	15	112
10 to 11 a. m.	42	38	2*	82
11 to 12 a. m.	48	44	11	103
1 to 2 p. m.	44	40	12	96
2 to 3 p. m.	44	42	10	96
3 to 4 p. m.	44	41	10	95
4 to 5 p. m.	49	40	13	102
5 to 6 p. m.	54	47	18	119
Totals for day	477	416	131	1024

*Between 10 and 11 a. m. Chicago and Oak Park trains were delayed fifty-five minutes.

A factor affecting street cleaning is the litter and newspapers thrown by careless passengers from the car windows of the elevated trains, constantly passing through the Loop district each day. This is a violation of the clean street ordinance, but is a condition hard to correct.

CLASSES OF STREET VEHICLES

Of the 100,727 vehicles used for commercial purposes in the cartage of freight and other commodities, 82.2 per cent were horse drawn and 17.8 per cent were auto trucks of all descriptions. Of the 59,950 carriages, buggies and automobiles used for carrying passengers, 0.9 per cent were carriages, 2.2 per cent were buggies, 19.2 per cent were two-seated automobiles and 77.7 were automobiles with four or more seats. This gives the percentage of horse-drawn vehicles to automobiles, 3.1 per cent to 96.9 per cent.

The total count showed that all traffic counted in the loop was distributed as follows: Horse-drawn vehicles, 45.1 per cent; motor-driven vehicles other than street cars, 40.5 per cent, and street cars, 14.4 per cent. The average number of vehicles per hour was 258, and the total hours counted was 728.

The estimated tonnage used for each class of vehicle is the same as that adopted by the bureau of highways, Brooklyn, N. Y., which is as follows:

RUBBER TIRED VEHICLES	
Large auto trucks—loaded	8 tons
Large auto trucks—empty	4 tons
Small auto trucks—loaded	3 tons
Small auto trucks—empty	1½ tons
Automobiles	1¾ tons
Wagons and carriages	1½ tons
IRON TIRED VEHICLES	
Three-horse trucks—loaded	7½ tons
Three-horse trucks—empty	3½ tons
Two-horse wagons—loaded	4 tons
Two-horse wagons—empty	2 tons
One-horse wagons—loaded	2 tons
One-horse wagons—empty	1 ton

The entire count was under the direct supervision of Charles Smith and W. J. Galligan, first and second assistant superintendent of streets reporting to Walter Leminger, superintendent of streets.

The Kansas City Viaduct

In a paper presented before the American Society of Civil Engineers on Sept. 1, E. E. Howard presented a description of the new Twelfth Street Trafficway Viaduct in Kansas City, Mo., which is unique in that it is one of the highest reinforced concrete structures of this type that has been built. The viaduct extends across the river bottom between the principal residential and business districts of the city and has a maximum height of 120 ft. With the earth embankment at the ends, it provides a street 60 ft. wide that is on a continuous grade of about 5.5 per cent for a distance of 3500 ft. To accommodate traffic desiring a less steep grade and willing, for such advantage, to travel by a less direct route, a roadway is provided on a lower deck with a grade of about 2.5 per cent.

The upper deck is separated into a roadway 30 ft. wide that is paved with creosoted blocks, a sidewalk 5 ft. wide and a street car space 22 ft. wide. The roadway is separated from the street car space by a concrete curb, and on each side of the structure there is a concrete hand rail. The two electric railway tracks are built with the usual wooden cross-ties set in ballast, so that no other traffic can use the area which they occupy. This arrangement, which is somewhat uneconomical from a highway standpoint, was specified by the city authorities. Iron trolley poles on each side of the street car space support the usual overhead wires. The lower deck provides a single roadway 30 ft. wide that is paved with creosoted block, the longitudinal girders that support this deck extending far enough above the roadway to form side barriers.

The upper deck comprises forty-five deck-girder spans of two girders each, these varying in length from 33 ft. to about 56 ft. There are also the arch spans and two earth-filled approaches. The lower deck comprises twenty-seven through-girder spans of two girders each supported on the same columns as carry the upper deck, a suspended deck under the arch span and earth-filled approaches. The floor slabs are supported on cross-girders and cantilever beams. Both upper and lower roadways are lighted with incandescent electric lights placed above the hand rail for the upper deck of the bridge and on brackets on the columns for the lower deck.

American Association News

The San Francisco Committee on Entertainment Announces Program—Personnel of the Southern California Entertainment Committees—Denver Tramway and Public Service Company Sections Resume Meetings

"WHITE SPECIAL"

The office of H. G. McConnaughy, director of transportation, closed on Sept. 23 and will not open again until Oct. 23. All information from now on regarding the "White Special" must be secured from L. E. Gould, Old Colony Building, Chicago, Ill., who is in charge ot the train. This train will leave Chicago at 6.30 p. m. on Oct. 1, over the Chicago Great Western Railroad, arriving at San Francisco at 10.25 a. m., Oct. 4.

"RED SPECIAL"

The "Red Special" pulled out of New York on Thursday with an enthusiastic company of well wishers in attendance. The decorations throughout the train were in red, and each lady was presented with a bouquet of orchids and lilies-of-the-valley. One end of the baggage car had been floored and equipped with a Victrola for dancing. Provision had been made to furnish souvenir postals en route ready stamped for mailing.

SAN FRANCISCO ENTERTAINMENT PROGRAM

The committee on entertainment for the convention has announced the following program:

Oct. 4, 9 p. m.—Reception and ball, Colonial ballroom, St. Francis Hotel.

Oct. 6, 8 p. m.—Electric scintillator drill and fireworks display. Illuminated flight by a member of the exposition aviation corps.

Oct. 7.—American Electric Railway Association golf tournament, Claremont Country Club, Oakland. Members of the golf committee will board special trains at Portland and Ogden.

Oct. 8, 10.45 a. m.—Delegates and ladies will leave Native Sons' Building for the exposition grounds in special buses.

11.30 a. m.—Presentation of bronze plaque by C. C. Moore, president Panama-Pacific International Exposition, to C. Loomis Allen, president American Electric Railway Association, followed by an address on "The Development of the Electric Railway," by James H. McGraw, president McGraw Publishing Company, Inc.

12.40 p. m.—San Francisco Bay trip and sight-seeing tour of Oakland and Berkeley.

In addition to the above a special sight-seeing car and local club privileges can be arranged for by the entertainment committee.

SOUTHERN CALIFORNIA ENTERTAINMENT

The personnel of the southern California committees of entertainment is as follows:

J. McMillan, general chairman, Pacific Electric Railway Company.

K. E. Van Kuran, secretary-treasurer, Westinghouse Electric & Manufacturing Company.

Committee Chairmen:

Finance committee—Paul Shoup, Pacific Electric Railway.

San Diego committee—B. M. Warner, San Diego Electric Railway.

Reception committee—Seymour Swarts, Great Western Smelting & Refining Company.

Publicity committee—D. W. Pontius, Pacific Electric Railway Company.

Program committee—R. H. Husbands, Pierson-Roeding Company.

Club courtesies—C. A. Henderson, Los Angeles Railway.

Transportation committee—A. W. Arlin, General Electric Company.

Barbecue and music—L. O. Lieber, Los Angeles Railway.

Evening entertainment—S. I. Wailes, manufacturers' agent.

Catalina trip—F. F. Small, Pacific Electric Railway.

San Francisco registration—H. H. Hale, Galena Signal Oil Company.

DENVER TRAMWAY COMPANY SECTION

The season of the Denver Tramway Section was opened with the twenty-eighth monthly meeting on Sept. 16. J. L. Adams resigned from the program committee and his place will not be filled for the present. A nominating committee consisting of R. W. Toll, chief engineer; W. M. Casey, superintendent of transportation, and W. H. McAloney, superintendent of rolling stock, was appointed to nominate new officers for the section. The election is to be held next month. The principal speaker was J. S. McGinnis, secretary and commissioner of immigration, who delivered an illustrated lecture on "Let's Know Our City and State."

PUBLIC SERVICE SECTION

The first regular meeting for the season of company section No. 2 was held in Newark, N. J., on Sept. 23. The general program on "Public Service Economics," announced in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 13, 1915, page 337, was departed from to permit a discussion of the jitney.

Two carefully-prepared and exhaustive papers formed the basis of the discussion, one on "The Jitney—Its Coming and Shortcomings," by A. T. Warner, traffic investigator transportation department and secretary of the section, the other on "Jitney Operating Costs," by R. H. Harrison, executive clerk mechanical department. The first paper traced the history of the jitney in the country as a whole and in New Jersey in particular, detailed statistics for a number of cities being given. Pictures of several types of jitney were thrown upon the screen. The speaker showed very clearly that, as the jitney lessens rather than increases the wealth of the community, whereas the contrary is true with railways, it is economically unsound.

Mr. Harrison gave additional statistics and the results of computations which demonstrated the impracticability of permanent jitney competition. Taking the statement of a member of the local board of public works to the effect that in ten years the jitney would put the railway out of business, he gave the results of calculations to show what this would mean in Newark in the way of street congestion alone. Mr. Harrison also illustrated his talk with views of jitneys and trolley cars.

The papers were discussed by W. B. Graham and J. J. Geddings, division superintendents, who gave additional jitney traffic data. The discussion brought out the fact that while the individual operator does not stay long in the business there is "a fool born every minute" so that the supply is kept up, each operator pocketing his loss as he retires.

A. J. Van Brunt, of the claim department, then showed two new safety motion picture reels staged by the Edison Company and Public Service Company acting jointly. Their purpose is to teach safety lessons by showing the foolishness of many practices of persons using the streets, and the lessons are impressed by touches of heroism and romance.

The topic for the October meeting of the section will be "The Design and Construction of Carhouses and Shops," and the annual election will also be hold at this meeting.

COMMUNICATIONS

Cars at Less Than Cost

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
EAST PITTSBURGH, PA., Sept. 20, 1915.

To the Editors:

We have read with keen interest the communication by Ernest Gonzenbach in your issue of Sept. 11. The article is written in Mr. Gonzenbach's usual forceful style, and, as we have come to expect from his letters, it contains points that are worthy of renewed interest by the electric railways, car builders and electrical manufacturers.

The rapid increase in the number of automobiles, auto buses and auto trucks which has taken place in the last few years is undoubtedly responsible for the great uneasiness that prevails among electric railway operators and brings out more clearly than ever the necessity for the most rigid economies in every line. Mr. Gonzenbach is undoubtedly quite right in his statement that the adoption of standard cars, including car bodies, trucks, electrical equipment and air-brake equipment, would effect enormous reductions in the cost of equipments to the operating companies, but he is wrong if he assumes that the automobile manufacturers are the ones who have discovered the economies of manufacturing standard articles in large quantities.

This principle was well established long before automobiles were ever conceived. It has been drilled into railway men, both operators and manufacturers, for many years, and from personal knowledge extending well over the life of electric railroads, I know that it has been the ideal toward which all of us have worked. However, the best that can be hoped for, in the line of standards in the electrical equipment for cars, seems to be a life of two or three years. The difficulty lies in the fact that there are other ideals that must be considered—ideals which conflict with that of standard design and which concern the cost of equipments just as much.

To be more specific, the question of standardization cannot be allowed to block the wheels of progress, and until the field for improvement is more nearly exhausted, or until competition ceases, I can see but small prospect for the standard car. It is more than probable —it is almost certain—that if in the present state of the art Mr. Gonzenbach were offered a car that represented the best of its kind two years ago, he would undoubtedly insist on many changes before he would accept it. In fact, if he were to overlook all of the improvements that have been made in cars and equipments in the last two years, he would run the risk of being declared obsolete himself.

Another reason why it has been so difficult for manufacturers to standardize their equipments actually lies in the efforts of so many operating companies to standardize. This may seem paradoxical, but it is none the less true. For instance, practically every large city railway has certain standards that are peculiar to that line. Self-interest prevents them from adopting standards that are common to other railways, consequently the manufacturers have to keep on making special apparatus for the simple reason that they must make what their customers want. Of course, it costs a great deal more. Manufacturers must keep on developing new apparatus, not only to keep up with the ideas of their own engineers but to meet the improvements that are suggested by operating engineers and at the same time to adhere to many of the standards of the old lines.

It must be recognized that the manufacture of a standard automobile is an entirely different matter from that of electric car equipments because the vast majority of automobiles go to individuals who have no other cars, or at least have no standards to maintain, and so are perfectly willing to take what is offered, provided it is good. There are probably more than 1000 customers for the automobile companies to one for an electric car equipment, and there is absolutely no reason why the automobile makers should not standardize except for the necessity for keeping up with the improvements. Even then it is possible to manufacture a single car for at least one season and the numbers are so enormous that the cost of tools is relatively small. But do not forget the tombstones marking the resting place of the unfortunate companies who fell or guessed wrong in manufacturing automobiles.

What is the remedy? I believe it lies entirely in the hands of the operating companies. Certainly nothing would please the manufacturers more than to have the American Electric Railway Association exercise its influence so as to make it possible for standard cars to be manufactured. N. W. STORER, General Engineer.

Who Should Keep Way Department Time?

CHICAGO, ILL., Sept. 15, 1915.

To the Editors:

In last week's issue of the ELECTRIC RAILWAY JOURNAL an article on "Time Keeping and Cost Records of the Way Department," by S. Gausmann, Brooklyn, N. Y., appeared. In introducing his subject Mr. Gausmann emphasized the two salient points of any accurate time-keeping method, namely, careful selection of time-keepers and a thorough system for checking the men. This is particularly important during the spring, summer and fall months when large construction forces are employed, and the entire way department clerical force is working under pressure. At that time the engineer in charge is too busily engaged in directing the work to devote much time to clerical details, therefore it is important that the clerical work should be carefully planned and well kept up so that information can be secured on short notice if necessary.

Aside from the time-keeping system a phase of this subject presents itself which is important to the way department head because of its relation to the accurate distribution of way costs, namely, shall the way department keep the time and make the distribution, or shall the work be done by the auditing department? Any discussion of this subject will apply to the electrical and mechanical departments as well.

It needs no argument to show that the department head and his assistants are more competent to check the accuracy of the distribution than a clerk in some other department unacquainted with the details of the work in progress. Furthermore, since the time-keepers on the various jobs must of necessity report to the way engineer, if he expects to control the wages of his men, it scarcely appears necessary to take the preparation of the payrolls out of the department. On the other hand, if the supervision of this clerical work is removed and the way department is permitted to devote all its time to the supervision of work under way, the duty of the department head becomes largely an executive one. Moreover, when the payrolls are prepared in the auditing department the work is handled by a force which specializes in accounting matters.

To reach a conclusion in this particular is as difficult as that pertaining to some of the problems involved in the proper distribution of departmental costs. Doubtless there is considerable advantage in having the distribution of costs made by accountants who are unbiased as to the result, but familiarity with the details of the work under way also appears equally important to obtain accurate distribution. Still another advantage of the latter plan is the fixing of the entire departmental responsibility in one man, and in my judgment this is a controlling consideration.

WAY DEPARTMENT ENGINEER.

Daily Work-Train Report

THE NORTHERN OHIO TRACTION & LIGHT COMPANY
AKRON, OHIO, Sept. 13, 1915.

To the Editors:

Referring to an article on "Way Department Report Forms" in the Sept. 4 number of the ELECTRIC RAILWAY JOURNAL, I send herewith a form of report for daily work-train service, which I have found very valuable for office records and ready reference to various work orders, covering construction and repair work. This report has been tried out, and after numerous changes was brought down to the present form, the object being to save time and trouble, causing as little work on the part of the crew as possible and yet giving all the information desired. This form is made out in triplicate, white, pink and yellow sheets being used, and is forwarded promptly to the roadmaster's office at the end of each day's work for his inspection and signature and also for the timekeeper's signature. The yellow sheet is kept in the roadmaster's office, and the other two sheets are forwarded to the general office, one copy being kept in the maintenance of way department, the other is sent to the distribution clerk.

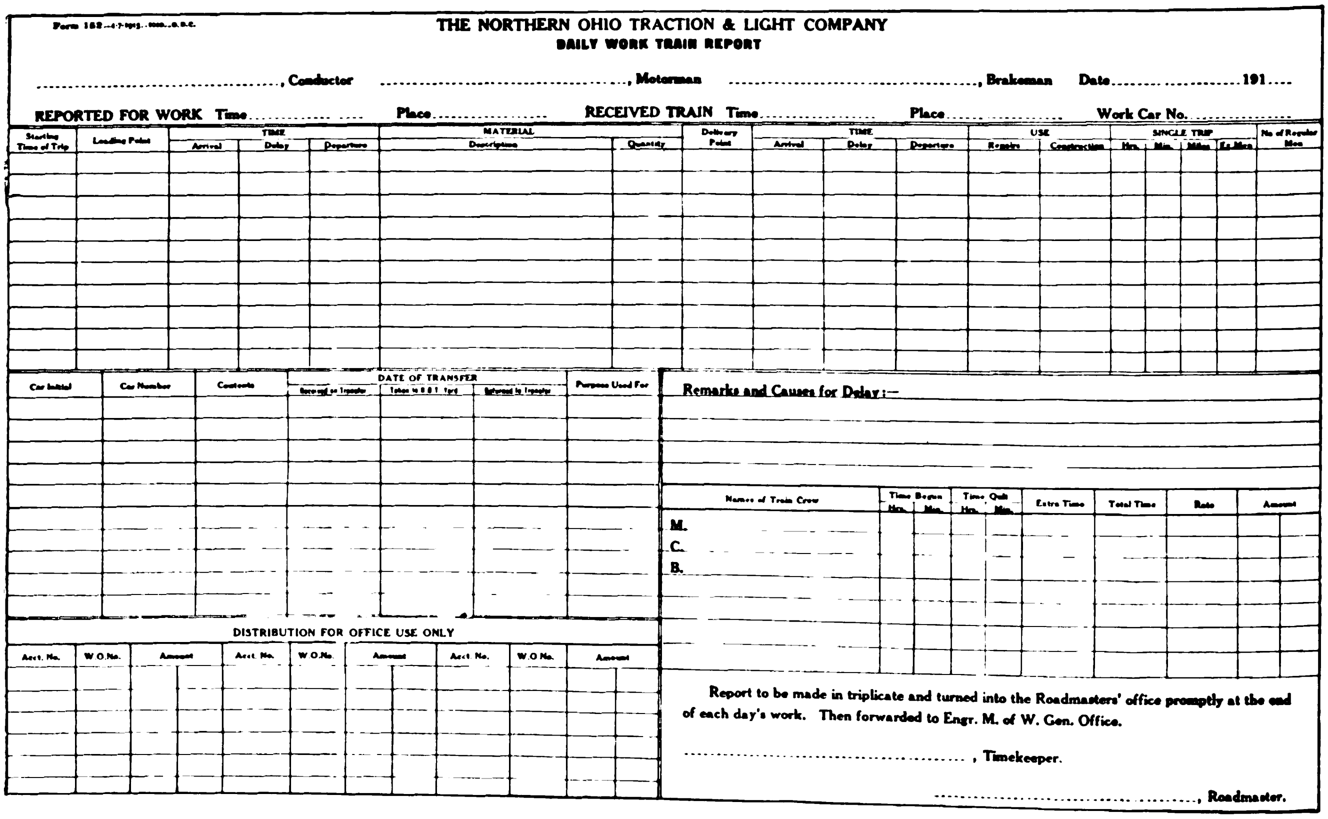
This report traces the work of the crew and movement of each work train from the time the men report for work until they quit for the day. A space is shown for the names of the conductor, motorman and brakeman, with date of report, as well as the time and place at which the crew reported for work and received the train, with the number of the car. This is necessary as they receive the train at different yards on the system; also, they may have reported for work but had to delay on account of repairs to cars. There is a column for each single trip, with the name of the starting place and loading point, also for the time of arrival, delay, if any, and departure at that point, description and amount of material carried, delivery point with time of arrival, delay, if any, and departure from that point. There are also columns for use as to repairs or construction. This is important to the distribution clerk, so that he can charge out for capital or operating accounts. The blank also has spaces for the total time, mileage and number of extra men and of regular men carried on each trip.

Under remarks or delays, the crew is required to give causes of all delays and any other information of use either to the operating department or to the maintenance of way department.

In explanation of the column on transferring of cars, switching, etc., it might be explained that the work trains on the Northern Ohio Traction & Light Company's system are required to switch the cars containing material for stock, repairs or construction, from the railroad transfer switch to the company's yard. These cars must be returned, and a record is kept of the movement and dates of transfer, so that demurrage can be checked, if there is any to be accounted for.

The time of the work-train crew and extra or regular men is also made out in the blanks, showing names of each, together with the time begun and quit, also extra time allowed, total time and rate, and lastly the amount. Then, for the use of the clerks for the distribution of various jobs chargeable to various accounts coming under proper work orders, we have columns to be filled out in the office, as shown in the lower left-hand corner. Finally, the timekeeper and roadmaster, after carefully checking and looking over the sheet, sign their names and forward the two sheets, pink and white, to the engineer of maintenance of way and the general office.

Possibly this may be of interest to the readers of the ELECTRIC RAILWAY JOURNAL. THOMAS W. BLINN,
Assistant Engineer Maintenance of Way.



Form 182—4-7-1915—1000—O.P.C.

THE NORTHERN OHIO TRACTION & LIGHT COMPANY
DAILY WORK TRAIN REPORT

.................................., Conductor ...., Motorman ...., Brakeman Date.......................191....

REPORTED FOR WORK Time.................... Place.................... RECEIVED TRAIN Time.................... Place.................... Work Car No. ....

Starting Time of Trip	Loading Point	TIME			MATERIAL		Delivery Point	TIME			USE		SINGLE TRIP				No. of Regular Men
		Arrival	Delay	Departure	Description	Quantity		Arrival	Delay	Departure	Repairs	Construction	Hrs.	Min.	Miles	Ex. Men	

Car Initial	Car Number	Contents	DATE OF TRANSFER			Purpose Used For
			Received on Transfer	Taken to R.R.T. Yard	Returned to Transfer	

Remarks and Causes for Delay:—

Names of Train Crew	Time Begun		Time Quit		Extra Time	Total Time	Rate	Amount
	Hrs.	Min.	Hrs.	Min.				
M.								
C.								
B.								

DISTRIBUTION FOR OFFICE USE ONLY

Acct. No.	W.O.No.	Amount	Acct. No.	W.O.No.	Amount	Acct. No.	W.O.No.	Amount

Report to be made in triplicate and turned into the Roadmasters' office promptly at the end of each day's work. Then forwarded to Engr. M. of W. Gen. Office.

...., Timekeeper.

...., Roadmaster.

DAILY WORK-TRAIN REPORT USED BY THE NORTHERN OHIO TRACTION & LIGHT COMPANY

Horizontal vs. "Festooned" Contact Wires

THE CONNECTICUT COMPANY
NEW HAVEN, CONN., Sept. 22, 1915.

To the Editors:

Referring to Dr. Ing. E. E. Seefehlner's letter of July 31 in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 18, I would state that I have not seen the articles there referred to but shall make it a point to follow up the references.

I am very much interested to know if Dr. Seefehlner has really had experience with operation on a festooned trolley, or whether he is basing his statement simply on the good behavior of the horizontal line.

The life of the collector is a function of so many variables that unless all of the facts are at hand it is not entirely safe to credit the good to any one cause. Dr. Seefehlner will doubtless be interested to note the article in the convention issue of the JOURNAL on the maintenance of the Southern Pacific Company's cars and the life of their trolleys, which, according to Mr. Sears, is expected to be 50,000 miles or 80,000 km., against the 42,000 km. of the Vienna-Pressburg bows.

CHARLES RUFUS HARTE,
Construction Engineer.

Starting Resistance of Electric Cars

PURDUE UNIVERSITY
WEST LAFAYETTE, IND., Sept. 16, 1915.

To the Editors:

In the editorial on the above subject which appeared in your issue for Aug. 14, you make the following statements: "There are numerous formulas, with curves based thereon, which indicate a minimum resistance at zero speed, although this condition is known not to exist. * * * It is misleading, therefore, to plot curves from these formulas down to zero speed." I heartily agree with you in this conclusion. Train resistance formulas are usually derived from curves plotted from actual test data. However, such formulas are capable of much broader interpretation than the curves from which they were derived, and curves plotted from such formulas may indicate values which are beyond the limitations of the test results which formed the primary bases of the formulas. For example, most train resistance data have been taken between speeds of 10 m.p.h. and 70 m.p.h., yet curves plotted from formulas derived from such data may be read at any speed.

Most train resistance formulas are of the form:

$$R = A + BS + CS^2$$

where S is the speed and A, B and C are constants.

A study of existing train resistance data leads to the conclusion that, for a given set of conditions, such an equation may be made to represent the relation between train resistance and speed with a fair degree of accuracy for all speeds above the speed at which the train resistance is a minimum. With existing equipments this minimum value obtains somewhere between 5 m.p.h. and 10 m.p.h. The curves of Wellington, Aspinwall, Dennis and others of the earlier investigators plotted, not from their formulas but from their actual test results, indicate that the starting resistance is much higher than the minimum resistance. However, the formulas which have been derived from their results contain no indications of this condition. C. O. Mailloux has pointed out that "the curve of train resistance plotted as a function of speed is really a 'two-branch' curve." (A. I. E. E. *Transactions*, Vol. 23, page 734.) As already noted, that branch of the curve which shows the relation between train resistance and speed for speeds above the one which gives minimum resistance may be represented by the above equation, but a satisfactory equation has not yet been developed for that branch of the curve which has to do with the lower speeds. We may conclude, therefore, that it is unsafe to use either train resistance formulas of the form $R = A + BS + CS^2$, or curves plotted from them below 10 m.p.h.

The custom of expressing train resistance by an equation of this form without stating explicitly the limits between which the formula is approximately correct is to be condemned. Such custom is certainly not in accord with true engineering ideals of accuracy and good practice, and is apt to be misleading to a large number of engineers who are occasionally required to solve problems in which train resistance is one of the involved factors, but who could hardly be expected to make train resistance specialists out of themselves before attempting the solution of their problem. The curve (ELECTRIC RAILWAY JOURNAL, Aug. 7, page 239) to which your editorial refers is an example of a correctly-drawn train resistance-speed curve.

Referring to the abstract from the sixth annual report of the Board of Supervising Engineers, Chicago Traction, contained in your editorial: As I understand the report, two distinct considerations are recognized. One has to do with the "friction of rest." Data pertaining to this consideration for a particular car and set of track conditions are given in my article published in your issue for Aug. 14. Also such data for heavy trains equipped with plain and with ball bearings respectively are given in your issue for Aug. 7, page 239. The second consideration deals with the increase in train resistance during acceleration over that which obtains during free running at the same speed. The data available here are hardly sufficient for even an approximate analysis.

In a communication on the subject which forms the caption of these notes published in your issue for Sept. 4, it was pointed out that it is customary in making calculations where train resistance is an involved factor to assume that during the notching-up period, the train resistance is constant at the value which obtains at the speed corresponding to full voltage and accelerating current, and that the results so obtained had checked very satisfactorily with results of tests. For the purpose of simplifying calculations, it is, of course, common practice with engineers to make certain assumptions, particularly where the use of such assumptions ordinarily does not involve serious error. However, it would seem to be better practice to found assumptions on factors, the values of which are known with a fair degree of accuracy, rather than simply to make an assumption and later to check its accuracy by tests.

As is so well set forth in the communication referred to, it is quite true that "the instances where it (train resistance at starting) is a determining factor in equipment selection, locomotive weight determination or energy consumption are relatively few." That in some instances it is worth considering, Fig. 4, page 239, of your issue for Aug. 7, bears evidence.

Also it might be pointed out that for a given average rate of acceleration that equipment which has the lowest starting resistance will have the lowest peak current during acceleration, other things, of course, being equal. From the standpoint, therefore, of operation and maintenance of electrical equipment of rolling stock, distribution system and substations rolling stock which has low starting resistance seems desirable.

In conclusion, therefore, it seems to me that more data and information on the subject of train resistance at starting and train resistance during the accelerating period are highly desirable. D. D. EWING,

Assistant Professor of Electrical Engineering.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

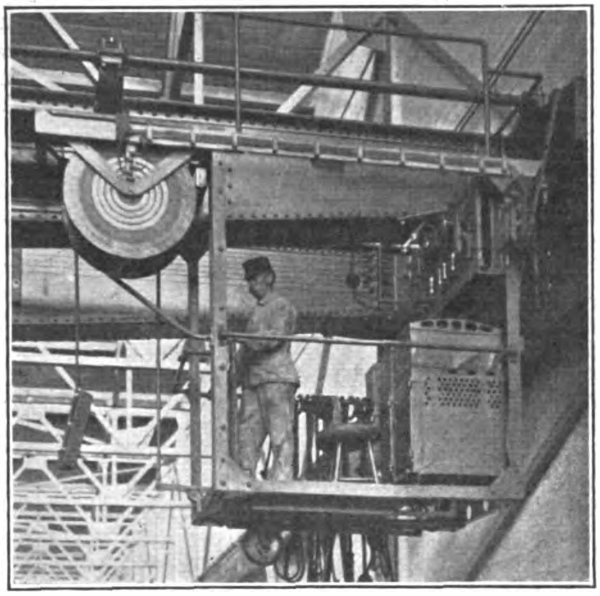
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Use of Current for Operating Crane to Remove Trucks from Under Car Bodies

BY R. E. HEWITT, MASTER MECHANIC, SOUTHERN PACIFIC COMPANY ELECTRIC LINES, WEST ALAMEDA, CAL.

As our standard motor truck is exceedingly heavy the work of pinching it out from under a car body with pinch bars, after the car had been raised and placed on standees, was slow and tedious work. As a consequence we conceived the idea of utilizing the current that operates the shop crane for moving the trucks electrically. The method used can be understood from a study of the accompanying illustration.

Overhead and directly in front of the crane operator is a drum from which hangs a four-conductor cable. To the cable is attached a block in which are inserted four standard motor-lead couplers. On the side of the drum are four metal rings that give sliding contacts at the terminals of four wires that can be traced to a double-throw switch at the extreme right of the crane-operating cradle.



DEVICE FOR REMOVING TRUCK FROM UNDER CAR BODY BY THE USE OF ELECTRICITY

When it is necessary to remove the trucks from under a car the crane is moved to the point on the floor where the car is standing, the cable is unreeled from the drum and attached to the armature and field leads of one of the motors in the truck, and the double-throw switch at the right in the operator's cradle is reversed cutting off the current from the crane motors and transferring it to the drum. The operator then utilizes the same controlling levers, resistance, etc., that he previously used in manipulating the crane in controlling the motor on the truck, moving the truck forward or backward as desired. As the crane operates on 220 volts, direct current, the power supply is well adapted for the above purpose.

From the description it will be evident that time and labor are saved by this method of utilizing the electric crane outfit.

Trolley Wire and Pantograph Shoe Wear on Annapolis Short Line

BY D. E. CROUSE, ENGINEER

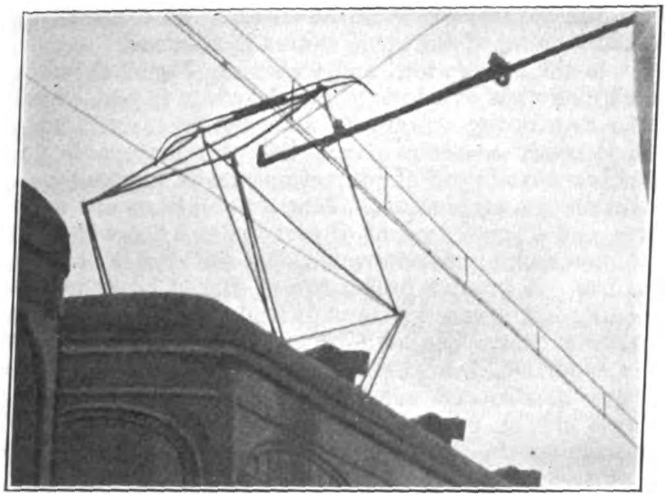
The Annapolis Short Line since 1908 has used various types of pantograph shoes of the sliding type for the collection of both a.c and d.c. power. From 1908 to 1914 the trolley pressure was 6600 volts a.c., single-phase, 25 cycles. The weight of the car was 50 tons, but since the voltage was high, the current collected was small, in fact, less than 100 amp. The overhead line was of the single catenary type with bracket suspension and with a messenger of 7/16-in. Siemens-Martin strand from which a No. 000 grooved copper contact wire was suspended by means of rigid-pipe hangers. The contact wire wore rapidly, due in part, undoubtedly, to the lack of flexibility in this type of construction.

The pantograph shoe used at this time was of 1/16-in. mild steel, 6 in. wide and 4 ft. long. Its average life was 1000 miles and its cost 26 cents. It was provided with aluminum horns which were altered (as described in the issue of the ELECTRIC RAILWAY JOURNAL for March 20, 1915, page 550) to permit greater contact area where the effects of oscillations were severe. The pantograph was controlled by standard Westinghouse electro-pneumatic equipment, and the shoes were lubricated with graphite grease. The life and operation of pantograph shoes of this type were satisfactory, but the wear on the No. 000 trolley wire was abnormal. In five and one-half years, during which there were 120,451 train movements, the copper trolley wire was one-half worn away.

On Jan. 4, 1914, the voltage on the contact wire was changed from 6600 a.c. to 1200 d.c. and the problem of collecting a larger current was introduced. It was desired to retain the operating features which are inherent to the pantograph but at the same time to eliminate the rapid trolley wear. A steel, grooved contact wire of No. 0000 section was therefore erected immediately under the worn No. 000 copper wire, and both were suspended from the messenger by means of full-loop hangers spaced 15 ft. apart. These loop hangers, which were also described in the March 20 issue of this paper, introduced the needed flexibility.

The weight of the 15 ft. of worn wire copper plus that of the new No. 0000 steel wire, when added to the weight of one hanger, gave a total of 16 lb. per point of hanger suspension. As the vertical pressure of the pantograph is maintained at from 12 lb. to 18 lb. the pantograph tension and the weight contact wire and hangers are so nearly balanced that there is little tendency toward the forming of waves in the contact wire between points of support.

Some doubt was felt at first as to the ability of the steel contact shoe to collect from a steel trolley wire the accelerating current of the new 40-ton cars, about 350 amp. The operation demonstrated, however, that there

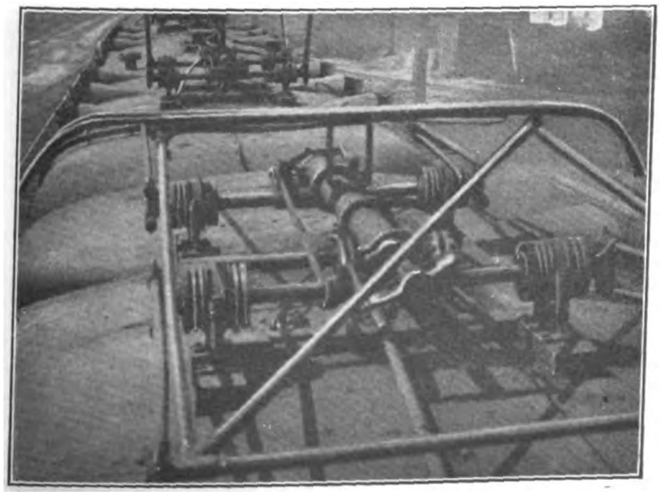


ANNAPOLIS SHORT LINE—OVERHEAD CONSTRUCTION SHOWING NEW SHOE IN OPERATION

was ample margin for collecting as high as 700 amp. with no burning of the wire or the shoe. The use of the old-style shoes soon developed the fact that the wear had been transferred to a large extent from the contact wire to the pantograph shoes, as the former mileage of 1000 was reduced to 400. To overcome this the style of shoe and horns was radically changed, with the limitation in mind that the greatest weight which the pantograph springs would permit in the horns, shoe and fixtures was 15 lb.

The ease with which the maximum current per car, 350 amp., could be collected suggested cutting down the width of the shoe and increasing its thickness. It was observed further that when the high accelerating current was being collected, the wire was usually in the center of the shoe; for the reason that extreme oscillations did not exist until high speeds were reached. Since the current density was greatest at the center of the shoe it was decided to cut a "dovetail" in both ends of the shoe and thus save weight.

The reduction in width from 6 in. to 4½ in. and the cutting of the "V" in the end of the shoe permitted a ⅛-in. mild steel shoe to be substituted for the 1/16-in. shoe. In addition, the costly aluminum horns were replaced by ¾-in. x ¾-in. x ⅛-in. angle-iron horns. The result of all of these changes was a shoe which costs $1 and gives an average life of 25,000 miles. The former cost of 26 cents per 1000 miles was reduced to 4 cents, and at the same time the labor charge for replacing shoes was greatly cut down. The shoes are lubricated, as before, with graphite grease. The control of the pantograph was changed on Jan. 4, 1914, from electro-pneumatic to straight air, as was described in the article referred to. The first mile of steel trolley wire erected on the Annapolis Short Line has been in service for three years and after 72,270 train movements shows a wear of 12 mils.



ANNAPOLIS SHORT LINE—PANTOGRAPH FRAME IN RETRACTED POSITION, SHOWING DETAILS OF NEW SHOE

Practical Views of Special Work—I—The Tongue Switch

BY R. P. WILLIAMS, INSPECTOR OF SPECIAL WORK BROOKLYN RAPID TRANSIT SYSTEM

With the present design of special work the waste is enormous. In nearly thirty years, or since the introduction of the "guaranteed" type, there has been practically no change. Heavier rails were first introduced, and next came the harder rail. With these changes the price of special work has gone steadily upward.

When it was found that, with the use of the built-up type of special work, the intersections of frogs and crossings laminated so quickly as to compel renewal of the individual piece before even the minimum amount of wear was obtained from the abutting arms, the renewable center was introduced to overcome the deficiency in wear. Solid manganese is recommended now for the same purpose. While it is true that layouts will last longer than formerly, comparatively the same condition now obtains as was found to exist with the old style of built-up Bessemer steel construction.

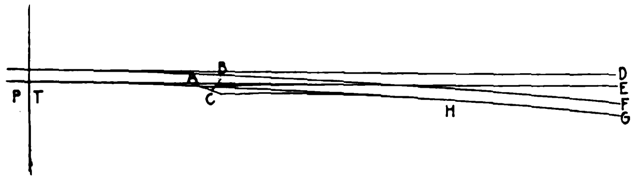
We have an illustration of this fact in Brooklyn at the Park Row loops. This layout was of solid manganese, and, while the frogs lasted five times as long as the guaranteed type, yet when thrown away on account of the dished condition of the intersection, the surface wear in the balance of the piece was scarcely noticeable. Counting the increased cost of the material and the amount of good material thrown away there is no saving. Evidently the fault is in the design, for there can be no economy in throwing away 8¾ in. of a 9-in. manganese rail, even if it does last longer than the open-hearth rail.

The writer has had thirty years of experience, divided almost evenly among building, installing and maintaining special work, and offers the following findings and suggestions as his view of a way out of the difficulty. By considering the tongue switch and the crossing the entire ground will be covered.

The tongue switch will be taken up first and the crossing will be discussed in a subsequent article. The objectionable features of the tongue switch are as follows: First, the manganese bed; second, the shape of pocket; third, the uneven wear; fourth, the shape of heel and fastening, and, fifth, the drainage.

The manganese bed was introduced for the same reason as the renewable center. The original built-up tongue switch was made with the tongue level with the head to give smooth riding on the straight run, the high guard appearing only near the heel of the tongue where the wheel tread would not touch it. As a consequence the wheel tread on the straight run wore a groove in the head of the curve rail parallel to the straight gage line. The manganese bed and manganese tongue have evened up the life of the switch, so that under even travel on straight track and curves the three abutting pieces of open-hearth steel rail are about worn out when the parallel ridge appears in the manganese bed. Now consider the switch to have been made of solid manganese and we are back to the original proposition. Obviously, then, this manganese bed must be renewable, and the abutting rails must be of the same degree of hardness. As made at present this bed is not renewable without removing the switch and turning it upside down. We have had to resort to this extreme measure when it becomes necessary to tighten the loosened bed. With the introduction of this bed came the distortion of the tongue pocket.

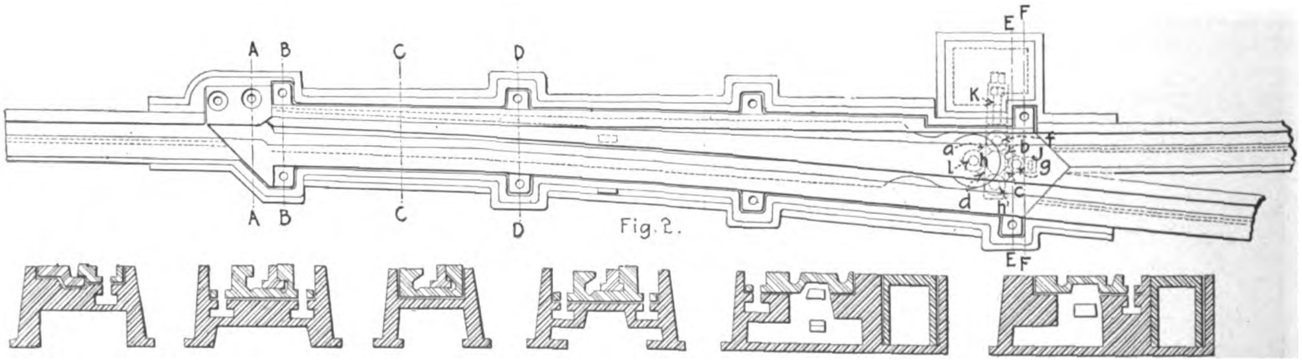
Fig. 1 is a diagram showing the natural formation of the tongue pocket, the line *E* representing the straight gage line, *G* the curve line. The width of tongue point having been determined, say ⅞ in., at a point where the natural deflection of the curve line from the straight track amounts to one-half of this distance, or 7/16 in., the other half of the full thickness is projected beyond the curve line toward the side *C*. The required width of heel is then determined. The curve line (100 ft. radius in this instance) is then carried from the guard side of the tongue heel, across the curve line at *H* to the required width of point at *C*. This forms the curve side of the pocket, and in the old built-up tongue switch worked out perfectly. With the manganese-bed type of switch the short piece of rail cast in at the point end between *A* and the point of tangency, *PT*, is left straight. Consequently the straight gage line is carried full to *A*, offering undue resistance to the flange entering the curve, also leaving a gap in the straight gage line between *A* and *B*. This amounts to the same condition as is produced by a very bad joint, and causing a dish to appear in the mate just opposite. Instead of this the curve gage should be carried naturally, and a slight clearance planned from the point of the tongue, as shown at *B*, to prevent the straight-bound flange from picking or straddling the tongue point. The line *F* represents the curve guard, the line *D* the straight guard; the width of groove shown is 1½ in. By following the lines *F* and *D* back to *A* it will be seen that with the curve lines set naturally 1 1/16 in. of room is left for straight-flange travel, and for the curve the natural condition of entering as obtained in the plain curve of the same radius is obtained.



SPECIAL WORK—FIG. 1—DIAGRAM OF TONGUE SWITCH LAYOUT

As to the tongue heel and fastening, Fig. 2 shows a rough plan view of a tongue switch with a 6½-in. round heel. But, in the writer's opinion, the excessively wide heel is costly in maintenance, the very large area demanding a condition of perfection almost impossible to maintain in a dirty street. Tongues will warp and work loose, and a small amount of dirt under a too-wide heel sets up a rocking motion which soon destroys the tongue and bed. A greater proportion of dished heels are developing in the excessively wide heels rather than in the narrower ones. The all-downward heel fastening helps this condition, for loosening of the device allows the tongue to rise and admit dirt. In the side elevation shown in Fig. 9 a suggestion is offered in the line of overcoming this tendency to rise. The heel of tongue is provided with a projection as in the old armored heel and prior types, but bent downward at an angle of 45 deg. so as to admit of a backward pressure, the tongue hinging, as it were, at the point where it disappears under the manganese bed, tending to hold the point of tongue down at the same time. With the present devices one is told, "Just a slight turn of the nut will tighten the tongue," to which might be added "and you cannot move it." That is just the trouble, too much friction requires too much care. The pressure device shown has been worked out in full size and seems good, its principal feature being that it swings with the tongue. An idea of its principle will be obtained by a study of the dotted plan view, Fig. 2, and the side elevation, Fig. 9. The device consists of two links with one end open, and two closed links, the pin shown directly under the curve groove going through the case *K*. The case *K* extends back into a box on the straight side where pressure is exerted by a bolt or screw in the end of the case, the two half-open end links set against the loose pin *I*. The opposite ends of the now doubled links are set in a recess in the loose lug *J*, and when pressure is exerted in the end of case *K*, the heel of the tongue is forced backward and the point of the tongue downward. The only friction is at the heel of the tongue, and on the pin *I*. This pin should be removable and set entirely in the bottom casting. It should be placed directly under the center of the round heel of the tongue for accurate pivotal motion.

Figs. 2, 4, 5 and 6 show the shape of the tongue and the drainage system. It will be noticed that the canals



Section A-A Fig. 3

Section B-B Fig. 4

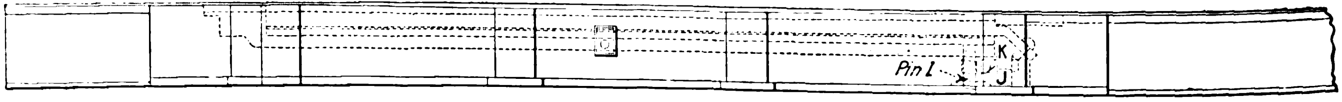
Section C-C Fig. 5.

Section D-D Fig. 6.

Section E-E. Fig. 7.

Section F-F Fig. 8.

Fig. 9

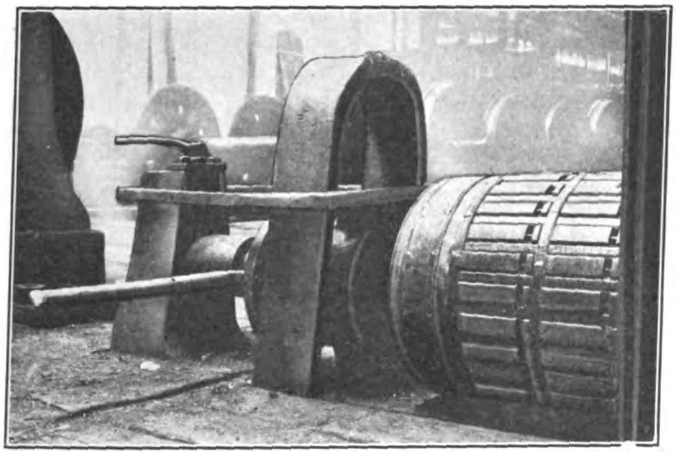


SPECIAL WORK—FIGS. 2 TO 9—PLAN, ELEVATION AND SECTIONS OF IMPROVED TONGUE SWITCH are so designed as to permit of being easily ground out with a small emery or other grinding wheel. Fig. 3 shows a renewable piece at a vital point, for on the keeping up of this guard edge depends the safe facing operation, as well as lengthening the life of the switch as a trailer. Figs. 7 and 8 are cross-sections at the heel showing the amount of metal under the supporting heel portion. It will also be noticed that the arrangements for fastening are all easy of access. The method and principle will be shown in a later article in connection with the crossing.

Home-Made Pinion Puller

BY C. M. FEIST, MASTER MECHANIC SIOUX CITY (IOWA) SERVICE COMPANY

An even distribution of the pressure on both the pinion and the armature shaft while removing pinions is the principle which evolved the pinion puller used by the mechanical department of the Sioux City (Iowa) Service Company. This device consists of four principal parts—a bolted flanged collar, a heavy yoke, a stationary screw jack and a link. These parts assembled for removing a pinion are shown in an accompanying illustration. The screw jack is made adjustable vertically so that it may be centered to fit any size of armature. The head of the screw jack presses against the end of the armature shaft, while the pressure tending to withdraw the pinion is brought to bear on the flanged collar by the yoke, which in turn is attached to the jack by the link. The lower ends of the yoke are held secure in slots in the floor. After the jack head is brought up tight against the end of the armature shaft, the yoke is struck a blow with the sledge. As a rule one blow is sufficient to loosen the pinion. From the foregoing it will be seen that the pressure employed in removing the pinion is distributed on both the armature shaft and the pinion with the result that neither is injured in the operation.

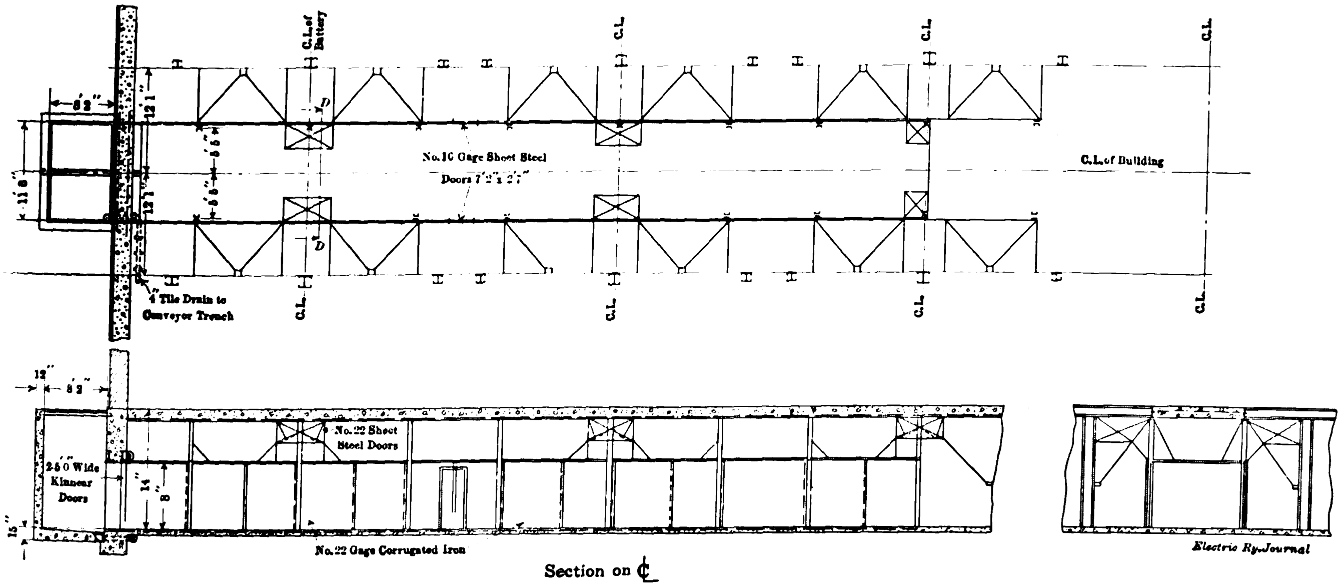


SIOUX CITY PINION PULLER

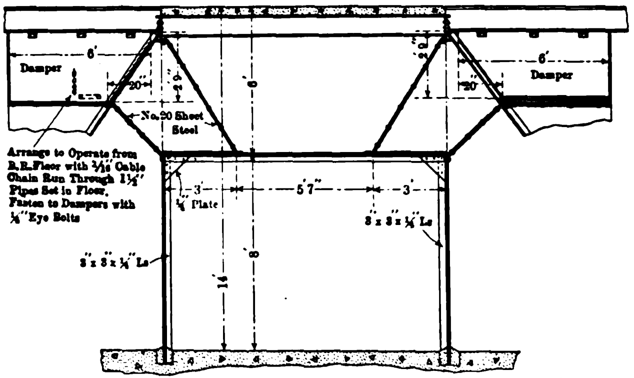
Air Intakes Increase Furnace Capacity

In the 58,500-kw. generating station of the Minneapolis (Minn.) Street Railway Company, an installation of cold-air intakes has increased the furnace capacity from 10 per cent to 15 per cent, and has improved boiler-room economy about 3 per cent. The steam-generating station capacity has been more than doubled during the last few years by the installation of large turbo-generators, new chain grates under the boilers and four new high-capacity stacks. The arrangement of the boiler room conforms to the usual standard, there being fourteen B. & W. 550-hp. boilers installed on each side of a 24-ft. firing aisle. Overhead steel coal bunkers supply coal to these boilers through hoppers and stokers. The boilers have grate surfaces approximately 10 ft. x 11½ ft. in size, and four 14-ft. x 265-ft. stacks furnish a total average draft of 1.6 in. A brief resumé of the growth of this plant was given in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 13, 1913, page 1250.

When the capacity of the plant was less than 20,000 kw., no difficulty was experienced in getting a sufficient unrestrained supply of air to the grates by way of louvers above the coal bunkers and from the aisle, but when the capacity reached 40,000 kw. and more, the air pressure in the center of the boiler room was from ⅜ in. to ½ in. less than outside, due to resistance of entrance, and to the updraft of the warm air in the room. This occurred particularly during the winter, when the large end doors of the boiler room had to be closed to prevent freezing of pipes and severe discomfort to the fire-room attendants. The large amount of cold air coming through the louvers above the coal bunkers froze the moist coal and necessitated the use of steam jets to thaw it out so that the coal would flow through the chutes to the stokers. This also caused excessive corrosion of the steel bunkers.



MINNEAPOLIS AIR INTAKE—CROSS-SECTION OF HORIZONTAL DUCT SHOWING TYPICAL CONSTRUCTION

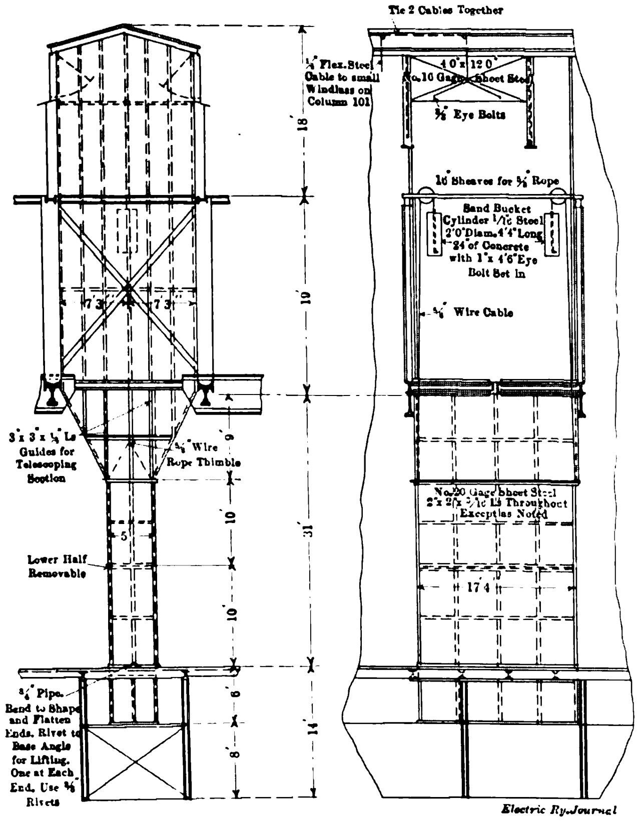

6'
Damper
20"
9"
9"
No. 20 Sheet Steel
6'
Damper
20"
Arrange to Operate from B.R. Floor with 3/16" Cable Chain Run Through 1½" Pipes Set in Floor. Fasten to Dampers with ⅝" Eye Bolts
3'
5' 7"
3'
¼" Plate
3" x 3" x ¼" Ls
3" x 3" x ¼" Ls
8'
14'
Electric Ry. Journal

Section on D-D showing Typical Construction

MINNEAPOLIS AIR INTAKE—DETAILS OF HORIZONTAL DUCT
(See section line on preceding illustration)

To remedy this condition two air ducts, each supplying air for fourteen 550-hp. boilers, were built to convey the cold air direct under the stokers. Reference to the illustrations will show that two methods were necessary. At one end of the boilers the intake supplies air from the outside at the boiler-room level and conveys it under the floor to the seven boilers on each side of the firing aisle. At the other end of the boiler room this could not be done and a vertical duct was dropped from the roof to the boiler-room floor and the air duct supplying the boilers direct was also under the floor. The bottom section of the vertical duct was counterweighted so that it could be lifted out of the way and the opening in the floor was covered with a grating. Dampers at the entrances to the intakes and at ducts leading to the grates control the air supply.

The construction, sizes and material used are clearly shown in the illustrations. The cross-section of the ducts was proportioned so that the velocity of air would be maintained at a reasonable figure when all of the boilers were operating at 200 per cent rating, thus allowing 50 per cent excess air over that theoretically necessary.

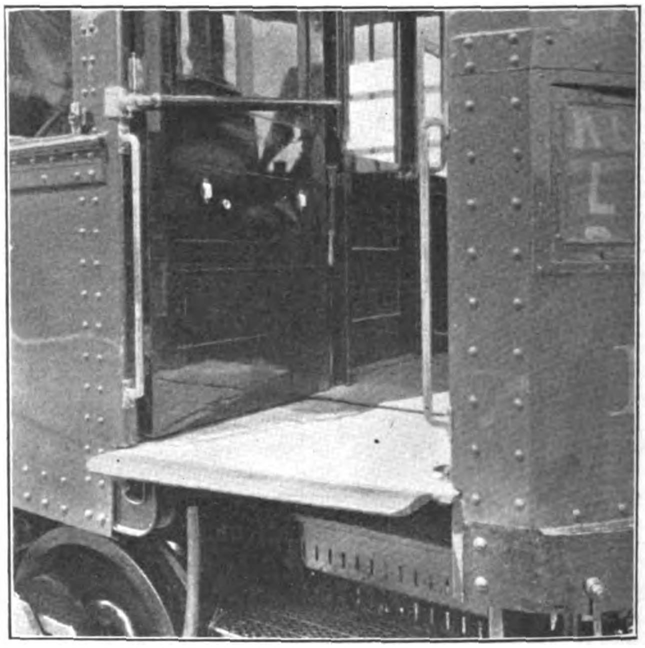

Tie 2 Cables Together
¼" Flex. Steel Cable to small Windlass on Column 101
4' 0" x 12' 0"
No. 10 Gage Sheet Steel
⅝" Eye Bolts
18'
16" Sheaves for ⅝" Rope
Sand Bucket Cylinder 1/16 Steel 2' 0" Diam. 4' 4" Long 24" of Concrete with 1" x 4' 6" Eye Bolt Set In
⅝" Wire Cable
19'
7' 3"
7' 3"
3" x 3" x ¼" Ls Guides for Telescoping Section
⅝" Wire Rope Thimble
9'
10'
5'
Lower Half Removable
10'
31'
No. 20 Gage Sheet Steel 2" x 2" x 3/16 Ls Throughout Except as Noted
17' 4"
¾" Pipe. Bend to Shape and Flatten Ends. Rivet to Base Angle for Lifting. One at Each End. Use ⅝ Rivets
6'
8'
14'
Electric Ry. Journal

MINNEAPOLIS AIR INTAKE—DETAILS OF VERTICAL DUCT

As a result of this installation the boiler room was made comfortable for the men with no apppreciable air currents, the boiler capacity was increased due to better draft, and the economy was appreciably improved.

Extensible Trapdoor

In the ELECTRIC RAILWAY JOURNAL for Sept. 4 a description of a new extensible vestibule trapdoor made by the O. M. Edwards Company, Syracuse, N. Y., was published in connection with a description of the new cars for the Chicago & Milwaukee Railway. In that description no view was shown of the trapdoor in extended position owing to the fact that no photographs were available at the time, and the view that is reproduced in the accompanying cut shows the extended trapdoor as it would appear at a station platform which provided wider clearances than were necessary for the cars. As may be seen from the illustration, the trapdoor in this position will fill up quite a large space that may exist between the side of the car and the platform.



EXTENSIBLE VESTIBULE TRAPDOOR

The extension or retraction of the trapdoor is effected by the folding handle which can be seen just inside of the vestibule door. At the right-hand side of the trapdoor may be seen also the vestibule door stop, this consisting of a rubber button on the floor plate which interferes with the operation of the vestibule door whenever the trapdoor is extended. It is obvious from the illustration that the vestibule door could not be closed when the trapdoor is in the position shown in the illustration, and this would naturally prevent trainmen from leaving the trapdoor sticking out beyond the side of the car while the train was in motion.

The rail-less electric cars that were placed on the streets of Shanghai several months ago by the Shanghai Tramways and subsequently withdrawn on account of the imperfect roadbed have now been restored, the roads having been rebuilt with concrete foundation and surface so as to be able to bear the weight of the cars. Five cars are being placed in service on one road. A number of improvements have been made in the cars since they were first placed in the service. It is expected that the rail-less system will receive a thorough test, and if successful other routes will be established.

News of Electric Railways

SEEKING TO INITIATE TOLEDO FRANCHISE

Effort Being Made to Put Toledo Grant Before the Voters—Summary of Principal Terms of Grant

Petitions for the initiation of the franchise agreed upon by the Toledo Railways & Light Company and the franchise committee of the City Council of Toledo, Ohio, were put into circulation by the Toledo Franchise Association on Sept. 15. The statement was made that 2000 names were secured in one day. Plans were also made for a number of public meetings. At these meetings it is intended to have speakers explain the provisions of the franchise and reply to those in attendance who desire to ask questions.

The first of this series of meetings was held at Zenobia Hall on the evening of Sept. 17. President Frank Mulholland of the Franchise Association acted as chairman. A feature of the meeting was the indorsement of the franchise by Attorney W. W. Campbell, president of the Municipal Ownership League. Mr. Campbell said that he favored the public ownership of all public utilities, but that he believed the franchise was the best that could be secured at this time.

Councilman M. F. Dotson, chairman of the Council franchise committee and author of the greater part of the franchise, discussed Section 9, which gives the city the right to regulate the operation of cars, to supervise the construction and maintenance of tracks, to decide on the number and kind of cars and to dictate as to the construction of extensions, the building of new tracks and the laying down of crosstown lines.

David A. Merritt, president of the Toledo Taxpayers' League, said he represents home owners and other small taxpayers. What they wanted more than anything else was service. This was demonstrated by the fact that many people used the jitneys and paid a 5-cent fare. Mr. Merritt expressed himself in favor of the franchise.

A vote showed that about 90 per cent of those present had signed the petitions. The most pronounced objection to the franchise, perhaps, was on the provision that the Federal Judge should appoint the third member of the boards of arbitration selected to pass on all matters of difference between the city and the company.

The franchise declares at the outset that the city may acquire the property of the company and operate it under municipal ownership at an appraised value fixed by a board of arbitrators. The securities outstanding at the time of the purchase and the franchise are not to be taken into consideration in determining the value of the property. Only such property is to be purchased as is useful in the operation of the railway.

The road is to be so rearranged by commissioners appointed by the city as to provide the most efficient service. A cross-town line is to be constructed to serve the many workmen employed in the west end of the city. The entire road is to be equipped with pay-as-you-enter or pay-as-you-leave cars within ten months from the date the ordinance becomes effective. Ten months after the ordinance goes into effect, and after the system has been rearranged and provided with cars of the types mentioned, a try-out period of twelve months is to begin. During this period passengers are to be permitted to ride at any hour of the day at the rate of five rides for 15 cents. The city is to have complete control for the twelve months.

While the try-out is being made, a board of arbitration is to value the property used and useful in the operation of a street railway in order that the city may be able to fix a rate of fare to be charged for a period of five years immediately succeeding the try-out period. This rate is to be fixed by Council at least thirty days before the expiration of the period and it is to be sufficient to pay the costs of operation, maintenance including depreciation, taxes and governmental charges and in addition yield a return of 6 per cent on the valuation. This means that the fare is to be based on the actual cost of operation plus 6 per cent on the valuation.

The commissioners appointed by the city are to fix a standard of efficiency, below which no line in the city is to be operated. If the return at the rate of fare fixed by the city for the first five-year period yields a sum any year in excess of the amount necessary for the payment of the items named above, the excess is to be paid into the general fund of the city unless the road has been operated at an efficiency above the standard fixed by the commissioners. In the latter case, the company is to receive one-half of the excess earnings and the other half is to be paid into the general fund of the city. This is the only manner in which the company can receive a return greater than 6 per cent on the valuation of the property as fixed by the arbitrators.

All disputes are to be settled by arbitration. Section 7 contains provisions for taking over the property and its operation as a municipal road. The ordinance does not conflict with the municipal ownership ordinance passed on Aug. 4, 1914. Full and complete control over the operation of the interurban lines within the city limits is provided.

The City Council of Toledo, Ohio, received the report of the special franchise committee on the evening of Sept. 13. The committee filed the ordinance with City Clerk McDonall, as required by law, and preparations were begun for a referendum vote on it. The names of 10 per cent of the voters must be secured to petitions to submit the franchise at a general election and 20 per cent for a special election. The association will endeavor to secure 7000 names. Council merely received and placed on file the report of the franchise committee on Sept. 13. It was signed by Members Hassenzahl, Dotson, Fraser and Redd. Councilman Ruppel, a member of the committee who had never taken any part in the negotiations, opposed the receipt of the report by Council. Members Brown and Hein did not attend the later sessions of the committee and Mr. Brown refused to attach his signature when the opportunity was presented. The report contained no recommendation as to what Council should do with the draft of the franchise prepared. The vote to receive the report stood twelve to six in favor of it. The committee was dismissed.

MARKET STREET, SAN FRANCISCO, CONTROVERSY RESULTS IN CONTEMPT FINDING

Holding Thomas A. Cashin, superintendent of the San Francisco (Cal.) Municipal Railway, alone for trial on contempt charges, Superior Judge Crothers in that city on Sept. 14 rendered a decision purging Mayor Rolph and the three members of the Board of Public Works of charges of contempt of court in directing the operation of the "C" and "D" lines of the municipal railway over lower Market Street, in violation of an injunction which had been issued by the court.

Judge Crothers held that Mr. Cashin, as superintendent of the city lines, was the only man in control of their operations or suspension. He held that neither the operation nor the suspension of municipal street cars was within the scope of the duties to be performed by the Mayor or the Board of Public Works. The Court further held that Judge Sturtevant's injunction was mandatory rather than prohibitive, and that therefore under the law the appeal taken to the State Supreme Court can in effect stay the operation of the restraining order and permit the continued operation of "G" and "D" line cars pending the outcome of the appeal.

The decision handed down by Judge Crothers deals only with the case between the city and the United Railroads. The decision in the cases brought by the Sutter Street Railway is held in reserve.

Following the exoneration of Mayor Rolph from contempt charges, Mr. Cashin was sentenced to pay a fine of $250 or serve two days in jail for running cars on lower Market Street tracks in disobedience to the injunction issued by Judge Sturtevant. Mr. Cashin obtained a twenty-four-hour stay of execution and on the expiration of this time the fine was paid.

AMALGAMATED ASSOCIATION AGAINST REPEAL OF ARBITRATION CLAUSE

President Mahon Raps Practice of Putting Attorneys on Boards of Arbitration

The feature of the closing sessions of the convention of the Amalgamated Association of Street & Electric Railway Employees of America at Rochester, N. Y., was the overwhelming vote against the proposal to repeal the arbitration clause in the constitution of the association. The proposal came before the convention on a recommendation by the law committee that the arbitration provision be retained. A motion to non-concur in the committee's recommendation was made. Outside of the delegates from the Bay State Street Railway, Boston, the opposition to arbitration found little support.

President William D. Mahon had declared in favor of the arbitration clause in his annual report, read early in the week. One account of the passage at arms over the arbitration proposal said:

"In a characteristic address, President Mahon declaimed against the proposal to strike the arbitration clause from the constitution of the association. He declared that in two-thirds of the cases of disagreement with employers, street-car men would find that public sentiment would force arbitration of the questions at issue, regardless of whether the constitution provided for it. Going into the history of arbitration in recent New England troubles of the street railway employees and their employers, President Mahon rapped the practice of putting attorneys on boards of arbitration. He said that in virtually every case the results of arbitration depended upon the selection of the arbitrators, and under the laws of the association the railway workers can say what questions will be submitted to arbitration, how long the arbitrators can sit and when their decision must be given. Addressing his remarks to the insurgent Massachusetts delegates, President Mahon told them they had had arbitration and under the laws of their organization they would have to live up to the awards of the arbitrators. He warned them, when next a similar situation arose, not to choose attorneys as arbitrators, and intimated that if they handled the situation in the right way they would have no complaint to make at the result."

A resolution which was adopted called for an investigation of the Cleveland 3-cent car lines.

LEHIGH VALLEY TRANSIT SPENDING $375,000

The Lehigh Valley Transit Company, Allentown, Pa., is spending $375,000 this year in improvements. The changes that are being made extend to practically every department of activity of the company. The east-bound track between Allentown and Bethlehem has been rebuilt to Sixth and Hamilton Streets, Allentown, and it has been determined to build a double track at West Bethlehem, where there are 1600 ft. of single track. The laying of the track will be begun in a short time. The track on Main Street, Slatington, will be rebuilt from the Lehigh Valley station to Trout Creek Bridge. The track on North Fourth Street, Allentown, is being rebuilt from Greenleaf to Steckel's Bridge and the street is being paved with brick on a concrete base. The stretch from Washington to Greenleaf Street was rebuilt last year on the supposition that the city would at that time pave this street. The company will do is share of paving on Seventeenth Street from Turner to Gordon, and as soon as the city is ready will reconstruct the tracks on Hamilton from Sixth to Seventh. On the Nazareth line a stretch of 1500 ft. has been reconstructed on private right-of-way, and some sharp curves eliminated.

Six new bridges have been constructed and six rebuilt. The new bridges span the Jordan at Steckel's, the Perkiomen on the Emaus line, Jones's on the Chestnut Hill division, the Philadelphia & Reading Railway tracks at Ambler and the Jordan at Iron Bridge on the Slatington division. Underfeed stokers are being installed beneath six of the boilers at the Front Street power house. The company is also installing transformers and regulators in the various municipalities through which its lines run.

There are some notable improvements on the Philadelphia division. The track is being ballasted between Quakertown and Perkasie. On the Chestnut Hill division the adjustment has been changed, curves eliminated and the track raised where necessary.

In line with recommendations by the safety-first committee, a special point has been made over the entire system, with the consent of adjoining property owners, of trimming all trees, shrubbery and underbrush, to provide a clear view at crossings. A number of new automatic signal bells and several hundred additional warning signs have been placed at crossings, and approach signs have been erected 300 ft. from crossings, to caution autoists, teams and pedestrians. When this work is completed there will be 600 warning signs along the line.

To take care of the increasing business on the Philadelphia division the company is arranging to increase the power facilities, it being planned in 1916 to run two and three-car trains the entire distance from Philadelphia to Allentown. During the heavy traffic of the present summer two-car trains were run daily between the cities, leaving Allentown for Philadelphia at 8 a. m. and returning from Sixty-ninth Street, Philadelphia, at 5 p. m. Saturdays, Sundays and holidays two-car trains were run every hour.

H. R. Fehr, president of the company, has been giving a great deal of attention to getting the Easton division into shape by the elimination of curves and the rebuilding of portions of the line. These improvements on the line to Easton will lessen the running time between the two cities ten minutes.

For the betterment of the limited service between Allentown and Easton the company has had The J. G. Brill Company build a number of all-steel cars. The first of these cars, No. 214, was placed in service on Aug. 12.

All tracks in South Easton have been rebuilt with 105-lb. T-rails on creosoted ties. Adjoining the carhouse at Seventeenth and Washington Street, Easton, the company has purchased a tract for the enlargement of the carhouse and shops.

The expenditures on the Easton division will amount to $110,000. As previously stated the expenditures for the improvement on the entire system will amount this season to upwards of $375,000.

I. R. T. BASEBALL SEASON CLOSED

The baseball season among the employees of the Interborough Rapid Transit Company, New York, N. Y., was brought to a close on Saturday, Sept. 11, with a game of ball between the car equipment division of the company and a team representing the Erie Railroad, and a shore dinner at the Brighton Beach Casino. On the Interborough system there is a league of eight clubs from various divisions of the service, and for the second time in succession the honors have been won by the men from the car equipment department. They won fourteen out of sixteen games, and then with apparently little respect for their guests at Hedley Field on Sept. 11 they smothered the Erie team. More than 400 invitations to both the game and the clambake were sent to officials of the State and city administrations, members and officials of the Public Service Commission, the executive officials of all the prominent electrical transportation systems in the East and to many trunk line officials east of the Mississippi River. The pennant was presented to the car equipment team at the dinner, gold medals were pinned on the individual members of the team and a cup donated by Harry M. Hempstead, president of the New York Giants, was awarded to the league player with the best all-around record. Among the speakers were Frank Hedley, vice-president and general manager of the Interborough Company; Supreme Court Justice Luke D. Stapleton, ex-Corporation Counsel John Whalen of New York and H. H. Vreeland, director of welfare of the Interborough Company.

A game is announced to be played at Ebbetts Field, the home of the Brooklyn National team, on Sept. 29 between the champions of the Interborough and an all-star team from the league of clubs on the Brooklyn Rapid Transit System. At Dexter Park, Brooklyn, on Sept. 23, the Brooklyn all-star team defeated a team of the Hudson & Manhattan Railroad by the score of 16 to 0. Deutsch, pitching for Brooklyn, allowed only three hits. One error was made behind him.

COLUMBIA STRIKE SETTLED

The strike of the employees of the Columbia Railway, Gas & Electric Company, Columbia, S. C., in progress about a week, was settled on Sept. 18, mainly through the efforts of Governor Richard I. Manning. With two exceptions the men on strike will all be taken back by the company. In future all differences will be submitted to arbitration. The strike was precipitated by differences between the men and the company over questions of fare accounting. In a statement which the Governor issued following the settlement of the strike he said:

"I am highly gratified at the peaceful and happy solution of the differences between the car men and the street railway company. I feel that the pleasant and prompt settlement of differences was brought about because of the desire for justice, and I am glad that justice has prevailed. One especially pleasing point is that under the agreement all differences will be settled by arbitration and this should totally eliminate all danger of strikes and lockouts in the future."

RHODE ISLAND ARBITRATION HEARINGS

In the wages arbitration hearings of the Rhode Island Company at Providence last week, John P. Farnsworth, a federal trustee of the company, testified that if an increase in pay was granted to the employees by the board, the capital of the company would more than likely be impaired, with possible receivership, and in the event of the latter the city of Providence would probably lose its contract with the company, at a cost of about $150,000 a year. In the last eight years only 15 per cent of the gross earnings had been used in maintenance, although 20 per cent should have been thus applied. The additional 5 per cent in this period amounted to $1,915,148. This ought to have gone into the property.

Mr. Farnsworth stated that since 1912 the receipts from transportation had not shown the normal gain commensurate with the growth of the territory. This should be about 6 per cent yearly, according to the reports of B. J. Arnold and W. J. Lewis. Since 1909 receipts had fallen off, with a deficit for 1915, aggravated by the increased volume of transfers. The witness called attention to the heavy inroads made by the jitney in the Providence district. Such competition was not contemplated by the company in making its contract with the city—an agreement that gave the city 5 per cent of the gross receipts and one-third the cost of widening and improving new streets, while the company also paved between the tracks and 18 in. outside. Mr. Farnsworth also said that the 5 per cent rentals paid on leased lines were not excessive in view of their physical valuation.

It was pointed out that the company must spend $800,000 this year in extensions and improvements. The company's charter and contracts precluded increasing fares unless by consent of the Assembly. The company was economically operated, the cost of power was low, but the cost of labor had increased since 1910 to a point where it is probably larger at present than in any other city under similar conditions. For extensions and improvements in the next five years $10,000,000 was needed, and even with wages as they are it will be difficult to secure this new capital without the inducement of a much larger interest rate.

A. E. Potter, president of the Rhode Island Company, pointed out that official salaries were smaller in the company than on the Boston Elevated Railway and Bay State Street Railway. He stated that if the company could arrange its schedules as it saw fit, within the hours of agreement with the union, it could eliminate about 150 men in summer and 300 in winter, guaranteeing the extra men six hours' work a day at a good wage. He also testified in regard to the fare accounting methods which are in use by the company.

Prof. Albert S. Richey of the Worcester (Mass.) Polytechnic Institute took the stand in rebuttal to the testimony of Arthur Sturgis, Boston, relative to the cost of living. The witness said that Streightoff, John Mitchell and others set the minimum-living wage at $600 to $650 a year instead of at $1,000 as advanced by Mr. Sturgis. The average wage in Providence in 1913, as reported in connection with the Rhode Island workmen's compensation act, was $539. Transportation employees received an average of $740. Professor Richey stated that according to the Wholesale Price Bulletin of the United States Bureau of Labor Statistics, clothing advanced 15.8 per cent from 1900 to 1915 instead of 30 per cent as claimed by Mr. Sturgis. The witness said that according to Streightoff there were at least 5,000,000 industrial workmen in the United States earning $600 or less a year. A chart was introduced showing a decline of 4 per cent in food prices from January to June, 1915, from the average of 1914.

James H. Vahey, counsel for the men, cross-examined the witnesses particularly with respect to the financial history of the company involving the various leases and the intercorporate relations with the New York, New Haven & Hartford Railroad.

PROSPECTS OF NEW DES MOINES GRANT

The Des Moines (Iowa) City Railway will be operating under the proposed new franchise, agreed to by the company and the City Council, by Jan. 1, 1916, unless plans of the company and the city miscarry. The Council will submit to a vote of the people, at a special election, a franchise proposed by the Des Moines Chamber of Commerce and accepted by the city and the company with slight alterations.

Sentiment in the city appears to be overwhelmingly in favor of a final settlement of the franchise question on the basis now offered, and when the franchise is accepted, the company will be sure of its right to operate in Des Moines for the first time since 1900, when litigation involving the validity of the franchise held by the company was begun by the city. This long fight now seems likely to end with a franchise practically the same as the one under which the company then was operating. The new franchise will provide six fares for a quarter, half-fare for school children, a guarantee of service as good as the best in any city of the nation the same size as Des Moines, and a valuation of $5,000,000 as of the present time if the city decides to buy the property within twenty-five years, which is the term of the franchise. No valuation is fixed for the purpose of determining profits. The company guarantees the service and takes its chances on the profits.

Emil G. Schmidt, president of the company, states that $1,500,000 in improvements will be spent as soon as the franchise is in effect. These will include twenty-five new cars, the construction of several new lines, a complete overhauling and rebuilding of the present system, a large amount of paving, and the establishment of loop and crosstown services.

Des Moines is rejoicing at the prospect of the settlement of the long standing controversy. Newspapers express the opinion, editorially, that Des Moines would have been better off had the fifteen years' fight been settled fifteen years ago by arbitration between the city and the company. This opinion is almost unanimously subscribed to by citizens of the city.

Recovering Cars Abandoned on Causeway.—Two interurban cars and a work car have been recovered by the Galveston-Houston Electric Railway from the debris of the Galveston causeway where they were abandoned on Aug. 16. They have been taken to Houston for overhauling. Officials of the railroads entering Galveston have announced that the causeway will be rebuilt at an estimated cost of $1,500,000.

Chicago Surface Lines' Club Has Outing.—The first annual outing of the Surface Lines' Club of Chicago, Ill., was held at Riverview Park Picnic Grove on Sept. 18, 1915. This club was organized last spring and now has a membership of 506. The members are from the departmental offices of the Chicago Surface Lines. In the afternoon there was a baseball game between the electrical and the engineering departments, followed by races and prizes for everybody.

Newport Franchise Matter Still Unsettled.—Another attempt of the Newport Business Men's Club to adjust the rental that the Cincinnati, Newport & Covington Railway shall pay after the expiration of its franchise failed on the evening of Sept. 10. Members of the club suggested several sums between $6,000 and $7,500 as reasonable, but the City Commissioners held out for $12,000 a year. The company has expressed a willingness to pay $3,000. It is said that the company will enter litigation on the question of its perpetual rights to the use of the streets rather than pay more than it has offered.

Further Transit Loan Urged in Philadelphia.—Mayor Blankenburg of Philadelphia, Pa., has sent a message to Councils urging that every expedient be used in passing the legislation necessary for a new permanent loan of $1,250,000 toward the construction of the Frankford elevated and other rapid transit facilities so that the proposal may be submitted to a vote of the people at the November election. With it the Mayor transmitted a letter on the subject from Transit Director Taylor, in which the latter said that he did not believe the city would be justified, from a business standpoint, in awaiting a special election to be held subsequent to the proposed amendment to the constitution.

Third Annual Engineering Conference in Pennsylvania.—An exhibition is to be held on Nov. 15 to 19 inclusive in Harrisburg, Pa., in connection with the third annual Pennsylvania Industrial & Public Welfare & Engineering Conference. The first two exhibits have been representative of the very best products of the safe, economical and efficient industrial development and also indicative of what the industrial and public service companies are doing to promote the health and welfare of the people. The Department of Labor and Industry and the Public Service Commission will participate in the exhibition. J. W. Reynolds, vice-president of the Pennsylvania Steel Company, is chairman of the exhibit committee.

National Fire-Prevention Day.—Saturday, Oct. 9, the anniversary of the great Chicago fire, has been designated by the Safety First Federation of America as the national fire-prevention day and extensive plans have been formulated for observing this anniversary in a fitting manner in various cities throughout the country. An appeal has been made to the Governor of each State requesting that a proclamation be issued designating Oct. 9 as the national fire-prevention day. In his letters to the Governors, Frederick H. Elliott, executive secretary of the federation, calls attention to the necessity of impressing upon the minds of the people the need of their co-operation to prevent the unnecessary loss of life and property by fire.

New Commonwealth Edison Publication.—The Commonwealth Edison Company, Chicago, Ill., has just issued a booklet of eighty-six pages under the title "Rules and Information Pertaining to Electric Service, Meters, Wiring and Motors." This is issued for the purpose of acquainting customers, contractors, architects and engineers with the requirements of the Commonwealth Edison Company pertaining to the installation of service connections, meters, wiring, motors, and other appliances which are to be supplied with electricity from the company's main. The rules are supplementary to the electrical code of the city of Chicago, and they contain considerable information of technical value. One-half of the booklet is taken up with dimensioned and other diagrams of meter mountings.

Application for Franchise in Cincinnati.—The West End Rapid Transit Company has asked the City Council of Cincinnati, Ohio, for a franchise for the extension of its line from Anderson's Ferry to the corner of Third and Sycamore Streets in the city. The route is the same as mentioned in the ELECTRIC RAILWAY JOURNAL of Sept. 11. All fares and charges of the company for carrying passengers and merchandise are to be so fixed that the net revenue shall be sufficient to pay not less than 10 per cent on the total amount invested in the property and equipment. After setting aside all charges for operating, a reasonable amount for depreciation and the 10 per cent return, the remainder of the surplus is to be divided equally between the company and the city. The books are to be open to the city from time to time, so that the amount invested may be ascertained, as well as the earnings and the disposition of the funds. C. E. Hooven is president of the company, and Stanley Shaffer is secretary.

Appeal in Toronto Case Unlikely.—North Toronto residents are not in favor of an appeal against the decision of the Ontario Railway Board, giving the Toronto (Ont.) Railway running rights over that portion of Yonge Street north of the Canadian Pacific Railway tracks up to Farnham Avenue, on which the Toronto & York Radial Railway formerly operated. At a meeting of the Ratepayers' Association on Sept. 17 the recommendation of the Board of Control that the decision be appealed was strongly condemned, and the Aldermen of the Second Ward and Third Ward were urged to oppose the recommendation. One Alderman promised to do so, but the others stated that it was their intention to cast their votes in the interests of the city generally and not in the interests of a particular locality. They were willing to join a deputation to the Toronto Railway to request that company to lay tracks from its present terminus to Farnham Avenue, where passengers from the Toronto & York Radial Railway might transfer to the other system. A petition will be presented to the City Council on Sept. 20 praying against the plan to proceed with the appeal.

Obstacles to Construction of Line Under East River Removed.—The Public Service Commission for the First District of New York has received from Henry Breckenridge, Acting Secretary of War, the modification requested by the commission in the permit from the War Department for the right to construct a rapid transit railroad under the East River from Fourteenth Street, Manhattan, to North Seventh Street, Brooklyn. This is a part of the Fourteenth Street-Eastern line of the dual system. In the permit as originally issued by the War Department responsibility for all damage or loss during the work was laid upon the city of New York. The commission objected to this clause and the government has now modified it so as to make the city assume "all legal liability" for loss or damage due to construction or operation. The modified permit also gives the commission permission to construct a temporary ventilation chamber outside of the bulkhead line at the foot of North Seventh Street, Brooklyn, on condition that all such structures outside the bulkhead line shall be entirely removed when the work is completed. This removes the last obstacle to the beginning of work on the Fourteenth Street-Eastern line and in a few weeks the commission will advertise for bids for the construction of the tunnel section.

PROGRAMS OF ASSOCIATION MEETINGS

Mississippi Electric Association

Owing to objection on the part of some of the members to the dates of Nov. 10 and 11 as the meeting time of the Mississippi Electric Association it has been decided to change the dates to Nov. 12 and 13.

Annual Congress National Safety Council

The fourth annual congress of the National Safety Council will be held at Philadelphia, Pa., on Oct. 19, 20 and 21. Accident prevention in all its phases will be discussed and the particular problems of the various industries will be presented in separate meetings. Dr. E. B. Rosa, acting director bureau of standards, Department of Commerce, Washington, D. C., will be chairman of the public utilities sectional meetings, to be held on Oct. 20, 1915. The program for this session is as follows:

"Linemen and Their Operations," by C. B. Scott, manager bureau of safety, Middle West Utilities Company, Chicago, Ill.

"Danger of Low-Tension Shocks," by H. S. Warren, American Telephone & Telegraph Company, New York.

"Hazards of High-Tension Lines," by Bryce E. Morrow, chief engineer Utilities Mutual Insurance Company, New York.

"Hazards of Gas Works," by J. B. Douglas, manager claim department United Gas Improvement Company, Philadelphia, Pa.

"Hazards of Street Work," by Edward C. Spring, assistant to the president Lehigh Valley Transit Company, Allentown, Pa.

"Education of Street Car Platform Men," by Rex. D. Billings, general claim agent Reading Transit & Light Company, Reading, Pa.

Financial and Corporate

Manila Electric Railroad & Light Corporation

The statement of income, profit and loss of the Manila Electric Railroad & Light Corporation, Manila, P. I., for the calendar year 1914 follows:

Gross earnings	$1,602,001
Operating expenses and taxes	818,415
Net earnings (After allowing for loss of $9,324 in operating Union Truck Company)	$783,586
Fixed charges—interest on bonds	277,716
Surplus over fixed charges	$505,870
Reserves:	
For sinking fund	$28,250
For replacements and renewals	80,000
Total	$108,250
Surplus	$397,620
Dividends	350,000
Net surplus for the year	$47,620
Surplus at beginning of year	1,253,337
Credits:	
Amount carried as reserve for sinking fund transferred to surplus	39,353
Earnings for prior period	2
	$1,340,312
Charges:	
Expenses of ice plant investigation written off	$6,228
Expenses prior period	850
Exposition fire loss	3,645
Surplus Dec. 31, 1914 (excluding reserves)	$1,329,589

The gross earnings for the year showed a decrease from the previous year of $96,582, or 5.62 per cent. The operating expenses and taxes increased $27,628, or 3.49 per cent, so that the net earnings from operation decreased $124,220, or 13.68 per cent. Of the decrease of $96,592 in the total gross earnings, $82,000 occurred in the railway department. Up to June 30, 1914, the decrease was less than 1 per cent, the balance of the loss occurring during the latter part of the year. The electric department earnings fell behind a little more than $9,000, or only a fraction over 1 per cent, the balance of the shrinkage being caused by the closing down of the trucking department.

During August heavy rains caused serious floods in Manila, and during September the city experienced the worst flood in its history. These floods caused a loss of considerable revenue and resulted in additional expense in repairing track, roadway, rolling stock and power plant. The increase in expenses was owing largely to the heavy growth in the number of electric customers, which necessitated an addition to the electric staff. This in itself created enlarged overhead expense, and the natural considerable increase in fuel consumption was emphasized by a larger average cost per ton of coal purchased. The company expended during the year for new construction $129,015; for replacements and renewals, $62,241, and for maintenance, which was included in operating expenses, $158,466.

Business and financial conditions in the Philippine Islands during the year were far from satisfactory. In the beginning of the year the general world-wide depression began to be felt and after the commencement of the European war the situation became gradually worse. The last five months of the year were the dullest period experienced in the history of the company.

Augusta-Aiken Railway & Electric Corporation

According to the annual report of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., for the year ended Dec. 31, 1914, the gross earnings amounted to $738,372 and operating expenses and taxes to $393,886, leaving income from operation of $344,486. Interest and sinking fund charges were $282,962, and the gross surplus for the year was $61,523. The gross electric earnings increased $19,265 or 6.6 per cent, with a decrease in expenses of $11,733 or 10.1 per cent. The gross railway earnings decreased $4,768 or 1.3 per cent, and expenses decreased $46. The gross earnings from other departments decreased $1,197 or 1.8 per cent and expenses decreased $1,409 or 3.6 per cent.

For the first ten months the total gross earnings were approximately $30,000 greater than for the same period of the preceding year; of this increase more than $15,000 ($14,000 in railway department) was lost during the last two months owing to the unprecedented business chaos. The operating expenses for the year showed a saving of $14,225; taxes were $6,000 higher, and the fixed charges increased by more than $75,000. As a result surplus suffered a decrease during the year to the extent of more than $55,000.

During the year $120,000 of additional 5 per cent sinking fund gold bonds were placed in the treasury to cover cost of additions, betterments and extensions, made previous to Nov. 30, 1914. Of these $20,000 were sold. A total of $250,000 of first mortgage 5 per cent sinking fund gold bonds of the Georgia-Carolina Power Company was issued to cover the cost of completing that plant and sold. Two dividends of 1½ per cent each were paid on the cumulative preferred stock, but with the outbreak of the war in Europe and the consequent falling off in earnings, the directors suspended payment of dividends on the preferred stock from July 1, 1914.

A sum of $96,903 was expended for additions and betterments and charged to capital accounts. Of this amount $53,064 was expended for line extensions and the necessary apparatus for connecting new customers; $13,675 was for a new substation at the city plant, and the balance for miscellaneous improvements, including a 2-mile extension of the railway lines to Aumond.

American Public Utilities Company

The combined statement of income, profit and loss of the subsidiaries of the American Public Utilities Company, Grand Rapids, Mich., for the year ended June 30, 1915, follows:

Gross earnings from operation	$2,932,069
Operating expenses	1,618,239
Net earnings from operation	$1,313,830
Miscellaneous income	25,930
Gross income	$1,339,760
Less expenses	$38,101
Net income	$1,301,659
Interest charges	952,108
Remainder	$349,551
Dividend on preferred stock	234,840
Balance	$114,711

The gross earnings from operation increased during the year from $2,319,955 to $2,932,069, net earnings from operation increased from $980,879 to $1,313,830, and expenses decreased from $51,485 to $38,101. The comparative net income for the respective years was $974,696 in 1914 and $1,301,659 in 1915. The increase in fixed charges was from $599,309 to $952,108. These increases in gross and net earnings and in the fixed charges were caused by the acquisition and financing of the properties of the Chippewa Valley Railway, Light & Power Company (merged into the Wisconsin-Minnesota Light & Power Company) and by the large expenditures, approximately $1,500,000, made by the Merchants Heat & Light Company and by the Wisconsin-Minnesota Light & Power Company for extensions and additions to their properties. The net income available for dividends decreased slightly because the fixed charges included interest on investments made during the last year, which did not become remunerative until late in the present fiscal period.

During the year the Capitol Light & Power Company, a competitor of the Jackson Light & Traction Company, Jackson, Miss., retired from business on account of unsatisfactory revenue conditions, and as a result a substantial increase of business accrued to the electric lighting department of this subsidiary. A movement to establish a municipal lighting plant was met by a publicity campaign which assisted in producing an adverse vote of the electors. The street railway income of this subsidiary was unfavorably affected by a jitney service which was established in Jackson during the year. According to the annual report of the holding company, this is a problem which still remains to be dealt with.

TAXES ASSESSED IN VIRGINIA

The total value of the tangible and physical property of electric railways operating in Virginia, as assessed by the State Corporation Commission for the calendar year 1914, was $8,933,873. The State property tax upon this assessed value, the tax on money and the franchise tax assessed upon the annual gross transportation receipts amounted to $83,225. The total State taxes assessed against electric carriers for the preceding year was $81,002, an increase for 1914 of $2,223. During 1914 the total value of the tangible and physical properties of the canals and steam railroads in the State was $122,120,868, and the total State taxes imposed amounted to $1,084,220, an increase for 1914 of $48,903. The assessed property values of light, heat, power, gas and water companies operating in the State totaled $10,114,941 for 1914, upon which the total taxes amounted to $60,237, an increase over 1913 of $4,449. The accompanying table shows the details of the taxable values of electric railway properties in Virginia for 1914 and the taxes assessed thereon, as well as the franchise tax assessed. The tax on money is omitted, the total for all companies for the year being only $768.

TABLE SHOWING THE 1914 TAXABLE VALUES OF ELECTRIC RAILWAY PROPERTIES IN VIRGINIA, AND THE TAXES ASSESSED THEREON, AND THE FRANCHISE TAX ASSESSED UPON THE GROSS TRANSPORTATION RECEIPTS FOR THE YEAR ENDED JUNE 30, 1914

Name of Company	Track Miles	Value	Value of Rolling Stock	Value of All Other Property	Total Property Value	Tax on Property	Franchise Tax	Total Tax
Appalachian Power Company	0.79	$7,364	$494	....	$7,858	$27	$91	$121
Blue Ridge Light & Power Company	5.30	25,625	4,500	$5,605	35,730	125	152	278
Bristol Traction Company	3.57	12,495	1,488	....	13,983	49	62	111
Charlottesville & Albemarle Railway	3.48	47,088	24,500	53,030	124,618	436	423	863
Danville Traction & Power Company	5.56	78,660	29,331	48,696	156,687	548	1,359	1,968
Henrico & Chesterfield Railway	2.50	10.000	....	....	10,000	35	.....	35
Lynchburg Traction Light Company	14.74	226,200	113,500	116,665	456,365	1,597	2,527	4,137
Mill Mountain Incline, Inc	0.37	8,372	1,800	13,400	23,572	82	47	132
Newport News & Hampton Railway, Gas & Electric Company	32.54	534,480	99,400	260,310	894,190	3,129	3,154	6,469
Norfolk City & Suburban Railway	4.50	47,250	3,252	1,533	52,035	182	68	251
Norfolk & Ocean View Railway	9.15	91,423	15,700	7,450	114,573	401	672	1,073
Norfolk Railway & Light Company	32.39	513,885	80,750	99,275	693,910	2,429	.....	2,428
Bedford Water Power Company	2.63	10,520	2,400	4,000	16,920	59	103	163
Richmond & Chesapeake Bay Railway	14.76	241,110	27,000	53,640	321,750	1,126	602	1,734
Richmond & Henrico Railway	4.93	254,860	49,500	153,100	457,460	1,601	1,107	2,710
Richmond & Rappahannock River Railway	25.34	70,990	25,090	11,344	107,424	376	399	805
Roanoke Railway & Electric Company	24.17	265,916	100,000	138,903	504,819	1,767	3,285	5,069
Taxewell Street Railway	1.97	5,910	1,250	250	7,410	25	97	125
Virginia Railway & Power Company	138.81	1,976,430	802,440	630,514	3,409,384	11,932	28,833	41,160
Washington & Old Dominion Railway	69.99	763,640	74,750	98,587	936,977	3,279	4,269	7,551
Washington Utilities Company	....	....	....	....	....	.....	.....	13
Washington-Virginia Railway	38.39	322,280	120,350	145,578	588,208	2,058	3,935	6,022
Grand total	435.89	$5,514,498	$1,577,495	$1,841,800	$8,933,873	$31,268	$51,188	$83,225

SECURITIES LOST IN EUROPE

It is reported that the Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont., probably will experience considerable difficulty in adjusting the matter of bearer share warrants lost during the European war. There are a large number of stockholders in Belgium who secreted their securities when the German invasion began. Many of these stockholders have been killed and no one knows the hiding place of the securities. The warrants, which bear coupons payable to bearer, are probably lost beyond all chances of recovery. Claims are being made on the company to have duplicate warrants issued, but it is expected that considerable difficulty will arise in proving claims to the lost stock. Other companies will have the same trouble, as substantially all securities held in Belgium and northern France were made to bearer and at the outbreak of war these were secreted for safe keeping. Many complications and much litigation is expected over these lost securities.

Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont.—J. S. Lovell has been elected a director of the Brazilian Traction, Light & Power Company, Ltd., to succeed the late Sir William Van Horne.

Camaguey (Cuba) Company, Ltd.—The Electric Bond & Share Company, New York, which some time ago took a ninety days' option on the $1,000,000 stock of the Camaguey Company, Ltd., at $50 a share, has decided not to exercise the option. Officials of the company state that bank obligations have been nearly all paid off and there is a probability that with the close of the current year there may be funds to pay a small dividend on the stock.

Chicago (Ill.) Surface Lines.—Complaints made to the Illinois Public Utilities Commission by J. B. Hogarth against the Chicago Railways and the Chicago Surface Lines were dismissed on Sept. 14 on motion of Mr. Hogarth. Among the complaints made by Mr. Hogarth were the following: As to the "unjust, unwarranted and unreasonable salary" paid John M. Roach as one of the members of the board of operation of the Chicago Surface Lines and as one of the directors of the Chicago Railways; as to the Chicago Railways carrying items of paving expenditures in the joint capital account with the city; as to the application of the Chicago Railways for authority to issue $3,145,000 of first mortgage bonds, and as to the system of accounting of the Chicago Railways.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—The Common Pleas Court has decided that the Columbus, Delaware & Marion Railway is not liable as guarantor on the $500,000 of first mortgage bonds and the $96,000 interest due thereon of the Columbus, Marion & Bucyrus Railroad. When these bonds were issued, the Columbus, Delaware & Marion Railway guaranteed them by endorsement as to principal and interest. On default by the Columbus, Marion & Bucyrus Railroad, the Troy (N. Y.) Trust Company, as trustee of the bonds, brought suit to enforce the guarantee.

Columbus Railway, Power & Light Company, Columbus, Ohio.—An initial quarterly dividend of 1 per cent has been declared on the prior preference stock of the Columbus Railway, Power & Light Company, in addition to the regular quarterly dividend of 1½ per cent on Series A preferred stock. Both of these dividends are payable on Oct. 1 to stockholders of record on Sept. 15.

Demerara Electric Company, Ltd., Halifax, N. S.—The directors of the Demarara Electric Company, Ltd., which does the entire lighting and tramway business in Demerara, British Guiana, have decided to omit the quarterly dividend of 1 per cent usually paid on Oct. 1. This omission is caused by conditions brought about mainly by the European war, resulting in an increase in the cost of fuel and a decrease in the general traffic.

Kansas City Railway & Light Company, Kansas City, Mo.—The Kansas City Railway & Light Company stockholders, it is stated, have accepted the plan formulated by Federal Judge Hook for the reorganization of the Metropolitan Street Railway and the Kansas City Electric Light Company, as described in the ELECTRIC RAILWAY JOURNAL of Aug. 21. A supplementary plan, not providing for any assessment on Kansas City Railway & Light Company stock, will soon be issued.

Long Island Railroad, New York, N. Y.—Earl T. Shaw, 30 Broad Street, New York, has offered to purchase at 60, less commission of 2½ per cent to be paid by the seller, a block of 25,000 shares of Long Island Railroad stock. The certificates must have been issued not later than 1910 and proxies must not have been put out against the same in favor of control by the Pennsylvania Railroad management.

New Orleans Railway & Light Company, New Orleans, La.—The gross earnings of the New Orleans Railway & Light Company for the six months ended June 30, 1915, amounted to $3,520,748 as compared to $3,596,463 for the corresponding six months in 1914. Other statistics for the six months' periods follow: Net after taxes—1915, $1,386,821; 1914, $1,482,475; miscellaneous deductions—1915, $18,184; 1914, $14,253; bond and other interest—1915, $870,198; 1914, $854,185; renewals and replacements—1915, $75,166; 1914, $130,871; surplus—1915, $423,273; 1914, $483,166.

Providence & Fall River Street Railway, Swansea Center, Mass.—In the United States District Court in Boston Judge Morton on Sept. 22 declined at present to appoint a receiver for the Providence & Fall River Street Railway, after considering a petition for such appointment brought last week by the Industrial Trust Company, Providence, R. I. The trust company holds the road's bonds to the amount of $165,000. Counsel for the railway opposed the receivership on the ground that no bonds have yet failed to receive interest, the next date when interest is due being Oct. 1. Conditions are beginning to improve on the road and the appointment of a receiver at this time would merely increase the cost of administering the property. This has been economically carried on during the last three years by a noteholders' committee. Several Massachusetts banks and the Rhode Island Company also opposed a receivership.

Public Service Corporation of New Jersey, Newark, N. J.—The monthly financial statement of the Public Service Corporation of New Jersey for August shows a gross increase of $54,473 in total business over August of last year. The percentage of gain was 1.8 per cent. The total gross increase in all business for the eight months' period to Aug. 31 was $806,282, the percentage of gain for the period being 3.5 per cent. The balance available—after payment of operating expenses, fixed charges, sinking fund requirement, etc.—for amortization, dividends and surplus, for August, 1915, was $230,303, while the decrease in surplus available for dividends over the corresponding period of 1914 was $41,363. For the eight months ended Aug. 31, 1915, the balance available for amortization, dividends and surplus was $2,094,947, and the increase in surplus available for dividends was $145,383.

Seattle (Wash.) Municipal Street Railway.—A. L. Valentine, superintendent of public utilities, states in his report to the City Council that Division "A" and Division "C" of the Seattle Municipal Street Railway were operated at a loss of $2,167 during August. Division "C" cost $2,416 to operate, and the revenues amounted to $2,111, making a loss of $305 on that line. Division "A" was operated at a cost of $1,823 and its revenues amounted to $1,554, or a loss of $269. To this should be added an interest charge of $1,593, bringing the total loss for Division "A" to $1,862.

United Light & Railways Company, Grand Rapids, Mich.—N. W. Halsey & Company, New York, are offering at par and interest an additional $750,000 of 6 per cent gold coupon notes of the United Light & Railways Company, dated Jan. 1, 1915, and due on Jan. 1, 1918 and 1920. The notes due on these dates are callable as a whole or in part upon four weeks' published notice at 100 and interest, and 101 and interest respectively. The proceeds of these notes will complete payments on property heretofore acquired and reimburse the treasury for improvement work. The present outstanding $2,250,000 of these notes is secured by $3,000,000 of first and refunding mortgage 5 per cent bonds on a 75 per cent basis.

DIVIDENDS DECLARED

Bangor Railway & Electric Company, Bangor, Me., quarterly, 1¾ per cent, preferred.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Columbus Railway, Power & Light Company, Columbus, Ohio, 1 per cent, prior preference; quarterly, 1½ per cent, preferred, Series A.

Halifax (N. S.) Electric Tramway, Ltd., quarterly, 2 per cent.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., 3 per cent, cumulative preferred; quarterly, 1½ per cent, common.

Porto Rico Railways, Ltd., San Juan, P. R., quarterly, 1¾ per cent, preferred.

Republic Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, $3.

Toronto (Ont.) Railway, quarterly, 2 per cent.

United Light & Railways Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred.

Washington Water Power Company, Spokane, Wash., quarterly, 1¼ per cent.

West India Electric Company, Ltd., Kingston, Jamaica, quarterly, 1¼ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE ELECTRIC RAILWAY, KENNEBUNK, ME.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$51,883	$26,893	$24,990	$669	$24,321
1 " "	'14	53,357	29,733	23,624	650	22,974

AMERICAN RAILWAYS, PHILADELPHIA, PA.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July,	'15	$485,039	....	....	....	....
1 " "	'14	522,625	....	....	....	....
7 " "	'15	3,060,387	....	....	....	....
7 " "	'14	3,195,974	....	....	....	....

BATON ROUGE (LA.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July,	'15	$16,016	*$9,114	$6,902	$1,736	$5,166
1 " "	'14	14,742	*9,260	5,482	1,732	3,750
12 " "	'15	182,229	*110,676	71,553	20,769	50,784
12 " "	'14	176,904	*115,621	61,283	21,150	40,133

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July,	'15	$15,346	*$8,457	$6,889	$1,185	$5,704
1 " "	'14	15,694	*9,037	6,657	1,064	5,593
12 " "	'15	118,618	*98,264	20,354	13,585	6,769
12 " "	'14	120,543	*101,068	19,475	12,815	6,960

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July,	'15	$31,319	*$17,666	$13,653	$5,355	$8,298
1 " "	'14	31,466	*19,665	11,801	5,217	6,584
12 " "	'15	338,023	*206,228	131,795	63,708	68,087
12 " "	'14	372,570	*209,389	168,181	61,298	101,883

CITIES SERVICE COMPANY, NEW YORK, N. Y.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July,	'15	$297,625	$14,370	$283,255	$40,833	$242,422
1 " "	'14	271,637	8,962	262,675	40,833	221,842
12 " "	'15	4,003,721	153,578	3,850,143	490,000	3,360,143
12 " "	'14	3,543,737	97,269	3,446,468	320,991	3,125,477

COLUMBUS (GA.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July,	'15	$57,364	*$25,484	$31,880	$25,332	$6,548
1 " "	'14	53,827	*24,153	29,674	26,250	3,424
12 " "	'15	700,035	*319,471	380,564	304,953	75,611
12 " "	'14	651,656	*276,839	374,617	264,651	109,965

DALLAS (TEX.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July,	'15	$144,101	*$94,002	$50,099	$28,380	$21,719
1 " "	'14	179,131	*113,181	65,950	30,744	35,206
12 " "	'15	1,933,274	*1,126,295	806,979	364,243	442,736
12 " "	'14	2,283,051	*1,354,024	929,027	299,284	629,743

FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY, FORT WAYNE, IND.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June,	'15	$139,113	*$87,586	$51,527	$47,783	‡$4,599
1 " "	'14	153,207	*96,472	56,735	47,733	‡10,660
6 " "	'15	846,894	*520,569	326,325	289,662	‡39,117
6 " "	'14	914,415	*560,711	353,704	281,758	‡74,884

KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
12m., June,	'15	$811,629	$432,403	$379,526	$237,230	‡$170,284
12 " "	'14	782,272	412,510	369,762	245,184	‡156,600

PHILADELPHIA RAPID TRANSIT COMPANY, PHILADELPHIA, PA.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$1,897,763	$1,086,744	$811,019	$815,942	†$4,923
1 " "	'14	1,912,970	1,111,017	801,953	808,764	†6,811
2 " "	'15	3,837,669	2,182,439	1,655,230	1,632,538	22,692
2 " "	'14	3,864,236	2,248,719	1,615,517	1,618,129	†2,612

REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July,	'15	$250,908	*$143,991	$106,917	$59,253	‡$47,828
1 " "	'14	252,217	*146,308	105,909	57,083	†48,967
7 " "	'15	1,707,826	*1,060,293	647,533	401,089	‡247,373
7 " "	'14	1,747,950	*1,075,415	672,535	393,108	‡280,275

VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June,	'15	$430,201	$205,490	$224,711	$137,248	‡$94,039
1 " "	'14	438,461	213,442	225,019	135,829	‡92,923
12 " "	'15	5,109,622	2,469,074	2,640,548	1,636,418	‡1,085,049
12 " "	'14	5,156,048	2,465,908	2,690,140	1,615,460	‡1,155,590

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*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

JITNEY JOTTINGS

Further Action Before the Public Service Commission of New York—The Philadelphia Injunction Suits

The International Railway, Buffalo, N. Y., has filed a complaint with the Public Service Commission of the Second District, against Albert G. Gould alleging that he is operating a jitney bus line in Buffalo, known as the Silver Star Line or the Silver Sightseeing Line, in violation of the Thompson jitney bus law, and asking that he be restrained. The company alleges in the complaint that the line is run from East Masten and Utica Streets on Masten to Dodge Street, to Ellicott Street, to Goodrich Street, to Main Street and to Seneca Street in competition with the lines of the International Railway, without a certificate from the Public Service Commission, and carrying passengers for a fare of 5 cents—all of which operation the company alleges is in violation of the law as interpreted in the recent decision of the courts in the case of the commission against Burt C. Hurtgam, Lockport. With regard to the charge of a 5-cent fare the complaint says that the line is "carrying passengers without collecting fare until the fifth passage of such passengers is consummated when a fare of 25 cents is collected for the five passages upon said cars." This, the complaint alleges, is an evasion of the law, which applies specifically only to lines carrying passengers for 15 cents or less.

The first of the two hearings for injunctions against the jitney ordinance passed by the Councils of Philadelphia, Pa., came up recently before Judge Patterson in Common Pleas Court No. 1 and the Judge postponed consideration of the case until Sept. 28, when the original suit for a restraining order will be heard by all the judges of Common Pleas Court No. 1 sitting together. Judge Patterson said the jitneymen had failed to take advantage of an opportunity to get a temporary injunction, afforded to them by Judge Sulzberger, by not filing the $2,500 bond required by the order of the court, and he declared that he saw no reason for reopening the case at this time. City Solicitor Ryan filed an answer to the suit of the jitney association in which they sought an injunction against Councils' ordinance. The answer was a general denial of the claims of the jitneymen that the ordinance was "confiscatory and discriminatory." When the application of the Auto Bus Company for an injunction against the jitney ordinance came before Judge Fineletter in Common Pleas Court No. 4, the judge took the same view as Judge Patterson. He stated that the merits and demerits of the jitney act would be fully threshed out at the final hearing, and declined to interfere at present.

The Mayor of Newark, N. J., has returned to the Board of Works of that city with his veto the jitney regulatory ordinance referred to in the ELECTRIC RAILWAY JOURNAL of Sept. 11, page 467. The veto has been overidden.

A very interesting communication on the jitney appeared recently in one of the local papers at San Diego, Cal. It was signed "A Business Woman." It is understood that the letter to the editor was contributed by a member of the staff of the San Diego Electric Railway who has served the company for eleven years. The communication, some 1500 words in length, was concluded as follows:

"We are a queer people. We have spent time, thought and hundreds of thousands of dollars to create commissions to compel public utilities to have due regard for our rights. We are carrying a heavy tax to maintain these commissions. Every time we hear they have rendered a decision in our favor against a public utility, we are filled with complacency that in our great wisdom we have made this thing possible. And now along comes the jitney bus—a new transportation scheme, a common carrier—and because it appeals to a mood, or a sympathetic streak, or satisfies a grudge we have against corporations, we form another flashlight judgment and cheerfully set aside the expensive, extensive regulative machinery we have built and maintain to protect us. We render null the ability to insure reasonable fare, for instance, by encouraging an unregulated system which so cuts into the receipts of the established, governed system that it must increase rates, or decrease service, or do other undesirable things in order to live. Is it mere extravagance on our part? Or the gambling instinct which is always willing to take a chance? Or is it that we have regulated the railroads down to a fine point, got them just where we want them, produced a finished article of the regulated variety, and now we are looking to the future in developing something new in the way of the jitney bus business so that in a few years we shall have fresh material upon which to exercise our talents for minding the other fellow's business?"

The history of the attempt to regulate the jitney in Portland, Ore., is very interesting. The first jitney appeared in Portland in December, 1914. Commissioner Daly promptly prepared a drastic ordinance and presented it to the Council. Hearings were held and the measure was modified by Mr. Daly. After several months of delay the Council adopted the modified measure. The jitney interests then invoked the referendum on the measure as passed, thus submitting it to a vote of the people. The Council's measure was adopted by the voters at the city election on June 2. A jitney inspector was then appointed, and the city started to enforce the ordinance. The jitney interests promptly started litigation and secured a temporary restraining order in the Circuit Court. The State Supreme Court decided against the measure on a technicality. Mayor Albee then urged the Council to pass the measure over again in the identical form adopted by the voters. Commissioner Daly subsequently presented a modified measure, and the Council after killing the Mayor's measure passed Mr. Daly's measure with an emergency clause. The city then started to enforce the new measure, but the jitney interest on September 14 secured a ten-day restraining order from Circuit Judge Bagley.

No decision has been rendered yet on the application of the Public Service Commission of the Second District of New York to Supreme Court Justice Hasbrouck at Kingston for a permanent injunction restraining James E. Adams, Corning, and Elmer G. Booth, Rochester, from operating jitney lines without the consent of the local authorities or a certificate of public convenience and necessity from the commission. The petition was heard on Sept. 4 at Kingston. The bringing of the action was referred to in the ELECTRIC RAILWAY JOURNAL of Aug. 14, page 292.

SEEK TO RESTRAIN JITNEY IN TERRE HAUTE

Trustee for Bondholders Applies to the United States District Court for Injunction

A new feature in the jitney situation at Terre Haute, Ind., was introduced on Sept. 14 when a petition for a restraining order against the jitney drivers in that city was filed in the United States District Court at Indianapolis by the Fidelity Trust Company, Philadelphia, Pa., trustee under the mortgage of the Terre Haute Indianapolis & Eastern Traction Company. Sixty persons are named in the suit, which is in the form of a bill of equity, the petition stating that the jitney buses in Terre Haute are being operated by the persons named, and others unknown, instead of by organized companies.

The bill recites the history of the first franchise grants to the street railways in Terre Haute, and the further development of the property and extension of franchises prior to and following the lease to the Terre Haute, Indianapolis & Eastern Traction Company. It is shown that the grant or charter to the company provides that, during the time the privileges were granted to the company, the city of Terre Haute shall not "extend, grant to or confer upon any person or corporation any privilege which will impair or destroy the rights and privileges herein granted to the said company." It is also shown that under the public service commission law no license or franchise shall be granted to any person or corporation to operate any public utility where a similar utility is already engaged in similar service, without securing from the commission, after public hearing, a declaration that the public necessity requires such duplication of service. W. H. Latta, attorney for the company, stated that the company proposed to show that the jitney bus operators had received no grant from either the State or city to operate in Terre Haute, and that they were a menace to the community, operating on uncertain schedules and, as shown by checkings made during the months of July and August, they have been operated on a losing basis, the latter feature emphasizing their inability to run on a regular schedule.

It is also cited in the appeal for the injunction that the jitney bus drivers of Terre Haute have organized what is known as the Jitney Bus Drivers' Union No. 168, which is a trades union recognized by the Central Labor Union of that city. It is then stated that the Central Labor Union started a boycott against the local street railway lines in Terre Haute in January, 1915, and that since that time the receipts from the operation of the Terre Haute city lines have been very seriously decreased. Mention is made in the bill of the manner in which the jitney bus drivers have been conducting their business, making it a practice to drive between the street cars and the curbs, appearing in crowds awaiting street cars, and being unusually active when transportation is in demand during the rush hours and on holidays, etc.

A hearing has been asked before Judge Arthur B. Anderson on Sept. 24.

SKIP STOPS SAVE TIME

Satisfactory Results Reported From Milwaukee in Experiment With Skip Stops on Three Short Lines

On Sept. 3 The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., gave out a statement showing the time saved on the three lines on which the experiment with skip stops is being made. Commenting on the figures the company said:

"Thus it will be seen that the average saving for each period of the day on the three lines being tested is 11 per cent, or seven minutes every hour. The lines under test are short runs, and but few stops are eliminated to accomplish this improvement in the service, as will be seen by the following:

"On the Farwell-Downer route twelve stops out of a total of fifty-two have been eliminated.

"On the Walnut-Pabst route twenty-three stops out of a total of seventy-one have been eliminated.

"On the Reed-Greenfield-Burnham route twenty-one stops out of a total of seventy-four have been eliminated.

"The report of our engineers shows that for an average day on the Farwell-Downer route formerly 33,198 persons, or 94.6 per cent of the total, boarded and alighted from the cars at designated stops, and 1895 persons, or 5.4 per cent, at the stops which have been cut out.

"On the Walnut-Pabst route formerly 25,367 persons, or 81 per cent of the total, boarded and alighted from the cars at designated stops and 5939 persons, or 19 per cent, at the stops which have been cut out.

"On the Reed-Greenfield-Burnham route formerly 25,895 persons, or 89 per cent of the total, boarded and alighted from the cars at designated stops and 3163 persons, or 11 per cent, at the stops which have been cut out.

"The conclusion, therefore, is:

"All persons using these three lines have been benefited by the improvement in the service to the extent of the saving of one-eighth of their time while riding on the cars. Only a relatively few passengers have been discommoded by being required to walk a short distance. Such inconvenience has been more than compensated for by the benefits derived from the improved service. The success and popularity of the plan so far prompts the belief that further improvement in the running time on these lines may be anticipated before the completion of the test. Similar results may be expected upon all other lines in the city when our patrons give their final approval to the plan."

WELFARE WORK OF THE INTERBOROUGH

In the annual pamphlet report of the Interborough Rapid Transit Company, New York, N. Y., for the year ended June 30, 1915, the following reference is made to the welfare work of the company:

"Considerable space was devoted in last years' report to a description of the efforts which your management is making to promote the welfare of its employees. That these efforts are appreciated is shown by the reduction in the number of men leaving the service over a given period. This reduction is best illustrated by the following comparison for the six months ended June 30, 1912, with the same period for 1914:

	June 30, 1912, Per Cent	June 30, 1914, Per Cent
Number of employees leaving service.........	35	19.3
Number of motormen leaving service.........	16	1.1
Number of conductors leaving service.........	4	2.9
Number of guards leaving service............	17.2	5.4

"Your company has had under consideration for some time a plan whereby the hours of ticket agents, gatemen, porters and platform men on the subway and elevated divisions could be reduced to ten hours a day without disarranging the present satisfactory schedule of service. Following a thorough investigation, a way has been found for placing all of the above service classifications on a ten hour a day basis so that approximately 80 per cent of the men will have straight ten-hour shifts. This classification went into effect on July 1, 1915."

Ordinance Against One-Man Cars.—The city of Belleville, Ill., has passed an ordinance requiring the East St. Louis & Suburban Railway to discontinue the one-man cars and to place both conductors and motormen on all street cars operating in that city.

Trial with New Cars in Toronto.—D. M. McIntyre, chairman of the Ontario Railway & Municipal Board, said on Sept. 7 that the new type of street car which the Toronto Railway has had on trial had met with the approval of the board. The new car is equipped partly with longitudinal seats and partly with cross seats, and has an inside aisle instead of an outside running-board.

The Joliet Arbitration.—John W. Downey, an attorney of Joliet, has been selected as the third member of the arbitration board of the Chicago & Joliet Electric Railway. Samuel J. Drew and E. Meers are the other two arbitrators. A new scale was demanded recently, and as the agreement between the company and the men provided for arbitration in case no decision could be reached the men selected Mr. Drew and the company selected Mr. Meers. The men want 33 to 36 cents an hour. The old scale provided for payment of 27 to 30 cents an hour.

First Aid in Brooklyn.—A system of first aid to the injured has been developed by the Brooklyn (N. Y.) Rapid Transit Company to a high state of efficiency. An improved portable first-aid case with equipment for use both by an instructed layman and by a physician has been developed by the physicians of the medical inspection bureau. Sixty-eight of these cases have been installed in the depots, terminals, shops and power houses of the company, and supplied to emergency and other crews required to work out on the lines. Wherever a first-aid case has been installed, a sufficient number of employees have been instructed in approved methods of first-aid to insure the presence of some qualified individual at all hours of the day or night when work is going on.

"Courthouse Advice."—More "courthouse advice" is being given to the trainmen of the Louisville (Ky.) Railway by N. F. Funk of the legal department. This last preachment is devoted to the matter of talking so that the jury can hear what the witness is saying. Mr. Funk said: "Talk loud on the witness stand. I wish we could engrave this sentence in letters of fire on every employee's brain. We have lost more cases through this apparently trivial neglect than because of any other reason. I have seen a man the size of Jess Willard take the witness stand and have a 100-lb. judge roar in fury at him for not talking loud, finally resulting in the judge losing his temper, the jury losing their patience, and the company losing the case. If there is anything more annoying than for a man to try to hear another man talk simply because the party of the second part will not raise his voice I have not discovered it."

Protecting Grade Crossings on the Pacific Electric Railway.—Thirty-two automatic wigwag warning signals will be installed at grade crossings of the Pacific Electric Railway in southern California. After a thorough investigation by the experts of the Railroad Commission, the railway has voluntarily agreed to protect thirty-two more crossings by these automatic signal devices. This is the largest number of safety installations ever agreed upon at one time by any company in the State. The question of making crossings safer in Los Angeles County, either by departure from grades, over or underneath the tracks, or by flagmen or automatic signals, has been the subject of conferences in Los Angeles between the Railroad Commission, governmental and civic bodies, and the railroads in the last few weeks. The thirty-two crossings which are to be protected are in Los Angeles, Riverside, Orange and San Bernardina Counties, covering the entire territory in which the Pacific Electric Railway operates.

Passenger Traffic on Subway and Elevated in New York.—The Public Service Commission for the First District of New York has issued a statement of the number of passengers carried on the elevated and subway lines of the city in the year ended June 30, 1915. The total for the subway traffic reached 345,585,749, of which 117,585,390 were northbound and 119,080,397 were southbound. The remaining tickets were sold at the "island" stations and could not be separated into directions traveled. The greatest number of tickets was sold at the Atlantic Avenue station in Brooklyn, with a total of 23,000,000. Grand Central station was second with 20,000,000. The increase in the number of passengers for the year was 5,172,646. The statistics for the elevated roads showed a total number of passengers carried of 301,792,517, of which 120,738,879 were northbound and 114,118,237 southbound. The remainder were sold at "island" stations. The years' traffic showed a decrease of 9,681,051.

Boise Transfer Controversy Settled.—W. E. Pierce, president of the Boise (Idaho) Railroad, has announced the position of his company in the Boise tansfer controvesy, mentioned in ELECTRIC RAILWAY JOURNAL of Sept. 4. Mr. Pierce says his company is willing to enter into an agreement at any time for the exchange of transfers with the Idaho Traction Company. He has instructed his attorney to notify the Supreme Court and the Public Utilities Commission of the position his company has assumed, with a view to obtaining dismissal of the actions begun before these two bodies to compel the companies to enter into an agreement for a system of universal transfers. Since the property of the two concerns was separated on Aug. 2 transfers have been exchanged by the companies, except between the Soldiers' Home line of the Boise Railroad and the Nineteenth Street line of the Idaho Traction Company. The Idaho Traction Company filed answers before both the Supreme Court and the Utilities Commission expressing its willingness to exchange transfers, but neither action was answered by the Boise Railroad until Mr. Pierce made his announcement.

Brooklyn Rapid Transit Reduces the Amount of Time Lost by Employees.—The system of compulsory medical inspection and free attendance for employees excused on account of illness, which was established by the Brooklyn (N. Y.) Rapid Transit Company on Jan. 1, 1913, for approximately 10,000 men in the operating department, accomplished during the year ended June 30, 1915, a reduction in the amount of time lost by the operating employees on account of sickness of 13,485 days (or nearly 18 per cent) over the time lost in the year ended June 30, 1914. The milder winter of 1915 accounted for about 7000 days of the total reduction. Making due allowance for this, however, there still remains a saving of upwards of 6000 days' work for the year, or a reduction of 8.6 per cent over the sickness record of the year ended June 30, 1914. The system of compulsory medical inspection was accompanied in its first year by a reduction of 24 per cent in the number of days' work lost by operating employees on account of illness. This initial record is still being improved upon as the activities of the medical inspection bureau develop. These activities embrace not only the inspection and attendance of operating department employees reporting sick, but free medical attendance for members of the Employees' Benefit Association outside of the operating department; the care of all employees injured in the performance of their duties and entitled to medical attendance under the compensation act; the examination of candidates for employment and the periodic re-examination of all motormen.

Personal Mention

Mr. H. O. Marler has been appointed traveling passenger agent of the Pacific Electric Railway with headquarters at Los Angeles, Cal., vice Mr. E. L. Taylor, resigned.

Mr. Charles Pierce Burton, publicity director of the Gary & Interurban Railroad, Gary, Ind., has just published, through Henry Holt & Company, New York, his seventh volume, "Camp Bob's Hill," a book for boys, having its setting in the sand dunes of northern Indiana. Mr. Burton is the author of a volume of essays and six books for boys.

Mr. P. P. Crafts, formerly manager of the Mobile Light & Railroad Company, Mobile, Ala., has been appointed general manager of the Kanawha Traction & Electric Company, Parkersburg, W. Va. From 1904 to 1914 Mr. Crafts was connected with the Iowa & Illinois Railway, Davenport, Iowa, first as general manager and later as vice-president and general manager. During part of this time he was also in charge of the Davenport & Muscatine Railway. From 1902 to 1904 he was manager of the Saginaw Valley Traction Company. Mr. Crafts entered the public utility field when he was sixteen years old.

Mr. Percy Farrant, who has been appointed to succeed Mr. J. B. Russell as auditor, assistant secretary and assistant treasurer of the Manila Electric Railroad & Light Company, Manila, P. I., has been in the service of the company as assistant auditor continuously since the company began operations in 1905. Mr. Farrant was born in London in 1880, and was graduated from Ryde House College, Surrey, England, in 1896, at the age of sixteen. He immediately thereafter entered the service of John Henderson & Company, London, as a member of their general office staff, and remained in their employ until 1900, when he resigned to join the Colonial Forces. He proceeded to South Africa and served as staff sergeant until the close of the Boer War, at the conclusion of which he was transferred to the public works department, holding the position of chief clerk and accountant. He resigned from the last-named position in 1904 to enter the service of the Argentine Railways as a member of the administration staff and remained in that position until 1905. He then returned to London and was appointed assistant auditor of the Manila Electric Railroad & Light Company.

Mr. J. B. Russell has resigned as auditor, assistant secretary and assistant treasurer of the Manila Electric Railroad & Light Company, Manila, P. I., on account of ill health, and Mr. Percy Farrant, acting auditor, has been appointed to succeed him. Mr. Russell has been in poor health for some time. In May, 1914, he left Manila to seek rest and a change of climate in Japan, and in March, 1915, he left Manila for a six months' vacation trip, taking a long sea voyage to San Francisco, Panama, Trinidad and thence to New York, cabling his resignation from New York. Mr. Russell was born in Glasgow, Scotland, in 1872. At the age of eighteen he left his birthplace to accept a position as a commercial accountant in Trinidad, where he remained for ten years. He left Trinidad for the United States and entered the service of Stone & Webster, first in Boston and subsequently in Tacoma, Wash., with the Tacoma Railway & Power Company. In 1904 Mr. Russell became associated with The J. G. White Companies as auditor while the construction work of the Manila Electric Railroad & Light Company was in progress. Upon completion of the construction work he was appointed auditor, assistant secretary and assistant treasurer of the company. In the early days of the company at Manila Mr. Russell had a difficult task in organizing the forces of the Manila Electric Railroad & Light Company's accounting department, now numbering 143, only six of whom are not Filipinos.

Mr. David A. Belden, who was elected president of the Massachusetts Street Railway Association at the annual meeting on Sept. 8, was born in Aurora, Ill., in 1867. He was educated at Racine College, Racine, Wis., and from 1892 to 1901 was general manager of the Aurora Street Railway, the Aurora & Geneva Street Railway and the Aurora, Yorkville & Morris Street Railway. Mr. Belden then went to Atlanta, Ga., and was general manager of the Georgia Railway & Electric Company until March, 1903, when he became general manager of the Birmingham Railway, Light & Power Company, Birmingham, Ala. After about four months service in this capacity Mr. Belden was called to the presidency of the railway and lighting properties occupying the districts centering about Haverhill, Mass., and Portsmouth, N. H., with intermediate lines. With headquarters at Haverhill, Mr. Belden is now president of the New Hampshire Electric Railways, the Massachusetts Northeastern Street Railway, the Dover, Somersworth & Rochester Street Railway, the Rockingham County Light & Power Company, and the Kittery (Me.) Electric Light Company. He has maintained unusually good relations with the public in the territory served by his companies, and his work in securing the establishment of a 6-cent fare unit on certain of these lines in proceedings before the Massachusetts Railroad Commission a few years ago was conspicuous for its clarity and set a new standard in the preparation of street railway rate briefs and exhibits at that time.

OBITUARY

John B. Mitchell, a pioneer street railway man of Louisville, Ky., died at his home in New Albany, Ind., recently at the age of eighty-three. He was superintendent of the Louisville Railway for a number of years before electricity was adopted as motive power.

William C. Dunning died at his home in Greenfield, Ind., on Sept. 16, at the age of fifty-three. With Mr. Francis G. Banker he procured a franchise for an interurban line through Rush, Henry, Hancock and Marion Counties, and constructed and operated the road for several years. The property is now a part of the system of the Terre Haute, Indianapolis & Eastern Traction Company.

Cornelius J. Field, who in recent years had been associated with Thomas A. Edison in the development of the Field-Beach battery-operated passenger bus, died at his home in Brooklyn, N. Y., Sept. 20, at the age of fifty-four. Mr. Field was in the early days general manager of the Edison Illuminating Company of Brooklyn, resigning in 1891 to go into electric-railway construction work. Later he went to Europe and the West Indies and built a number of railway lines and industrial plants.

CLEVELAND ELECTRIFICATION PROBLEM DISCUSSED

Following a statment by City Electrician Smith before a special committee of the Council of Cleveland, Ohio, on Sept. 17, to the effect that operation on electrified Eastern roads cost 5 cents per engine-mile, P. T. White, superintendent of the Cleveland division of the Big Four Railroad, declared that the roads would all substitute electric power for steam if this rate could be guaranteed. He said that the cost of operating switch engines is now 35 cents per engine-mile. Mr. White suggested that if the city would build power stations and overhead equipment and guarantee to operate locomotives at a cost not to exceed 5 cents per engine-mile, the railroads would be glad to purchase the locomotives and operate them. According to him the Big Four Railroad could afford to spend $40,000,000 and pay the interest on the investment if it could secure that rate of cost for operation. Mr. White declared that the figures, of from $26,000,000 to $30,000,000, given by former Smoke Inspector E. P. Roberts as the cost of electrifying the roads within the city were wrong. He said that the expense would probably be more nearly double the amount. He proposed to furnish an estimate of the cost of electrifying the Big Four Railroad, and suggested that the city make an appropriation for a careful study of the question. S. D. Robertson, superintendent of the Pennsylvania Lines west of Pittsburgh, notified the committee that he is having estimates prepared.

The utilities committee of the City Council of Seattle, Wash., has voted to recommend the passage over Mayor Gill's veto of the ordinance for the city to enter into a contract with F. M. Petersen, granting him the right to operate a motor-bus line from the northern terminus of Division "A" of the Seattle Municipal Railway to the north limits of Ballard, on a transfer basis.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Cumberland County Electric Company, Bridgeton, N. J.**—Chartered in New Jersey to operate electric railways. Capital stock, $100,000.

***Charleston-Southern Railway, Darlington, S. C.**—Chartered in South Carolina to construct either a steam or electric railway from Charleston to Hutchinson Island, 86 miles, to connect with the Seaboard Air Line. Headquarters, Darlington. Capital stock, $43,000. Officers: Bright Williamson, president, and George E. Dargan, secretary, both of Darlington.

FRANCHISES

Anniston, Ala.—The Alabama Power Company has asked the Council for a franchise to construct an extension to the Anniston Country Club.

San Jose, Cal.—The San Jose Railroad has asked the Council for a franchise to construct an extension on Alum Rock Avenue. Bids for this franchise will be received until Oct. 4.

South San Francisco, Cal.—The South San Francisco Railroad & Power Company has received a franchise from the Council to operate a single or double-track electric line over the extension of Grand Avenue to the northeasterly line of the Mission Road, or State highway.

Rockford, Ill.—It is reported that the Elgin & Belvidere Electric Company may ask the Council for a franchise to construct an extension on State Street, Rockford.

Salem, N. J.—The Salem-Pennsgrove Traction Company has asked the Council of Salem for a franchise. It is planned to construct a line between Salem and Pennsgrove. [Sept. 4, '15.]

Kenmore, N. Y.—The International Railway has received a franchise from the Council of Kenmore to double-track part of its main line in Kenmore.

Lancaster, N. Y.—The Buffalo & Depew Railway has asked the Council for a franchise to extend its line, with an additional track, necessary switches, etc., from Ellicott Road and Central Avenue to the New York Central Railroad tracks.

Youngstown, Ohio.—It is reported that the Youngstown & Southern Railway will ask for a twenty-five-year extension of its franchise, with permission to double-track Front Street.

Chester, Pa.—The Council is said to be opposed to the ordinance prepared by the Southern Pennsylvania Traction Company for franchises over additional streets between Chester and Eddystone. One of the city commissioners submitted a plan whereby the company could double-track on certain streets it now uses and use single track over additional streets. The company argued that this method would not relieve the situation. The bill was laid over.

Dallas, Tex.—The Northern Texas Traction Company has filed a petition with the Board of Commissioners of Dallas through the union terminal committee of the Chamber of Commerce asking for a franchise to operate a double-track line on Jefferson Street between the Oak Cliff viaduct and Commerce Street. If the franchise is granted the company agrees to begin immediate construction of the new viaduct over the steam railway tracks entering the new union terminal.

Seattle, Wash.—The Seattle, Snohomish & Everett Railway has asked the Council for a two-year extension of time on its franchise to complete its line between Seattle, Snohomish and Everett. The franchise provides for a line beginning at the present terminus of the Ravenna Park line, extending on Thirty-fifth Avenue, N. E., East Fiftieth Street, East Fifty-fifth Street and other streets in that section of the city. David Swank, Seattle, is interested. (Oct. 18, '13.)

Steilacoom, Wash.—The Tacoma Railway & Power Company has asked the Council for a franchise to construct an extension along the Steilacoom Highway from the end of the present tracks of the Pacific Traction Company, near the Fort Steilacoom Asylum, to the city limits. Chairman Sladen, of the Pierce County Commissioners, states that there will be no opposition to the granting of a franchise and that the petition will be advertised at once and a public hearing held Oct. 1.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—This company plans to install thirty-two automatic wigwag warning signals at grade crossings. One is to be installed on the Pasadena Short Line at Schützen Park, one on the Altadena line, one on the Alhambra line, eight on the San Bernardino line and the others on the southern and western divisions. It is expected that the city commission will ask this company to construct a line to Brookside Park, Pasadena.

Municipal Railways of San Francisco, San Francisco, Cal.—The Board of Supervisors have been asked to extend the Union Street line through the Presidio reservation to Fort Winfield Scott.

Tidewater Southern Railway, Stockton, Cal.—It is reported that completion of the line into Turlock is assured by Feb. 1. Material has been delivered and work will be begun at once on the construction of a bridge across the Tuolumne River and grading of the right-of-way will soon be begun from the Turlock end of the line.

Denver & Inter-Mountain Railroad, Denver, Col.—A report from this company states that it is in the market for thirty cattle guards.

Connecticut Company, New Haven, Conn.—Plans are being made by this company to extend its double track on Main Street, East Hartford, north from the corner of Linden Street to the corner of Main and King Streets.

Miami (Fla.) Traction Company.—This company's line in Miami is practically completed. Cars have been ordered and the machinery for generating power and charging the storage batteries has been received. It is expected that operation will be begun by October. B. B. Tatum, president. [May 8, '15.]

Jesup, Ga.—Thomas J. Arline reports that, owing to financial conditions, the project to construct a line between Jesup and Doctortown has been abandoned for the present. [Aug. 1, '14.]

Lula-Homer Railroad, Lula, Ga.—This company reports that 75 per cent of the grading on its proposed line from Belton to Homer has been completed. Surveys are also being made from Homer to Clinesville. The company intends to construct a line from Belton, Ga., to Anderson, S. C., 82 miles. The contract for the construction of track has been let to William J. Redmond, Atlanta, and construction will begin Oct. 1. C. J. Hood, Commerce, Ga., president. [March 20, '15.]

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—New rails throughout will be used on Franklin Avenue, where the track is being removed from the west side to the center of the street.

East Side Electric Railway Company, Centralia, Ill.—S. A. Frazier reports that the project to build an electric railway between Centralia and Irvington has been abandoned. [April 12, '13.]

Mason City & Clear Lake Railroad, Mason City, Iowa.—A report from this company states that it expects to reconstruct 2 miles of track in Clear Lake.

Hutchinson (Kan.) Interurban Railway. — This company reports that it is laying new track on Second Avenue, East, leading from Main Street to Poplar Street, also a wye at Main Street and another entering the Arkansas Valley Interurban Railway's terminal station at Second Street, East. All special work is being supplied by the Elliott Frog & Switch Company and the steel ties by the Carnegie Steel Company.

Iola (Kan.) Electric Railroad.—Plans are being considered by this company for the extension of its lines from Iola to Humboldt.

***Newton, Kansas & Nebraska Railway, Newton, Kan.**—A stock and bond issue of $1,500,000 for this company has been approved by the Public Utilities Commission. The new road, which is to be a standard-gage line, will begin at Newton, Kan., and extend north to Albia, near the Nebraska line. The promoters of the road have not decided whether they will build a steam or electric line, but it is to be built through Harvey, Dickinson, Saline, Marion, McPherson, Clay and Washington counties.

Hagerstown & Frederick Railway, Frederick, Md.—Citizens of Emmitsburg have asked this company to build an extension of its lines from Thurmont to Emmitsburg, 7 miles.

Boston (Mass.) Elevated Railway.—A petition signed by West Roxbury citizens has been filed with the Public Service Commission asking for the restoration of the surface car line between Jamaica Plain and the North Station.

Springfield (Mass.) Street Railway.—This company plans to relocate its tracks in Springfield between the North End bridge and the Plainfield Street bridge. The relocation of tracks and removal of poles and wires will cost the company about $20,000.

Armada, Mich.—Work has been begun on the construction of an electric line from Armada to Detroit via Ray, Davis, Macomb and Fraser. The line will enter Detroit on Mack Avenue. Mount Clemens, through which it was at first planned to extend the road, refused to grant the company a franchise for the use of its main streets. Peter Jacobson, Detroit, is interested. [Aug. 7, '15.]

Joplin & Pittsburgh Railway, Kansas City, Mo.—It is reported that J. J. Heim and associates of Kansas City, who own the Joplin & Pittsburgh Railway, are considering the purchase of the Joplin-Parsons line of the Missouri, Oklahoma & Texas Railroad, with the object of converting the road into an electric line. It is said negotiations have been opened and that the prospective purchasers are planning an early visit to Parsons to confer with officials of the Missouri, Oklahoma & Texas Railroad. The purchase seems to be contingent upon the willingness of the city of Parsons to help defray the expenses of building the railroad from Cherokee Junction to Parsons, 5 miles, in order that the line may enter the city of Parsons at a desirable point.

Metropolitan Street Railway, Kansas City, Mo.—The receivers of the Metropolitan Street Railway have awarded a contract to the Columbia Construction Company, Milwaukee, for the building of all new railway extensions required at this time by the terms of the new contract. Work will be begun at once by this company. There are 10 miles of these extensions.

***St. Louis Subway & Elevated Corporation, St. Louis, Mo.**—This company is being organized to construct 4.76 miles of elevated railway and 3.29 miles of subway in St. Louis. The road would connect with interurban railways at the city limits. James D. Houseman and F. E. Niesen, Bank of Commerce Building, St. Louis, are interested.

Manchester (N. H.) Street Railway.—Plans are being made for the construction of a bridge at South Elm Street, Manchester, at a cost of about $76,000, of which $40,000 will be paid by the city of Manchester, $24,000 by the Boston & Maine Railroad and $12,000 by the Manchester Street Railway.

Salem-Pennsgrove Traction Company, Salem, N. J.—This company has asked the county of Salem to construct a new bridge at Penn's Neck. The bridge will cost approximately $30,000 and the company offers to pay half of this sum. It also offers to pay for strengthening the Lower Canal bridge. Rights-of-way have been received from three-fourths of the property owners along the route of this company's proposed line. [Sept. 4. '15.]

Brooklyn (N. Y.) Rapid Transit Company.—Official announcement has been made by the Brooklyn Rapid Transit Company that on Sept. 25 the company will begin operating trains over the Liberty Avenue extension of the new dual subway system improvements. The extension will carry the Fulton Street elevated road, which is being third-tracked to afford express service, from the borough line between Brooklyn and Queens to Lefferts Avenue, Richmond Hill, thus adding many miles of territory to the 5-cent-fare zone. Sections which the new route will serve include Woodhaven, Clarenceville, Morris Park and Richmond Hill.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has authorized the New York Municipal Railway Corporation to award the contract for furnishing structural steel for the third-tracking of the Myrtle Avenue elevated railroad between Broadway and Wyckoff Avenue, Brooklyn, to the Phoenix Bridge Company, the lowest bidder, for $40.50 per net ton.

International Railway, Buffalo, N. Y.—A comprehensive plan of this company for the construction of the new Bailey Avenue line is soon to be laid before the Council. It calls for the construction of a line between Sycamore and William Streets in 1916, between William and Seneca Streets in 1917, between Sycamore and Ferry Streets in 1918 and East Ferry Street and Kensington Avenue in 1919. Approval of the four-year period for the development of this new double-track line is asked by the company. The entire distance is 3 miles.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—Construction has been begun by this company on a loop line on Seventeenth Street from State Street to Peach Street, Erie. The company is completing a double-track system on East Sixth Street.

Cleveland (Ohio) Railway.—The double track on Eucild Avenue between East Twenty-second and East Fortieth Streets is now about complete and cars were scheduled to be in operation on it on Sept. 20. Residents of Prospect Avenue, between the same streets, where Euclid Avenue cars have always run before are to have a shuttle service until Wade Park Avenue cars, now routed over Superior Avenue because of sewer work on East Sixty-fifth Street, again begin operation over that line. A single track will shortly be constructed on Mumford Court between East Fifty-fifth Street and Broadway to make a loop for some of the Fifty-fifth Street cars. Because of much heavier traffic on the northern end of the line than the southern end it has become necessary to turn some of the cars at this point.

Oklahoma & Interstate Railway, Oklahoma City, Okla.—Final surveys are being made of this company's proposed line to connect Columbus, Galena, Baxter Springs, Miami, Centralia, Collinsville and Tulsa. Construction will be begun as soon as several details of right-of-way are settled. John R. Rose, Oklahoma City, president. [Aug. 28, '15.]

Toronto (Ont.) Civic Railway.—Concrete is now being laid under the double tracks on Bloor Street, west of Dundas Street for the new civic car line. Excavation work was done, and two lines of track put down in the center of the roadway as far west as Indian Grove. This portion will be completed before any more track is laid. The present car line is operated on a temporary single track on the north side of the street. Ratepayers of the southern portion of the ward want the line extended north on Quebec Avenue or Pacific Avenue to Annette Street and Jane Street.

Philadelphia, Pa.—Bids will be opened on Oct. 19 for about 25,000 tons of steel for four sections of the proposed Frankford elevated line as follows: Contract 511, Front Street from Callowhill Street to south of Girard Avenue, about 4074 ft. of structure; contract 512, Front Street and Kensington Avenue from south of Girard Avenue to north of York Street, about 7128 ft.; contract 513, Kensington Avenue from north of York Street to North of Ontario Street, about 7769 ft.; contract 514, Kensington and Frankford Avenues from north of Ontario Street and south of Unity Street, Frankford, about 7653 ft. A subway will be built from League Island to Olney and Rising Sun Avenues and an elevated railway from Front and Arch Streets to Bridge Street, Frankford. A subway-elevated line to Roxborough and an elevated railway from Thirtieth and Market Streets to Darby will eventually be built. Work has been begun by James D. Dorney on the Frankford elevated line, and the Keystone Construction Company has begun the first excavation for the Broad Street subway. The total cost of the lines recommended for immediate construction has been approximated at $46,000,000, with an additional $12,000,000 for equipment. A. M. Taylor, director of city transit, is in charge of the work. [Aug. 28, '15.]

Stroudsburg (Pa.) Passenger Railway.—This company reports that it is rebuilding 1 mile of track on Main Street, Stroudsburg.

Rhode Island Company, Providence, R. I.—Work has been begun by this company reconstructing its tracks on Clinton Street, Woonsocket, with 9-in. grooved girder rails.

Greenville Railway & Light Company, Greenville, Tex.—Wesley College has acquired this company's line to the college with the right to operate over the railway from the intersection of the Mineral Heights track to the northwest corner of the square. A car has been purchased by the college and will be placed in operation at once. The track will be repaired and placed in good condition.

Houston, Richmond & Western Traction Company, Houston, Tex.—A meeting was held in Gonzales to consider the proposition of constructing this company's proposed railway between San Antonio and Houston through Gonzales. A committee was appointed to solicit subscriptions and right-of-way through the county. E. Kennedy, president. [Sept. 4, '15.]

Temple & Marlin Interurban Railway, Temple, Tex.—It is reported that construction will soon be begun on the proposed line from Temple to Marlin, about 30 miles. S. D. Hanna, Temple, chief engineer. [Feb. 7, '14.]

Salt Lake & Ogden Railway, Salt Lake City, Utah.—This company reports that it is laying 3 miles of second track between Orchard and Clinton, thus making double track from Ogden to Clinton.

Richmond, Rappahannock & Northern Railway, Richmond, Va.—Surveys have been completed for this company's proposed line from West Point to Urbanna and construction will soon be begun. Warner Moore, president. [Aug. 28, '15.]

Fayette, W. Va.—Surveys have been begun for the proposed electric railway from Fayette Station to Beckley, 35 miles. H. G. Scott, general manager Virginian Power Company, Charleston, W. Va., is interested. [June 12, '15.]

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company has presented plans to the Board of Public Utilities for remodeling Hill Street station and trackage. It is estimated that the cost will be about $30,000.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill.—The new terminal building of this company at Main Street and Broadway, Aurora, has been opened. The South Broadway transfer station will be discontinued and all transferring between interurban cars and between interurban and city cars will be done at the new station. The general offices of the company have been moved from Wheaton to the sixth floor of the building. The second, third, fourth and fifth floors have been sublet by the company as office suites.

Union Traction Company, Coffeyville, Kan.—This company has awarded a contract to Clements & Lavery for the construction of a terminal building in Coffeyville. The structure will be 96 ft. x 143 ft., two stories high. The building will be of brick and steel and will cost about $40,000.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Public Service Commission has approved this company's application for a rearrangement of stations on the Myrtle Avenue elevated line between Broadway and Wyckoff Avenue. The stations as rearranged will be Central Avenue, Knickerbocker Avenue and Wyckoff Avenue.

Ogden, Logan & Idaho Electric Railway, Ogden, Utah.—It is reported that this company plans to move its street railway and interurban carhouse and shops from their present location on Washington Avenue to a new site at the old fair grounds on West Seventeenth Street.

POWER HOUSES AND SUBSTATIONS

Bartlesville (Okla.) Interurban Railway.—This company reports that it is installing a new Westinghouse-Leblanc jet condenser with motor-driven pumps to replace a condenser with turbine-driven pumps. The company is also resetting three 400-hp. Babcock & Wilcox boilers and installing a complete new system of steam piping.

Manufactures and Supplies

ROLLING STOCK

Boise (Idaho) Railroad, W. E. Pierce, president, has made arrangements for the purchase of five new cars.

Wilmington & Philadelphia Traction Company, Wilmington, Del., is about to place an order for twenty-five new cars.

Florida-East Coast Railway, St. Augustine, Fla., has ordered a gasoline electric car from the General Electric Company.

Lula-Homer Railroad, Lula, Ga., a line under construction, is considering the purchase of storage-battery locomotives for operating its new road. D. G. Zeigler is chief engineer.

Brooklyn Rapid Transit Company, New York, N. Y., noted in the Electric Railway Journal of May 22 as preparing designs for an experimental articulated center-entrance car, has ordered the center section of this equipment from the Laconia Car Company. This railway company is now rebuilding two of its single-truck car bodies in its Fresh Pond shops preparatory to attaching them to the center section.

Toronto (Ont.) Civic Railway, noted in the Electric Railway Journal of Sept. 11 as having ordered four semi-convertible prepayment cars from the Preston Car & Coach Company, has specified the following details for this equipment:

Length of body	21 ft.
Length over vestibule,	34 ft. 8½ in.
Width over sills	8 ft. 5½ in.
Width over all	8 ft. 5¾ in.
Height, rail to sills	2 ft. 6 in.
Height, sill to trolley base,	8 ft. 4 in.
Body	wood, steel frame
Interior trim	oak
Roof	arch
Underframe	metal
Axles	Jones & Laughlin
Bumpers	Hedley
Buzzer system	Consol.
Control	K-10
Curtain fixtures,	Curtain Supply Co.
Curtain material	Pantasote
Destination signs,	Keystone, four per car
Fare boxes	Coleman
Guards	H. B.
Gears and pinions	tool steel
Gongs	Preston
Hand Brakes	Peacock
Heaters,	Consol., coal burning
Headlights,	Crouse-Hinds "Z"
Motors	2 GE-80, inside hung
Paint	Sherwin-Williams
Sanders	Preston
Sash fixtures	Preston
Seats	Preston
Seating material	wood
Springs	Brill
Trolley-base	McRae
Trucks	Brill 21-E
Varnish	Murphy
Ventilators	Automatic
Wheels,	Dominion Wheel & Foundry

TRADE NOTES

John P. Jay, Jr., vice-president of the Pennsylvania Steel Company, has resigned from that company to become chairman of the board of the Maxwell Motor Company.

United States Electric Signal Company, West Newton, Mass., has received an order from the Massachusetts Consolidated Railways, Greenfield, Mass., for two complete blocks of its Type K registering signals.

Pennsylvania Steel Company, Steelton, Pa., has appointed R. W. Gillespie as general sales manager, with headquarters in Philadelphia. Mr. Gillespie succeeds John C. Jay, Jr., recently resigned. Mr. Gillespie has been identified with this company for many years and for the past several years has been the company's district sales manager in New York.

Electric Service Supplies Company, **Philadelphia, Pa.,** has received an order from the Chicago, Milwaukee & St. Paul Railway for 20,000 "protected" rail bonds, type P-4-P, 250,000 circ. mil capacity, 37 in. long. This is in addition to orders for 25,000 similar bonds placed with this company last May, thus making a total of 45,000 "protected" rail bonds that will be used in this important electrification.

C. L. Oechsner, publicity manager of the British Thomson-Houston Company, Ltd., Rugby, England, who was for many years with the Thomson-Houston Company at Lynn and with the General Electric Company at Schenectady, is on an extended visit to this country. He is planning, before he leaves, to visit the San Francisco exposition. His address, while in this country, will be in care of the *Electrical World*, New York.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has declared a quarterly dividend of 1½ per cent on the common stock, an increase of half of 1 per cent quarterly. This places the stock on a 6 per cent basis. The regular 1¾ per cent quarterly dividend was declared on the preferred stock. The following statement regarding war orders was issued after the meeting of directors: "The company has received firm contracts for the manufacture of war munitions aggregating approximately $60,000,000, the greater proportion of which is a contract for rifles which is to be executed at factories in New England especially acquired for that purpose."

William E. Keily, recently associate editor of the *Electrical World*, has opened an office in the Edison Building, 72 West Adams Street, Chicago. For nearly a year past Mr. Keily has been engaged in literary and consulting work having to do with public-utility problems and relations, and he will continue work of this character, with improved facilities, in his new office. An experienced writing man, Mr. Keily has done journalistic work in both daily newspaper and technical magazine fields. For a number of years he was managing editor of the old *Western Electrician* of Chicago. Mr. Keily is an associate of the American Institute of Electrical Engineers, a class B member of the National Electric Light Association, and a member of the Jovian Order, Electric Club-Jovian League of Chicago, National Geographic Society, and the City Club of Chicago.

ADVERTISING LITERATURE

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued a list of its second-hand car equipment and railway supplies.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued sheets describing the operation of its Type C controllers for crane service.

NEW PUBLICATIONS

Single-Phase Electric Railways. By Edwin Austin, of the editorial staff of **The Engineer,** London, published by D. Van Nostrand Company, New York. 303 pages. Cloth, $5 net.

This is a well-illustrated volume of careful descriptions of many single-phase railways, based for the most part upon articles which have appeared in the periodical with which the writer is associated. There are eleven chapters. The first contains a brief for the single-phase railway, which the author states "should be adopted whenever there is a possibility of running heavy electric trains long distances." Each of the other chapters is taken up with descriptions of one or more systems in one country. The list, which will be valuable for reference, is as follows: England, London, Brighton & South Coast Railway and Midland Railway; France, Midi Railway; Germany, Blankenese-Hamburg-Ohlsdorf Railway, Dessau-Bitterfeld Railway, Murnau-Oberammergau Railway, Mittenwald Railway; Austria, St. Polten-Mariazell Railway; Switzerland, Martigny-Orsières Railway, Valle-Maggia Railway, Rhaetian Railway and Lötschberg-Simplon Railway; Holland, Rotterdam-Scheveningen Railway; Norway, Thamshavn-Lokken Railway and Rjukan Railway; Sweden, Swedish State Railways; Italy, Parma Tramways; United States, New York, New Haven & Hartford Railway, New York, Westchester & Boston Railway, Spokane & Inland Empire Railway, Rock Island & Southern Railway, Hoosac Tunnel Railway and St. Clair Tunnel Railway.

Obviously the book contains a wealth of information of a general nature. It does not take up single-phase motors except as a part of the descriptions, and it does not summarize the essential features of the subject. As the author states, progress in this field has been so rapid that he had to stop at some point, and hence was unable to add a description of the new Norfolk & Western electrification in this country.

Electric Railway Journal

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Consolidation of Street Railway Journal and Electric Railway Review

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RAILWAY

STANDARDS IN CAR DESIGN

The communication signed by "Car Builder," which appears on another page of this issue, raises several interesting and logical points in connection with Mr. Gonzenbach's recent appeal for standardization as a means for reducing the cost of electric railway cars. All of the writer's comments contain food for thought, but it is, perhaps, unfortunate that he should have cited, as a reason for preventing the establishment of standards, the fact that a great number of radical innovations in car design have been introduced during the past three years. Certainly these widely different designs possess individual points of great merit, and certainly none of them will ever become a universal standard. But this is by no means an argument against standardization. Would the Hedley-Doyle car be any worse if its side-post spacing were changed by the fraction of an inch necessary to make it correspond with that of the Jones car or the Brinckerhoff car or any of the special types mentioned by our correspondent? And would the Birney design be fatally handicapped if a roof contour were imposed upon it similar to that on the car which proudly bears the name of "Peatwit"? We cannot conceive that it would. Of course, it is a long cry from standardization in details to a single universally-standard body. Yet the former is certainly possible to-day, and if the car builders really want uniformity, as our correspondent says, they can make an initial step toward it by the simple process of standardizing a few details and encouraging their establishment by charging less, even if it is only $5 per car, whenever they are used.

PRESENTING DATA IN WAGE ARBITRATIONS

A noticeable feature of recent arbitration hearings has been the use of charts for impressing data upon the minds of the arbitrators. An example of such use was furnished by the Bay State Street Railway arbitration. Charts used in these hearings were reproduced on page 708 of the issue of the Electric Railway Journal for April 10, 1915. We have been fortunate in securing copies of a number of the exhibits used in connection with Prof. A. S. Richey's testimony, referred to on page 645 of last week's issue. These are reproduced herewith, on page 664. The charts are self-explanatory and they contain data well worthy of study. One chart which proved very effective at the hearing was that showing the rapid increase of wages of conductors and motormen with an actual decrease in the work of each man as indicated by the number of passengers carried per car-hour and the corresponding revenue. Another was that giving a comparison of the wages paid on the Rhode Island system, expressed in various ways, with the union wages paid in other trades, using data for the latter taken from government bulletins. This chart also compared the above with the cost of living made up from components shown on a third chart. The use and publication of data like these must have a cumulative value and effect. If the general public and the employees are convinced of the accuracy of the data they can have no reasonable justification for obviously excessive demands. Professor Richey and other students of economic conditions who present the results of their investigations in such convincing fashion deserve the thanks of both parties concerned in wage controversies.

RAILWAY PAPERS AT INTERNATIONAL CONGRESS

The intimate relations of electric railroading to all branches of engineering is shown very conspicuously by the appearance of papers on electric railways in nearly all of the sections at the International Engineering Congress recently closed. Thus the important papers on London traffic by Sir Albert Stanley and on utilities by Dr. Humphreys, not to mention others, were assigned to the section of municipal engineering. The railway engineering section included the paper on track construction by George H. Pegram, chief engineer of the Interborough Rapid Transit Company of New York, and the papers on heavy electric traction by Messrs. McHenry and Hood. In the same way, the papers on motor vehicles and on power station design, with the exception of that by Dr. Parshall, were assigned to the mechanical engineering section, while that paper and the one by Mr. Eaton on the mechanical problems of the electric locomotive were put in the electrical engineering section. Finally, the electric railway engineer who is interested in the chemistry of rails and of special work must search for the matters which interest him in the metallurgy section. The consequence is that the papers on electric railway engineering, like the electric railway exhibits at the fair, are scattered by being placed in some half a dozen or more different places, and their value in a sense is somewhat lost by this plan. We hope that at the next International Engineering Congress the precedent established at the Turin International Engineering Congress will be followed by the establishment of a special electric traction section, and that at the next international exposition the importance of the electric traction industry will be recognized by the collection of the electric railway exhibits in one building instead of being distributed among several. Surely the industry is of sufficient importance to warrant this.

THE HEALING POWER OF PUBLICITY Rousseau once made the pessimistic remark that the pain from the prick of the rose thorn more than counteracts the pleasures of a thousand rose smells. Unfortunately the same principle is applicable to the easily irritated patrons of the electric railway, but with care and good judgment the situation can often be met in a way to justify another remark that the removal of one thorn from the flesh often makes the other thorns seem like roses. This latter mental phenomenon was recently illustrated in Pennsylvania, where a certain local railway company was receiving from its riders an unusual number of criticisms of various kinds, but among them complaints about flat wheels and infrequent service were perhaps most pronounced. The manager realized it was important to do something, so he remedied the first complaint and turned or ground all of the flat wheels. As soon as this work was done the railway issued special announcements calling attention to the improvement in equipment effected. This frank publicity not only won ready appreciation from the public but such was its effect that frequent comments were now overheard regarding the general improvements which the company was providing, although no other betterment had actually been made at that time. Of course, if the character of service had continued to be poor the effect of the mental cocaine of satisfaction administered the public by the one improvement would soon have worn off. We do not recite the above illustration, therefore, in order to suggest a cloak for half-hearted or incomplete practices but to show an example of the general mental healing power of publicity when applied at the right psychological opportunity.

5000-VOLT DIRECT CURRENT In this issue is recorded another step, one might almost say jump, in the climb of voltages for d.c. railway equipment. The Michigan United Traction Company, already famous for its pioneer work in electric railway engineering, stands sponsor for a 5000-volt installation on one of its lines. At present the equipment is considered to be hardly clear of the experimental stage, as emphasized by N. W. Storer in his description of the motors and control which we publish elsewhere. But judging from the astonishing results obtained on the 2400-volt Butte, Anaconda & Pacific installation which was regarded hardly two years ago with considerable trepidation on account of the high voltage, this qualification may perhaps be due to super-modesty on the part of those who have made such a notable advance. In so far as concerns the voltages impressed upon the motor commutators there is nothing startling to be found—a characterization that, however, by no means applies to the design—because the line emf. is split up by permanently coupling the four motors in pairs, and in addition, building each motor with twin armatures in series. Thus across each commutator there are normally but 1250 volts. As a whole the equipment is a marvel of ingenuity in the application of familiar principles. Among the most interesting elements are the double-break switches with chilling pieces to kill the arcs, the storage battery charged from the ground side of the circuit which supplies the auxiliaries and thus eliminates the frequently-troublesome motor generator set, and last but by no means least the mercury vapor converter by means of which the three-phase power is transformed to the d.c. form. As the rectifier has unquestionably had considerable influence in making the 5000-volt equipment a commercially attractive proposition the disclosure of its remaining weaknesses and peculiarities, which must necessarily follow its use in such a conspicuous installation, will be awaited with interest.

METHODS OF CHECKING SERVICE

In close connection with the series of articles by F. W. Doolittle on the general subject of traffic surveys, recently appearing in this paper, lies the question of selecting the proper method for checking the measure of service. Obviously it is not easy to formulate a detailed plan applicable to all traffic checks, for in some cases the controlling factors can be easily located and sufficient information obtained from a single check to determine whether the transportation is satisfactory, while in others the question of the extent of service cannot be answered without an examination at many points determined by local conditions. In regard to the service checks for any particular city, however, the difficulty of establishing a general yet definite rule does not seem insuperable. It should be possible to determine the approximate number and general character of strategic points that would be adequate for checking the service as well as the duration of the checking operations. Any rule that is drafted along this line, however, should state definitely only the main provisions of the checking method, and latitude should be allowed for the accidental variations, both in service and in the location of strategic points, that are certain to be effected by the seasons and by changes in routes.

In general, there are three checking methods—by points, by routes, and by groups (the comparative efficiency of using stationary or riding observers not being herein considered). All are useful and sometimes all may be necessary, depending upon the character of the service rendered and the investigation to be made. Checks at points are made only at particular points where the traffic has seemed to be unusually congested. For such a study they are valuable, but obviously such checks are not a measure of the service of the whole street or route. Checks by routes are made at several controlling points, either on lines served by only one route or on a trunk line served by several routes, the purpose being to determine the adequacy of service on the one or on each separate route. The chief function of route checks is in connection with streets covered by only one route, and the real problem arises when one tries to adapt this method of checking to trunk-line service. In most cities of considerable size certain streets in the downtown districts are traversed by several lines, which enter the trunk line at one or various points and run on it for varying distances. Such a service would seem to require the group plan of checking, which is also made at several controlling points but measures the number and loading of all cars, regardless of route, that run over the common track.

Those who favor a combination of route checks in measuring such composite service take the point of view that if the various routes operating over the trunk line are checked separately and are found to be furnishing satisfactory service on that line, it is a reasonable inference that all the routes together are furnishing sufficient trunk-line service. The existence of any short-haul traffic which both originates and terminates on the trunk line between the points where the lines branch is believed to be reflected in the ratio of seats to passengers on the several routes. It is true that in most cases not much traffic drops off the route lines, but to the extent that it does the amount of such purely trunk-line traffic is not shown by the route checks. Furthermore, the route checks on the trunk line fail to take into account the transfer of passengers between routes when the turn-off points are reached. On the other hand, if a group check is made on a trunk line, an accurate measure of the traffic, both long-haul and short-haul, on this line is secured, but no accurate data are obtained for dividing the trunk-line service among the several routes so as to satisfy the route services beyond the points of divergence.

For these reasons neither the route nor the group method seems self-sufficient in checking composite service. We believe that the logical plan is to check by the group method at the controlling points the combined loadings of all cars that serve the trunk line, irrespective of their routes. This gives a measure of the total trunk-line service needed. To determine the proper division of this service, however, route checks should be made on each route at its controlling points beyond its turn-off from the trunk line. When the trunk-line continues past the turn-off point of one route line instead of splitting up into several routes, a check should also be made on the trunk line beyond the point of divergence in order to ascertain whether the service offered has been decreased in the same proportion as the number of passengers. If the combined services of the routes, thus determined, fail to satisfy the trunk-line service as established by the group method, the existence of a short-haul trunk-line service is proved. In such a case a special shuttle service could be installed on the trunk line to handle this short-haul traffic, whereas without the route-method figures the service on one of the long contributing lines might be increased, at much greater cost, to make up the deficiency. In short, the combination of the two methods permits the recognition of transfer passengers at the points of divergence, a division of the service on a trunk line between it and a diverging route or among diverging routes so as not to lower the seat ratio on any line, and the ascertainment of the amount of short-haul trunk-line traffic, which, once known, can be handled efficiently.

The greatest difficulty in using the group method of checking composite service seems to be the determination of what part of any trunk-line street must be covered by a route before that route can be considered as supplying part of the trunk-line service. This question recently arose in Chicago, the objection being raised that some route cars would turn off the trunk line before they had passed all the checking points. Some argued that cars should be required to run over two-thirds of the trunk-line mileage checked before they would be considered as giving trunk-line service. It was asserted that this arbitrary provision was proper in the case of Chicago because most of the route lines in that city cover this distance before they branch off, but it would undoubtedly be an unwise precedent for other cities. In our opinion, if the distance which any car runs on the trunk line is greater than the distance which the average passenger will walk in preference to taking a car, say from a quarter to half a mile, that car unquestionably adds to the service on the street and should be considered in a group check.

THE BAY STATE EQUIPMENT DEPARTMENT

Elsewhere in this issue is described the organization of the equipment department of the 1000-mile Bay State Street Railway. This organization is represented graphically by an effective form of organization chart which is easy to produce and easy to read. A noticeable feature of this organization is the concentration into the hands of the superintendent of equipment of a variety of duties that are usually divided among subordinate or sub-department heads and the unusually high proportion of the working time of foremen to their supervising time. In studying this organization it should be remembered that the Bay State Street Railway not only spreads over an enormous area but that the city of Boston breaks it up into two physically unconnected groups of lines north and south of Boston. Therefore, to maintain efficient supervision, the superintendent of equipment must spend a large part of his time in traveling over the property. Fortunately, the automobile is available to bring such supervising time down to a minimum.

The physical separation of the Bay State lines explains in large measure the dual character of the departmental family tree, but over and above this, the organization is singularly flexible in its provision for the performance of special services by men peculiarly qualified for particular tasks. Here is no excessive adherence to symmetry of organization for its own sake, but rather an arrangement of staff responsibility which confers upon some subordinate officer duties which in some measure are his alone. At the same time a wide gap exists between the head of the department and his staff, for unlike other mechanical departments he has no sub-departmental heads like an engineer of car construction, of electrical equipment, of maintenance, of structures, etc., but must handle these duties alone. That such arrangement has worked out well on this large property is a compliment to the executive ability shown in directing the numerous activities of the equipment department from design to maintenance.

Operating with 5000-Volt Direct Current

The Michigan United Traction Company Has Placed in Service, on Its Jackson-Grass Lake Line, Motors with Two 2400-Volt Armatures Mounted in One Frame and Connected in Series, Power Being Drawn from a Trolley Supplied by Mercury-Arc Rectifiers

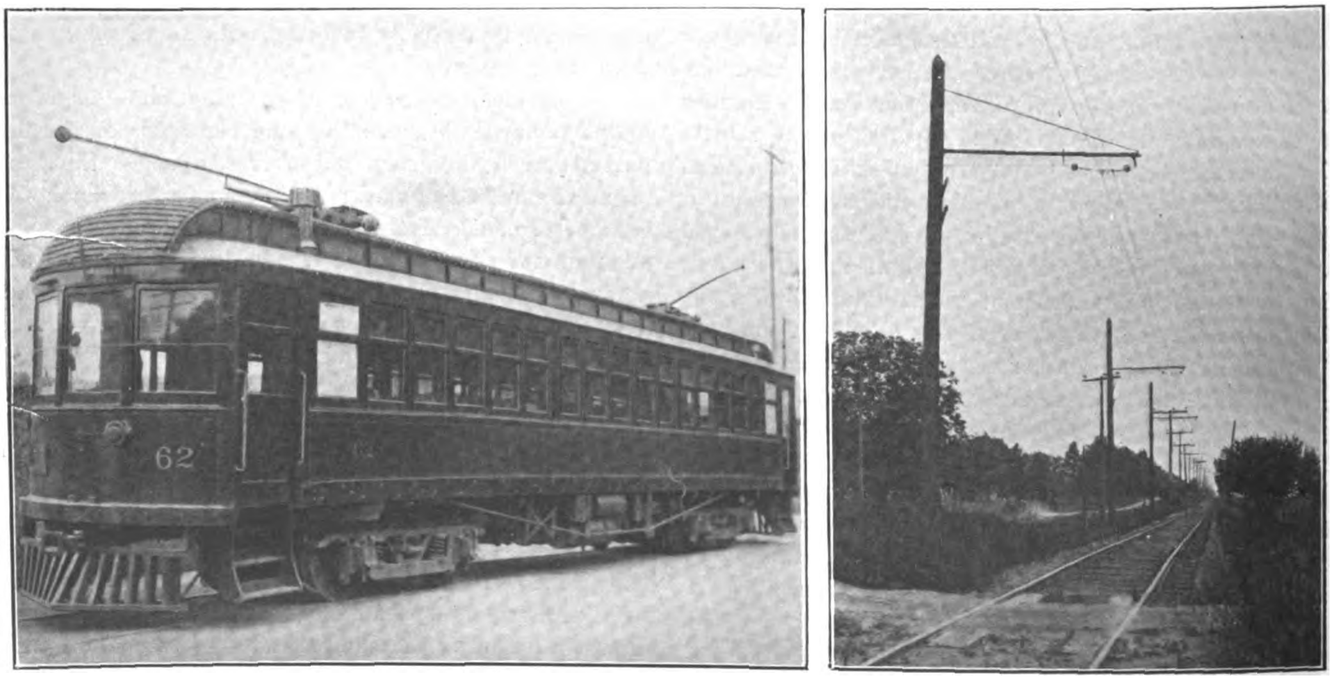
BY N. W. STORER, GENERAL ENGINEER WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

Ten years ago a proposal to equip an interurban car with motors and control apparatus to operate from a 5000-volt direct-current trolley would have fallen on deaf ears. No one would for one moment have considered such a proposition seriously. But to-day such a car is in daily service and as the equipment has experienced several months of actual service, it is permissible to give a description of the principal features. The equipment was designed and built by the Westinghouse Electric & Manufacturing Company primarily for the purpose of determining, if possible, the practicable limit to which voltages for direct-current railway's could be carried. Five thousand volts was selected as the initial limit, as this is high enough to make easily possible the collection of current for the largest locomotive from an overhead wire. It is also high enough to lessen the amount of line copper and the number of substations, and to secure a good load factor and efficiency with reasonable cost.

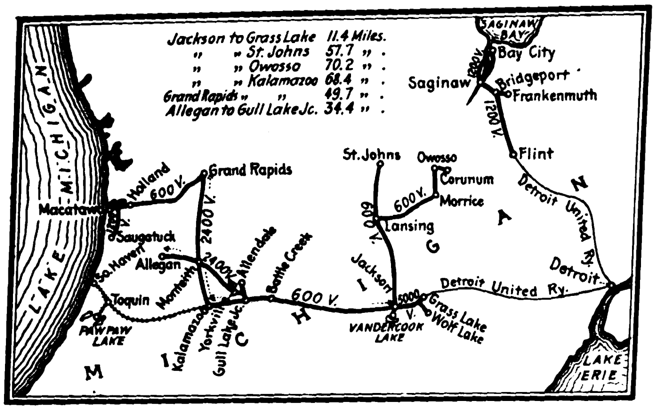
The initial experiments involved the design and construction of two 2400-volt motors and the necessary control equipment, which were mounted on a car and tested on the interworks railway at East Pittsburgh in the spring of 1914. The equipment was first arranged for series-parallel control with voltages of from 2400 to 3000 on the trolley. Then the two motors were connected permanently in series and the equipment operated at a trolley voltage of 4000, which was gradually increased until the equipment was finally tested with 7000 volts on the trolley.

The results were such that the company decided to place a complete four-motor equipment in service. Through the influence of the late W. A. Foote and Frank Silliman, who are well-known pioneers in the use of high voltages both for transmission and for traction purposes, J. F. Collins, vice-president of the Michigan United Traction Company, agreed to co-operate with the Westinghouse Company in the test, and he offered the use of a branch line extending from Jackson, Mich., to Grass Lake and Wolf Lake for the purpose of giving the equipment a test in service. This line is about 12 miles in length and the high-voltage section extends to Page Avenue, which is about 2 miles from the center of Jackson. The car must, therefore, operate over the 600-volt line within the city limits. The trolley line was reinsulated and space was allotted in the substation at Grass Lake for a mercury-arc rectifier equipment which was installed to furnish high-voltage current. A complete car equipment, consisting of four 100-hp. motors with control and auxiliaries, was installed under the direction of R. C. Taylor, superintendent of equipment, on one of the Michigan United cars, the completed car weighing approximately 40 tons.

On June 1 of this year preliminary tests were begun after the regular service had been completed for the day. They continued for a few nights until it was certain the equipment was in proper condition, and the car was then put in daily service for the last two or three round trips between Jackson and the Lakes, which could be handled by a single car. Since that time the operation has been fairly regular for these trips, and up to date it has continued without a single interruption to the service due to the car equipment. It has not been necessary to change any detail in the equipment since service began, and the car has always been ready for operation when line and power were available. Considering the radical increase in voltage over



5000-VOLT D.C. EQUIPMENT—CARS AND OVERHEAD CONSTRUCTION ON GRASS LAKE (MICH.) LINE

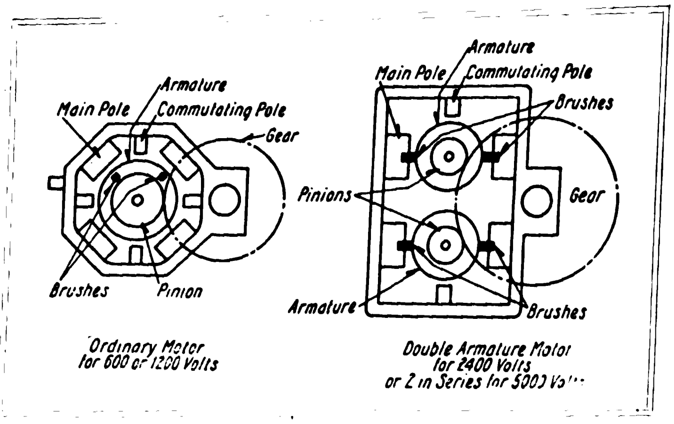

Jackson to Grass Lake 11.4 Miles.
" " St. Johns 57.7 " .
" " Owosso 70.2 " .
" " Kalamazoo 68.4 " .
Grand Rapids " " 49.7 " .
Allegan to Gull Lake Jc. 34.4 " .
LAKE MICHIGAN
SAGINAW BAY
Bay City
Saginaw
1200 V.
Bridgeport
Frankenmuth
Flint
Detroit United Ry.
Detroit
LAKE ERIE
St. Johns
Owosso
Corunum
Morrice
600 V.
Lansing
Jackson
5000 V.
Grass Lake
Wolf Lake
VANDERCOOK LAKE
Battle Creek
Allendale
Gull Lake Jc.
Yorkville
Kalamazoo
Monteith
2400 V.
Allegan
Grand Rapids
Holland
Macatawa
Saugatuck
So. Haven
Toquin
PAW PAW LAKE
M I C H I G A N

5000-VOLT D.C. EQUIPMENT—MAP SHOWING VOLTAGE AND MILEAGE OF MICHIGAN UNITED RAILROAD LINES

anything previously undertaken and the small size of the motors, this result is remarkable.

MOTORS

Of course, the most difficult part of the equipment would appear to be the motors. It is well understood that, in order to secure the maximum benefits from electrification, a railway must be able to operate not only locomotives but multiple-unit car service. Consequently, any system of electrification that hopes for recognition for heavy traction purposes must be suitable for operation on passenger cars. It is not so difficult to secure space for the necessary number of commutator bars and the creepage surface for insulating large locomotive motors for high voltages, but it has been a serious problem to secure these requisites for a motor of the size required for ordinary interurban cars without exceeding commercial limits for weight, cost and dimensions. For that reason the design of the motor was undertaken first as being the most difficult. One of the first of these is shown in the accompanying illustrations. This motor, it may be said, is on exhibition at the Panama-Pacific Exposition. The arrangement of parts is shown in section in the cut at the top of the next column.


Main Pole
Armature
Commutating Pole
Gear
Brushes
Pinion
Ordinary Motor for 600 or 1200 Volts
Armature
Main Pole
Commutating Pole
Brushes
Pinions
Gear
Armature
Brushes
Double Armature Motor for 2400 Volts or 2 in Series for 5000 Volts

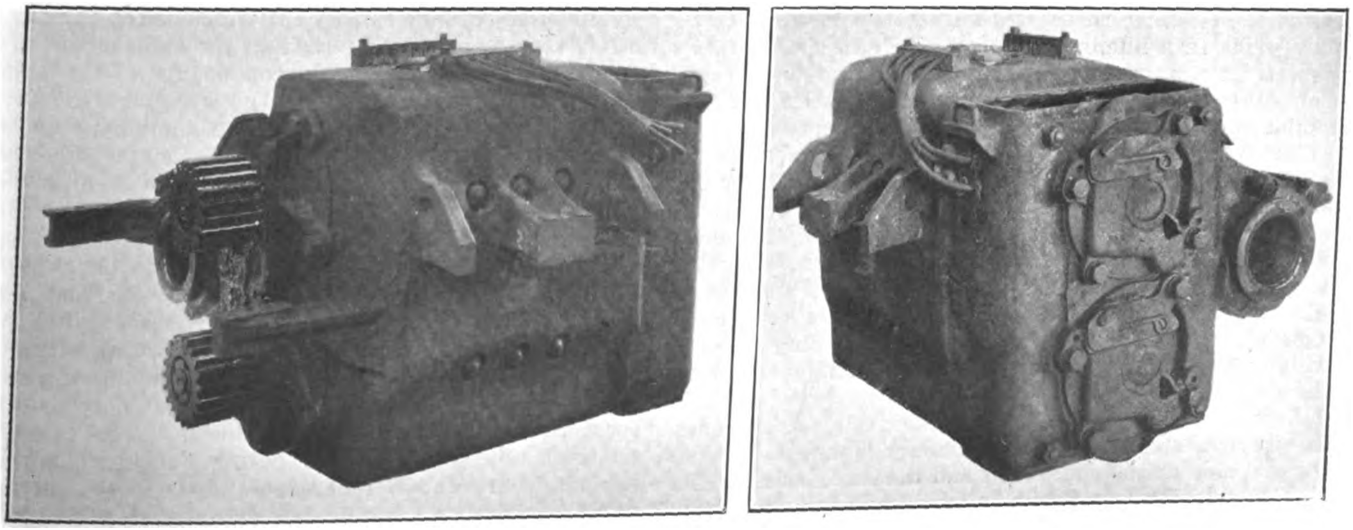
5000-VOLT D.C. EQUIPMENT—COMPARISON OF STANDARD MOTOR AND 5000-VOLT MOTOR

The motor is known as the twin-armature bi-polar type and it has many advantageous features for high voltage work. A bi-polar design permits the use of double the voltage on a given commutator that is possible with a four-pole motor. The twin armatures make the weight but litttle more than that of a corresponding four-pole motor. Fewer field coils are required than are used with the four-pole motor, and the two armatures, being geared to the same axle, act as one unit and cut the pressure on the gear teeth in half. The two armatures are connected in series, and consequently, the voltage on each is reduced to lower limits. The form of motor lends itself readily to a very effective type of insulation, and the mechanical construction is simple and rugged.

The performance of the motors has thus far been all that one could ask. There has yet to appear the first defect in any motor that has been built. The commutation is sparkless, and the stability of the motor, as shown by its absolute freedom from flashing, is perfect. Large creepage surfaces are supplied, both on armatures and brush-holders, in order to give immunity from grounds. One characteristic that will assist in the maintenance of the insulation is the fact that the current is small, being only 30 amp. for each 100-hp. motor, and that only a few small brushes are required. Thus with the excellent commutation, there is very little wear either on brushes or commutators, and consequently the amount of carbon and copper dust originating in the motor is small. It is fully recognized that upon the permanence of the insulation depends the success or failure of the experiment, and this is something that time alone can determine.

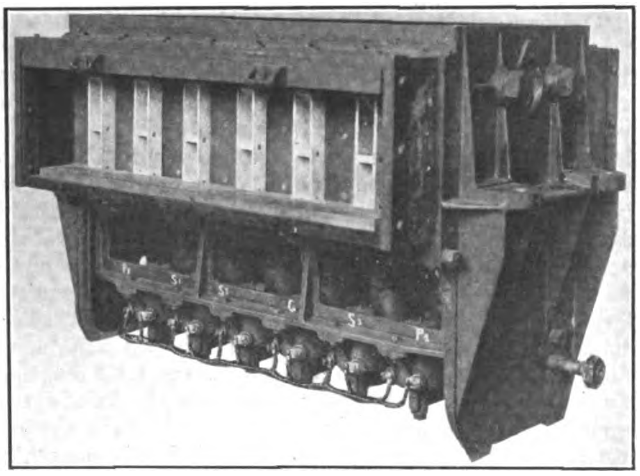
CONTROL

Next to the motors, the control is the most important feature of the equipment, since the switches must close and open the high-voltage circuits properly and must be insulated to stand continuously the maximum



5000-VOLT D.C. EQUIPMENT—FRONT AND REAR VIEWS OF TWIN MOTOR voltage to ground in all kinds of weather. In order to secure a relatively large number of breaks in series without increasing the number of switches unduly, each switch is made with two breaks in series.

High-Voltage Switches—The switches are very similar to the standard Westinghouse electro-pneumatic switches, but have some special features, due to the small current and high voltage. The main ideas governing the design of the switch group were safety and reliability in opening the high-voltage circuits and most effective distribution of insulation. The design adopted has both of these desirable features and, in addition, is extremely simple and rugged. The frames of the switch group are grounded and the interlock wiring is thoroughly protected, in order to isolate the high-voltage current from the control wiring and master controller. One of the novel features in the switch is the use of an "arc splitter," consisting of a piece of soapstone placed in front of the switch jaws in the path of the arc. The effect of the magnetic field is to blow the arc against this along its entire length until the arc is broken. This greatly increases the length and at the same time chills the arc, and the result is highly satisfactory. The operation of the switch groups has been fully as reliable as that of the motors. The circuits are opened with ease and the appearance of the switches shows scarcely a trace of their having been in service.



5000-VOLT D.C. EQUIPMENT—SWITCH GROUP WITH COVER REMOVED

Starting Resistance—Practically the only other part of the control equipment that is subject to the line voltage is the starting rheostat. This is composed of cast alloy grids in a number of frames. These frames are insulated from ground by triple insulation and from each other by double or quadruple insulation. This insulation has thus far proved entirely adequate.

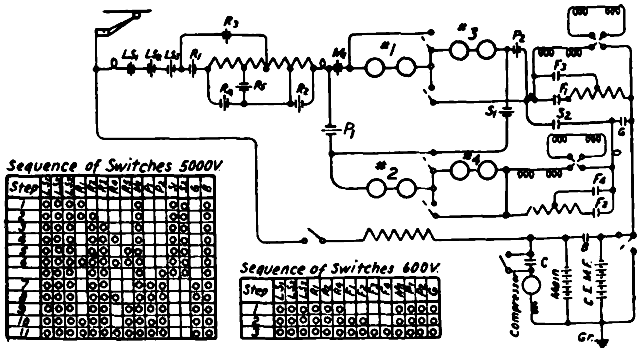
Changeover Apparatus—Inasmuch as the equipment is required to operate through the city of Jackson on 600 volts, a changeover switch is provided which connects the four sets of armatures in parallel. This apparatus consists of two triple-pole, double-throw disconnecting switches with the contacts mounted on porcelain insulators immersed in oil. They are connected together so that they are operated by a single lever, which also operates a small drum that changes a few of the contactor magnet connections.

Low Voltage Switch Group—One group of switches is provided to effect the necessary changes on the ground side of the equipment and the auxiliaries. This is a standard group which is used ordinarily for small 600-volt car equipments, and it needs no description.

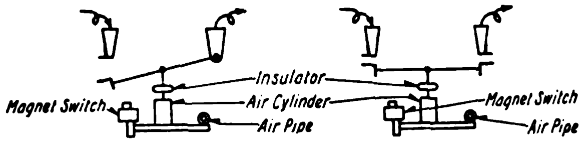
Reverser—A standard type of electro-pneumatically operated two-motor reverser is used to reverse the connections of the motor fields, the fields being always connected on the ground side of the armatures so that no extra insulation is required.

AUXILIARY EQUIPMENT

Not of least importance is the apparatus needed for furnishing current for control, lights and air-compressor motor. It is well known that the small high-voltage machine known as the dynamotor which is used for this purpose on 1200-volt and 1500-volt equipments is the least reliable part of the equipment. This is necessarily the case, since the usual compound winding on the field makes it far more susceptible to flashing troubles, and its small size makes the insulation problem and the armature winding much more difficult. While these 1200-volt and 1500-volt equipments are giving excellent results, it was felt that it would be not only very desirable, but necessary, to eliminate the dynamotor from higher voltage equipments, especially for cars, since it would be quite reasonable to expect the difficulties to be multiplied with the voltage. For this reason the entire auxiliary equipment of the 5000-volt car is operated at 150 volts. The scheme adopted is as follows:



5000-VOLT D.C. EQUIPMENT—SCHEMATIC CONTROL DIAGRAM



Ordinary Switch for 600 or 1200 Volts

Double Break Switch for 5000 Volts

5000-VOLT D.C. EQUIPMENT—SCHEMATIC DIAGRAM OF DOUBLE BREAK SWITCH

A 150-volt storage battery, to which all of the auxiliaries are connected, is placed in the main motor circuit between the motors and ground. All of the main motor current, therefore, either goes through the battery and charges it, or through the auxiliary circuits which may be connected to the battery at the time the motors are working. By the application of a simple device, the air compressor does practically all of its work when the main motors are operating, and thus simply diverts a part of all of the main motor current as required, so that the battery is relieved from furnishing the current to the compressor motor and at the same time does not receive the high charging currents that would otherwise be imposed on it during acceleration. The battery has thus a very light duty to perform and can be made up of small cells. A set of counter-emf. cells parallels the battery during charging periods to prevent overcharging and excessive charging rates.

The voltage of the battery for such an equipment is determined by the amount of power required for the auxiliaries. The average current required by the auxiliaries should, in order to leave a satisfactory margin, be not more than 80 per cent of the average current taken by the main motors. The use of 150 volts for the battery in this case indicates that the auxiliaries are expected to use less than 3 per cent of the total power taken by the car.

The main schematic wiring diagram is shown in the line cut on page 662 in which the double-break switches are indicated by three parallel lines across the circuit and the single-break switches by two lines. It will be seen that twelve of the former and ten of the latter are required for this equipment. Considering the fact that these switches control not only the main motor circuits for both 5000-volt and 600-volt operation, but all of the auxiliaries as well, the equipment is very simple. Very satisfactory operation on 600 volts is secured by shunting the fields of the motors.

As before stated, power for operating this car is obtained from three mercury-arc rectifiers, which receive power from a 60-cycle, three-phase system and are operated in series. Connecting the three phases of the system in series gives not only a smooth current wave, but balances the load on the three phases of the transmission system. This is believed to be the first time mercury-arc rectifiers have been used in this way to furnish so much power for high-voltage work.

CONCLUSION

It is fully recognized that the tests have not continued long enough to draw any definite conclusions as to the future use of 5000-volt direct current for railways. All that can be stated at this time is that the preliminary tests are extremely satisfactory, and the fact that no difficulties in the car equipment have appeared to date indicates that there is ground for the hope that the 5000-volt direct-current railway is a possibility. In any case the amazing fact remains that a commercial car equipment of 100-hp. motors has been designed, built and tested in commercial service and has a perfect record for the operation to date.

Second Philadelphia Report Issued

Department of City Transit Presents Modifications in Recommendations—Record of Methods Employed in Traffic Survey Is Included

The Philadelphia Department of Public Works has issued the second report of A. Merritt Taylor, director of the department of city transit, outlining the present status of new subway and elevated construction in Philadelphia and calling attention to various detailed modifications and enlargements of the original recommendations. This report is for the calendar year 1914. Abstracts of the preceding report, containing the salient construction, traffic and financial points of the enlarged Philadelphia system, were published in this paper on Aug. 9 and Oct. 4, 1913, and Jan. 10, 1914.

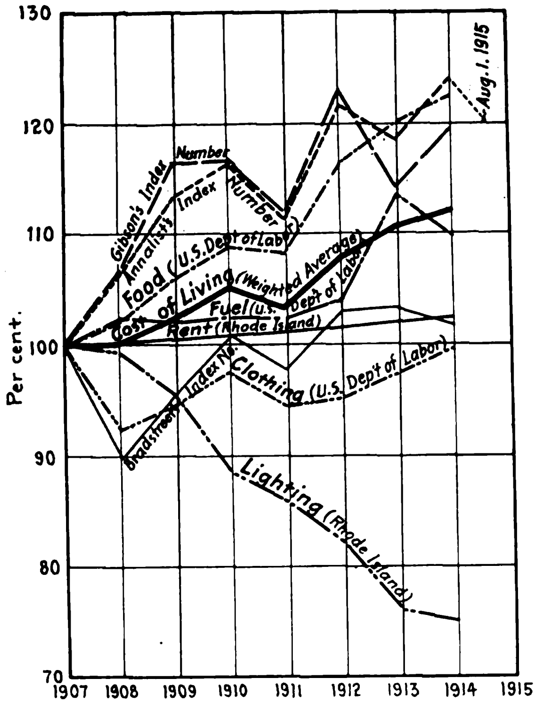
The 1914 report prints in full in Appendix A the co-operative program for transit development that was agreed to on May 27, 1914, by the Philadelphia Rapid Transit Company, providing among other things that when the city builds the three high-speed lines recommended for immediate construction at a cost of approximately $46,000,000, the Philadelphia Rapid Transit Company will equip them at a primary cost of about $12,000,000 and operate them in conjunction with its present system. The transit company has stated that it will have to rely upon the Union Traction Company to aid in securing such funds as will be required for the normal extension of the existing system, but the latter company has not agreed to this proposition and has informally expressed its dissent. If the Union stockholders refuse to accept the terms of the program, both they and the Philadelphia Rapid Transit Company, Mr. Taylor states, should forfeit the protection afforded them by the co-operative program against loss of net income diverted to the high-speed lines and against loss of exchange ticket revenue, and the city would be justified in establishing the proposed high-speed system with an independent operator.

The modifications that have been found desirable since the submission of the transit commissioner's report on July 24, 1913, include the following items: (1) Location of west side of delivery loop in Broad Street instead of Fifteenth Street to save distance and curvature and avoid serious engineering problems. (2) Provision of a connection on the loop for the Parkway subway, which should be built in the near future, this provision involving an extra expenditure of about $1,750,000. (3) Designing of North Broad Street subway below Ridge Avenue so as to allow space for the proposed subway to be built by the Pennsylvania Railroad, making a connection between the New York division and Broad Street Station partially via Broad Street. (4) Location of south side of delivery loop in Locust Street instead of in Walnut Street in order to enlarge the central business district, allow a station to be located between Chestnut and Walnut Streets and permit more favorable grades and curves. (5) Formulation of alternative elevated and subway locations for branches of the north Broad Street subway. (6) Provision under the co-operative program for free transfers in a forward direction between the surface system of the Philadelphia Rapid Transit Company and all high-speed lines at every station on the latter where surface lines intersect. (7) Determination that, if an independent operator is secured for the high-speed lines, such a corporation must build and equip the Camden tube.

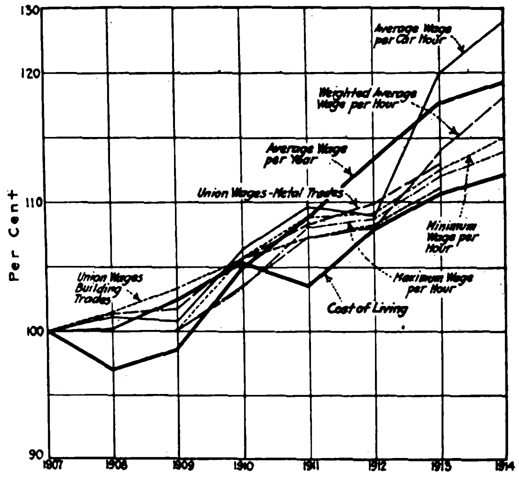
In order to fix the relation of the 8-cent exchange system and its elimination to the problem of rapid transit development, the department of city transit has made an exhaustive investigation of the limits imposed by the system and of its application to various parts of the city. In this connection the range of travel for 5 cents, 8 cents and 10 cents was determined for seventy-two sections of the city, covering practically all settled parts. The department has added to its report in Appendix E a series of maps illustrating the ranges of travel for these fares from each separate section to all others, thus showing the accommodations provided and collecting all cases of discrimination in the application of the 8-cent transfer system.

Appendix C is undoubtedly the one of most general interest to electric railway operators, for herein is presented a detailed record of all the methods employed in collecting the traffic survey and other information and in working out the enlarged system described in the 1913 report of the transit commissioner. For example, calculations are inserted to show how the figure of 179 cars passing the maximum load point for the maximum hour was obtained, as well as ratios of 83.5 per cent for cars required in operation as compared to those passing the maximum load point at the maximum hour and of 40 per cent for the service factor used in determining car-hours. With its illustrative tables and maps, this appendix constitutes an admirable and lucid description of the detailed work necessary in traffic surveys.

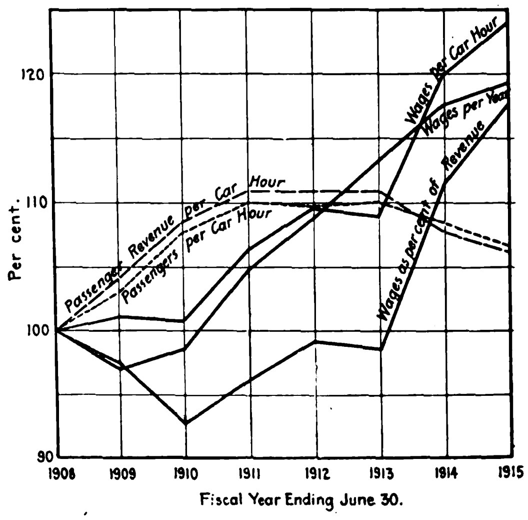
Appendix B contains the estimated financial results to the city from the operation of the recommended rapid transit lines, both under the proposed arrangement with the Philadelphia Rapid Transit Company and with an independent operator. Appendix D is a reprint of the Pennsylvania Supreme Court Case No. 691 in re the city's borrowing capacity.



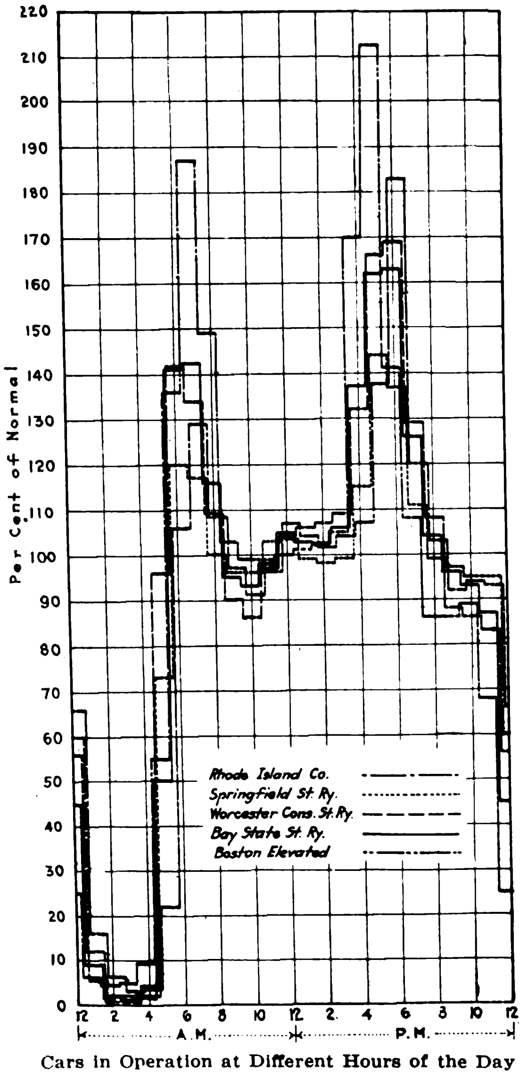
Analysis of Living Costs by Years



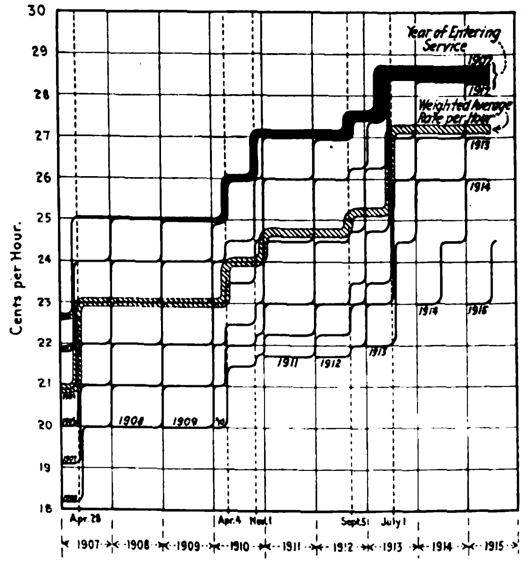
Comparison of Wages and Living Costs by Years



Comparison of Wages and Unit Revenue by Years



Cars in Operation at Different Hours of the Day



Comparison of Average and Individual Wages by Years

Charts exhibited in Rhode Island Company wage arbitration hearings (originals on sheets about 17 in. x 22 in.) showing labor conditions on its system. See editorial comment on first page. These charts were prepared by Prof. A. S. Richey of the Worcester (Mass.) Polytechnic Institute.

Graphs, Charts and Statistics as Aids to Administration[*]

Critical Discussion is Made of These Devices for Keeping Executives in Touch with Operations—Specimen Comparative Forms are Included in This Article

BY E. C. STOTHART, CHARLESTON, S. C.

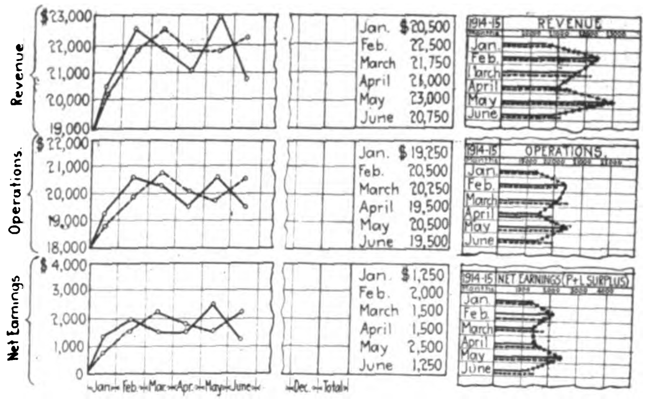
The basic terms used in this article may be defined as follows: "Graphs" are statements of results written or delineated in a vivid, forcible and striking way, "a picturization of facts." "Charts" are maps of results or facts, similar to but more complex than graphs. "Statistics" are collections of facts tabulated numerically or a group of facts brought out by collecting numbers. The term also applies to the science which treats of subjects as elucidated or illustrated by enumeration of facts.

Graphs, charts and statistics all serve to bring the executives of an organization in touch with the operations of its various branches where a personal contact would be a physical impossibility. They convey quickly, accurately and intelligently the results of each department and the organization as a whole. Many executives, including heads of departments or branches, know that they are not getting all the profits or returns they should get, and yet are unable to put their fingers on the weak spots, owing to lack of condensed and comprehensible data. In nine cases out of ten there is something wrong with the organization of the business. Possibly there is no one prominent fault, but simply room for general improvement in organizing and standardizing the plant, machinery, equipment, office, sales and working forces, etc. Sometimes there are defects in the structural organization—that is, in the relations of the concern to its customers or competitors or to the sources of its raw materials.

In order that the chief executive may determine whether the organization is efficient and the results the best attainable, or whether there are leaks which must be remedied in order to obtain proper returns on investment, he must be in possession of all data pertaining to the operation of the organization. These must necessarily be in concise yet comprehensible form, as the present-day business executive's time does not permit his searching through a volume of detail. The results of operations of each and every department must be in his possession as soon as possible after the expiration of the period under consideration, and in such form as to allow a thorough understanding of conditions with the least possible delay. The individual employees and departmental heads should therefore exert every effort to formulate and devise such reports as will best serve the purpose of the executive, showing in unmistakable form data essential for economic operation but eliminating all superfluous and confusing details.

For the purpose of comparing reports compiled in graphic, chart and statistical forms, the accompanying illustrations are submitted. Form I shows fluctuations in revenue, operations and net earnings in both chart and graph form, as well as the ordinary data. While the illustration covers but one division for the current period, by use of different colored inks and enlargement of forms the same could show as many divisions as necessary for any comparative periods. It should be noted that the graph can be converted into chart form by joining the points, as shown in the right-hand section. The chart shows fluctuations in a more connected manner than does the graph, the comparisons of the latter being more difficult to follow.

The data in Form I are probably the first to be observed by executives, as they are able to determine therefrom whether or not the business as a whole is making returns commensurate with the investment involved. Yet from this form they are unable to ascertain whether different branches are obtaining efficient results, and similar subsidiary data may be necessary. Moreover, the fact that a profit has been effected does not suffice, the questions foremost in the mind of the executive being, "What can be done to increase the profits? Are there leaks in operation? If so, where? Can revenues from transportation, sales, etc., be increased, and if so, how?" In answering these and similar questions, however, probably the first thing to consider would be the cost of operation, for most frequently restricted or decreased profits can be attributed to increased and very often unnecessary expenditures, rather than to limitations of revenue. Hence a comprehensible statement of operating costs is essential, for by it the source of loss can be readily discovered and remedied.



ADMINISTRATION AIDS—FORM I—SHOWING CHART, ORDINARY EXPRESSION AND GRAPH FOR REVENUE, OPERATIONS AND NET EARNINGS (PROFIT AND LOSS SURPLUS)

Form II shows both the ordinary and the graphic style of presenting operating costs. The former, taken from the trial balance, is used by clerks in preparing graphs for presentation to executives. The expenditures in dollars and cents represent nothing of value, so far as results are concerned. It is the standard set on unit costs that reveals the true conditions. While expenditures might show an increase, the car-miles operated determine whether or not the increase is warranted. While the unit costs per car-mile are shown only for total operations and general accounts, the subaccounts would be shown in making up the regular completed statement. This comparative statement may be used for any and all divisions, and also for any periods, by inserting the proper titles of accounts and changing unit cost requirements, such as cost per 1000 cu. ft. and cost per kilowatt-hour for the gas and electric divisions respectively. It will be noted that while the above statement shows comparisons in dollars and cents and unit costs, it does not give increases and decreases in percentages, which are by far the most comprehensible. Such information could, of course, be obtained by inserting additional columns, but as a rule it is shown on statistical data sheets.

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[*] Abstract of prize paper in American Electric Railway Accountants' Association correspondence course. For notice of award see ELECTRIC RAILWAY JOURNAL of Sept. 18, 1915, page 594.

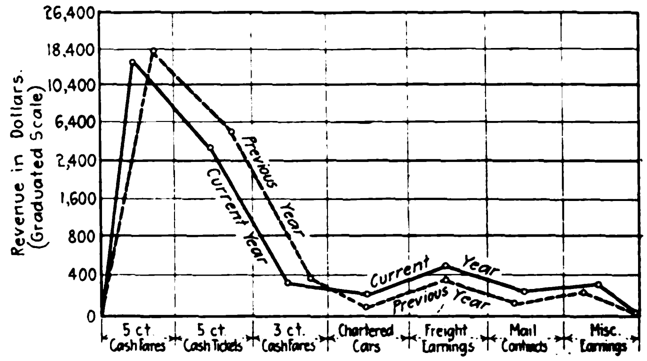
The cost of current would enter into this statement, but as railway companies do not usually operate power stations for production of current for car operation exclusively, it may be assumed that current is purchased from the electric division at production cost. The cost of current production in such cases would be taken up in considering operating costs of the electric division, and a pro-rata share of the expense based on the output charged to the railway.

The graph section of Form II can be adapted to any or all divisions by merely substituting titles of accounts and rescaling, and also to any number of years by allowing additional account spaces for the number required. With the graph form comparisons of months, periods and years for each account are possible and are more comprehensible than the mass of figures necessary to produce the same results. The increases and decreases can be determined by a casual glance at the graph, whereas in ordinary figure form a careful study of each set of figures is necessary. In compiling data for the graph the clerk relieves the executive of detail, for in order to obtain essential data from a mass of figures the executive must form a mental graph of conditions.

To save the executive the trouble of going through the comparative blocks shown in the graph of Form II, to determine in which accounts losses were sustained and gains affected, check (√) columns are provided, wherein the clerk preparing the graph places checks opposite the accounts showing increases. The executive is then in position to call for analyses of accounts so as to compare expenditures made for the current period with those of preceding corresponding periods. An analysis of certain accounts might well accompany the general graph. By this method leaks in operation are very frequently discovered, which enables the executive to confer with heads of departments and discuss intelligently the accounts wherein savings might be effected. The data herein involved might also be shown in chart form, but where so many accounts are concerned, the chart would be rather complex and very difficult to trace.

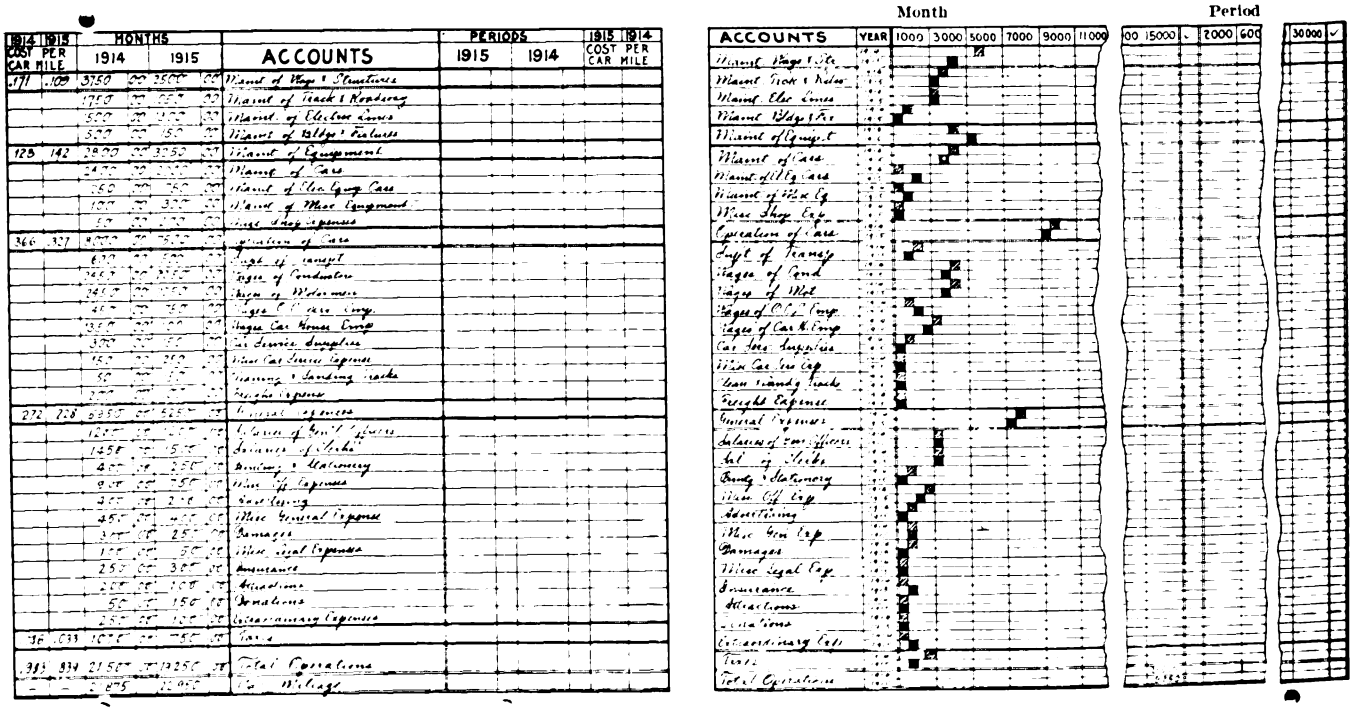
If after the investigation of operating costs savings are not effected to increase profits sufficiently, it becomes necessary to observe the sources of revenue in order to determine wherein lies the trouble. Form III will assist very materially in locating such sources of loss. This form shows where increases and decreases occur, and assists executives in determining the most effective course to pursue to increase revenue from the various sources—such as more rigid inspection, both regular and special; offering of prize redemption coupons to passengers; changes in schedule, etc.

Having now determined and corrected the sources of decreased profits by investigation of revenues and opera-



Class of Revenue	1914	1915	Change
5 cent cash fares	$16,750	$15,125	—$1,625
5 cent cash tickets	5,425	4,050	— 1,375
3 cent cash fares	400	375	— 25
Chartered cars	200	150	— 50
Freight earnings	400	500	+ 100
Mail contracts	150	200	+ 50
Miscellaneous earnings (rents, etc.)	175	250	+ 75
Gross earnings	$23,500	$20,650	$2,850

ADMINISTRATION AIDS—FORM III—SHOWING COMPARATIVE CHART OF REVENUE DETAILS FOR RAILWAY DIVISION AND ORDINARY FORM OF DATA USED



1914 Cost per Car Mile	1915 Cost per Car Mile	Months 1914		Months 1915		Accounts	Periods 1915	Periods 1914	1915 Cost per Car Mile	1914 Cost per Car Mile
.171	.109	3750	00	2500	00	Maint. of Ways & Structures				
		1750	00	1050	00	Maint. of Track & Roadway				
		1500	00	1300	00	Maint. of Electric Lines				
		500	00	150	00	Maint. of Bldgs. & Fixtures				
.128	.142	2800	00	3250	00	Maint. of Equipment				
		2400	00	2000	00	Maint. of Cars				
		250	00	750	00	Maint. of Elec. Equip. Cars				
		100	00	300	00	Maint. of Misc. Equipment				
		50	00	200	00	Misc. Shop Expenses				
.366	.327	8000	00	7500	00	Operation of Cars				
		600	00	500	00	Supt. of Transpt.				
		2450	00	2250	00	Wages of Conductors				
		2450	00	2250	00	Wages of Motormen				
		450	00	750	00	Wages O. C. Car Emp.				
		1350	00	1000	00	Wages Car House Emp.				
		300	00	150	00	Car Service Supplies				
		150	00	250	00	Misc. Car Service Expense				
		50	00	50	00	Cleaning & Sanding Tracks				
		200	00	50	00	Freight Expense				
.272	.228	5850	00	5250	00	General Expenses				
		1250	00	1200	00	Salaries of Gen'l Officers				
		1250	00	1500	00	Salaries of Clerks				
		400	00	250	00	Printing & Stationery				
		900	00	750	00	Misc. Off. Expenses				
		300	00	200	00	Store Keeping				
		450	00	400	00	Misc. General Expense				
		300	00	250	00	Damages				
		100	00	50	00	Misc. Legal Expenses				
		250	00	300	00	Insurance				
		200	00	100	00	Attractions				
		50	00	150	00	Donations				
		250	00	100	00	Extraordinary Expenses				
.036	.033	1000	00	750	00	Taxes				
.983	.834	21500	00	19250	00	Total Operations				
—	—	21875		22950		Car Mileage				

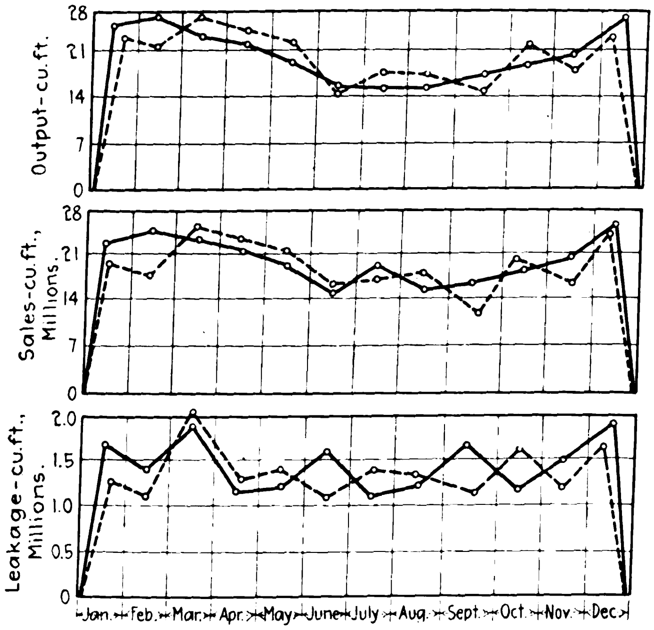
ADMINISTRATION AIDS—FORM II—SHOWING ORDINARY AND GRAPHIC FORMS OF STATEMENT OF OPERATION tions, the executive has other matters requiring attention. Are efficiencies being obtained at the power station, gas works, etc.? Are electric lines and mains in bad condition, resulting in line loss and leakage? Is the company overstocked on materials and supplies that will deteriorate, and can such stocks be reduced and the money involved be expended to better advantage? In this case, of course, there is another question to be considered—namely, if stock materials can be purchased at a declined rate, will the saving between purchase price and price when market is up be equivalent to the revenue derived from the investment of a like amount in a different way?

The solutions to the foregoing questions quite frequently might be brought to the attention of the executive more forcibly by means of charts or graphs. For example, Form IV shows a valuable chart of output, sales and leakage, which may be used for both gas and electric divisions. This can also be used for showing purchases, disbursements and balances of store stock or other material.

The uses to which charts and graphs might be put are so numerous that one might continue to compile them and explain their advantages indefinitely. Before passing to the subject of statistics, however, the writer will only mention a few mechanical charts, such as graphic meter charts, pressure gage charts, steam and flue gas charts, stack draft charts, recording watt and volt charts, feed-water temperature and rate of feed charts, car speed and mileage charts, etc., all of which are of inestimable value to the operating departmental heads as efficiency guides.

Statistics comprise statements exhibiting results obtained by process of elimination—that is, the boiling down of a voluminous report of details to a concise and intelligible statement of facts. To an executive the statement that $15,000 was spent on car operation, electric production, gas manufacture, etc., has no value unless he knows the number of car-miles operated, the kilowatt-hours of electricity produced and the cubic feet of gas manufactured. Nor does the statement that $20,000 was received from transportation and sale of gas and electricity mean anything, unless he has the car-miles and the number of passengers carried, etc. With information as above, he is in a position to determine the revenue and the cost per car-mile operated and passenger carried, per 1000 cu. ft. of gas and per kilowatt-hour of electricity. A comparison of these results with standards previously set shows whether or not there is any improvement. A statistical statement for a railway division that embodies information essential for a comparison with standards is one containing on the left-hand side four columns for a particular month, showing the month's record in the preceding year, in the current year, the increase or decrease in dollars, and the increase or decrease in percentage, and on the right-hand side four similar columns reversely arranged for a series of months. The center of the statement contains the following list of miscellaneous statistics:

Passengers (revenue).
Passengers (mail carriers).
Passengers (complimentary).
Passengers (employees).
Total passengers carried.
Passengers (transfers).
Per cent of transfers to passengers carried.
Total car-hours.
Average car-hours per day.
Number eighteen-hour cars operated.
Average number eighteen-hour cars per day.
Average passengers per day.
Average passengers per car per day.
Car mileage (passenger and freight).
Car mileage (chartered cars).
Total car mileage
Average car mileage per day.
Average car mileage (chartered cars).
Average car mileage per eighteen-hour car.
Operating expenses per car-mile.
Net earnings per car mile.
Platform expenses per car-mile.
Earnings per revenue passenger.
Operating expenses per revenue passenger.
Net earnings per revenue passenger.
Earnings per passenger.
Operating expenses per passenger.
Net earnings per passenger.
Platform expenses per passenger.
Daily average earnings (passenger and freight).
Daily average earnings (other sources).
Daily average earnings from operation.
Daily average operating expenses.
Daily average net earnings from operation.
Percentage of operating expenses to earnings (including taxes).
Percentage of operating expenses to earnings (excluding taxes).
Percentage of claims and expenses of claim department to earnings from operation.
Cost of power per kilowatt-hour used.
Kilowatt-hours used.
Kilowatt-hours used per car-mile.
Cost of power per car-mile.
Miles of track operated.
Car-miles per mile of track.



1914	Output in cubic feet	Sales in cubic feet	Leakage in cubic feet
January	25,300,000	23,700,000	1,600,000
February	26,200,000	24,800,000	1,400,000
March	24,800,000	22,900,000	1,900,000
April	22,700,000	21,500,000	1,200,000
May	20,500,000	19,100,000	1,400,000
June	19,750,000	18,200,000	1,550,000
July	18,200,000	17,000,000	1,200,000
August	16,400,000	15,100,000	1,300,000
September	17,500,000	15,800,000	1,700,000
October	18,600,000	17,400,000	1,200,000
November	20,450,000	18,950,000	1,500,000
December	27,500,000	25,750,000	1,750,000
Year	257,900,000	240,200,000	17,700,000

ADMINISTRATION AIDS—FORM IV—SHOWING CHARTED AND ORDINARY GAS DATA, SAME FORM BEING APPLICABLE TO STOCK ACCOUNTS

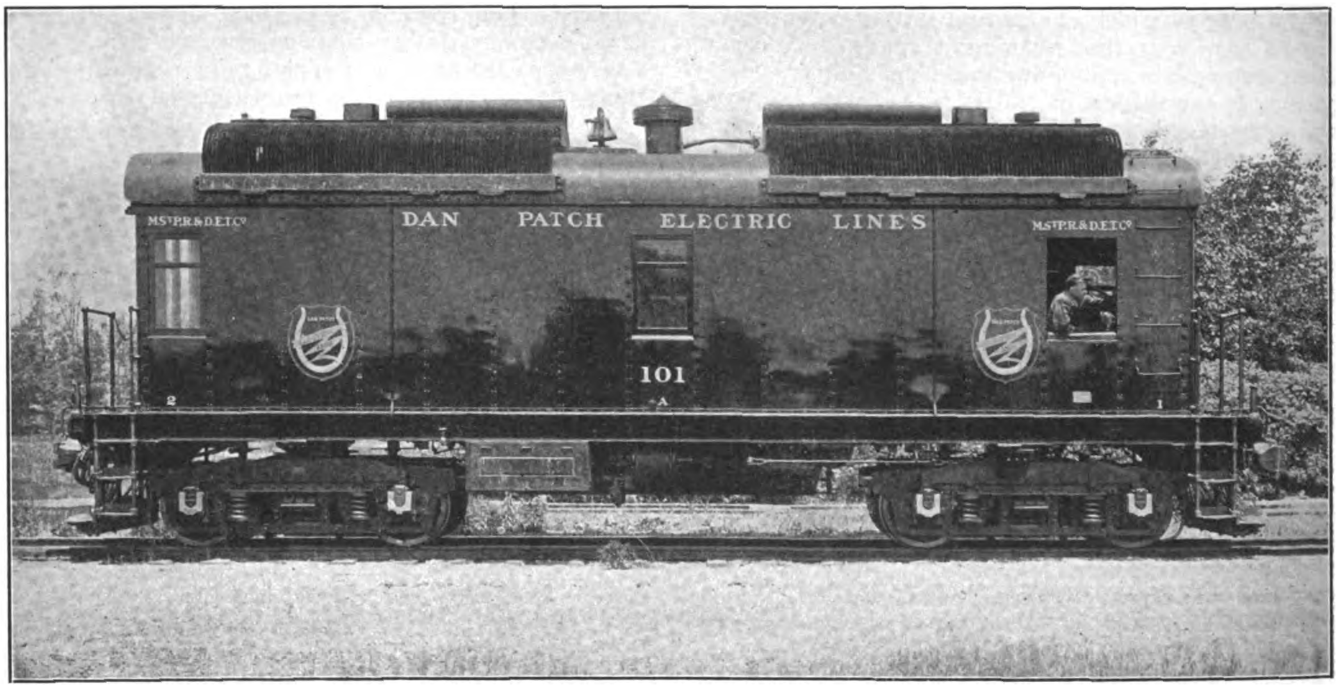
This statement gives comparative statistical data for months and periods for both current and preceding years, showing increases and decreases and percentages of same, the percentages being the basis of arriving at accurate and definite conclusions. Since it shows only the results obtained by the organization as a whole, similar statistical statement may be made giving the results of each individual branch or department. The statement described, however, is considered sufficient for executives having general supervision of entire operations. While the information appearing thereon is deemed enough, additions and omissions might be made according to the requirements of the executive. Statistics of a similar nature might be prepared for gas and electric divisions.

An English contemporary, in commenting on the fact that most of the railway lines between France and Belgium intersect the trenches and are thus prevented from running regular trains, states that the German army is operating the lines with storage-battery cars run singly, the purpose being to remove the wounded from the front and to bring supplies to the men in the trenches.

Gas-Electric Locomotives for Dan Patch Line

This Railway, Which Is the First to Have Been Operated Throughout with Gas-Electric Equipment, Has Recently Placed in Service Three 60-Ton Locomotives, the Largest Machines of the Type Ever Built

The Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, operating what is popularly know as the "Dan Patch" electric line, has recently placed in commission three 60-ton gas-electric locomotives for freight, passenger and terminal service, these being the largest machines of the type ever built. They are somewhat similar in design although more powerful than the 57-ton gas-electric locomotive which has been in successful operation for the past year on the company's lines from Minneapolis to Mankato, Minn., and the four gas-electric locomotives, together with the thirteen gas-electric motor cars which the railway has purchased to date, constitute a complete equipment for mixed traffic which is unique in the history of interurban railroading. The Dan Patch line, in fact, is said to be the first railroad in the world to have been operated entirely with gas-electric service.



"DAN PATCH" LINE LOCOMOTIVES—GENERAL VIEW OF 60-TON GAS-ELECTRIC LOCOMOTIVE

CHARACTERISTICS OF LINE AND TRAFFIC

The line extends south from the company's terminal building in Seventh Street, Minneapolis, to Mankato, a distance of 107 miles. About midway of the line a branch runs northeast from Northfield to Randolph, 7 miles distant. Another extension is contemplated from Fairibault southeast to Albert Lea, Dodge Center, Rochester and beyond, having Dubuque, Iowa, as its objective terminal point. The fine rolling section of Minnesota thus traversed, with productive grain fields, dairy and truck farms, and numerous thriving towns and cities of varied industrial activity, is one of the most prosperous in the State. The territory presents few difficulties in road construction, the severest grade on the present line being 2 per cent.

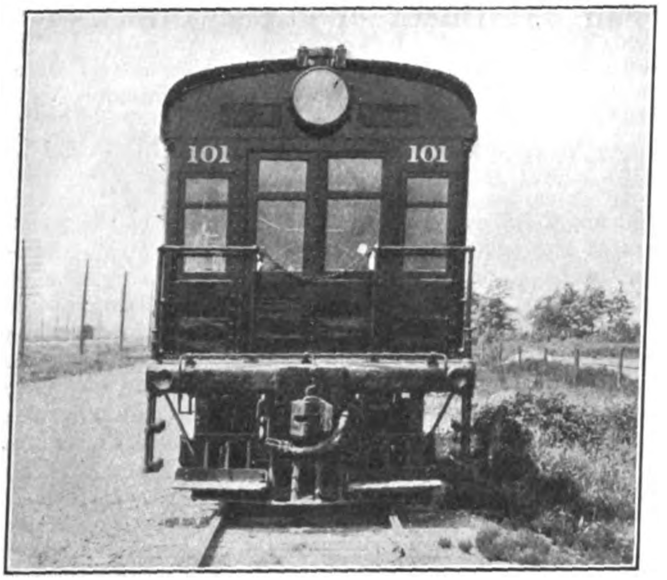
The roadway was built and improvements are being constructed with a view to permanent stability, reinforced concrete being frequently used in the work. Substantial stations, similar to those used by steam railroads, are located at the various cities and towns along the route, and smaller stations have been erected every few miles at rural stops to afford protection to the traveling public from inclement weather.

About 25 miles south of Minneapolis, at Orchard Gardens station, several thousand acres of farm land have been divided into 5-acre and 10-acre tracts by the company, and these are being sold to residents of Minneapolis and St. Paul, many of whom have erected houses and travel to and from their places of business in the city each day on the railway. There are also many attractive lakes along the route, affording excellent facilities for boating, bathing and fishing, and bringing thousands of city dwellers out into the open country during the summer months. Antlers Park, a summer resort and recreation park 30 miles south of Minneapolis, is owned and operated by the traction company.

Four through trains daily each way, one of which is a limited parlor-car train, constitute the normal passenger schedule of the road. The limited train makes the run of 107 miles, including four stops, in three hours and twenty-five minutes, while the other trains require four hours and five minutes for the trip. This service is supplemented by local trains between certain points of the line and the terminals, and by excursion trains during the summer season as occasion requires. One 70-ft. gas-electric motor car, seating eighty-nine passengers, normally makes the run. When travel is somewhat heavy a trailer is added, and for excursions and extra heavy traffic a train is made up of trail cars drawn by a gas-electric locomotive.

LOCOMOTIVE POWER PLANTS

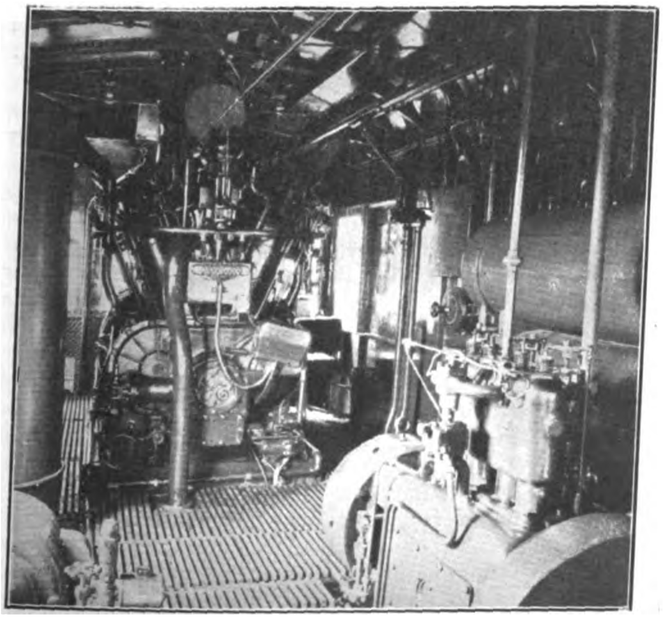
The new 60-ton locomotives are double ended, being built with the box type of cab extending nearly the en-



"DAN PATCH" LINE LOCOMOTIVES—END VIEW

tire length of the underframe and having all the weight on drivers. The wheels are 33 in. in diameter, and each locomotive is equipped with four 100-hp. motors. The truck clearances allow for 100 ft. minimum radius of curvature. The power plant consists of two 135-kw. generating sets similar to the one used in the gas-electric motor cars, only one engineer being required for its operation. The locomotives were designed and constructed complete by the General Electric Company.

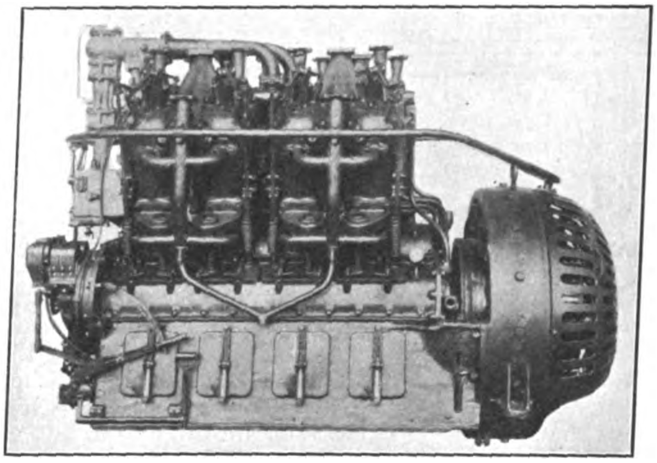
Each of the two gas-electric generating sets for the power plant equipment is composed of a 175-hp., 550-r.p.m., eight-cylinder, 4-cycle gasoline engine of the "V" type, which is direct-connected to a 600-volt, commutating-pole, compound-wound electric generator with an outboard bearing supported by brackets bolted to the magnet frame. The cylinders are 8-in. bore and 10-in. stroke. Ignition is accomplished with low-tension magnetos and the sets are started by air pressure, in the same way as in the gas-electric motor cars, with the additional feature that after one set is running, the second may be started electrically from the first. The control is so arranged that either one or both of the generating units may be used to operate the locomotive from either end, in accordance with the needs of the trailing train load. Compressed air for starting is taken from the main reservoirs of the air-brake system, these being built with surplus capacity. The two main single-cylinder air compressors which are driven from the crankshafts of the main engines have a displacement of 22.5 cu. ft. of free air per minute at the rated speed and are fitted with automatic governors to maintain a constant pressure.



"DAN PATCH" LINE LOCOMOTIVES—INTERIOR OF CAB

Great flexibility of control and economy of operation result through electrical transmission of the energy. The engines can rotate at normal speed irrespective of the speed of the locomotive and deliver their maximum power at all times, a feature of great advantage on grades, in case of snow storms, or other emergency conditions involving sudden, heavy current demands.

The locomotive is provided with an auxiliary gas-electric set to furnish power for lighting the cab, headlights and train coaches, and for pumping an initial charge of air to fill the tanks and start the main engines. This set is started by hand. It consists of a vertical, 750 r.p.m., four-cylinder, 4-cycle gasoline engine, which is direct-connected to a 5-kw., 65-volt, commutating-pole, compound-wound, electric generator. The cylinders are 3-in. bore and 6-in. stroke, and ignition is effected by a high-tension magneto. The air compressor on the 65-volt circuit is of the two-cylinder, motor-driven railway type, and has a piston displacement of 25 cu. ft. per minute when pumping against a tank pressure of 90 lb. per square inch.



"DAN PATCH" LINE LOCOMOTIVES—OPERATING SIDE OF EIGHT-CYLINDER, GAS-ELECTRIC GENERATING UNIT

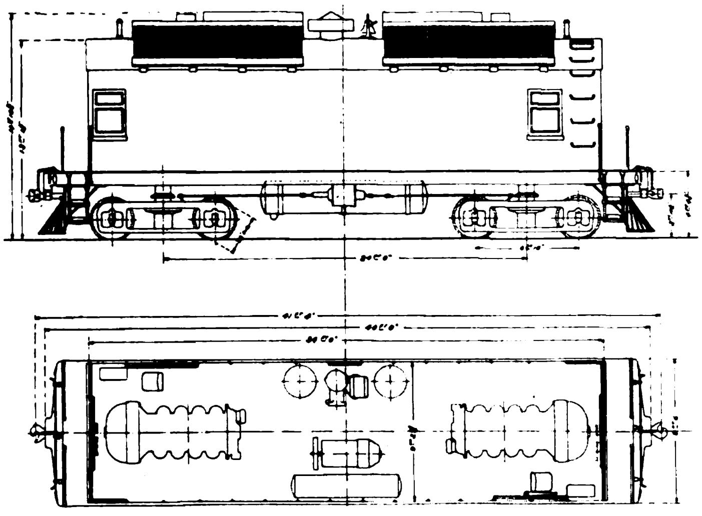
Air for all compressors is taken from the cab interior through screens and is delivered to the three reservoirs, each 87½ in. x 18 in., installed at one side of the cab in the center and connected in series, thereby affording an opportunity for radiation of heat and condensation of moisture before entering the brake cylinders. After starting the main engines, the governor cuts out the motor-driven set, and all air is supplied by the air compressors on the main engines.

MOTORS AND CONTROL

Mounted on the axles with nose suspension are four GE-205-D, 600-volt, series-wound, commutating-pole, box frame, railway motors having an hourly rating of 100 hp. each. All four axles are therefore driving axles. The gear ratio is 17 : 58, a reduction of 3.41, which is especially adapted for freight and terminal switching service, as it affords maximum tractive effort for starts and for low speeds. The motors are ventilated by a special vacuum system operated in conjunction with the engines. The performance of the locomotive is approximately such that a tractive effort of 16,000 lb. is provided at 5 m.p.h. and 3500 lb. at 30 m.p.h.

The control of the motor equipments is similar to that of standard gas-electric motor cars, a type P-53 controller being installed in each end of the cab. The motors are, however, connected permanently in pairs in parallel, and the two pairs, operated like single motors, are placed progressively in series and parallel. The controller provides seven running steps in series and six in parallel, without rheostats in the main circuit. There are also two additional points for shunting the series fields, making a total of fifteen efficient running points.

Inasmuch as electrical energy is transmitted directly, there are no losses through the intervention of mechanical change-speed gearing. To produce smooth and rapid acceleration, the speed changes of the motors are effected by governing the voltage through varying the strength of the generator fields, this being accomplished by the movement of one handle on the controller. Separate handles are provided for throttling the engine and for reversing the motors. The latter operation is accomplished by changing the motor connections in the usual manner and without stopping the engines, which always rotate in the same direction. This, in an emergency, allows the train to be brought quickly to a halt independent of the brakes.



"DAN PATCH" LINE LOCOMOTIVES—DIMENSION OUTLINE

A 300-gal. gasoline storage tank, fitted with filler and filter, is installed underneath the underframing of the locomotive. The radiators are the fin-tube type and are mounted on each end-section of the cab roof, the cooling water being circulated by the thermo-syphon system. There is also a radiator draining system, the tanks being situated at one side in the central section of the cab, and a suction type ventilator is mounted in the roof between the radiators.

The principal data and dimensions applying to the locomotives are as follows:

Total net weight	120,000 lb.
Weight per axle	30,000 lb.
Maximum tractive effort	32,200 lb.
Length between knuckle faces of couplers	42 ft. 4 in.
Length over cab	34 ft.
Height over all	14 ft. 10¾ in.
Width over all	10 ft. 2 in.
Total wheelbase	24 ft.
Rigid wheelbase	6 ft. 10 in.

Electric current for the entire operation of the Oakwood Street Railway, Dayton, Ohio, is now being furnished by the Dayton Power & Light Company, pursuant to the execution of the contract, into which the two corporations entered on May 8.

Fair Treatment of Public Utilities*

Proper Regulation by Commissions Is Advantageous Alike to the Public and to the Utilities—Financial Aspects of Regulation

BY A. B. LEACH, PRESIDENT A. B. LEACH & COMPANY, NEW YORK

Through the activities of a large number of the members of the Investment Bankers' Association of America, the development of the public utility companies of this country, the building of water and steam power plants and the construction of urban and interurban railways have given to our land a great impetus. Cities and villages have been improved, urban life has been made comfortable and convenient, rapid communication between communities has added to the comfort of travel. The changes in the character of the service and the form of equipment from the days of the horse car to the modern motor, the changes from the earlier developed plants and equipment for electric lighting and power, have been astonishingly rapid and have caused constant expenditures by these companies to keep abreast with the trend of the times.

These developments have been made possible through the issuance of bonds, of preferred and common stocks, distributed to a large range of investors through the investment banking world. In a large number of the states public service commissions or similar bodies have been organized. The best thought, both of the public service companies and the banking world, is that public service commissions, when properly organized and named, are a benefit not only to the community served, but also to the public service companies, and an added assurance and security to the investor in the securities of the companies supplying this kind of service.

It was considered that with the coming of the public service commissions it would be found that regulated monopoly was the most efficient and economical method for the development of these great industries. In a great many of the states, however, the public service commissions have seemingly felt that it was their province to grant the demands of the public for lower-priced service, for increased service, without giving due consideration to the rights of the public service companies and to the holders of their securities. As in the railroad world, a great amount of discussion has taken place as to the physical valuation of these properties, and here and there on these valuations an interest return has been computed which, when forced upon the companies, leaves a great many of these properties practically stranded.

What has been said in regard to the change in the character of the industry has a very great bearing to-day upon the actual valuation of these properties as going concerns. If a careful engineer's report is to be made on the actual properties now in use by the public service companies of this country, there should be added to this amount an adequate and reasonable sum for going values. The method of computation, the basis upon which this is to be allowed, may be one on which there may be a difference of opinion, but the fact certainly is that without this no just valuation of these properties can be had. In rate making, in view of the hazard of the business, 6 per cent allowed on a reduced valuation of the public utility property means bankruptcy; it means that new capital is not available.

In this connection, the cry of public ownership is heard. The most expensive, the most unsatisfactory, the most disastrous financial experiment that the American cities could undertake would be public ownership of their public utilities, but unless the public utility companies are to receive fair treatment by the public service commissions, unless the public service commissions are to cease being the champions and advocates of lower rates and greater service and become guardians not only of the public but also of the public service companies, a great disaster to the investments in this country and the public service companies and a great reduction in the service which these companies bring to the public are sure to follow. This warning is the fruit of a careful lookout on the things that have taken place in the public utility world in recent months. What the American people demand is good, progressive service, developments that will keep in step with and ahead of the growth of the cities and towns. This is not possible or probable unless the public service companies of this country are met in a broad, liberal, reasonable spirit by the public and the public service commissions.

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*Portion of president's address delivered before convention of Investment Bankers' Association of America in Denver on Sept. 20, 21 and 22.

How Bay State Railway Maintains 2751 Vehicles with 680 Men

An Unusual Organization Which Effectively Cares for the Maintenance of Rolling Stock, Shops and Buildings on the Largest City and Suburban System of the United States

The system of the Bay State Street Railway embraces almost 1000 miles of track in eastern Massachusetts, New Hampshire and Rhode Island, and its equipment department handles 1020 closed passenger cars, 1095 open passenger cars, 248 plows, 148 service cars, thirty-two express cars, 208 horse vehicles and snow sledges, and 5662 electric motors. Yet the department employs only 680 men, of whom 365 work in the operating houses, 245 at the shops and on building repairs, and seventy on the preparation of material and in construction activities. There are sixteen operating divisions, with thirty-six operating carhouses and thirty-eight storage houses.

The system is divided into lines north and lines south of Boston, two grand divisions, with their own shops and carhouses, being formed in each group. In general charge of all employees and work in the department is the superintendent of equipment, whose duties are broad supervision of the maintenance of rolling stock, shops and buildings, and the design and construction of new rolling stock.

The superintendent of equipment also follows the inspection and testing of supplies, promotes standardization, confers with car engineer representatives of specialties, confers with the general foremen and inspectors of equipment upon the progress of employees as to promotion, ability and discipline, and sees any of the employees and local grievance committees. His offices are in Boston and Chelsea, Mass., and his work is carried on by dealing directly with a general assistant, a chief clerk and a special assistant, the inspector of equipment, three acting inspectors of car repairs and one acting and one general foreman on the lines north of Boston.

The inspector of equipment as well as one acting and one general foreman cover the lines south. There are, also, a special general foreman on order work, and engineers of equipment construction and of tests and supplies. An automobile assigned to the department enables the superintendent to devote a greater part of his time to supervision and a much smaller part to traveling than by use of railroads or electric cars.

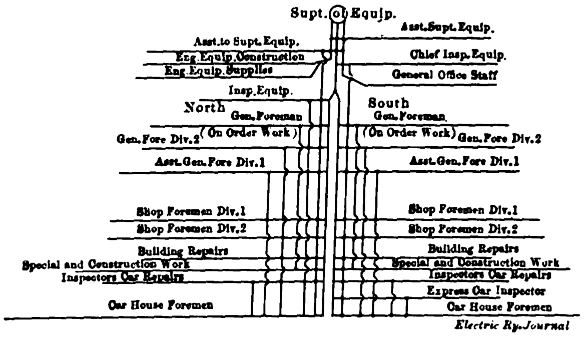
BAY STATE STREET RAILWAY—EQUIPMENT MAINTENANCE COSTS FOR FIVE YEARS

	1914	1913	1912	1911	1910
Total maintenance expense .	$759,134	$846,030	$757,748	$769,061	$775,613
Operated car mileage .	30,864,039	31,641,875	30,094,113	30,322,589	29,915,956
Total cars..	2,509	2,445	2,391	2,391	2,381
Cost per car per year..	$303	$346	$317	$322	$326
Cost per 1000 car-miles.	$24.60	$26.80	$25.30	$25.40	$25.90

The assistant superintendent of equipment supervises the work done at the Boston office and performs much of the detail. He is specially assigned to all work requiring co-operation with the claim department and is held responsible for the correctness of the records of equipment. He follows the summarization of various reports for the superintendent of equipment, reads all correspondence, looks up data and confers with assistants in other departments.

The chief inspector of equipment acts as general assistant to the superintendent of equipment on the lines south of Boston. His duties cover the supervision of carhouses and shops, including the general care of the car equipment, repairs of buildings and heating plants, instruction of carhouse foremen, and following up of men as to ability and discipline. He recommends changes of location, pay and class of men, checks and approves bills and follows shop work.

An inspector of equipment has direct charge, on the lines north of Boston, of the carhouse foremen and the men in the carhouses. He confers with the general shop foremen on the routing of cars needing shop attention and supervises the changes of equipment in the spring and fall. He reviews all reports of accidents and collisions, changes of equipment and hiring of men, as well as the reports of inspectors of car repairs.



Electric Ry. Journal

BAY STATE ORGANIZATION CHART

The general foreman of grand division No. 2, north, has general charge of the shops at Lowell, Mass., and is responsible for all repair work in carhouses on the division. An assistant general foreman supervises all the work done at the Chelsea shops, where he is stationed, and that of the paint shop at Lynn, these shops serving grand division No. 1, north.

The general foreman for grand division No. 2, south, has charge of car repairs in the Fall River and Newport division at the carhouses at Stafford Road, Bowenville, Fall River and at Newport. The assistant general foreman for grand division No. 1, south, is at Campello and has general supervision of the shop at that point.

The engineer assistant on equipment construction is stationed at the Chelsea office of the superintendent of equipment. His work is confined largely to construction matters, making up drawings of new equipment and assisting the superintendent of equipment in the design of the latter. The engineer assistant sees that specifications are carried out in detail, works on the standardization of equipment, on redesigning with improvements as the object of the work, and in connection with the shops checks up patterns, castings, etc., and makes drawings and sketches for tools and machinery.

There is also an engineer of equipment supplies who inspects and tests all kinds of materials, including material delivered at the four main storerooms of the company in Fall River, Campello, Chelsea and Lowell. He inspects scrap stock and prepares engineering data such as maintenance costs of various equipment parts, reports various items such as armatures, wheels, etc., and co-operates in the standardization of equipment.

The duties of the general foremen on order work are obvious, as are also those of the inspectors of car repairs. There are twenty-nine carhouse foremen, and the inspectors are assigned among the carhouses so that the work of each is approximately equivalent.

Manila Company Submits Service Brief

Case Before Board of Public Utility Commissioners Involves Adequacy of Car Service of Manila Electric Railroad & Light Corporation in Three Districts of Manila

The ELECTRIC RAILWAY JOURNAL of Sept. 4, 1915, page 395, contained a tabulation of traffic data taken from a count made by the Manila Electric Railroad & Light Corporation, Manila, P. I., during the six weekdays of the week from May 21 to May 27, to determine whether the service during the rush hours on certain lines in the Pasay, Malate and Ermita districts was adequate. These data were collected for use in a hearing ordered on June 15, 1915, by the Board of Public Utility Commissioners on its own motion, after it had turned down on June 7, 1915, an "unreasonable" demand made a year before that the company double the number of cars on all its city lines. Since the publication of these data, the company's complete brief in this new case, holding that it is not responsible for the so-called inadequacy of service or over-crowding of cars so long as reasonably adequate service is furnished, has been received, and the main points thereof are abstracted below. As service regulation is becoming more common, it has been thought that an outline of the defense offered would be of interest.

SERVICE FURNISHED

The car service furnished the Pasay district by the company on the lines in question, during rush-hour periods (from 6 to 8 a. m., 12 m. to 2 p. m., and 3.30 to 7.30 p. m.), consisted, at the time of making the count of passengers, of eight regular cars per hour, operated on a seven-and-one-half-minute headway. That the company has more than fulfilled its obligation to reserve for the use of second-class passengers a minimum of 60 per cent of car space is conceded. A further obligation imposed upon the company by its franchise is at all times to furnish cars or compartments of both classes sufficient to satisfy the public demand and to carry comfortably all the members of the public desiring to ride thereon. In determining whether this part of the franchise is being complied with, great weight should be given to the fact that not a single user of the service appeared at the public hearing to make complaint, to testify or to furnish information to the board.

REASONABLE AVERAGE OF SERVICE

If the board, however, carries the inquiry further to determine whether the accommodations furnished are, apart from any public demand, sufficient to carry riders comfortably, according to standards to be fixed by the board, it is assumed that the occasional overcrowding of cars will not be considered as evidence of inadequate service, but that regard will be had to the service as a whole, and that a reasonable average of service throughout the whole period under investigation will be deemed sufficient. In Fisher et al. vs. International Railway, quoted in Public Service Commission Reports, Second District of New York, Vol. III, page 146, the New York board did not attempt to define with precision what would, in its judgment, constitute overcrowding. It did, however, lay down the rule that questions of overcrowding should be determined not by the conditions found in individual cars but by examination of a number of cars, operated during a reasonable period, and the number of passengers riding in those cars, and that if it should be found that during such period headway was reasonably maintained and sufficient cars furnished so that the average car was not overcrowded, the service could not be held to be inadequate.

PECULIAR CONDITIONS IN MANILA

One peculiar condition is the furnishing of two classes of accommodations. Should the service furnished by this company be judged upon the basis of entire cars, without regard to first and second-class divisions, there would be no necessity for argument. As it is, the company more than meets the requirements of its franchise and the demands of the public. The problem of providing for both classes is worked out by the company's employees arranging the division between the first and second-class compartments in such manner as to provide for the amount of traffic which experience has shown may be expected on the different lines, always allotting more than 60 per cent of the space to second-class passengers. Yet accommodation must also be furnished for possible first-class passengers, who frequently do not materialize in numbers sufficient to fill the seats provided, with the result that much waste space is carried. This condition, resulting in increased expenses, should be considered.

MANNER OF USE

Another factor worthy of notice, beyond the control of the company, is the way the public uses the service as regards voluntary standees and overcrowding for short distances. In a typical fifteen-minute period, affecting five cars of the lines in question, car No. 105, of the Pasay-San Juan line, arriving at the counting point at 6.01 a. m., contained fifty-seven second-class passengers, with seats for twenty-eight, and four first-class passengers, with seats for eight. At 6.10 a. m., or nine minutes later, car No. 117 of the same line came along, also with twenty-eight second-class seats and carrying forty-eight passengers, and with the same number of first-class seats and passengers as car No. 105. This seems to indicate a somewhat crowded condition of the second-class compartments of these two cars at the counting point, but such crowding was not the fault of the company. At 6.11 a. m., or one minute after car No. 117 and ten minutes after car No. 105, car No. 109 passed the counting point carrying only fourteen second-class passengers, but with the same number of seats as the preceding car. Four minutes after car No. 109 came car No. 39, with but three second-class passengers to a seating capacity of twenty-six and carrying eight first-class passenger seats, but not a single passenger of this class. To turn back on the schedule, car No. 37 at 6 a. m., preceding car No. 105 by one minute, carried but eleven second-class passengers, with seats for twenty-six, and three first-class passengers, with seats for eight. With an average of the five cars mentioned covering a period of fifteen minutes, or one car every three minutes, it will be seen that the total number of second-class passengers carried was 133, with seats for 136, an average of more than a seat per passenger, during one of the heaviest rush-hour periods.

It may be suggested, however, that three out of the five cars referred to were of different lines than the two cars carrying an excess of passengers to seats, and that the runs of the three cars showing underloading did not extend to the entire length of the Pasay line. This is true. It is also true that a very large, if not the greater, part of the traffic on the Pasay line originates between Malate loop and Switch No. 2 (0.75 mile out), but that many passengers probably boarded cars Nos. 105 and 117 between Malate loop and the counting point. At Malate loop all five of the cars mentioned became available. On the Pasay line cars at the Malate loop there was 17 per cent of seats in excess of the number of passengers carried, and considerable unused accommodation was carried in the form of first-class seats. On the assumption, however, that there were some passengers standing when the car reached the loop, this fact in itself does not constitute overcrowding and implies no discomfort, and it is certain that this condition had existed over but a very short portion of the journey. Moreover, there were two remedies open to such passengers as were not satisfied with the conditions—to take first-class accommodation, at an additional cost of only 2 centavos, or to transfer to other cars with an excess of accommodation. The company having provided more than the 60 per cent of second-class accommodations required by its charter, these remedies are not deemed unreasonable. As to passengers boarding the Pasay line cars between Malate loop and the counting point, they did so voluntarily with other cars available within a reasonable time. The accommodations on the various lines are adequate, and the appearance of overcrowding is caused by the manner in which the public uses the service.

Reducing Standing Passengers

The brief states that a very interesting and instructive article, entitled "Traffic Characteristics," appeared in the ELECTRIC RAILWAY JOURNAL for May 15, 1915. The following paragraph is quoted to show the difficulties and dangers arising from an effort to fit car operation, with its inelastic unit of seat-miles per round trip of one car, to an inelastic standard of service:

"The diversity of loading observed on a certain line was such that it was believed that the furnishing of 33 per cent more seats would insure no standing except by preference. At the time the original survey was made, the company was furnishing during each fifteen-minute period a seat per passenger at the point of maximum loading, but owing to the diversity of loading some cars had vacant seats and others had standing passengers. Under the circumstances, 4.2 per cent of the passenger-miles were being made by passengers who could not find seats. After the service (seat-miles) was increased by one-third, it was found that 3.8 per cent of the passenger-miles were made by standing passengers. Thus to increase by 0.4 per cent the number of seated passengers, it was necessary to increase the seat-miles furnished by 33 per cent."

Comparative Service

For the whole period under consideration, 12,353 second-class passengers were carried, with seats for 10,806, or an average of seats per passenger of 0.87—or 13 per cent of passengers standing to the total number carried, and 14.3 per cent of passengers in excess of seats. The comparison between these accommodations and the standards in six American cities is most favorable to the local company. In all but one case, that of the period from 6 to 8 a. m. for in-bound cars, the result shows a service much superior to that required in these cities. The excepted case is that of in-bound cars for the period from 6 to 8 a. m., showing 56.2 per cent of passengers standing to seats. This excess, however, is caused by no fault of the company. A reasonable use of the service by the public would distribute the traffic over these lines in such manner that excess of passengers to seats would be about the same for every period, which, with due allowance for the difference between the length of the period used as a standard and the periods taken in the American cities, would be well within the limits of adequate service. If the exact facts could be ascertained, it probably would be found that the number of passengers standing, in excess of seats provided, would be little, if any, in excess of the voluntary "standees." The Federal District Court in Washington, commenting upon a decision of the Public Service Commission of that State (Public Utility Reports, 1915 B, page 810) intimates that an excess of 33 1/3 of passengers over seats, during certain hours of the day, would indicate a congested condition requiring a remedy. The line under consideration was a suburban line in Seattle, with a large number of passengers standing for about 4 miles. In Manila, however, the excess of passengers over seats is relatively small, and the conditions are such that, if the public made reasonable use of the service, the number of involuntary "standees" at any stage of the run would be negligible, and this over infinitesimal portions of the journey.

Added Service

While convinced that the service furnished between May 21 and May 27 was adequate, the company has materially increased this service by extending the run of certain cars beyond the Malate loop into the Pasay district as far as Switch No. 2. Eight cars are thus operated during the rush-hour period from 6 to 8 a. m. These cars provide seats for forty passengers, which means, for the additional service, a capacity of taking up 320 passengers per day or 1920 passengers for a six-day period. This additional service during the rush-hour period adds about 50 per cent to the accommodations provided during these hours, and changes the average of seats per passenger on this line from 0.74 to 1.15. This additional service, however, is so far in excess of what should be required of the company under all the circumstances, that its discontinuance would be warranted, in view of the decrease in earnings.

Operating Costs for Omnibuses in Sheffield, England

The *Tramway and Railway World* in a recent issue submitted the following results of the omnibuses operated in the town of Sheffield, England, by the Sheffield Corporation Tramways, the figures covering the fiscal year 1914-1915. Expenditures are given in cents per bus-mile:

Superintendence	0.03
Platform wages	4.39
Other traffic employees' wages	0.18
Cleaning and oiling	0.86
Miscellaneous traffic expenses	0.56
General expenses	0.74
Repairs to chassis	1.69
Repairs to body	0.40
Repairs to wheels and tires	1.57
Repairs to tools	0.03
Repairs to buildings and fixtures	0.09
Miscellaneous repairs	0.05
Sundry road expenditures	0.11
Gasoline	3.37
Total operating expenses	14.07

Fares averaged about 2 cents for a distance of about 1.12 miles, the longest omnibus route being 6.5 miles. The receipts amounted to 20.94 cents per bus-mile. There was set aside for depreciation 2.15 cents per bus-mile, for interest and sinking fund 1.09 cents, and for income tax on profits 0.13 cent.

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 to 8, 1915

American Association News

ANNUAL CONVENTION
SAN FRANCISCO
OCTOBER 4 TO 8, 1915

"Red Special" Itinerary Works Out Well—Details Are Given Herewith—Chicago Section Conducts Novel Suggestion Contest and Sends Winner to San Francisco—Best Suggestions Are Outlined Below

ON THE TRAIL OF THE "RED SPECIAL"

Supplementing last week's brief note regarding the "Red Special," the following notes bring the history to the JOURNAL'S press hour. After a stop of one and a half hours in the city of Chicago, the train left for National Glacier Park. There were fifty ladies and eighty men aboard.

The train reached Glacier Park at 2 o'clock on Sunday afternoon and left for Spokane on Monday evening. During the stay the party visited St. Mary's Lake and the encampment of Blackfeet Indians located in the park. Here Messrs. Pierce, Gale and McConnaughy were admitted into membership of the Indian tribe with appropriate ceremonies. The party reached Spokane at 9 a. m. Tuesday and was met at the station by the following representatives of the Washington Water Power Company: Vice-President Bleeker, General Manager MacCalla, Secretary Steele, Superintendent Wilson, Claim Agent Aston and Chief Engineer Uhden. Next morning the party took three-car trains of this company on its interurban line to the suburbs, where a very successful inspection test was made of the Wilson automatic stop. Then the party took lunch at the hotel and enjoyed automobile drives in the afternoon. A separate lunch was given to officers of the association and a few others at the Chamber of Commerce Building by the Chamber of Commerce. After this luncheon speeches were made by C. Loomis Allen, Charles L. Henry, William J. Clark, W. F. Ham and Charles C. Pierce. All discussed the needs of the electric railway, the importance of electric railways in the development and prosperity of the cities, the need of more liberal and fairer treatment of the electric roads and the desirability of co-operation on the part of chambers of commerce and other bodies of public-spirited and influential citizens. At the close of the meeting the president of the Chamber expressed the appreciation of his organization at the opportunity of hearing these remarks. The local papers in the evening editions gave considerable space to the addresses.

The departure of the special train from Spokane in the evening was delayed several hours so that the train would go through the Cascade Tunnel of the Great Northern Railway by daylight. Seattle was reached by Wednesday noon.

The "Red Special" party spent Wednesday in Seattle as guests of the Puget Sound Traction, Light & Power Company inspecting the system and touring the city in automobiles.

Thursday was spent in Portland, the travelers being the guests of the Portland Railway, Light & Power Company. The party was taken by electric cars to the principal points of interest. Several members also attended a farewell luncheon which was extended on this day at noon by the Portland Chamber of Commerce to F. W. Hild. Mr. Hild recently resigned as general manager at Portland to become vice-president and general manager of the Denver Tramway System, succeeding John A. Beeler, resigned. At the luncheon C. Loomis Allen, W. F. Ham and Charles C. Peirce addressed the members of the Chamber on the electric railway problems of the day. President Griffith then paid a tribute to the ability of the retiring manager, who replied in a fitting speech. The train left Portland for San Francisco exactly on schedule at 8.15 Thursday evening via the Southern Pacific Railway.

The trip has proved a very delightful one, and the number of passengers has grown to 131, including fifty-two ladies.

The committee in charge of the train, headed by Frank H. Gale, master of transportation, and H. G. McConnaughy, secretary of the Manufacturers' Association, had most carefully planned all details, and provided surprises each day, in the way of flowers for the ladies and other attentions.

CHICAGO SECTION SENDS TWO MEN TO CONVENTION

At the first meeting of the Chicago Elevated Railroad section following the summer vacation two members were elected as delegates to the San Francisco convention. One of these delegates was elected by a popular vote of all the members of the section and the other was selected because he submitted the best suggestion for improvement in the elevated railroad service, which at the same time would effect a considerable money saving. A. H. Daus, assistant master mechanic, was elected a delegate in a very close contest, winning by only eight votes. Mr. Daus began service as an armature winder in the shops of the elevated railroads in 1898. He was successively advanced to various positions in the mechanical department and was appointed assistant master mechanic in 1913. For the employee submitting the most meritorious suggestion, C. E. Shaw, Metropolitan division foreman of signals and interlocking, was selected. Numerous suggestions were submitted, and the rather unusual thing about the winning suggestion was that it applied to the train service which was entirely out of the winner's department. The winning suggestion, as well as other suggestions of merit, follow:

WINNING SUGGESTION

A means of cutting down operating cost while running trains at same interval from 9.30 a. m. to 4.30 p. m., and from 7 p. m. to 12 midnight—twelve hours out of twenty-four. Every other train from the four branches to run express on track No. 3 east from Marshfield Avenue to Franklin Street without stop—and express west on No. 1 track from Franklin Street to Marshfield Avenue without stop. Trains that run express east to run local west, and trains that run local east to run express west, thus saving four minutes running time on each round trip. Two minutes more can be taken from the relay at the terminal, making six minutes, the interval of trains, which will allow one train to be taken off of each branch, thus saving the cost of running four trains for twelve hours out of each twenty-four hours.

CHARLES E. SHAW,
Foreman of Signals and Interlocking.

WINNER OF SECOND PLACE

A suggestion for reducing maintenance cost on electrical equipment:

The introduction of a fusible element into an electrical circuit so installed that the temperature of coil or apparatus will melt the fusible element and automatically open the electric circuit before high temperature has affected the insulation and caused the apparatus to become short-circuited, thereby saving the cost of rewinding, plus that of material. The fuse can be installed on the most accessible parts.

Test made with fusible element:

Temperature at which enamel covered wire will carbonize and cause short-circuit	450 deg. Fahr.
Temperature at which fuse will melt	320 deg. Fahr.
Highest operating temperature of coil in service	200 deg. Fahr.

This fusible element can be introduced into circuits of pilot motor, reverser and pump motor on South Side cars, and of reverser, current relay, reset coil on Type M cars on Northwestern Elevated cars.

Number of roasted pilot motors due to jamming, per month, twelve

Cost of rewinding armature, field and brake coils	$9.40
Cost of renewing fuse	.50
Net saving on repairs	$8.90
Total saving per month based on average number of failures on pilot motor	$108.80
Average cost of repairing roasted reverser coils	5.00
Net saving on repairs to coil	4.00
Total saving per month based on six failures	24.00

The introduction of a fusible element will not reduce the number of failures, but will only reduce cost of repairs.

A. H. DAUS, Assistant Master Mechanic.

OTHER MERITORIOUS SUGGESTIONS

After a careful study of trains in operating at Kimball Avenue terminal I find we can reduce the number of hours in the tower from twenty-four to ten per day, except Saturday, which should be fourteen hours on account of adding and cutting cars. At present they are working a twenty-four-hour trick, but the following schedule should apply:

Daily (except Saturday), 6 a. m. to 11 a. m., and 3 p. m. to 8 p. m.

Saturday from 6 a. m. to 8 p. m., fourteen hours.

Sunday—No work at all.

The present practice requires 720 hours, $244.80 per month, or $2,937.60 per year. The saving would be 276 hours, $103.84 per month or $1,245.08 per year.

JOHN MANNION, Dispatcher.

A fund providing for sickness, disability and old age might be established by the Chicago Elevated Railways on a co-operative basis, the company and the employees to contribute to the fund in an equitable manner. A committee composed of officers and employees of the company should be appointed to investigate thoroughly all organizations related in any way with such a plan and then submit the result of their investigation, together with their recommendations, to a mass meeting of all employees and officials of the company.

The establishment of such a fund and its proper control will do more to advance the interests of the company, and engender a spirit of faithful service than anything I know of. A contented and efficient set of employees is the greatest asset of a corporation. "Co-operation First."

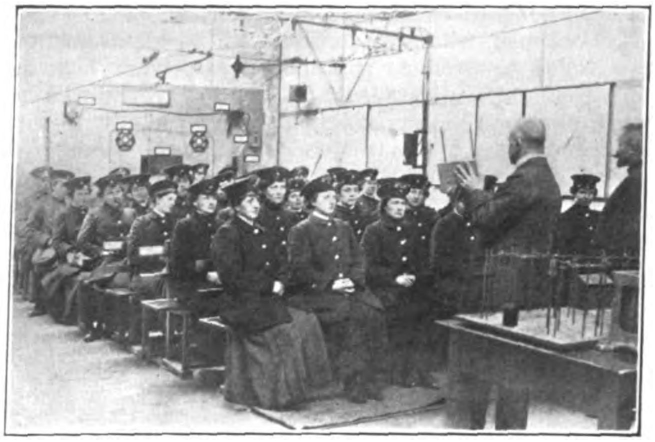
JOHN MCINTOSH, General Superviser of Service.

At this meeting of the section 160 members were in attendance, and the secretary reported twenty new applications, which makes the total membership 188. In the program which followed H. A. Otis, engineer in the office of the master mechanic, spoke on the value of coasting. He explained what coasting is, the many benefits to be derived from it, and the measures that have been taken by electric railways throughout the country to encourage the motormen to do more coasting. He also described the various methods employed to increase coasting and outlined a scheme of installing coasting boards on the elevated railway system to increase coasting. He said that after carefully experimenting and testing the service the general supervisor of service had selected locations for these boards. In addition to this the supervisor spends his entire time in instructing the motormen and their immediate instructors in the proper method of train operation, paying particular attention to coasting.

J. T. McIntosh, general supervisor of service, spoke on "The Efficient Motorman." He discussed his subject by taking his audience, in imagination, on the trip from one end of the road to the other, during which he outlined what the efficient motorman would do at each particular point and in every conceivable circumstance or emergency. Mr. McIntosh stated his belief that much could be accomplished to increase coasting by instructing the motorman. He felt that work in this direction was as important as the installation of instruments for recording the amount of coasting.

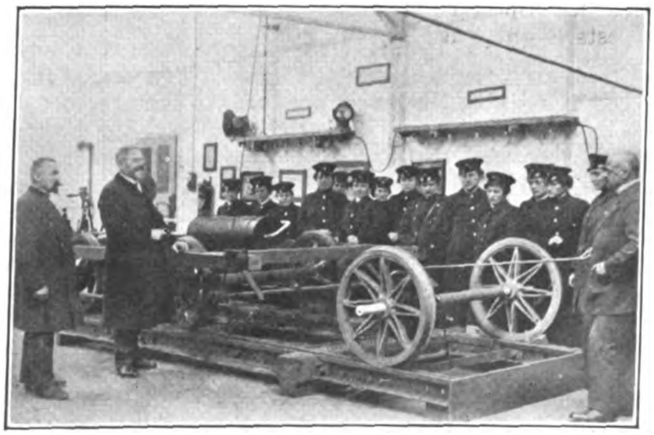
Women Conductors in Berlin

As noted in the ELECTRIC RAILWAY JOURNAL for April 24, 1915, the Grosse Berliner Strassenbahn (Great Berlin Street Railway) had already found it necessary to employ more than 600 women as conductors to take the place of men called to the front. At that time more than 50 per cent of all the employees had already been called to the colors. It is very likely that this percentage has since been greatly increased because the government has made further levies, and because it is the practice of German railways in hiring men to favor those who have already been in the army.



WOMEN CONDUCTORS IN BERLIN—A LECTURE ON PLOW COLLECTOR AND OTHER CAR DETAILS

The accompanying illustrations were recently taken in the inspection room of this railway. One of them shows a class of women being instructed in the use of the plow collector and other details. It will be observed also that the room contains parts of overhead equipment, it being customary to instruct platform employees in the correct names of line fixtures. An illustration taken in another part of the same room shows a demonstration of truck and track equipment; also the application of trolley catchers and headlights.



WOMEN CONDUCTORS IN BERLIN—STUDIES IN TRACK AND TRACK EQUIPMENT

COMMUNICATION

Standards in Car Design

NEW YORK, Sept. 22, 1915.

To the Editors:

Mr. Gonzenbach's communication under the title "Cars at Less Than Cost" in the Sept. 11 issue seems to contain the following inferences: (1) Each car builder should make only one standard type of car. (2) Car builders' overhead expenses are too high. (3) He suggests a remedy.

As car builders have been fighting for years for standardization and the ELECTRIC RAILWAY JOURNAL has published editorials urging the same, it is encouraging to have a manager of Mr. Gonzenbach's prominence at last fall into line—in theory at least. Numberless cars have been designed and patented by railway men and manufacturers in the confident belief that they would be generally adopted as standard. Recently we have the Hedley-Doyle car, the Jones car, the Adams car, the Mitten car, the Brinckerhoff car, the Birney car, the "Peatwit" car, etc. All have great merit. But none has been nor will be adopted as standard.

If these men, who are familiar with all requirements, have failed to produce a standard car, what hope is there that car builders can design one which will be acceptable to all? Cars will continue to be built to suit local conditions, and automobiles will be designed for general conditions.

While a standard car would prove a blessing to the car builders, it is a question whether the railways could afford to confine themselves to it for any extended period. Without the initiative and courage exercised by the above-named men and other men equally courageous, we still would to this day be riding in bob-tail "hay-burners" over strap rails.

As to overhead expense in car building, I venture to say that it is kept much lower than the average in other lines of manufacturing of equal volume. A considerable percentage of this overhead burden is selling expense, and for this the railways are to some extent responsible. I have known several cases where a dozen or more high-salaried salesmen and engineers were detained for from one to two months by frequent postponements on the part of railway companies in letting contracts for cars. Doubtless the purchaser thought this was costing him nothing and that impatience and nervous exhaustion among the supply men might result in concessions which could not be obtained earlier. But selling expense is a legitimate part of manufacturing cost and ultimately the consumer pays for it. How many purchasers appreciate that they are paying the expenses of the men they keep waiting in anterooms and hotel lobbies?

A real saving in the cost of cars and real competition, also, could be effected by receiving sealed proposals at a stated time, opening them in the presence of the bidders, announcing the prices publicly, and awarding the contract to the lowest responsible bidder.

Now, as to Mr. Gonzenbach's remedy, I quote as follows from his communication: "Let them produce a standard car at a standard price, based on an output of 100,000 cars a year, or something like that." There are about ten active electric car builders. This would mean a total output of 1,000,000 cars per year. However, the average number of cars purchased per year during the last eight or ten years was approximately only 5000, and this shows clearly the impossibility of making a production proposition out of car building along the lines that have been applied to automobile manufacture.

CAR BUILDER.

Commerce Commission Hears Principles of Valuation Discussed

Depreciation proved to be the chief bone of contention on Sept. 30, the first day of the three-day conference called by the Interstate Commerce Commission to discuss the fundamental principles of valuation. W. G. Brantley, speaking for the carriers, reiterated his argument made at the conference last May, that the use of the component parts in the complete railroad should govern, and that therefore there should be no depreciation deducted unless there was deferred maintenance. For instance, he would consider track as a whole, and not as individual ties and rails. Questions put by the director and several of the commissioners indicated that they doubted their authority to do this under the valuation act.

About 100 men attended the sessions. The carriers' arguments were presented by four of counsel, G. S. Patterson, Pierce Butler, Sanford Robinson and Mr. Brantley. They indicated at the start that they would need at least two days. They had already filed a 544-page brief with the commission, printed copies of which were available. As the State commissions had not held any meeting to formulate an argument, the members present indicated that they would confine themselves to the filing of briefs.

The carriers had divided their argument into nine sections. Mr. Patterson discussed the first—the purposes of the valuation act. He cited seven reasons, including bases for rate-making, taxation and capitalization.

Mr. Butler, discussing cost of reproduction new, brought out briefly the main points hitherto presented by the carriers relative to the determination of quantities and the overhead allowances. Mr. Robinson discussed separately the fixing of unit prices, asking the exercise of the best judgment and the consideration of prices for a ten-year period.

Mr. Brantley's topic was "Appreciation and Depreciation." He began with the latter, and had not finished when the conference was adjourned for the day.

Flange Oiling

At the recent convention of the Traveling Engineers' Association it was stated that the wear on the wheel flanges of steam locomotives was one of the greatest sources of annoyance and expense in maintaining the machines in service, but it was estimated that, by the use of a flange oiler, the mileage between tire turnings for flange wear would be increased from three times to four times the original figure. Also, the rapid wear of rails can be eliminated to a certain extent by the use of flange oilers that positively deliver jets of asphaltum oil against the flanges of the wheel. On one division of the Erie Railroad the saving in rails on curves was reported to be 66 per cent. On the Delaware, Lackawanna & Western Railroad the saving on curves alone warranted the expense of flange-oiling equipment, and in addition, the saving on the tires was more than 60 per cent. It was stated that proof had been given by a number of roads that the flange oiler does prevent derailment. The impression that any crude oil would do to use with a system of flange oiling was common, but several experiments have proved that results cannot be obtained unless the oil contains from 40 per cent to 60 per cent of asphaltum in solution, and is low in grease and paraffine. All oils that are low in asphaltum and high in grease and paraffine will run down onto the thread of the wheel, causing slipping and tending to defeat the purpose of the device.

Equipment and Its Maintenance

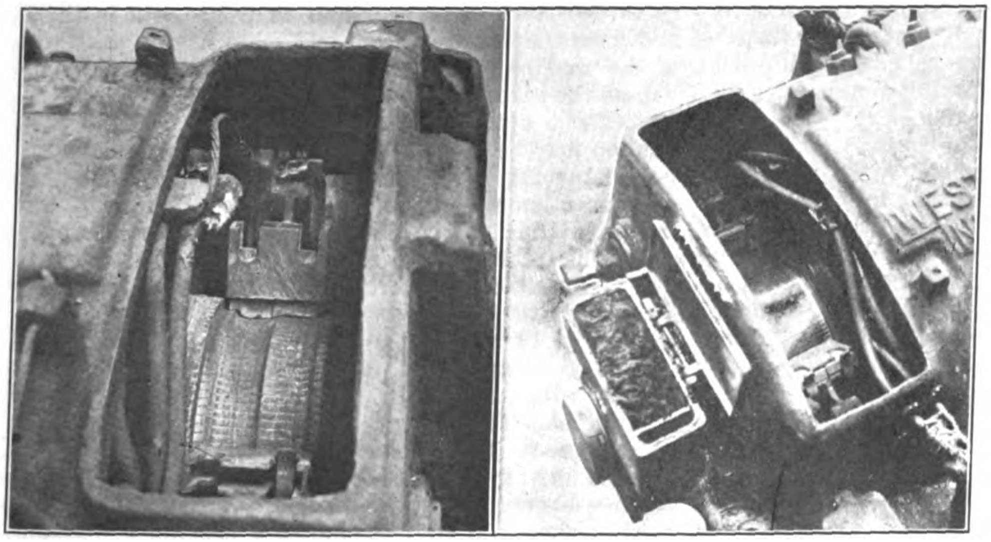
Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Good Results from Old Motors in Atlantic City

BY GEORGE F. FABER, GENERAL SUPERINTENDENT ATLANTIC CITY AND SHORE RAILROAD

The problem of getting maximum efficiency out of the older types of motors, such as Westinghouse No. 68, of which we have forty two-motor and one four-motor equipments, has been a difficult proposition in Atlantic City, especially for the reason that these motors are used during the heavy-service summer months and on an average line voltage of about 575, with severe surges at times due to the starting and stopping of the heavy trains run by the West Jersey & Seashore Railroad from which this company buys its power. In addition, the heavy riding season in Atlantic City continues for but ten to twelve weeks, necessarily involving the employment of a large force of inexperienced men to operate the cars, and just about the time when these men are becoming thoroughly competent in their work the season is over, and off they go. Thus, green men handling old equipment with high and irregular voltage make a bad combination for efficient operation and low maintenance charges, and our shop forces have been kept very busy.



GOOD RESULTS FROM OLD MOTORS—WESTINGHOUSE 68-C MOTOR BEFORE AND AFTER REMODELING

The most unsatisfactory feature of the old type of motor was the poor design of oiling device. To remedy this condition we have installed cast-iron lubricating oil boxes like those shown in the accompanying illustration, which make waste-feeding oil boxes equal to those on modern motors. We are using solid armature bearings with openings for oil feed only at the top, and are also cutting out the openings in the bearings to nearly twice their original size to give more contact surface between the waste and the armature shafts. We are still using babbitted, iron-shell armature bearings, but are now figuring on eliminating these gradually and replacing them with solid bronze bearings.

In the overhauling of these motors, which are nearly twenty years old, we find that the housings in the motor frames have become worn. We have not rebored them, as at present we have not the facilities to do this work, but have shimmed them up with hard fiber shims. Some roads have designed a special machine for reboring motor shells, which is the only proper way to get correct results, but we could not undertake this all-important operation at this time. We have also slotted the commutators, and have changed the motor connections to make all the motors field-fed. The top covers have been left off, and the bottom inspection covers have been perforated to allow more ventilation and to get rid of the carbon and copper dust. This formerly was quickly deposited on the armature and in the case, and was the cause of many of the flash-overs in the motors of Types 68 and 68-C.

Since we have thoroughly overhauled all open-car equipments we are getting excellent results, not only in commutation but in good lubrication of bearings, and have not had a car taken out of service for a grounded armature since the cars were placed in service in April. With the improvement in the motors and careful inspection, together with the fact that we test everything thoroughly before it gets into a car, our maintenance cost has decreased materially and I believe it will continue to do so.

Many roads would recommend scrapping such old equipment, believing it to be more costly in the end to make these improvements than to purchase the newer types of motors, but I find the Westinghouse 68 and Westinghouse 68-C motors are very economical from a power consumption standpoint and feel now that we are getting very satisfactory results.

Indexing Car Equipment Data

BY NORMAN LITCHFIELD, M. E.

The indexing of data has been the subject of much study in all classes of knowledge, engineering or otherwise, and many systems have been evolved in the attempt to obtain one which would make the data instantly available when needed. Outside of the many valuable handbooks each engineer must, of necessity, collect information pertaining to his particular line of work, and as time goes on and the mass of material assumes considerable proportions some system of filing and indexing becomes imperative. In the choice of one suitable to the nature of the information lies the success or failure of the collection of data.

One of the most successful index forms is that known as the Dewey decimal system, which is in use by many large libraries and industrial concerns. It consists essentially of the division of the subject data to be classified into nine chief subdivisions, each being numbered one of the integers from 1 to 9. Each subdivision is then again divided into nine further classes, the first being numbered, 1.1, the second 1.2, the third 1.3, etc. Still further subdivision may be used, as 1.21, 1.22 or 1.31, 1.32, etc. This has many advantages over other systems, such as the alphabetical, and lends itself readily to car equipment data.

The following nine main subdivisions are suggested, having been found in practice to cover the ground conveniently and thoroughly.

1—Office.
2—Weights.
3—Costs.
4—Progress.
5—Equipment data.
6—Transportation and traffic.
7—Specifications.
8—Dimensions and capacities of cars.
9—Other information.

Under the first heading may be grouped matter concerning the office and needed for ready reference, such as addresses, rates of pay, records of service, etc. The second and third classes are selected because it was found that if the weight of an article such as a brakeshoe was listed under a detailed subject heading it might be found either under "brake," "shoes" or "truck details." Again, many parts are called by different names—thus, a "swing hanger," "swing-motion hanger" or "swing-link" all denote the same part. Obviously the same principle is equally true in regard to costs.

With the Dewey system as applied in the foregoing if the weight of a part is desired, one first looks over the short list of nine main divisions, which the eye scans readily, and instantly selects the division under which the desired item is most likely to be found. One then turns to the page of the catalog headed "weights," at the top of which is found the following list of chief subdivisions.

2—Weights.

2.1—Cars, complete on trucks.
2.2—Car bodies and parts of body structure.
2.3—Trucks and parts.
2.4—Equipment complete.
2.5—Brake parts.
2.6—Control parts.
2.7—Motor and parts.
2.8—Other electric and pneumatic equipment.
2.9—Miscellaneous.

If the article looked for does not fall in any of the first eight classes one turns to the page headed 2.9 where there may be found:

2.9—Miscellaneous.

2.91—Draft rigging
2.92—Seats, cushions and backs.
2.93—Doors.
2.94—Pneumatic devices.
2.95—Windows.
2.96—Hardware.
2.97—Hand holds.
2.98—Destination signs.
2.99—Other parts.

The same or a similar subdivision is applicable to Division No. 3, covering costs.

The fourth division, "progress," is intended to cover important dates and amount of work accomplished on jobs which require particular attention. The fifth division, or "equipment," covers main items such as number owned, date of manufacture and other general information, the subdivisions being the same as those under "weights."

Division No. 6 includes data in regard to operation of cars and other data upon transportation. Division No. 7 gives lists of all specifications and any notes thereon. Division No. 8 gives chief car dimensions and capacities which are apt to be distributed over several drawings and are brought together here for ready reference.

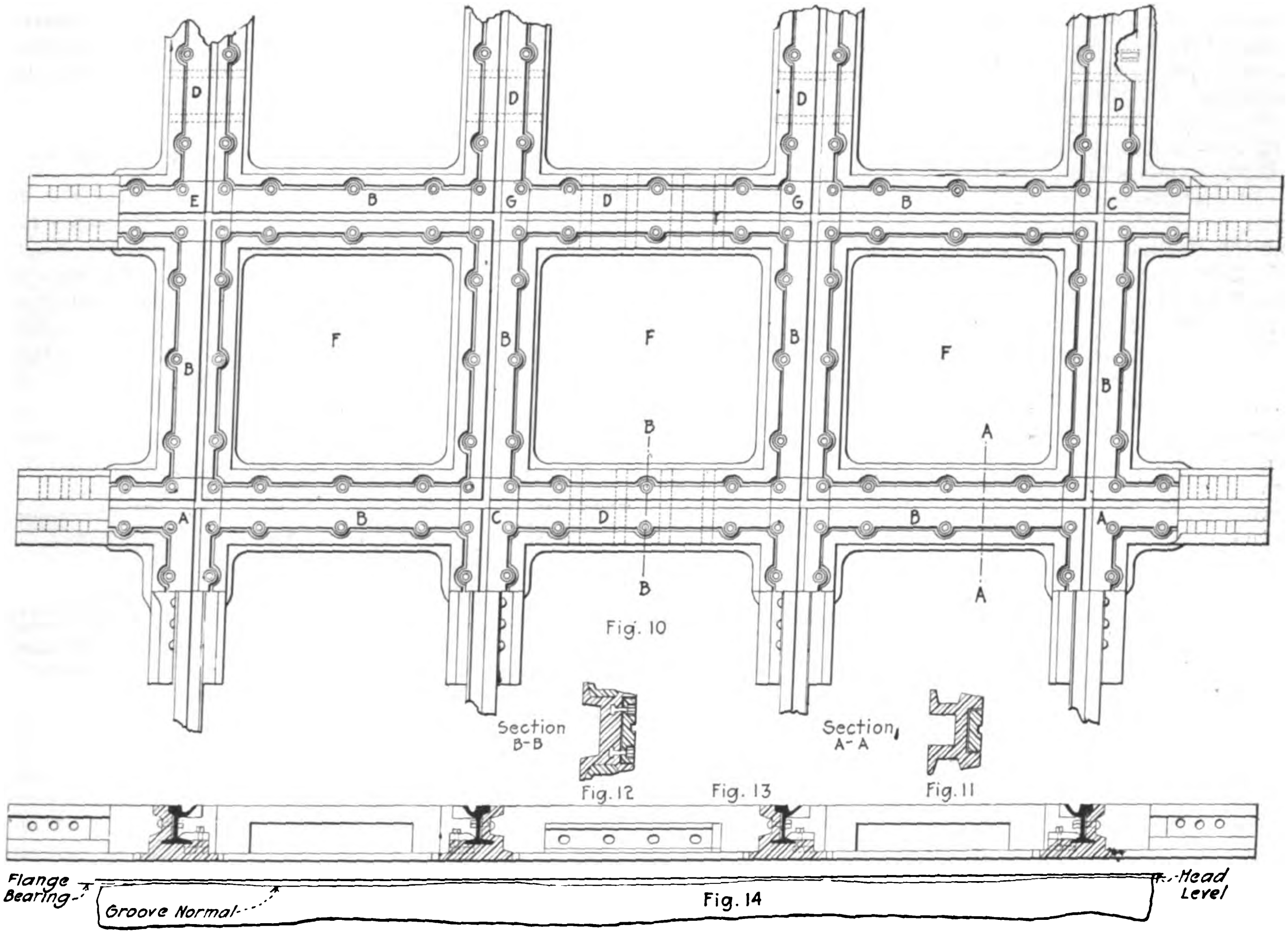
One of the chief advantages of this system is that it permits of indefinite expansion without disturbing or rearranging the data already collected and indexed. It has been found applicable not only to sets of file cards, but, in a modified form, to the filing of tracings. In the latter case, all tracings are numbered serially, the latest revisions being denoted by the subscrip *A*, *B*, *C*, etc., and listed in a catalog classified under the Dewey system, one copy being kept in the drafting and file room and another in safe deposit to guard against loss by fire of the office copy or otherwise.

Practical Views of Special Work—II—The Crossing

BY R. P. WILLIAMS, INSPECTOR OF SPECIAL WORK
BROOKLYN RAPID TRANSIT SYSTEM

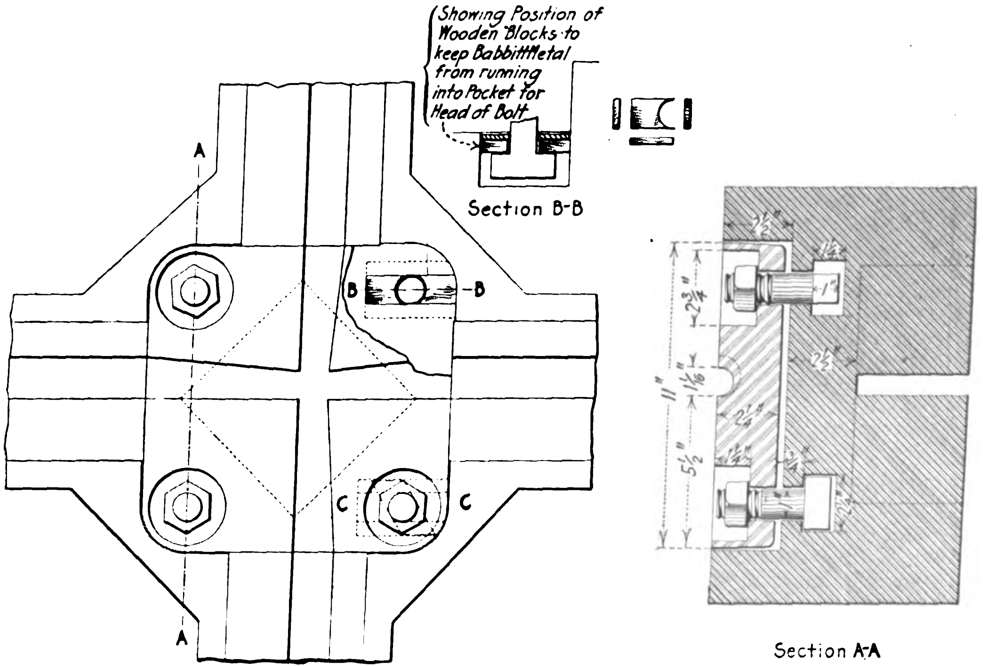
In the article published in last week's issue it was stated that the present design of special work is wasteful. Take the case of a double-track branch-off and assume that 75 per cent of the wear is confined to one run. When that side is worn out, all of the frogs must be thrown away with over half their life still in them, and with the tongue switch and mate having one-third of the wearing surface in good shape. With solid manganese the percentage of waste is increased. The writer advocates a practical change of design so that the worn portion may be discarded, and new parts installed without disturbing the pavement. This has been the ideal in connection with all special work construction. The crossing being the hardest proposition in maintenance, it will be interesting to see if this plan is feasible, and if it is feasible in the crossing, the same principle may be used in the tongue switch, mate and frogs.

In Fig. 10 is shown a rough drawing of one-half of a 90-deg. crossing with an entirely renewable top, the whole being within the lines of the present accepted conditions. There is not one renewable part as big as a manganese tongue-switch bed, while in the present design of branch-offs and complicated layouts there are many larger pieces designed for renewability. The writer showed a similar plan to a prominent manufacturer, who said, "The plan is good, it is feasible and sound. The point will be to impress the necessity for a good foundation." And that is the point; if the plan is accepted, it should be with the consideration of an all-steel permanent tie bed. Referring to the drawing, it will be noted that the crossing consists of four main interchangeable iron castings, *F*, 10 in. in depth. These would, of course, be better and lighter if made of steel. The renewable parts, *A*, *B*, *C*, *D*, *E* and *G*, are also interchangeable, calling for seven patterns. The complete crossing consists, all told, of fifty-two pieces, counting the eight joints, as against the present design which requires 104 pieces, counting the joints sixteen in number, all subject to wheel wear. In the new design there are no such joints. *D* is one piece reaching across the devil strip, and bridging the joint of the substructure. This is the only piece which would have to be babbitted in the field, the balance being fastened in the main casting, *F*, at the factory. The only unsatisfactory feature is that the cavity for the bolt head is one-half in each of the castings, *F*. This might be made so that there would be eight holding-down bolts, the center ones being shifted so that four would be in each arm. That is to say, one of the center bolts could be staggered so that there would be one on each side of the joint. The cross-section, Fig. 12, shows the fish-plate arrangement


D
E
B
G
C
F
A
Fig. 10
Section B-B
Section A-A
Fig. 12
Fig. 13
Fig. 11
Flange Bearing
Groove Normal
Fig. 14
Head Level

SPECIAL WORK—FIGS. 10 TO 14, PLAN, VERTICAL SECTION AND CROSS-SECTIONS OF IMPROVED 90-DEG. GIRDER CROSSING

allowing of this change. Fig. 13 is an end elevation showing the method of connecting to the straight rail. Fig. 14 shows the possibilities of flange bearing as against the present unsatisfactory short bevels in renewable centers. The renewable portion will not run over 85 lb. per yard as against the present heavy guard section. If properly made and installed, the sub-structure is capable of outlasting several top renewals, and when scrapped will bring a higher price, being in short lengths. Another feature which must not be lost sight of is that there is no high-priced girder rail used in its construction, therefore the bidding field is larger, for it is within the possibility of manufacture in any iron foundry. The design lends itself to any one of three forms used in insert construction, the all-machined, the partly-machined, or the all-babbitted form, but the partly-machined seems to be the best form. The whole scheme is built about the fastening system, and while this is a patented device, the patent was obtained to safeguard our company so that it might not infringe on any device now in use, and not for profit, individual or collective. This fastening has been tried out in Brooklyn under all kinds of traffic, and of some 250 centers installed, covering a period of two years, only one has loosened up. Investigation showed that to have been due to faulty work in the factory. The all-babbitted style

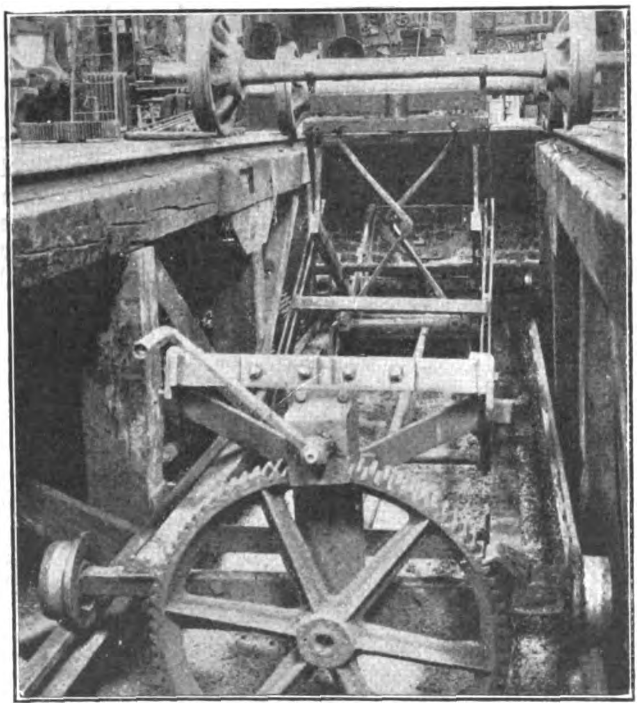

Showing Position of Wooden Blocks to keep Babbitt Metal from running into Pocket for Head of Bolt
Section B-B
A
B
C
2½"
1¼"
2¾"
1"
2½"
11"
1⅛"
2¼"
1¼"
¾"
5½"
2¼"
Section A-A

SPECIAL WORK—FIGS. 15 AND 16, PLAN AND CROSS-SECTION OF SQUARE CENTER FOR GIRDER CROSSING was used and one of the posts was 1/16 in. low. Without disturbing the babbitt, the center was removed, a liner of the proper thickness was inserted, and the center was bolted back with the same nuts. Fig. 15 is a plan view of the fastening referred to, the detail at *BB* showing strips in place to prevent babbitt or dirt entering the lower chamber.

In the cross-section *AA*, Fig. 16, the bolt at the bottom is shown turned as at *CC* in the plan, while the one at the top is shown turned ready to be lifted against the bottom of the babbitt for removal. If no babbitt is allowed to enter the lower chamber or to mount up along the bolt (and by this is meant that the lower chamber must contain nothing but the bolt head), the nuts may be loosened at any time, and the bolts turned back as at the top in Fig. 16, then lifted and a pry inserted under the nut, thus removing, at once, bolts, babbitt and center. With this type of fastening used in constructing the tongue switch shown in Fig. 2 of the article in last week's issue, the problem of repair, even in the present form of construction, would be solved.

A Safe Wheel-Changing Jack

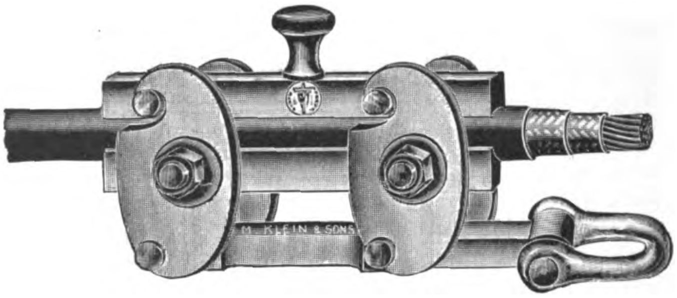
Safety and flexibility are the essential features of the novel wheel-changing jack used in the shops of the Sioux City (Iowa) Service Company's shops. This jack is 15 ft. in over-all length and employs the pantograph principle. It is manually controlled through a crank, gear and pinion. The changing mechanism is mounted on a truck equipped with roller-bearing wheels, which in turn rest upon a track extending the full length of the repair pit. The roller-bearing wheels were adopted so that the jack carrying a car wheel could be readily moved from beneath a car by one man. The parts of the pantograph or folding-jack mechanism are made of ⅝-in. x 3-in. steel bars with pin bearings. A swiveled saddle supports the axle of a pair of wheels at two points, and the range of the jack is such that as soon as the wheels are released from the track rails the axle may be swung in line with the track and the wheels lowered to clear the underside of the truck. The man at the operating crank is 6 ft. away from the wheel, consequently well in the clear if any accident should occur. A view of this unique wheel-changing jack is shown in the accompanying illustration.



SIOUX CITY WHEEL-CHANGING JACK

Quickly-Adjustable Feeder Grip

A tool for handling feeder cables from 250,000 to 500,000 circ. mil capacity, lead-covered cables and steel messenger wire, is being marketed by Mathias Klein & Sons, Chicago, Ill., and is shown in the accompanying illustration. The main body construction of the grip is of substantial steel casting. Pivoted side plates control the action of the upper and lower jaws. The upper jaw is removable to facilitate application of the cable.



GRIP FOR LARGE-SIZE CABLES

It is merely necessary to disengage lugs from the notches in the side plates in order to remove the upper jaw before or after using the grip. The manufacturers claim the grip to be rapid in application and release, and automatic in action, thus embodying an improvement over the old troublesome chain and ring method of stringing large-size cables. Its hold is in direct ratio to the pull exerted. The grip is made in two sizes, one for ⅝-in. strain and the other for cables of 250,000 to 500,000 circ. mil.

In a recent test by a large operating company, 19,500 ft. of 500,000 circ. mil insulated feeder cable was pulled in place without the slightest slippage or damage to the insulation.

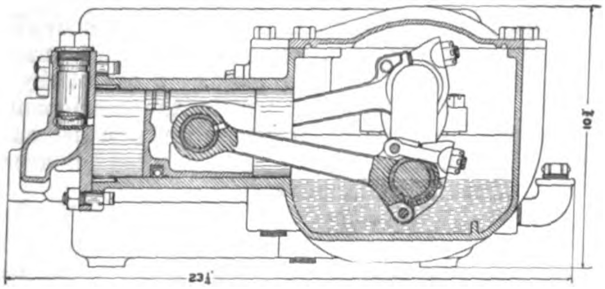
Pole-Guy Anchor Tests

The Faultless Anchor Company, Fostoria, Ohio, recently conducted an elaborate test upon several different sizes of anchors in order to obtain data bearing upon the holding strain of the devices and also to determine the ultimate strain required to break the anchor or to pull it from the ground. In the test the load was tied to the anchor by connecting it through a dynamometer with a double set of large blocks and a heavy-duty chainfall to a heavily-guyed pole of normal height. A substantial initial strain was first applied and a mark made on the anchor rod to indicate its initial position. The creeping of the rod was measured from this initial margin, the load being added in increments of from 500 lb. to 1500 lb. Measurements for creep were made between each loading, and an interval of five minutes without strain was allowed between each pair of loads.

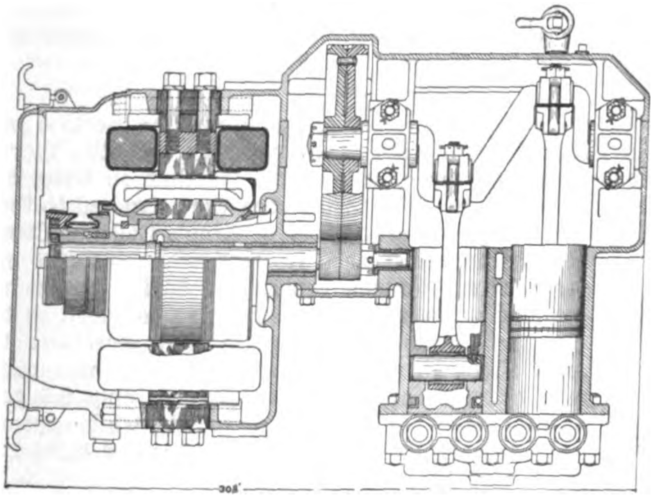
The result of these tests was as follows: A two-blade, 16-in.-spread anchor with ½-in. rod held without creep at 5500 lb. pull and broke in the rod at 6600 lb. A two-blade, 18-in.-spread anchor with ⅝-in. rod held without creep at 4800 lb. when one blade broke because of a flaw in the casting. The capacity of this anchor is said to be about 9000 lb. A three-blade. 18-in.-spread anchor with ¾-in. rod held without creep at 12,800 lb., the blade bending down at 13,200 lb. pull. A four-blade, 24-in.-spread anchor with a 1-in. rod had its blade bent down at a pull of 5200 lb. without any creep having been previously apparent. This type of anchor is newly designed, being intended to hold a load of 16,000 lb. without creep in dead-end and cable-strain service, and as this test was the first to which the new design was subjected, it proved that the fins require more metal.

Compressor for Light-Weight, Low-Floor Cars

Reductions in weight and decreased clearances incident to low-floor cars have created a demand for a light-weight minimum-dimension air compressor, and such a design has recently been developed by the National Brake & Electric Company, Milwaukee, Wis., the new machines being exhibited in the company's booth at the San Francisco Exposition. This compressor is known as the National Type MW-1. It embodies all the latest improvements in air-brake compressor design, including an improved method of preventing the loss of oil or escape of oil vapor from the casing. Ease of access to all working parts, and a quick and easy method of mounting and dismounting by means of three-point suspension straps, are also distinctive features.

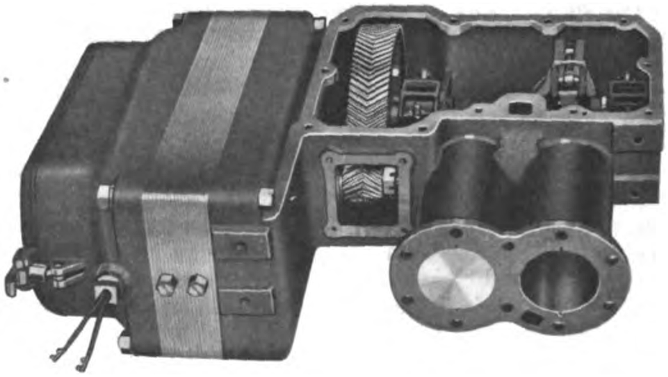


LIGHT-WEIGHT AIR COMPRESSOR—CROSS-SECTION OF COMPRESSOR



LIGHT-WEIGHT AIR COMPRESSOR—HORIZONTAL SECTION OF COMPRESSOR

The motor is of the four-pole, direct-current, series-wound type, and it is completely inclosed, equipped with two field coils and designed to operate with its frame grounded. Important features provided in the motor construction are a slotted commutator, improved commutation, increased creepage surfaces, low temperature rating, spring plates for holding field coils rigidly in place, laminated field yoke and pole faces, protection for armature winding and brush-holders mounted in fixed position on the frame. A simple method of adjusting the brush pressure is used, and provision is made for easy removal of the armature. In general, the construction is compact and rugged, and the design obtains a high efficiency.



LIGHT-WEIGHT AIR COMPRESSOR—VIEW WITH COVER AND CYLINDER HEAD REMOVED

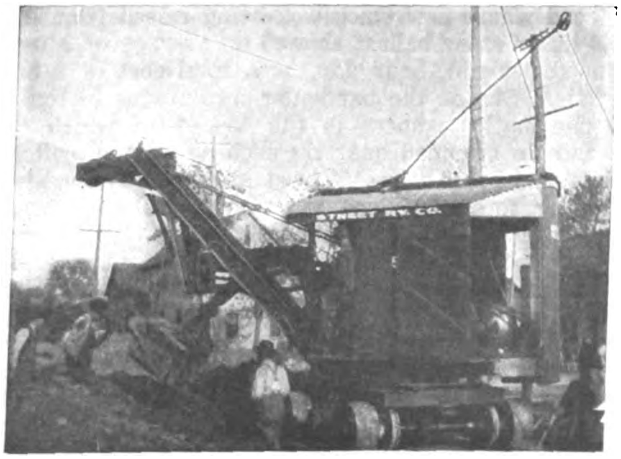
The compressor has a displacement of 10 cu. ft. per minute when operating against 100-lb. pressure. It has an over-all height of 10¾ in., and it weighs 400 lb., or 420 lb. with the suspension irons, brackets and bolts included. The compressor is of the gear-driven, single-acting, duplex, horizontal type.

Both the motor and the compressor form a complete, compact, dustproof unit. The cylinders, crankcase, motor housing and bearing brackets are cast in one piece, which provides rigidity and insures perfect alignment. A handhole in the front or cylinder side of the crankcase gives access to the pinion, and a hinged cover with positive locking devices on the motor end of the compressor provides access to the armature, field coils and brush-holders. Two sectional drawings shown in the accompanying illustrations give the dimensions and detailed arrangement, and a halftone illustration shows the air compressor with the cover and the cylinder head removed.

Electric Shovel for Railway Work

In 1903 the Thew Automatic Shovel Company, Lorain, Ohio, manufactured its first electric shovel, and this proved to be so successful that another type was brought out, this being similar in fundamental design, but modified in many respects to adapt it to the particular requirements of electric railway service. This shovel likewise was a success and at the present time many of the larger city and interurban lines of the country use it to handle all their excavating.

The horizontal "crowding" motion which is one of the features mainly responsible for this shovel's success, has proved to be ideal for digging shallow cuts, track trenching, grading interurban roadbeds, and for speed in performing the various kinds of work encoun-



AUTOMATIC ELECTRIC SHOVEL

tered in city and interurban lines. By reversing the crowding motion, an extremely powerful prying action is obtained which affords the most economical method known for tearing up concrete and track ballast, the shovel being frequently used for removing old rails and ties.

It is of the full-circle-swing variety and is very compact, features of great advantage in through-cut work or places of limited working space, and it also has a special jack-knife boom that will swing under trolley wires. In addition to handling all kinds of excavating, the shovel can be used for loading coal from stock piles, for handling pile drivers and for limited crane service. It is self-propelling, operated by one man, mounted on traction or car wheels or both and has proved to be a very profitable investment for even the small railway that has comparatively little excavating work to do.

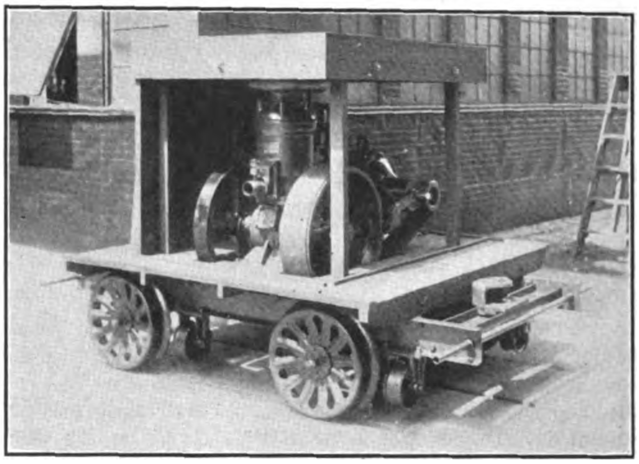
Ballasting Economy

The replacement of hand labor with machines has become the fixed policy of nearly every up-to-date electric railway company. This has led to the development among other devices of the "Imperial" pneumatic tamping machine, which is manufactured by the Ingersoll-Rand Company, New York, and which has proved to be the means of materially reducing the cost of track ballasting and maintenance.

The tampers are operated in pairs, one on each side of the tie. The operation of the tool is a rapid hammer action on the tamping bar, which in turn compacts the ballast and forces it down and under the tie. It is the practice to tamp each tie for a distance of about 18 in. on either side of the rail. Observations made on a railroad where new track was being raised from 2 in. to 3 in. on stone ballast showed an average of 240 ties tamped per nine-hour day, at a total cost of 2 cents per tie. One of the particular advantages in the use of pneumatic tampers is the ease with which they operate in cramped quarters such as around switches, frogs and cross-overs. These are places where hand tamping, to be well done, is a very difficult and in most cases practically impossible task.

TAMPING OUTFIT ON CLEVELAND RAILWAYS

For operating the tie tampers the manufacturer builds a special "Imperial" compressor unit in two styles, the ordinary outfit being the electric motor-driven type. This consists of a hand car mounted vertical air compressor with reservoir cooling system "short-belted" to an electric motor. Electric current is obtained from the trolley line, a suitable air receiver and piping being included. This compressor is designed to operate two tamping machines.

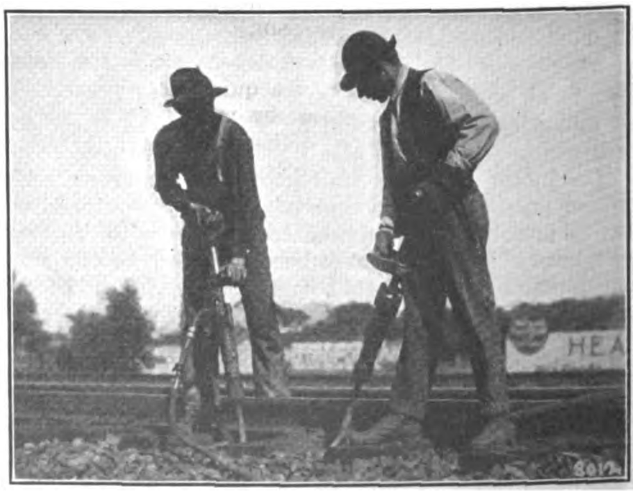


MOTOR-DRIVEN AIR COMPRESSOR FOR OPERATING TWO TIE TAMPERS

For operation where electric current is not available a gasoline engine-driven self-propelled unit may be used. This, except for the motor, is essentially the same as the compressor shown in the accompanying illustration. Gasoline-motor-driven units in use on the New York Central Railroad have effected an average saving of $150 per mile of track.

While no extensive cost data are yet available covering operation on electric roads it is to be assumed that the savings effected are well worth while. The manufacturer states that track tamped with "Imperial" tie tampers will be more evenly ballasted, that the ballast will be more firmly packed and that settlement of track will be much less and far more uniform than in the case of hand work. The machines handle stone, cinder or other ballast with equal effectiveness.

In a paper read before the Engineering Section of the British Association at Manchester recently, there were described the effects of the weather on wires of various materials. The test pieces were exposed to the London atmosphere on the roof of King's College. Commercial aluminum increased its electrical resistance by 17.2 per cent in thirteen years, and during the same time copper-aluminum alloys became so corroded as to be useless and a copper-manganese alloy increased its resistance about 10 per cent. Copper-manganese-magnesium alloys increased their resistances only 9.6 per cent in four years but had become brittle, while copper-nickel and copper-zinc-nickel alloys increased their resistance somewhat.



PNEUMATIC TIE TAMPERS IN OPERATION

LONDON LETTER

Experimental Working on the North-Eastern Railway—Regular Service on Line This Month—Additional Facts on Women Conductors

(From Our Regular Correspondent)

Experimental working on the electrified portion of the North-Eastern Railway from Shildon to Newport has commenced, and it is hoped that the whole length of what is known as the Simpasture branch from Shildon to Erimus sidings, Newport, near Middlesbrough, will be opened for traffic during October. This is the first experiment in the British Isles in handling heavy freight by electrical locomotives. The system differs from that of the electrified passenger lines on Tyneside. The current is collected by the overhead system and conducted by two bows to the locomotives. Ten engines will be employed. Nine of these machines have been completed, and have made experimental runs. They have eight wheels, each pair of wheels motor driven. The cab is in the center. The locomotives were designed by Vincent Raven, the chief mechanical engineer of the North-Eastern Railway, and were built at the Darlington works. Each locomotive is capable of hauling a load of 1000 tons. The line falls slightly from Shildon to Erimus, and average loads of 1000 tons will be taken on the outward journey. The average return load will be about 575 tons. The steepest gradient on the line is 1 in 100. The electrical equipment has been designed and carried out under the supervision of Charles A. Harrison, who recently retired as chief engineer of the company. The power is supplied by the Newcastle-on-Tyne Electric Supply Company and the Cleveland and the South Durham companies, which have erected the substations.

Investigations made by municipalities lately on the subject of female labor for tramways have resulted in eliciting the fact that throughout England there are only three large towns—Liverpool, Leeds and London—which are now not employing women as conductors on tramway cars. The reports generally are to the effect that the women are doing the work in a thoroughly satisfactory manner. In Liverpool and Leeds there seems to be some local feeling against the employment of women on tramcars. In London the County Council and the other tramway authorities have no option, because the Commissioner of Metropolitan Police objects to the employment of women, and his word is law on the matter. It is probable that but for this restriction women would in some cases be acting as conductors. Perhaps an appeal may be made to the Home Office should the scarcity of male conductors increase. If permission to employ women were granted it would probably be under restrictions as to hours, because most of the cars in the Metropolitan area are very large, so that the work of collecting fares is correspondingly arduous.

The Manchester tramways committee recently gave permission to the general manager to appoint a few women as conductors, and to report on the results. Mr. McElroy has stated that the scheme is simply an experiment. In all 602 guards have enlisted, and it has become increasingly difficult to obtain the right class of men to fill their places. Men have been engaged temporarily from the ranks of those above military age or physically unfit to join the army, but these sources are almost exhausted. Many of the older guards have been at work seven days a week, and some have given up their holidays. They cannot go on any further under existing conditions. Mr. McElroy proposes to experiment with two or three women as guards. While there is no question of the ability of women to collect fares and perform similar duties, some doubt exists as to their physical endurance, especially under adverse weather conditions.

It is now some months since the experiment of employing women as tramguards in Salford was first tried. Starting with a comparatively small number of women, the Salford authorities have gradually increased the number, until now there are fifty in the service. So far the experiment has proved a success.

The Underground Railways and the London General Omnibus Companies have in course of preparation a series of illustrated booklets dealing with notable features of London and its environs. Among the twelve subjects to be touched upon are the Tower, zoological gardens, city churches, Hyde Park, the markets and St. Albans. The first two booklets, dealing with the Tower and the zoological gardens, are ready, and may be had free of charge on application to the station masters at the Underground stations, or to the advertising manager, Electric Railway House, Broadway, Westminster, London, S. W.

All the horses of the London County Council tramways department have been disposed of, and the London County Council is abolishing the position of horse superintendent. Mr. Wilcox, who has held this office since 1903, has been transferred to the cartage department.

The Brighouse Corporation has agreed to a proposal by the Huddersfield Corporation for a postponement of the scheme whereby the latter proposed to connect its system with Brighouse and Bradford by the construction of a new line through Rastrick. It was arranged to deposit the necessary bill in the forthcoming session of Parliament, but it has since been decided by both the authorities that the scheme shall be delayed until the session of 1917.

The new trackless routes of the Mexbro' & Swinton Tramways have been inspected by the Board of Trade and formally opened for public service. The two sections extend from Mexbro' to the Manvers main colliery on the west, and to Elm Green, Conisbro', on the east. They will prove a considerable benefit to the miners who work in these localities. Each car will hold twenty-eight passengers. They have been so designed that they can run over the permanent track through Mexbro' which connects the two new sections.

Some remarkable figures showing the development of tramway traffic in Liverpool have been published recently. From Jan. 1 to Aug. 21 the receipts were £422,221 as against £443,061 last year. The passengers totaled 95,766,114, as against 94,053,741 in 1914. In reference to the anomaly of an increase of 1,712,373 passengers being coupled with a decrease of £840 in receipts, it was pointed out that 4,483,775 free journeys had been given to soldiers on duty or on furlough, to wounded soldiers and to nurses. Those journeys, at an average fare, would yield £22,745. Liverpool was the only city giving these free journeys to any great extent. So far as was known, this enormous traffic had been conducted without a complaint.

In the annual report of C. J. Spencer, general manager of the Bradford Corporation Tramways, there is a reply to the criticisms which have been offered from time to time against the trackless trolley system. Mr. Spencer contends that it is not correct to state that either a profit is being made or a loss incurred on the trackless routes in Bradford, because the feeding value, which is an important function of the car, cannot be taken into consideration in the accounts. The routes along which the cars are run are undoubtedly routes upon which tramways could not be laid without incurring heavy capital expenditure, and this method of traction was primarily adopted because of its cheapness in capital construction, and not because it was better than a tramway. He, therefore, submits that an efficient means of transit has been afforded in districts in which regular tramway service would be too costly.

The Underground Electric Railways have for some time been at work transferring the power supply of the City & South London Railway and the Central London Railway to the immense station at Lots Road, which supplies all of the other underground railways of the company. The two railways mentioned above have only recently been acquired and both had power stations of their own. Soon, however, these power houses will be discontinued, and both of the railways operated from Lots Road by means of substations.

A report has been presented to the Bristol Council from the tramways option committee regarding the option to purchase vested in the corporation which expires on Oct. 31 next. The lords of the treasury have given it as their opinion that it is not desirable, under existing conditions, that the purchase money should be raised either by the issue of stock or otherwise, and the committee recommends the Council to take advantage of a special act of Parliament passed this year and make application to the Board of Trade for an order extending for one year the period during which the corporation may exercise its option.

A. C. S.

News of Electric Railways

STRIKE IN FORT WAYNE

Despite a Court Order the Men on the Fort Wayne City Lines Go on Strike

In the face of a temporary restraining order granted by Judge Arthur B. Anderson of the United States District Court of Indiana, enjoining labor leaders from persuading the employees of the city lines of the Fort Wayne & Northern Indiana Traction Company from violating their working agreement with the company, the men quit work shortly after midnight on Sunday, Sept. 26. Complaint was filed in the Federal Court at Indianapolis on Saturday evening, Sept. 25, by the United States Mortgage & Trust Company, New York, trustee under the mortgage of the Fort Wayne & Northern Indiana Traction Company, against Joseph C. Colgan, executive officer of the Amalgamated Association, who has been conducting the work of organizing the union at Fort Wayne, and the car service men who have signed the individual working agreement of the company, asserting that a strike was about to be called on the lines of the company in the city of Fort Wayne in violation of the contract between the company and its employees.

Judge Anderson entered an order on the showing of the United States Mortgage & Trust Company, temporarily restraining Colgan, his agents, and others who received notice of the issuance of the order, from persuading, intimidating or compelling the trainmen to leave the service of the company in a body, or in any way interfering with the operation of the cars of the company, until a hearing should be held in the United States Court on Oct. 5, at which time the court would decide whether the restraining order should be made permanent. Printed copies of the order were delivered to the employees of the company, and the order was read to Joseph C. Colgan and the members of the union at a meeting which was being held on Sunday night, Sept. 26, prior to the walkout. In spite of the order, the men failed to take out their cars Monday morning, and only about ten cars were operated in the city. About 180 car service men of the local city lines are involved in the strike, of whom about two-thirds have joined the union.

The point on which the strike was ordered, and practically the only demand made by the labor organizers, was the recognition by the company of the newly formed union. This was in violation of the "open shop" working agreement which was signed by all employees of the company on July 25, 1915, under the terms of which it was agreed that all differences arising between the company and its employees which could not be settled between them should be submitted to the Public Service Commission of Indiana, sitting as a board of arbitration. The union alleged that five men were discharged by the company for their activity in organizing the trainmen. The company had reinstated two of the men after a hearing of their cases, but refused reinstatement of three men on account of repeated violation of rules.

On the afternoon of Sept. 27, upon the showing of the United States Mortgage & Trust Company, through its attorneys, Ferdinand Winter and W. H. Latta, Indianapolis. Judge Anderson issued a citation for civil contempt against three union men identified with the strike movement. These men were ordered to appear in the United States District Court at Indianapolis on the morning of Oct. 5 to show cause why they should not pay such sums and compensation to the parties entitled to receive it as the court may find, and to answer to any other order of the court that may be made for violation of the court's restraining order.

An ordinance was passed by the City Council of Fort Wayne on Sept. 29 imposing the qualification that car crews shall have fourteen days' experience in operating cars over the streets of the city before being allowed to take out cars. The president of the Council asked the members to pass the ordinance for the avowed purpose of aiding the union to win the strike. The ordinance as passed includes a penalty of from $5 to $100 for each offense. The city attorney of Fort Wayne decided that the ordinance could not be made effective until Oct. 7, allowing time for publication.

Mayor Hosey requested the officials of the company to meet a committee of the union and arrange for arbitration. President J. M. Barrett of the company stated in a letter to the Mayor that harmonious relations with the men were interrupted by professional organizers who came to incite the strike and that the company had a contract with the employees which was violated when the men went out on strike under instructions from outside organizers. The employees had been required to return to work or lose their positions. Through their committee they declined to return to work. This was taken as final and the company secured other experienced and competent men to operate its cars who would continue as employees. These men were not strikebreakers, as reported. Mr. Barrett declined to agree to any board of arbitration other than the Public Service Commission. Mr. Barrett insisted on the company's legal and constitutional right to choose its employees for the operation and management of its business.

On the morning of Sept. 28, Sam W. Greenland, general manager of the company, stated that at least 65 per cent of the cars were being operated on the Fort Wayne city lines, some by the regular employees who had returned to work and others by new men who had been employed.

On Sept. 29 six cars were stopped and several of them stoned by strike sympathizers. A motorman was injured in this attack, but the arrest of three men, who were held under bond, seemed to quiet the disorder. Mr. Barrett promptly addressed a written appeal to Mayor Hosey for additional police protection and to put policemen on cars.

On Sept. 30 practically all regular cars were being operated in Fort Wayne in the day time, but operation was suspended in the evening to prevent violence. The feeling seems be prevail that the arrests following the recent disorder have had the desired chastening effect and that the company will be able to continue operating without further serious disorder from the lawless element.

FURTHERING THE PROGRESS OF THE TOLEDO FRANCHISE

A statement was filed with the City Clerk at Toledo, Ohio, on Sept. 23 by the committee of the Toledo Citizens' Franchise Association which filed the petitions for a referendum vote on the street railway franchise recently. In this case the statement is a review of the most important conditions of the franchise. It is as follows:

"To obtain municipal ownership of the street railway system any time during the twenty-five-year term of the ordinance, either by arbitration or condemnation proceedings.

"If the property is purchased, nothing shall be paid to the company on account of stocks, bonds or securities of the company, or for any franchise rights, and the remainder of the franchise term shall be surrendered by the company.

"The company must construct a cross-town line as directed, and equip the system with pay-as-you-enter or pay-as-you-leave cars.

"After the system has been rearranged the city shall, for a period of one year, direct the operation of the system. During this period the company shall give 3-cent fares by selling five tickets for 15 cents, which 3-cent rate of fare shall not be increased during the remainder of the term of the ordinance, provided the company receives a return of 6 per cent net on the appraised value of the street railway property.

"Children in arms, policemen and firemen in uniforms shall be carried free.

"Transfers for all passengers; extra transfers to or from cross-town lines.

"The city to regulate for safety and convenience of public and passengers.

"The company must pave, clean, sprinkle and keep the street car strip clear of snow.

"Provision is made for increased wages to employees of the company."

The Central Labor Union has gone on record as opposed to the initiated franchise and has made arrangements to take part in the campaign against it.

Petitions for the submission of the franchise to a referendum vote at the regular November election have been filed with City Auditor McDonnall. They contain 22,135 signatures. This is equal to the entire vote cast at the recent primary election. The men who circulated the petitions reported to the Citizens' Franchise Association that most of those who signed expressed themselves in favor of the franchise.

The franchise has been indorsed by the City Civic Federation. W. W. Campbell, president of the Municipal Ownership League, who expressed himself in favor of the franchise at a recent meeting, appeared at the offices of the Franchise Association and offered to aid in the campaign for the franchise.

RHODE ISLAND COMPANY RESTS ITS CASE

In the arbitration hearings of the Rhode Island Company on Sept. 28 at Providence, James M. Swift, attorney for the company, rested the case of the road. It is not known when the matter will go to the arbitration board for decision, however, as a considerable number of rebuttal witnesses are to be called by the union. At this session evidence regarding an interview with W. D. Mahon, president of the Amalgamated Association, as advanced in connection with reports of the recent union convention at Rochester, N. Y., and bearing upon the fundamental importance and desirability of arbitration, was submitted. The board also allowed the admission of an address by Mr. Mahon published in the *Motorman and Conductor*, in which the point was made that the wages of employees and the ability of companies to pay a living wage should be determined by local conditions and not by conditions existing elsewhere.

Prof. Albert S. Richey of the Worcester (Mass.) Polytechnic Institute was again on the stand at last week's hearings. He stated that in the last eight years tenement rentals had increased about 2.4 per cent. Comparisons were made of the cost of living in 1907 and 1914, taking the former year as a basis because it was the first in which the federal government issued a bulletin on the cost of foodstuffs. Professor Richey said that during this period foodstuffs had increased 22.4 per cent in price, while in 1915 there has been a reduction of 2.6 per cent from the 1914 price level. Between 1907 and 1914 clothing prices fell off 0.4 per cent, fuel prices rose 9.8 per cent, and lighting prices fell off 24.8 per cent. The witness testified that as a whole the cost of living in 1915 was 10.4 per cent more than in 1907, but that in 1914 it was 12.1 per cent more than in 1907. With the exception of clothing, these figures applied to retail prices. The weighted average of the principal items used in reaching the estimated result was as follows: food, 51.13 per cent; rent, 26.2 per cent; clothing, 16.4 per cent; fuel, 4.68 per cent; lighting, 1.59 per cent. Yearly wages have increased on the average 19.3 per cent, or 8.9 per cent more than the increased cost of living to 1915 inclusive. It was brought out that motormen and conductors on the Boston Elevated Railway received 3 cents a day more than at Providence and worked one hour less a day than men in the latter company. For 1914 the Rhode Island Company paid 8.5 per cent of its operating revenue in taxes, whereas ten Massachusetts companies paid 6.2 per cent of their revenue. In 1915 the Rhode Island Company was obliged to pay 9.3 per cent in taxes.

A. E. Potter, president of the company, also testified that in the last year the company had run all-night cars at a cost of $49,000, on account of the franchise agreement. The cars did not pay. Among the data sheets filed at the hearing was a list of union employees who have testified at the proceedings, giving the wages and days off duty of each man for the year ending July 2, 1915. The wages varied from $396.05 to $1,320.30, and included forty-eight regular men and one spare man. Of these thirty-two earned more than $700 a year, seventeen earned more than $800, eight earned more than $900, and three more than $1,000. Only six earned less than $600. The days off, excluding Sundays and holidays, for those normally working a six-day week, varied in the table from none to seventy-eight. Mr. Potter said that the company really furnished taxicab service for a nickel as a result of the headway limitations enforced by the franchise. The night service cost the company almost 21 cents per car-mile. The company was obliged to forego the building of a new carhouse near the Pawtucket city line this year at a cost of $300,000.

ANOTHER SUBWAY COLLAPSE IN NEW YORK

The second accident within a few days occurred on subway construction work in New York at Thirty-eighth Street and Broadway on Saturday evening, Sept. 25, just before the theater crowds were beginning to drift in toward Times Square. The planking over the excavation for the new Broadway subway on the west side of that thoroughfare at Thirty-eighth Street collapsed without warning, leaving a hole about 100 ft. long, 30 ft. deep and extending from the street car tracks halfway across the width of the pavement. A taxicab standing in the street was carried down with the planking. One woman was killed and three men were badly hurt. A street car which was approaching the point of the accident had a narrow escape from being precipitated into the subway cut. The accident is unofficially ascribed to a rock slide under the sidewalk at the edge of the cut.

As a result of the accidents Mayor Mitchel has appointed a committee of twelve engineers to conduct an inquiry in co-operation with him and other city officials, with Commissioner of Accounts Walstein in general charge.

The Public Service Commission has retained a number of outside engineers to examine the cut and cover work in New York, report on its safety, and recommend means to prevent further disaster.

Much of the traffic that had been blocked by recent accidents in the construction work of the new subways was restored on Sept. 28. Longitudinal traffic was opened between Thirty-first and Thirty-fourth Streets. Broadway at Twenty-seventh and Twenty-eighth Streets was opened at night, and the crossing of Broadway and Twenty-ninth Street was opened before the rush hour on Sept. 29. This permitted the resumption of crosstown traffic on Twenty-eighth and Twenty-ninth Streets, including operation of the crosstown car lines. Seventh Avenue was opened to north and south traffic from Sixteenth to Twenty-third Street in the afternoon, and from Twenty-seventh to Thirty-first Street at night on Sept. 29. The Mayor's committee and the engineers of the Public Service Commission are considering what ought to be done on Broadway, between Thirty-fifth and Fortieth Streets. Meanwhile Police Commission Woods has issued a statement assuring the public that there never has been any question as to the security of the foundations of buildings in the shopping district of elsewhere.

B. R. T. AND INTERBOROUGH PLAY A TIE

The all-star team of employees of the Brooklyn (N. Y.) Rapid Transit Company and the team from the shops of the Interborough Rapid Transit Company, the champions of the Interborough Rapid Transit League, met in a ball game at Ebbett's field on the afternoon of Sept. 29. They played to a deadlock of six all, the game being called in the tenth inning on account of darkness. H. Tobin started the game for the Interborough team, but he gave way to Wood in the seventh inning after a pinch hitter had batted for him in the sixth. Deutsch, a port-sider, started the game for the Brooklyn Rapid Transit team. Five hits off him in the third inning for a total of four runs drove him to the clubhouse. Schroeder succeeded him and allowed only five hits up to the tenth inning. The Interborough team made thirteen hits as against ten hits for the Brooklyn Rapid Transit team. The fielding feature of the game was a one-handed catch off first base by Smith of Brooklyn, while the batting feature of the game was a home run along the third base line by an Interborough man in the third inning.

The game was staged like a regular league contest. The score board used by the Brooklyn National League team was employed to show the balls, strikes, outs and score by innings. About 7500 people witnessed the game, among them many ladies. The B. R. T. contingent was carried to the field in special cars. Music was furnished by both the Brooklyn Rapid Transit Band and the band of the Interborough Rapid Transit Company. The rivalry between the teams is extremely keen. At the game were many of the officers and department heads of the companies.

Cleveland Municipal Ownership Proposal Rejected.—The City Council of Cleveland has voted down the ordinance providing for the issue of bonds for the purchase of the Cleveland Railway. Councilman W. J. Reynolds is urging Council to have a complete transportation survey of the city made.

New Elevated Extension Opened in Brooklyn.—The Liberty Avenue extension of the Fulton Street elevated line of the Brooklyn (N. Y.) Rapid Transit Company was opened on the afternoon of Sept. 25. Lefferts Avenue will be the terminus of the line until further extensions are opened on the way to Jamaica.

Ohio Roads Denied Reduction in Tax Valuation.—The Ohio Tax Commission has declined to make any reduction in the valuations of the Cincinnati Traction Company, the Ohio Traction Company and the Columbus interurban station property. The request of the Ohio Electric Railway for a reduction of about $3,000,000 in its valuation has not been passed upon.

Briefs Filed in Missouri Right-of-Way Case.—Judge E. E. Porterfield of the Jackson County Circuit Court has received the final brief, the answer to the response of plaintiff to the brief of defendants in the application for the rehearing of the suit of the Interstate Railway against the Kansas City, Clay County & St. Joseph Railway. He probably will take a month to consider the case before rendering a decision. This is the case in which damages of $1,500,000 were awarded for alleged usurpation of right-of-way.

Massachusetts Companies to File Contracts.—The Massachusetts Public Service Commission has requested all street railways within its jurisdiction to file with the secretary of the board copies of all contracts relative to the purchase of power and of all agreements relative to the use of tracks or rolling stock, management, construction or maintenance work, between any company and any other street railway. Contracts for supplies are also to be filed, except where the volume of purchases does not exceed $5,000.

Wage Concessions Awarded by London Conciliation Board.—The claims of the London (England) County Council tramwaymen have been dealt with by the Conciliation Board, which grants various concessions worth £58,300 per annum. The demands for an extra 1s. a day, a fortnight's holiday, and the reduction of the hours of labor to eight a day are refused. As the finance committee of the Council states, the result of this award is to place a heavy additional charge on the tramways undertaking. The award has been accepted by the men by ballot.

Newport Franchise Ultimatum.—The Commissioners of Newport, Ky., have passed an ordinance fixing the rental charge for the use of the streets at $1,000 a year per mile of track until such time as the Cincinnati, Covington & Newport Railway secures a definite franchise to take the place of one alleged to have expired. This amount is to be paid in monthly installments with interest at the rate of 6 per cent on all deferred payments. The Business Men's Club endeavored to settle the difference between the city and the company, but so far no results have been reached. The company offered to accept a franchise with a rental of $3,000 a year for the use of the streets, but fixed that as the maximum.

No Suitable Signals for New York Elevated.—The Interborough Rapid Transit Company has notified the Public Service Commission for the First District of New York that its engineers have been unable to discover "on the market or in process of development" a system of signals for use on the elevated railroads which would give the maximum of safety without reducing the capacity of the roads. Last April the commission adopted a resolution directing the company to place such a system in trial operation not later than Oct. 1, 1915. The company now asks for an extension of at least six months in which to begin the experiment. Without acting upon the request for extension, the commission directed that a hearing be held on the matter on Oct. 1, 1915.

New Haven Conspiracy Trials This Month.—William Rockefeller and his associates in the directorate of the New York, New Haven & Hartford Railroad will face trial in the United States Courts at New York on Oct. 13 on the indictment found by the Federal Grand Jury last November, accusing them of a criminal conspiracy under the Sherman law. The date was set on Sept. 27 by United States Circuit Judge Hunt at the close of a session of the court at which efforts were made to secure separate trials for Lewis Cass Ledyard, Charles M. Pratt, Henry K. McHarg, Frederick F. Brewster and Alexander Cochrane. They asked to be put in the same class as George F. Baker, T. N. Vail, T. de Witt Cuyler, Edward Milligan and F. T. Maxwell.

Atlanta Paving Dispute Before Court.—Litigation between the city and the Georgia Railway & Power Company, Atlanta, Ga., is still going on in the courts over a city ordinance which requires the company to lay a concrete base for its tracks wherever the city is putting down a permanent pavement. Soon after the ordinance was passed the city attempted to enforce it by blocking up Grant Street when the company refused to concrete the track base on that street. The company then enjoined the city from blocking the street. A hearing on a permanent injunction preventing the city from interfering with the company's track construction will come up soon in the Superior Court. The company claims that crushed stone is a better base for tracks than concrete.

Combined Auto and Railway Service in Seattle.—The City Council of Seattle, Wash., has disregarded Mayor Gill's veto and has passed a bill authorizing the Board of Public Works to enter into a contract with F. M. Peterson to establish an auto bus service from the north terminus of Division "A" of the Municipal Railway to points in Ballard. Under the contract, passengers who ride on Division "A" may obtain transfers to the motor bus at Thirteenth Avenue and Nickerson Street, the north terminus, and ride into Ballard. Passengers also may board the jitney at Ballard and transfer to the municipal railways. The city will allow the operator of the auto bus 3 cents on every transfer for adults and 1¼ cents for school children. The franchise granted to Mr. Peterson is not an exclusive one. It is understood that several large motor buses will be put into operation at once.

Gulf Storm Suspends Street Car Service in New Orleans.—The property of the New Orleans Railway & Light Company, New Orleans, La., suffered from the destructive hurricane which swept up the Gulf Coast on Sept. 28 and 29. At the New York office of the United Gas & Electric Engineering Corporation, which acts as operating engineer for the New Orleans property, B. F. Wood, chief engineer, stated on Oct. 1 that the engineering company had been unable to get into any wire communication with the officials in New Orleans, but had received the following wireless message via Mobile, Ala., sent from New Orleans on Sept. 30, by S. J. Dill, a vice-president of the engineering corporation: "Severe hurricane New Orleans Wednesday. Considerable property damage. Electric and street railway service badly crippled account poles and trees down. Cleiborne, Canal and Prytania barns damaged. Clearing up lines fast as possible. Cannot give estimate of property damage. Also considerable damage to consumers' idle power house."

Agreement on Extensions in Tacoma Likely.—It is reported that an agreement will probably be reached between the city of Tacoma, Wash., and the Tacoma Railway & Power Company by which the company will extend the Pacific Avenue line to Forty-sixth Street, making connections between the Tacoma Avenue and Point Defiance lines, this in return for the use of the Tacoma Avenue fill for the South Tacoma line and a physical connection between the municipal power plant at La Grande and the Tacoma Railway & Power Company's plant at Electron. It is understood the point upon which the transaction hinges is the rate to be charged in the exchange of current in case either plant should be disabled. The construction of the South Tacoma line over the Tacoma Avenue fill would eliminate a dangerous curve and grade on one of the most heavily patronized lines in the city and shorten the time between South Tacoma and the business section of the city. It would also permit the routeing of cars direct between South Tacoma, American Lake and Point Defiance. The Pacific Avenue extension has been desired for some time, as it will provide transportation for a large residence district south of the present terminus of the Pacific Avenue line at South Thirty-fourth Street.

Financial and Corporate

SECURITIES OWNED BY METROPOLITAN LIFE

Annual Report Shows Comparative Holdings of Electric Railway, Steam Railroad, Municipal and Other Securities

The latest annual report of the Metropolitan Life Insurance Company, New York, N. Y., for the year ended Dec. 31, 1914, contains an unusual summary showing the detailed security holdings of that corporation. On the above-mentioned date, the company owned $204,790,794 of bonds and $5,423,826 of stocks. This total for bond holdings was made up of the following items: municipal bonds, $21,444,694; steam railroad bonds, $123,220,922; electric railway bonds, $25,218,845, and bonds of other public utilities, $34,906,333. The stock holdings comprised $3,086,052 of bank stock, $1,034,500 of electric railway stock, $986,945 of steam railway stock, $194,480 of other public utility stock and $121,848 of industrial stock.

The bond and stock holdings were both widely diversified as to location, thus affording an excellent example of how a large investing corporation follows out one of the cardinal principles of investment in minimizing the bad effects of local business disturbances. Moreover the distribution of the securities among the several fields was almost as might be anticipated, the only surprising feature being the way electric railway bonds and other public utility bonds outranked municipal bonds in popularity. At first glance one may wonder why the total of steam railroad bonds is so high, but when he considers that the insurance company began business in 1867 and that electric railways and similar utilities are relatively infant industries as compared to the steam railroad business, the comparatively high investment in steam railroad funded obligations is not difficult to understand. It is interesting to note that electric railway stocks are considered to rank next to bank stocks in the possession of non-speculative attributes.

DIVIDEND REDUCTION IN HARRISBURG

Cut Largely Caused by Decrease in Earning Brought About by Jitney Competition

The Harrisburg (Pa.) Railways has announced that the semi-annual dividend on the preferred stock of the company will be 1 per cent, payable on Oct. 1, as compared with the last semi-annual dividend of 2½ per cent. The Harrisburg Railways preferred stock was issued to be a 5 per cent cumulative stock until this year, when it became a 6 per cent cumulative stock. The payment for the half year just closed makes a total of 3½ per cent for the last twelve months.

Frank B. Musser, president and general manager of the company, is quoted as follows:

"The jitneys are largely responsible for the decrease in our earnings. The falling off in passenger traffic cannot be ascertained until the work for the year is gone over, but we can tell from the ordinary receipts that there is a big drop in the city lines, convincing us that it is caused by the jitney service. The jitneys do not go out of the city, confining their operations to the more prescribed city limits."

F. M. Davis, superintendent of transportation of the company, is reported to have said:

"Whenever we arranged for something big at Paxtang, the rain interfered and prevented a large attendance, and there was a corresponding loss. But the largest cutting in on the receipts was by the jitneys. Then, again, the increase in the number of automobiles, not in the jitney service, has had something to do this summer with reducing receipts. Formerly it was the custom of a man to take his entire family for a trolley ride in the summer evenings, but now he owns an auto and takes the family out for a ride in that.

"This, however, is not the first ordeal the street railway has gone through in the way of reduction of receipts. When the bicycle craze started some years ago and reached the high mark, the street railway receipts were materially reduced, but the bicycle has had its day."

ANNUAL REPORT

American Water Works & Electric Company, Inc.

The first annual statement of income, profit and loss of the American Water Works & Electric Company, Inc., New York, N. Y., for the year ended June 30, 1915, follows:

Company's proportion of net earnings of subsidiary companies (exclusive of West Penn Traction Company)	$646,012
Income from bonds and preferred stocks owned, interest on bank balances, etc.	348,462
Total gross income	$994,475
Expenses and taxes—less proportion contributed by subsidiary companies for expenses of administration and included in the operating expenses of such companies	48,353
Net earnings	$946,122
Deductions	467,484
Net income	$478,638
Net income, April 27, 1914, to June 30, 1914	89,969
Total credits	$568,607
Deduct special funds to be set aside under terms of supplemental mortgage	519,455
Credit balance remaining June 30, 1915	$49,152

With the exception of minor amounts actually received as dividends on preferred stock of some of the West Penn Traction properties around Pittsburgh, Pa., the foregoing figures do not include any earnings from those companies, as such earnings are not immediately available for the American Water Works & Electric Company, the cash equivalent having been used for construction purposes. Had the American Water Works & Electric Company's proportion of these earnings been included, the net earnings would have been increased about $232,000 and would have been approximately $1,178,122.

While the earnings for the year ended April 30, 1915, (comparisons at June 30 not being available) do not show so large an increase as previous years, they do show an increase even under the very unfavorable general business conditions which prevailed during the last year. Owing to the business depression in the Pittsburgh district, the earnings of the West Penn Traction properties were not so large as had been anticipated. In addition to this, the net income was adversely affected by the interest charges on the new money provided for a large amount of construction work, the benefits of which were reflected in the earnings to only a limited extent. The recent statements, however, show decided improvement, and with the return of normal conditions it is expected that large and increasing earnings will accrue to the American Water Works & Electric Company from its holdings of the securities of the West Penn Traction properties.

The annual report contains the following statistics relative to the West Penn Traction properties: Miles of road owned, 317.04 miles; miles of power lines (25,000 volt transmission lines)—poles miles, 396.56 miles, and wire miles, 552.71 miles; number of cities and communities served, 170; number of consumers, 23,345, and kilowatt-hour output, 154,973,930 kw.-hr.

THIRD AVENUE BOND DELAY

A statement by the Third Avenue Railway, New York, N. Y., relative to the delay in authorization of the remaining $2,650,000 of the original $6,650,000 bond issue applied for on Dec. 23, 1913, is at variance with a recent announcement made by the Public Service Commission for the First District of New York. The commission stated that while it had authorized on Feb. 20, 1914, $4,000,000 of 4 per cent bonds to cover expenditures occasioned by the acquisition of the New York City Interborough Railway and the Belt Line Railway Corporation, the remaining $2,650,000 applied for is still under investigation, as the amount asked for is to replace expenditures on plants. The commission asserted that the delay was occasioned by reason of the Third Avenue Railway's failure to comply with an order issued several years ago, requiring all corporations to file monthly statements of expenditures against capital accounts.

The Third Avenue Railway now states that its petition for approval of $6,650,000 of bonds was filed on Dec. 23, 1913, and covered expenditures for capital account from Jan. 1, 1912, to Oct. 31, 1913. The petition was amended from time to time to cover expenditures for capital account up to Feb. 28, 1915. On Oct. 31, 1913, the commission issued a circular letter suggesting that all companies make periodical reports of expenditures against which they might later ask the approval of the commission for the issue of bonds. This has never been put in the form of an order, and no definite form of report has been suggested by the commission.

The railway, however, acknowledged the receipt of this circular letter and stated that it was the intention of the company to make such reports. Before it was possible to prepare the reports in question the application was made and the books and records were thrown open to the accountants and engineers of the commission for investigation. It then seemed that any reports of this nature would be superfluous and the matter was dropped pending the action of the commission on the application. In the present case the commission is considering expenditures made during a period of twenty-two months prior to the date of its suggestion as to the reports and during a period of sixteen months subsequent thereto. It is said, therefore, that the delay, if any, in acting on the application connot be charged to the lack of these reports. In the latest annual report of the company, President Whitridge stated that he was informed that a final decision in this case might be expected in the near future.

BIRMINGHAM REORGANIZATION PLAN ADOPTED

Committee of Bondholders Approves Plan Based on Procuring of Guaranty for Bonds—Alternative Plan Is Submitted

The committee of bondholders of the Birmingham, Ensley & Bessemer Railroad, Birmingham, Ala., of which S. H. Cunningham is chairman, has adopted the plan of reorganization submitted by the committee headed by Charles H. Zehnder, and has given notice that it will allow dissenting depositors until Oct. 25 in which to withdraw. In the event that it is possible to procure a guaranty of the principal and interest of an issue of bonds such as is desired, the proposed new company to be created after the foreclosure sale will be organized with $4,000,000 of bonds, $1,060,000 of preferred stock and $1,590,000 of common stock. Of the $4,000,000 of first mortgage 5 per cent thirty-year gold bonds covering all the property $1,500,000 is to be issued at once. The bonds are to be dated and to bear interest from Jan. 1, 1916, but are to be redeemable at the option of the company on any interest date at 101 and interest. The $1,060,000 of preferred stock is to be a non-cumulative issue and is to have equal voting power with the common stock. The preferred and common issues are at present limited to the foregoing figures.

Holders of deposited first mortgage 5 per cent bonds of the present company will receive 50 per cent of the principal amount of their bonds in bonds of the new company, amounting to about $1,262,650. The remaining $237,350 of bonds presently to be issued will be sold for cash. The balance of the authorized issue of bonds will be reserved for betterments and additions, new equipment, etc., at 85 per cent of the cost of the same. The new stock issue will be delivered to the guarantor of the bonds as a consideration for such guaranty, any part not so used to go into the treasury of the company. The cash arising from the sale of the $237,350 of bonds will be applied to the payment of any part of the purchase price of the properties required to be paid in cash, to the expenses, disbursements and compensation of the committee and all other expenses incident to the reorganization. Any balance will be placed in the treasury of the new company.

An alternate plan or reorganization provides for a new company with the same share capital as previously mentioned, but in this case the first mortgage thirty-year, 5 per cent bonds are to be for the authorized principal sum of $1,000,000, dated Jan. 1, 1916, the present issue of which is not to exceed $250,000. In this case the $250,000 of bonds are to be sold for cash at such prices as the committee may approve to meet the expenses of the reorganization, the balance being reserved for betterments, etc. In such a case the entire authorized stock is to be deposited with voting trustees for five years. The voting trust certificates would be distributed among the holders of the deposited present first mortgage 5's, 50 per cent of the face amount of the bonds to be exchanged for preferred voting trust certificates and 60 per cent for common voting trust certificates, thus calling for $1,009,120 and $1,515,180 thereof respectively. Any balance would be turned over to the treasury of the new company. Depositors under the Sept. 15, 1914, agreement must waive the right to exchange $700 of new bonds for $1,000 of old bonds.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill.—The Aurora, Elgin & Chicago Railroad has decided to omit the usual quarterly dividend of 1½ per cent on the $3,100,000 of 6 per cent cumulative preferred stock. Regular payments have been made on the stock since July, 1906. E. C. Faber, vice-president and general manager of the company, is quoted as follows: "Directors and officers unanimously and formally decided that on account of the depressive effect of the European war on the company's business the company's best interests would be conserved by taking no action on the preferred dividends at this time." The depression in the Chicago industrial district, increased use of automobiles by former regular patrons and rainy Saturdays, Sundays and holidays all contributed to the reduced earnings.

British Columbia Electric Railway, Ltd., Vancouver, B. C.—The report of traffic for the first eight months of the year over the Vancouver city lines owned by the British Columbia Electric Railway shows a decrease of nearly 10,000,000 passengers as compared with the record for the corresponding period of last year. The company's percentage payments to the city for the period show a decrease of nearly $25,000 as compared with last year. The number of passengers carried on the city and suburban lines during August was 2,357,102, as compared with 3,368,572 for August of last year. The city's percentage check on the August traffic was $3,251, as compared with $6,956 a year ago.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—The report of operation of the Columbus, Delaware & Marion Railway to the Common Pleas Court for the year ended June 30 shows the net operating income was $160,922, the operating revenue being $295,335. Eli M. West, receiver, states that his salary and attorneys' fees were included this year, whereas they were formerly made separate items. Improvements amounting to $40,000 were made. Mr. West says that the showing would have been much better had it not been for unseasonable weather, business depression and an increase in the number of automobiles used.

Denver & Northwestern Railway, Denver, Col.—The directors of the Denver & Northwestern Railway, which is the holding company for the Denver Tramway, have passed the usual quarterly dividend of one-half of 1 per cent. This payment, it is said, was discontinued in the best interests of the company and the interests as well of its stock and bond holders.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The regular dividends on the first 7 per cent cumulative preferred and the second cumulative 5 per cent preferred stock of the Elmira Water, Light & Railroad Company have been declared, but no dividend has been declared on the common stock.

Memphis (Tenn.) Street Railway.—The Memphis Street Railway has sold on a when-issued basis an issue of $1,500,000 of two-year 6 per cent collateral gold notes to a syndicate composed of Bertron, Griscom & Company, Reilly, Brock & Company, Philadelphia, and Counselman & Company, Chicago. The company has also sold to the first two houses named an issue of $600,000 of one-year 5 per cent guaranteed notes. Both issues are to be dated Nov. 1, 1915.

New York (N. Y.) Railways.—The arbitration committee appointed to fix the amount of interest to be paid on the New York Railways 5 per cent adjustment income bonds for the six months ended June 30, 1915, declared on Sept. 30 that 1.37 per cent would be an equitable payment. This interest compares with 1.288 per cent for the corresponding period last year, an increase of 0.82 per cent. The payment for the last six months of 1914 was 1.769 per cent.

Northern Electric Railway, Chico, Cal.—The reorganization agreement of the Northern Electric Railway, in addition to being agreed to by all the creditors' representatives, has been signed by all parties in interest, including the several constituent railways, the Sloss interests and certain San

Francisco banking institutions. The holders have been asked to deposit securities and claims with the Union Trust Company or the First Federal Trust Company, San Francisco, depositaries.

Philadelphia & Western Railway, Upper Darby, Pa.—As announced in the ELECTRIC RAILWAY JOURNAL of Sept. 18, 75 per cent of the stockholders of the Phoenixville, Valley Forge & Strafford Electric Railway recently agreed to the sale of the company to the Philadelphia & Western Railway. Official advices from the latter company now state that fast through electric car service between Philadelphia, Valley Forge, Phoenixville, Spring City and Pottstown is probable within a year, the Philadelphia & Western Railway to form the terminal trunk line but to take no part in financing the plan. There has been no sale of the property to the Philadelphia & Western Railway. The plan contemplates a 7-mile extension of the Phoenixville, Valley Forge & Stafford Electric Railway to a connection with the Philadelphia & Western Railway at Bridgeport. This work and new cars such as the Philadelphia & Western Railway would be willing to attach to its trains will cost, as estimated, about $300,000. The Phoenixville, Valley Forge & Strafford Electric Railway now runs 4½ miles from Valley Forge to Phoenixville. From there the Pottstown & Phoenixville Railway now operates 25 miles in two sections, one from Pottstown to Sanatoga, the other from Spring City to Phoenixville. The gap from Sanatoga to Spring City is now being filled in by a new line under construction and largely graded. With these lines joined up new fast electric service will be provided through a territory inhabited by about 40,000 persons, affording Philadelphia easier access from towns 30 miles up the Schuylkill River and giving a frequent service out to Valley Forge Park.

Tennessee Railway, Light & Power Company, Nashville, Tenn.—The $2,500,000 note of the Tennessee Railway, Light & Power Company, due on June 22, 1915, was paid at maturity. To finance this payment there was sold by E. W. Clark & Company, Philadelphia, Pa., $2,500,000 of one-year 6 per cent secured note participating receipts dated on June 22, 1915, and due on June 22, 1916, interest payable quarterly on Sept. 22. The participating receipts are issued by the Guaranty Trust Company, New York, N. Y., and certify that the holder is entitled to a certain interest in a one-year 6 per cent promissory note for $2,500,000 executed by the Tennessee Railway, Light & Power Company and secured by pledge of $2,500,000 of Nashville Railway & Light Company common stock, paying 4 per cent, and $2,500,000 of Tennessee Power Company first mortgage 5 per cent gold bonds. These securities represent an investment on the part of the Tennessee Railway, Light & Power Company of more than $5,000,000, and the income received from them is 50 per cent greater than the interest on the notes.

Trinidad Electric Company, Ltd., Port of Spain, Trinidad.—The directors of the Trinidad Electric Company, Ltd., have passed the usual quarterly dividend of 1¼ per cent. Heretofore this rate has been maintained for many years.

Western New York & Pennsylvania Traction Company, Olean, N. Y.—The property of the Buffalo & Susquehanna Railway between Wellsville and Buffalo, on which W. R. Page, president Western New York & Pennsylvania Traction Company, had an option, was recently sold at foreclosure to M. G. Bogue, representing the bondholders' committee. It is officially stated, however, that this sale will not interfere with the option that was given on the property.

DIVIDENDS DECLARED

Asheville Power & Light Company, Asheville, N. C., quarterly, 1¾ per cent, preferred.

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.

Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred.

Chicago (Ill.) City Railway, quarterly, 2 per cent.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Cleveland (Ohio) Railway, quarterly, 1½ per cent.

Columbus, Newark & Zanesville Railway, Columbus, Ohio, quarterly, 1½ per cent, preferred.

Elmira Water, Light & Railroad Company, Elmira, N. Y., quarterly, 1¾ per cent, first preferred; quarterly, 1¼ per cent, second preferred.

Honolulu (Hawaii) Rapid Transit & Land Company, quarterly, 2 per cent.

Houghton County Traction Company, Houghton, Mich., 3 per cent, preferred.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Ottawa (Ont.) Traction Company, quarterly, 1 per cent.

Porto Rico Railways, San Juan, Porto Rico, quarterly, 1¾ per cent, preferred.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 1½ per cent.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 75 cents, preferred.

Tidewater Power Company, Wilmington, N. C., 3½ per cent, common.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., quarterly, 1½ per cent, preferred.

Western Ohio Railway, Lima, Ohio, quarterly, 1¾ per cent, first preferred.

Winnipeg (Man.) Electric Railway, quarterly, 2½ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY, FORT WAYNE, IND.					
1m., July, '15	$139,823	$83,689	$56,134	$54,312	‡$2,371
1 " " '14	153,560	93,773	59,787	53,817	‡6,468
7 " " '15	986,717	572,360	414,357	375,872	‡41,488
7 " " '14	1,067,975	624,054	443,921	366,005	‡81,060
GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.					
1m., July, '15	$174,093	*$107,636	$66,457	$26,466	$39,991
1 " " '14	226,664	*112,435	114,229	30,995	83,234
12 " " '15	2,132,941	*1,236,433	896,508	341,990	554,518
12 " " '14	2,454,805	*1,366,180	1,088,625	363,356	725,269
HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.					
1m., July, '15	$26,177	*$13,297	$12,880	$4,584	$8,296
1 " " '14	28,309	*16,881	11,428	4,651	6,777
12 " " '15	263,167	*164,694	98,473	55,629	42,844
12 " " '14	284,921	*180,531	104,389	55,615	48,774
JACKSONVILLE (FLA.) TRACTION COMPANY					
1m., July, '15	$50,098	*$34,890	$15,208	$13,559	$1,648
1 " " '14	57,441	*37,341	20,100	11,437	8,663
12 " " '15	637,939	*445,117	192,822	155,715	37,107
12 " " '14	731,116	*464,829	266,287	141,553	124,734
KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.					
1m., July, '15	$74,851	$38,598	$36,253	$20,339	$17,154
1 " " '14	79,998	41,807	38,191	20,267	19,604
NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.					
1m., July, '15	$151,850	*$92,663	$59,187	$25,094	$34,093
1 " " '14	188,715	*104,801	83,914	23,179	60,735
12 " " '15	1,782,860	*1,045,332	737,528	293,293	444,235
12 " " '14	2,169,475	*1,215,255	954,220	276,586	677,634
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.					
1m., July, '15	$23,196	*$14,400	$8,796	$6,286	$2,510
1 " " '14	24,250	*16,658	7,592	6,600	992
12 " " '15	291,458	*184,201	107,257	80,601	26,656
12 " " '14	308,279	*197,246	111,033	80,562	30,471
PENSACOLA (FLA.) ELECTRIC COMPANY					
1m., July, '15	$21,941	*$12,627	$9,314	$6,026	$3,288
1 " " '14	24,405	*15,449	8,956	6,054	2,902
12 " " '15	246,080	*150,518	95,562	73,748	21,814
12 " " '14	285,521	*178,166	107,355	72,743	34,612
PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.					
1m., July, '15	$664,564	*$402,137	$262,427	$153,395	$109,032
1 " " '14	726,373	*423,156	303,217	156,440	146,777
12 " " '15	7,846,588	*4,804,799	3,041,789	1,888,957	1,152,832
12 " " '14	8,691,638	*5,065,591	3,626,047	1,844,296	1,781,751
REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.					
1m., Aug., '15	$260,792	*$158,298	$102,494	$58,560	‡$44,078
1 " " '14	255,488	*155,057	100,431	57,063	‡43,456
8 " " '15	1,968,619	*1,218,592	750,027	459,648	‡291,451
8 " " '14	2,003,459	*1,231,906	771,553	450,112	‡322,677
SAVANNAH (GA.) ELECTRIC COMPANY					
1m., July, '15	$67,285	*$44,306	$22,979	$21,608	$1,371
1 " " '14	73,627	*48,294	25,333	21,265	4,068
12 " " '15	806,732	*522,568	284,164	257,688	26,476
12 " " '14	850,681	*566,457	284,224	253,958	30,266
VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.					
1m., July, '15	$448,858	$215,831	$233,027	$143,375	‡$98,312
1 " " '14	443,816	212,237	231,579	136,398	‡101,595

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*Includes taxes. ‡Includes non-operating income.

Traffic and Transportation

JITNEY JOTTINGS

New York's Jitney Law Sustained by Supreme Court—Richmond Company Suspends Jitney Service

With the filing in the Albany County Clerk's office on Sept. 27 of an order by Supreme Court Justice Hasbrouck the Public Service Commission of the Second District of New York finds the so-called jitney bus law sustained in all its principal phases. As the result of the decision, rendered on Sept. 27, the courts in this and other cases have held that the following classes of vehicles must secure the consent of local authorities and come to the commission under the new law for a certificate of public convenience and necessity, namely: (a) A bus line. (b) A stage route. (c) A motor-vehicle line or route. (d) A vehicle in connection with a bus line, a stage route, a motor-vehicle line or route. (e) A vehicle carrying passengers at a rate of fare of 15 cents or less for each passenger within the limits of a city. (f) A vehicle carrying passengers in competition with another common carrier which is required by law to obtain the consent of the local authorities of said city to operate over the streets thereof.

This classification was made by Supreme Court Justice Brown in a case in the Niagara County Supreme Court wherein Burt G. Hurtgam was restrained from operating a bus line from Lockport to Olcott Beach, though he charged a fare of 50 cents and only part of his line was within the city of Lockport. The result of this decision was to make practically all operators of bus lines in the cities of the State liable to procedure under the penalty clause of the public service commissions law unless they secure the permission of the city authorities and the certificate of the Public Service Commission.

In Justice Hasbrouck's decision, filed on Sept. 27, he holds that in the case of Elmer G. Booth, Rochester, the license of the city of Rochester, granted Booth before this law took effect, does not relieve Booth from the necessity of getting the consents of the city authorities under the new law and of coming to the Public Service Commission. The court says: "The license, being the child of the statute and not of the nature of a contract nor of a class known as vested rights, is susceptible of revocation or annulment at any time by the creating power" (the Legislature).

This decision will compel all of the many Rochester jitney owners to conform to the new law, whether or not they possess an old public-vehicle license from the city.

The Public Service Commission for the Second District of New York has permitted the Troy Auto Car Company to renew its application for a certificate of convenience and necessity under the jitney law for its bus line in Troy and Lansingburgh. The petitioning company has amended its certificate of incorporation and says it wishes to proceed with the application, which was opposed by the street railway employees of Troy.

Frederick B. Hemingway, Allen Brothers and Irving K. Weed have discontinued the operation of the jitney bus line they were alleged to be running in competition with the Poughkeepsie City & Wappingers Falls Electric Railway. The Public Service Commission has permitted the company to withdraw the application it had made to the commission for permission to sue the jitney operators under the recently enacted jitney bus law.

Complaint by the jitney owners of Philadelphia who were forced to discontinue their business because of Council's ordinance of July 2 was again heard by the Common Pleas Court, this time by Judges Audenried, Carr and Finletter, Court No. 4. Argument was heard for and against the demurrer of City Solicitor Ryan to the bill in equity filed by the Union Motor Bus Company against the city authorities to restrain them from enforcing the ordinance. Assistant City Solicitor Wolf supported the demurrer by contending that the complainant's bill did not advance sufficient reasons for having the ordinance declared unconstitutional, nor did the bill point out the extent of the injury alleged to be worked the jitney owners by the ordinance. The fact that a number of automobiles were purchased by some of the complainants on the installment plan, and that the enforcement of the ordinance prohibited them from earning sufficient money to keep up the payments as they became due, did not show, according to Mr. Wolf, the necessity for equitable intervention by the court. Mr. Wolf said the ordinance did not discriminate against the jitneys and in favor of the taxicabs as alleged in the bill. He also said that the right to operate a jitney was a concession granted by Councils with the authority of the Legislature, and therefore Councils had the right to restrict their operations. Decision was reserved.

Under the guise of the People's Motor Club, the jitneymen of Philadelphia, Pa., think they see a way under the so-called membership plan of operating without paying a license or putting up the required $2,500 bond. All that is necessary now to become a member of the club and enjoy its privileges is to pay 25 cents "dues." This payment carries with it a strip of five tickets, which are each good for a jitney ride. The headquarters of the club are in the Parkway Building. It is a small office. There President Paul Randolph and a young woman were busy recently selling tickets to new "members" and in registering drivers who wish to "hire" their cars to the club.

The Motor Transit Company, a subsidiary of the Virginia Railway & Power Company, Richmond, Va., has announced that it will discontinue operation of its jitney cars. In its formal announcement the Motor Transit Company states that it has lost in actual operation more than $700 a month, without providing for interest and depreciation, which amount to more than $15,000 additional. It is impossible, the company states, to operate cars on a 5-cent fare without heavy and increasing loss, and the company is therefore forced to abandon its motor service.

The City Council of East Liverpool, Ohio, has passed the jitney ordinance on final reading and the measure is now before the Mayor for signature. The new measure contains but few changes from the original draft. Instead of making the city license $10 as before, the new measure taxes the jitney owners $25 annually to operate. This tax will be paid into a fund for the improvement of streets, according to the second measure, which differs from the first in that it stated that such money should be paid to the general fund. Another section which makes the latter ordinance differ from the first is the section requiring all owners to provide a $5,000 bond, which may be furnished by another party. At the request of Councilman Horton this clause was made to read that only a reliable bonding house would be accepted as legal in order to operate the buses.

Standing by his former decision in the jitney ordinance suit, in Portland, Ore., Circuit Judge Bagley states that he still firmly believes that the City Council has no authority to stop the referendum by attaching an emergency clause to an ordinance. Pending an appeal to the Supreme Court, the city of Portland was enjoined from enforcing the ordinance regulating jitneys. A decision is expected in the Supreme Court within a month.

Two injunction suits filed in the Sixty-eighth District Court against the city of Dallas, Tex., seeking to prevent the operation of the jitney ordinance have been dismissed for want of prosecution.

A new ordinance, passed by the Common Council of Jamestown, N. Y., authorizes the operation of jitney bus lines under modified restrictions from those at first proposed which were held to be prohibitive. The new ordinance reduces the license fee to $10 and $20 for the two size cars, and the indemnity bond from $10,000 to $1,000 for the small car, and $2,000 for the large car.

The Pacific Coast Casualty Company, which has been doing practically all the jitney bus bonding business in the State of Washington under the 1915 bonding law, has notified H. O. Fishback, state insurance commissioner, and I. M. Howell, Secretary of State, that it has temporarily discontinued doing jitney bus bonding business. This action is taken, it is understood, in order to permit the consolidaton of a number of companies. In the meantime the jitney bus operators are finding it difficult to secure bonds required by the state law.

The Auto Bus Protective Association of Ohio was organized at Youngstown on Sept. 24. This is intended as a State organization, composed of representatives of various local associations. The next meeting, it is said, will be held in Columbus.

PUBLIC SCHOOL SAFETY WORK IN BROOKLYN

Summary of Report for Year—Crusade to Continue—New Plans Made for Coming Year

George W. Wingate, president of the Brooklyn Institute for Safety, has submitted a report of the activities of the institution during the public school year of 1914-1915, together with the work in the vacation schools and playgrounds during the summer term of 1915. The fiscal year of the Brooklyn Institution for Safety, beginning on Oct. 1, brings the inauguration of each year's work of the insitution into accord with the approximate date of the opening of the schools in the fall and enables the work of the regular school year and of the summer term in the vacation schools to be considered together. The Brooklyn Institution for Safety holds the permission of the Board of Education of the city of New York to conduct public safety instruction in the public schools. This activity has been delegated by the institution to the bureau of public safety of the Brooklyn Rapid Transit Company, which has maintained a lecturing staff and carried out such instruction with the approval and under supervision of the directors of the Brooklyn Institution for Safety.

During the regular session of the public schools ending in June last, the bureau of public safety delivered lectures in 173 public schools in Brooklyn, reaching approximately 200,000 children in the lower grades and 15,000 in the high schools. In addition to this, safety lectures were given in fifty-four parochial schools to approximately 40,000 pupils. These safety lectures were generally accompanied by an exhibition of stereopticon slides related to the subject of the lecturers' addresses and where schoolhouse equipment permitted, by the presentation of safety motion pictures, particularly the film, "The Price of Thoughtlessness," and the film, "The Locked Door," both of which were produced through the co-operation of the institution. It is estimated that about 95,000 children were reached with the motion pictures during the year. In forty-five schools safety patrols were organized with a total membership of 800 boys, and forty-two "Careful Clubs," with a membership of 770 were organized among the girls in the schools.

The safety patrols have been instructed through the co-operation of teachers in certain specified patrol duties in and about the schoolhouses in the hours of assembly and dismissal, whereby protection is given to the younger children while coming to and going from school; they have been used as a means of obtaining reports of accidents or dangerous conditions observed by the children and as a general stimulant of thought for safety in the schools where they have existed. Similarly the "Careful Clubs," without attempting specific patrol duties in and about the schools, have been made agencies of safety thought and safety endeavor among the girls.

There were distributed in the schools 190 safety bulletin boards and attractive safety bulletins from time to time were issued for posting on these boards as well as a supply of blanks for the reporting of accidents and dangerous conditions observed by the children.

Upwards of 400,000 safety buttons were distributed along with about 235,000 copies of a safety leaflet in story form. In seventy schools prize essay competitions were held on subjects related to safety, the prize being in each case a picture, book or other useful or decorative object suggested by the principal. These prizes were presented to the schools in the name of the child adjudged to be the winner of the essay contest.

As in the previous year a large safety calendar was provided for every school classroom in Brooklyn, public and parochial, where such calendars could be displayed, approximately 8500 of such calendars being provided, and thus effectively placed before the school population of the borough. About 1000 small calendars were distributed to various organizations and individuals engaged in safety work throughout the country with whom the institution has been exchanging safety ideas and material.

In addition to the work in the public schools the bureau of public safety developed to a considerable extent lectures among social and civic organizations. Upwards of 100 such lectures were delivered to approximately 40,000 adults. At these lectures safety motion pictures were exhibited where possible and for this purpose educational films, such as, "The Workman's Lesson," and "The Crime of Carelessness," were presented through co-operation with the National Association of Manufacturers and other organizations engaged in summer work.

The summer term in the schools and playgrounds began on July 6 and came to a close on Aug. 20. The instruction at these playgrounds was of an informal and personal nature, and the circumstances under which the lecturers met the children were particularly well adapted to bringing the safety lessons home to the children in a personal and effective way.

At many of the playgrounds parents as well as children were addressed. Safety lectures were given between July 6 and Aug. 20 in sixty-two of the sixty-six vacation schools and playgrounds, about 50,000 children and 1100 adults being reached. Safety buttons were distributed to these chilren as well as to the children in attendance at the public schools.

The president of the Brooklyn Institution for Safety has served during the year as a member of the Mayor's central committee on street traffic and safety. In this capacity he has presented the experience of the institution gained in its public safety work in Brooklyn to this committee, which advises the Mayor and the Police Commissioner in respect to safety problems throughout the city. Specifically he has transmitted to the Mayor's central committee on street traffic and safety suggestions as to a plan of co-operation between various municipal authorities and local interests in working for child safety in public streets and places. The president of the institution has also prepared for the information of the president of the Board of Education, based upon the work done in the Brooklyn Public Schools, a plan for the proposed extension of the safety patrol system in the schools.

The Brooklyn Rapid Transit Company has provided funds to continue the work in the public schools during the coming year. The crusade for the next year, as approved by the Department of Education of the city and the directors of the Brooklyn Institution for Safety, will embrace a new feature in the shape of district safety work, as well as containing the safety instruction which has been given in the public schools.

The studies which have been made by the bureau of public safety of the Brooklyn Rapid Transit Company in conjunction with the Brooklyn Institution for Safety have indicated that the hazard of street accidents in Brooklyn is most severe in certain well-defined districts where tenement houses and similar causes of congestion abound. Many of these districts are comparatively small and consist of a few blocks on a given street or group of streets, within which accidents, particularly to children, are very common. Last spring, for the purpose of trying out the possibilities of safety work in such congested districts, a section of Myrtle Avenue between Tompkins and Sumner Avenues was taken up by the bureau of public safety. Co-operation was established between police and public school authorities, churches and local organizations. Literature was distributed and meetings held and the population, old and young, was greatly impressed with the work carried out in its own behalf.

The success of this experiment has led the Institution for Safety through the bureau of public safety to feature similar work for the coming year. The so-called danger sections are now being checked up, and during October each one of these districts will be taken up in its turn and systematic safety work with the co-operation of both public and private agencies will be conducted therein. While the district safety work is built up around the most common types of street accidents it is not restricted to such hazards —the dangers of fire and firearms, of falls, drowning, etc., are all emphasized.

In the public schools the safety patrols and careful club feature have been organized during the last two years and will be continued to further development by the bureau of public safety.

Negotiations are now under way for the production of a new safety motion picture to supplement the film, "The Price of Thoughtlessness" which has been in constant use in safety work of Brooklyn for nearly two years.

BAY STATE FARE HEARING PLANS

Protracted Investigation Anticipated on Application to Increase Fares on 954-Mile Suburban System

The Massachusetts Public Service Commission has announced that hearings on the proposed general increase in fares upon the Bay State Street Railway will begin on Nov. 8. The new schedules were to become effective on Nov. 1, but under the statute the commission is allowed six months in which to consider the matter. The proposed rates will therefore be suspended for the full period unless otherwise ordered. In view of the large area affected by the case, the size of the company, and the number of municipalities concerned, it is expected that an exhaustive and protracted investigation will be necessary.

At the request of the commission the company has had copies of the new fare schedules printed. These are being sent by the board to the local authorities in the cities and towns affected. To assist counsel the board is also supplying those desiring them copies of its opinions in recently decided fare cases, and has expressed itself ready to welcome any suggestions as to methods of investigation, or to principles and rules which ought to be applied in dealing with the Bay State case.

On the fourteen divisions of the company in Massachusetts there are about 875 fare limits, single-fare units predominating over through fares. By the new schedule local fares in some municipalities would be increased from a 5-cent to an 8-cent unit, notably in Reading, Wakefield, Stoneham, Woburn and Melrose, and in part in Winchester, Brockton, Quincy, Milton, Hingham and elsewhere. On the Reading and the Woburn divisions, for example, nearly 100 fares are listed with a rate per mile ranging in general from 2.47 cents to 3.41 cents. On the Lawrence and Haverhill divisions there are several zones where the per-mile rate will exceed 2 cents, and also on the Gloucester division. On the Salem division the rate usually runs below 2 cents per mile, and on the Lynn division twenty-four zones are below 1 cent and thirty-one above 1 cent per mile. On the Chelsea division the rate runs from slightly below 1 cent to a maximum of 4.84 cents per mile.

Near-Side Stop in Elgin.—The City Commission of Elgin, Ill., has ordered that all street cars must hereafter stop on the near side.

Exchange Arranged Between Canadian Lines.—Arrangements have been completed between the London & Port Stanley Railway, London, Ont., and the Wabash Railway, for an interchange of freight and passenger traffic.

Loans of $25,000 in St. Louis in August.—The Savings & Loan Association, organized among the employees of the United Railways, St. Louis, Mo., loaned to its members in August $25,000. The membership of the association now numbers 2151. The loans made during the last eight months total $146,000.

Motorman Exonerated.—Sidney Boyt, motorman of the car of the International Railway which met with disaster at Queenstown Heights, Ont., on July 7, has been found not guilty of the charge of manslaughter lodged against him by the dominion police authorities before Magistrate Campbell in St. Catharines, Ont.

Cincinnati Suburban Fare Case Before Ohio Supreme Court—The case of the Interurban Railway & Terminal Company, Cincinnati, Ohio, against the city of Cincinnati, involving a reduction of fare to 5 cents between Pleasant Ridge and the end of the line, was heard in the Ohio Supreme Court on Sept. 23. Attorney Frank Dinsmore appeared for the company and Walter M. Schoenle, city solicitor, for the city. The company lost in the lower courts and at present an injunction prevents it from collecting more than 5 cents between the points mentioned.

Publicity for Louisville Suburban Lines.—Plans for publicity by which Louisville people can be induced in greater numbers to use the country cars of the Louisville & Interurban Railway in search of views and recreation are being considered by R. H. Wyatt, general freight and passenger agent of the company. At his suggestion the officials of the company have taken under advisement a plan of displaying in the city cars views of picturesque landscapes with statements to the effect that such and such a view is to be seen on the LaGrange, the Shelbyville, the Prospect or other line at this or that point.

Semaphore Traffic System for Louisville.—Louisville's police authorities are about to make some experiments with the semaphore system of traffic regulation at the busy street intersections, by way of increasing the efficiency of the traffic officers. It is expected that the first installation will be made at Third Street and Broadway. This is a busy corner with much automobile and street railway traffic. Large apartment houses here have produced many complaints that the whistle of the traffic officer is disturbing to the occupants. The safety-zone system, which has been in effect for a year or more, has proved so uniformly successful that the police authorities are interested in whatever comes along in the way of an improvement.

Three-Car Trains Operated in St. Louis.—Expansion of business in Granite City, Madison and Venice, Ill., immediately across the river from St. Louis, Mo., necessitated an increase in the street railway service furnished by the St. Louis Electric Terminal Railway, and to meet this demand three-car trains have been put in operation. These trains consist of a motor car, equipped with GE-201 or Westinghouse 306 motors, and two trail cars. The motor cars and trailers are all single end with full vestibules on both ends. The motor cars were described in the ELECTRIC RAILWAY JOURNAL of May 28, 1910, page 951. These cars furnish a combined seating capacity of 126. They are 50 ft. long over the bumpers and 9 ft. 3 in. wide over the side sheathing. The three-car trains are operated for the accommodation of passengers living in St. Louis and employed in a number of large industries on the Illinois side of the river. Safety appliances on these cars include a green signal light to indicate to the motorman that the vestibule doors are closed. The cars are wired in series, making it necessary for all doors on the motor and trailers to be closed before the signal light shows in the motorman's cab. All cars are equipped with folding doors and steps. The trailer capacity has been increased by removing the bulkheads between the vestibules and the body of the car. The satisfactory results obtained from the operation of these three-car trains has induced E. D. Bell, general superintendent of the company, to decide to increase the number of trains of this type as business justified.

Eighty-five Autos Driven Through Lowered Gates on Long Island Since Jan. 1.—Exactly $4,327.01 has been spent in the last three months by the Long Island Railroad for 176 newspaper advertisements in New York City, Brooklyn and on Long Island, to make people more careful in driving automobiles over grade crossings. Twenty-five crossing gates on Long Island have been painted with black and white stripes. Heavy gates made of telegraph poles have been placed at one of the crossings leading to Long Beach and another at Central Islip. Similar gates will be placed at other crossings. Thirteen large signs, most of them electrically lighted at night, have been displayed over the main roads on Long Island warning automobile drivers of the danger they run in going over railroad grade crossings without stopping to look for trains. Since the first of the year eighty-five automobiles have been driven through lowered crossing gates. In fifty of these cases the gates were broken by the machines. These gates were lowered to warn automobile drivers of approaching trains. J. A. McCrea, general manager of the Long Island Railroad, said on Sept. 24: "We have devoted much time and thought during the past summer to the question of how most effectively to prevent automobile accidents at grade crossings, and we have adopted every suggestion that was at all feasible. It is quite clear, however, from the number of accidents due to reckless driving which we have had reported to us in the past summer, that the railroad alone will not be able to do very much. As long as there are crossings—and certainly all the grade crossings on Long Island cannot be eliminated at a moment's notice—accidents will occur unless the State and township authorities take up the subject vigorously. We are going to continue our campaign, and I hope next summer we will be able to think of something sufficiently startling to arrest the attention of those reckless drivers with whom it seems utterly useless to reason."

Personal Mention

Mr. Edward H. Dewey of Nampa has been elected president of the Boise Valley Traction Company, Boise, Idaho, the corporation that took over the Idaho Traction Company's lines following the receiver's sale. This company, which forms a part of the power merger, will be operated as a separate unit.

Mr. T. Lee Miller, for the last four and a half years associated with the Toledo Railway & Light Company, Toledo, Ohio, in the capacity of assistant to the president and manager in charge of operations, has been placed in charge of the Sangamo Electric Company's New York office. Mr. Miller was graduated from the University of Cornell, class of 1909, and established connections with Warwick, Mitchell, Peat & Company, accountants, where he originated and established the present efficiency system for the Buick Motor Company.

Mr. J. H. Prior has been appointed chief engineer of the State Public Utilities Commission of Illinois. Mr. Prior was educated at the Armour Institute of Technology and the University of Chicago. He was engineer of design of the Chicago, Milwaukee & St. Paul Railway from 1905 to 1914, engaged in the design of all classes of railroad structures, structural betterments, and track elevation work for that company. In 1906 and 1907 he made valuations of that company's structures in Minnesota and South Dakota, required by the railroad regulatory and taxing bodies of those States. Previous to his appointment as chief engineer, Mr. Prior was assistant chief engineer of the commission he now serves. He is a member of the American Society of Civil Engineers and has been from time to time an officer of the Western Society of Engineers.

Mr. John A. Beeler has resigned as vice-president and general manager of the Denver (Col.) Tramway, in which capacities he will be succeeded by Mr. F. W. Hild, as noted in the next column. Mr. Beeler was born at Towanda, Ill., on June 28, 1867, and received his early education in the public schools of Cincinnati. He entered the street railway field in 1886 as an assistant in construction work with the engineering department of the Vine Street Cable Railway, Cincinnati. Continuing in cable construction work, he went to Denver, Col., in 1888 as assistant engineer with the Denver Tramway. In 1890 he was made constructing engineer for the Denver Tramway, which was then actively engaged in building electric lines. In 1898 he was elected chief engineer of the Denver City Tramway, which represented a merger of all the railways, cable and electric, in Denver. In 1902 he was elected vice-president and general manager of the system. Mr. Beeler was among the first to adopt a double-truck trail car for handling rush-hour loads or peak traffic. He also introduced a number of other novel features that have created much interest in the railway field. One was the employment of student conductors, selected from the local universities and high schools, to man the trailers operating during the periods of heaviest travel.

J. A. BEELER

Mr. Edmund S. Davis, chief engineer of the Boston (Mass.) Transit Commission, who is one of the engineers called upon by the New York Public Service Commission to investigate the construction conditions on the new subway system now being built in New York City, was born in Northfield, Vt., sixty-seven years ago. From 1876 to 1879 he was employed on the Boston water works system, and from 1880 to 1890 was located in Colorado, where he served in the United States surveyor-general's office at Leadville and Denver. In 1890 he located in Boston and was associated with Mr. Howard A. Carson in the formation of the Boston Transit Commission's engineering staff. All the subway construction in Boston has been under Mr. Davis as principal assistant to Mr. Carson, and on the latter's retirement in 1909 Mr. Davis became chief engineer of the board. The building of the Boylston Street subway under the leaning tower of the Old South Church in Copley Square was carried through under his direction. This is, perhaps, the most difficult task the commission has had in the twenty years of its activity.

Mr. F. W. Hild, general manager of the Portland Railway, Light & Power Company, Portland, Ore., has resigned from that company to become vice-president and general manager of the Denver (Col.) Tramway. Mr. Hild has been general manager of the Portland Railway, Light & Power Company since March 15, 1911. This company operates 286 miles of electric railway and does a general lighting and power business in Portland and vicinity. Mr. Hild was in charge of the railway, light and power operating departments of the company. He was formerly assistant general manager and chief engineer of the Havana (Cuba) Electric Railway. He was graduated as an electrical and a civil engineer from Union College at Schenectady, N. Y., in the class of 1898 and was for a time connected with the General Electric Company. While in the employ of this company Mr. Hild assisted in the important rehabilitation work carried out by the Twin City Rapid Transit Company, the Kansas City Railway & Light Company and the Chicago Edison Company. Mr. Hild was one of the originators of the idea of organizing an association to represent the electric railways on the Pacific Coast and was elected president of the Pacific Coast Electric Railway Association at its organization in San Francisco, Cal., on April 1, 1913. A farewell luncheon extended to Mr. Hild on Sept. 30 by the Portland Chamber of Commerce was attended by several members of the "Red Special" party of delegates to the San Francisco convention who were the guests that day of the officers of the Portland Railway, Light & Power Company. President C. Loomis Allen of the American Electric Railway Association, Mr. W. F. Ham, vice-president of the Washington Railway & Electric Company, Washington, D. C., and Mr. Charles C. Pierce, vice-president of the American Electric Railway Manufacturers' Association, addressed the members of the chamber on the electric railway problems of the day. Mr. F. T. Griffith, president of the Portland Railway, Light & Power Company, then paid a tribute to the ability of Mr. Hill, who replied in a fitting speech. Mr. Hild succeeds Mr. John A. Beeler with the Denver Tramway. The Denver company operates 230 miles of line.

F. W. HILD

OBITUARY

Rufus R. Canfield died on Sept. 23 at Sequim, Wash. He was sixty-one years of age. Mr. Canfield assisted in building the electric railway at Windsor, Canada, and became superintendent of the line. Later he was connected with the Detroit & Northwestern Railway, of which he was an officer until the merger of the company with the Detroit (Mich.) United Railway. He then became superintendent of the Syracuse, Lakeside & Baldwinsville Railway, which was succeeded after sale under foreclosure by the Syracuse, Lake Shore & Northern Railroad and is now included in the system of the Empire United Railways, Inc. Mr. Canfield removed to Sequim in 1908.

T. J. Hanlon, Jr., manager of the Pensacola (Fla.) Electric Company, has written the following letter to the City Commissioners regarding tickets for school children: "We have received from our Boston office authorization to sell a 3¾-cent school ticket as was recently requested by you. These tickets will be sold in books of forty each, and will be good on school days only, between the hours of 8 a. m. and 5 p. m."

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***City Electric Company, Albuquerque, N. M.**—Incorporated in New Mexico to operate a railway system, also to operate trackless vehicles and do general electric power business. Offices, Albuquerque. Capitalization, $250,000. Incorporators: George Roslington, Lloyd E. Sturges and E. L. Groze.

FRANCHISES

Ceres, Cal.—The Tidewater & Southern Railroad has received a franchise from the Council to construct a line through Ceres. The company is building a line from Stockton to Modesto and Turlock. The company has asked the Council of Stockton for a franchise to construct a single track along Sutter Street from Hazelton Avenue to Main Street.

Los Angeles, Cal.—Bids will be received until Oct. 6 by the Council of Los Angeles for a twenty-one-year franchise on San Pedro Street and South Park Avenue from Thirtieth Street to Slauson Avenue. Bids will also be received for a twenty-one-year franchise on San Pedro Street and South Park Avenue from Thirtieth Street to Florence Avenue.

Cambridge, Mass.—The West End Street Railway has asked the Council for a franchise to relocate its track on Garden Street at Mason Street and at Concord Avenue, and on Huron Avenue from Concord Avenue to Aberdeen Avenue.

Farmington, Mich.—Frederick McCain, Detroit, has asked the Council for a franchise to construct an electric railway between Farmington and Royal Oak.

Collegeview, Neb.—The Lincoln Traction Company has received a twenty-five-year franchise from the Council to construct a loop around block 25 in Collegeview.

Yorkville, N. Y.—The New York State Railways has received a franchise to place its tracks in the center of Whitesboro Street, Yorkville, and on the easterly and westerly approaches of the new halfway bridge.

Elyria, Ohio.—The Cleveland, Southwestern & Columbus Railway is negotiating with the city of Elyria for a renewal of its franchise for twenty-five years. The company has agreed to pay a portion of the expense of eliminating the railway crossing on Bridge Street. Peter Witt, street railway commissioner of Cleveland, has suggested to the city that the company put 1 cent out of each 5-cent fare into a trust fund to belong to the city and be used for extensions and betterment of service.

Providence, R. I.—The Rhode Island Company has received a franchise from the Council to relocate its tracks on Narragansett Boulevard from the side to the center of the street.

El Paso, Tex.—The El Paso Electric Railway has received a franchise to construct a line on Piedras Street from Alameda Street to Boulevard Street.

Galveston, Tex.—The Galveston Electric Company has received a franchise from the Council to construct single track beginning at a connection with its present track on Fifty-sixth Street and Avenue V½, extending on Avenue V½ to Fifty-third Street, connecting with the company's track at Fifth-third Street and Avenue V½. The franchise was granted on condition that the company abandon its track on Fifty-third Street from Avenue V½ to the beach, on Fifty-sixth Street from Avenue V½ to the beach and on Avenue W½ from Fifty-third Street to Fifty-sixth Street.

TRACK AND ROADWAY

Los Angeles (Cal.) Railway.—Orders have been issued to this company by the Board of Public Utilities to install a 1500-ft. stretch of double track on the Temple Street line, beginning at Robinson Street, to provide proper siding accommodations for that line.

Pacific Electric Railway, Los Angeles, Cal.—This company will electrify the municipal belt line at the harbor, 6½ miles. This was the only bid received for the work.

Municipal Railways of San Francisco, San Francisco, Cal.—A bill ordering the construction of an extension of the Geary Street municipal railway across Golden Gate Park from Tenth Avenue and Fulton Street to Fourteenth Avenue and Lincoln Way, and thence to Judah Street, was passed by the Board of Supervisors on Sept. 20 with only one dissenting vote. At the same time the supervisors adopted a resolution requesting that the Park Commission grant permission for the construction of the proposed extension of the municipal railway across Golden Gate Park.

Boise (Idaho) Railroad.—This company has awarded a contract to S. E. Burnham for the construction of an extension from the present terminal of the Thirteenth Street line to connect with the Soldiers' Home line.

***Hillsboro, Synthiana, Bainbridge & Chillicothe Traction Company, Hillsboro, Ill.**—This company made application to the Public Utilities Commission of Ohio on Sept. 23 for permission to issue $500,000 capital stock to sell at 80 and $1,700,000 first mortgage, 5 per cent, ten-year bonds to sell at 85, the funds thus secured to be used in building an electric line between Hillsboro and Chillicothe, 42 miles. It is claimed that 80 per cent of the right-of-way has been secured.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company has awarded a contract to the Central States Bridge Company, Indianapolis, Ind., for the construction of the only bridge necessary between Ludlow and Paxton. It is to be 100 ft. long and only one span. The two pieces of steel weigh 115,000 lb. A slight change has been made in the line from the orginal plans so as to pass a large timber tract half-way between Ludlow and Paxton to be converted into a park by a stock company of Paxton people. They have agreed to spend $10,000 in making it ready for boating, swimming and other amusements. By the change the line extends about a half mile further east than originally intended.

Union Traction Company, Coffeyville, Kan.—This company is leveling its track on Eighth Street west of Walnut Street. An entirely new base, the same as on East Eighth Street, is to be put in.

Anthony & Northern Railway, Hutchinson, Kan.—Plans are being considered to build extensions of this company's line north from Pratt. Cars are running to Trousdale, and Larned business men have guaranteed to O. P. Byers, promoter of the line, that the city and townships in Pawnee County traversed by the new line will vote $115,000 in bonds. Kinsley business men have duplicated the offer.

Kansas City-Western Railway, Kansas City, Kan.—New track is being laid by this company on Thirteenth Street, Leavenworth. The rails will be 60 ft. long, weighing 80 lb. per yard. There will be 6 in. of rock under the ties.

Salina (Kan.) Street Railway.—This company has abandoned the construction of its Park Street line to the new union station at Salina as the Mayor will not recede from his position which requires a bond to be given by the company to protect the city from any damage that might arise on the street. The company is willing to give bond to protect the city from the company's negligence. The business men of Salina have taken up the matter in an effort to have the city waive the unreasonable demand regarding the bond.

Worcester (Mass.) Consolidated Street Railway.—Work has been begun by this company repairing its tracks on Main Street from May Street south. Work has also been begun on the construction of double tracks on Pleasant Street from the end of the present double track to Moreland Street. The laying of new rails on the Canterbury Street line from Webster Square to Freemont Street will be started soon.

Metropolitan Street Railway, Kansas City, Mo.—Work has been begun by this company on the construction of its tracks on Broadway south from Fourteenth Street to Southwest Boulevard. The extension of the Prospect Avenue line from Forty-eighth Street to Seventy-second Street will be begun within a few weeks.

Springfield (Mo.) Traction Company.—Plans are being made by this company to construct an extension of its Monroe Street line to Phelps Grove Park. It is planned to use the rails on Boonville Street, which are to be removed to make way for heavier and more modern equipment of that line.

Three Forks, Mont.—The contract for the construction of the line between Three Forks and Radersburg has been awarded to Clifton, Applegate & Company, Spokane, Wash. Julius Rosholt, Fairmount, N. D., is interested. [Aug. 21, '15.]

New York, N. Y.—On Oct. 15 the Public Service Commission for the First District of New York will open bids for portion "C" of the ballast contract for the new rapid transit lines. This portion covers about 80,000 cu. yd. of trap rock, or hard limestone. The commission has already awarded contracts for nearly 300,000 cu. yd. of ballast.

Interborough Rapid Transit Company, New York, N. Y.—In a few weeks the Public Service Commission of New York will advertise for bids for the digging of another East River rapid transit tunnel. It will be the tube from the foot of Fourteenth Street, Manhattan, to North Seventh Street, Brooklyn, which will carry the tracks of the Fourteenth Street-Eastern District line of the dual system. The work has been held up because a permit granted by the War Department made the city responsible for all loss or damage due to construction. The commission objected, and the War Department has modified the permit so that the city's obligation is restricted to "all legal liability."

Cleveland (Ohio) Railway.—Operation has been begun by this company on its extension on Euclid Avenue, Cleveland.

Bartlesville (Okla.) Interurban Railway.—This company reports that it is reconstructing ½-mile of track in Dewey, using 72-lb. 6-in. T-rail to replace 60-lb. rail. The company is also constructing a 2-mile loop in Bartlesville.

Southwestern Light, Power & Railway Company, Oklahoma, Okla.—A report from this company states that it will construct a line from Oklahoma to Dennison via New Castle, Duncan, Lawton, Lindsay, Davis, Ishmingo and Durant, 176 miles. The line will reach a park at Arbuckle. The power station will be located at Davis and the repair shops at Arbuckle. The company will also furnish power for lighting. The contract for the construction of the line has been let to the Arbuckle Construction & Improvement Company. Officers: W. T. Croslen, president; J. H. Stewart, secretary; W. P. Woolsep, general manager, and A. L. Mitchell, electrical engineer. [Sept. 18, '15.]

Philadelphia & Western Railway, Upper Darby, Pa.—Direct electric car service between Philadelphia, Valley Forge, Phoenixville, Spring City and Pottstown will be established within a year if the plans formulated by a group of Philadelphia financiers are fulfilled. The Philadelphia & Western Railway will form the terminal trunk line and perform an important part of the new service, it being planned to run the new cars over their tracks. The plan embraces the extension of the Phoenixville, Valley Forge & Strafford Railway to a connection with the Philadelphia & Western Railway at Bridgeport. It will be necessary to build 7 miles of line. The cost is estimated at about $300,000. The Phoenixville, Valley Forge & Strafford Electric Railway now runs 4½ miles from Valley Forge to Phoenixville. From there the Pottstown & Phoenixville Railway now operates 25 miles in two sections, one from Pottstown to Sanatoga, the other from Spring City to Phoenixville. The gap from Sanatoga to Spring City is now being filled in by a new line under construction and largely graded.

Galveston-Houston Electric Railway, Galveston, Tex.—According to David Daly, general manager of this company, poles and other materials have been distributed along the temporary trestle over the causeway with a view to beginning immediate work to provide facilities so the company can send cars over the causeway under its own power. On account of difficulties to be encountered, by the fact that the single track across the temporary trestle is constantly being used for the many trains into and out of Galveston daily, it will be at least three weeks before this work can be finished and interurban cars can be operated across the trestle by electricity.

Richmond, Rappahannock & Northern Railway, Richmond, Va.—At a meeting of the stockholders of this company held on Sept. 16, the sale of $100,000 in preferred stock and $50,000 in common stock was authorized, the preferred stock to pay 7 per cent. Subscriptions have been received for $25,000 of preferred stock. [Sept. 28, '15.]

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Work will be begun at once by this company on the construction of an extension of its line on Asylum Avenue, Racine.

SHOPS AND BUILDINGS

Shore Line Electric Railway, Saybrook, Conn.—Work has been begun by C. M. Williams on this company's new carhouse in Thamesville. The building will be 60 ft. x 250 ft. and will be constructed of brick. The erection of the proposed carhouse on Montauk Avenue, New London, has been postponed until next spring.

Arkansas Valley Interurban Railway, Wichita, Kan.—The contract for the construction of this company's $10,000 terminal at Hutchinson has been awarded to the Foy Construction Company, Hutchinson.

Holyoke (Mass.) Street Railway.—Plans have been completed by G. E. Pellissier, Springfield, for a new carhouse and substation to be erected at Amherst for the Amherst and Sunderland branch of the Holyoke Street Railway. The carhouse will be 130 ft. x 100 ft., of brick, mill construction, with blue stone or artificial stone trim, and all modern improvements. Part of this building will be two stories high, in which will be the offices. The substation will be 31 ft. x 102 ft., one story high.

New York Municipal Railway Corporation, Brooklyn, N. Y.—Station finish construction on the New Utrecht Avenue elevated railroad in Brooklyn will soon be undertaken. The Public Service Commission for the First District of New York will advertise for bids, to be opened Oct. 26, for the finish of eleven stations on that road between Tenth Avenue and Coney Island. The stations are Fort Hamilton Parkway, Fiftieth Street, Fifty-fifth Street, Sixty-second Street (express), Seventy-first Street, Seventy-ninth Street, Eighteenth Avenue, Twentieth Avenue, Bay Parkway (express), Twenty-fifth Avenue and Bay Fiftieth Street. The New Utrecht Avenue line will be operated by the New York Municipal Railway Corporation as a branch of the Fourth Avenue subway, connecting therewith through the Thirty-eighth Street cut.

POWER HOUSES AND SUBSTATIONS

Richmond Light & Railroad Company, New York, N. Y.—This company has ordered from the Westinghouse Electric & Manufacturing Company one 7500-kva. turbo-generator, together with motor exciter equipment, and one 10,000 sq. ft. surface condenser. The purchase of this additional power-house equipment, which is to be installed in the Livingston power plant, has been made necessary by the energy demand imposed by the thirty-two new all-steel cars, equipped with Westinghouse motors, recently placed in operation on this line.

Carbon Transit Company, Mauch Chunk, Pa.—A report from this company states that it is receiving bids on new power equipment consisting of boiler with culm burning furnace and a 300-kw. 600-volt, d.c. turbo or engine-driven generator installed complete with condenser, piping, etc.

Ashland Light, Power & Street Railway, Ashland, Wis.—This company was the recent purchaser at a private sale of what was the original plant of the old Kentucky Electric Company, organized in Louisville, Ky., about eight years ago. This plant, together with other units of the Kentucky Electric Company, passed into the possession of the Louisville Gas & Electric Company when that organization took over the utilities of the city. It was not available for use in connection with the system which has been centered in the Waterside plant of the gas and electric company and has been on the market for some time. The plant will be shipped, almost in its entirety, to Wisconsin. The equipment, which was installed about eight years ago, included four 350-hp. B. & W. boilers, automatic stokers, etc., three 500-kw. Curtis turbo-generators, rewound and changed over from two to three phase, etc.

Manufactures and Supplies

ROLLING STOCK

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., is considering the purchase of two single-truck cars.

Jefferson City Light, Heat & Power Company, Jefferson City, Mo., will shortly place in operation six new cars, which are being built in the Topeka shops of the Illinois Traction System.

TRADE NOTES

Fibre Conduit Company, Orangeburg, N. Y., has located its New York office in larger quarters at 101 Park Avenue, corner of Fortieth Street.

G. S. Ackley & Company, New York, N. Y., representing the Ackley Companies, with offices at New York, London, Paris and Berlin, has been appointed by F. A. Wasson as exclusive sales representative for the Wasson air retrieving and non-retrieving trolley bases, in the foreign fields, excepting Canada.

Electric Service Supplies Company, Philadelphia, Pa., has received the following orders for "Protected" rail bonds: Interborough Rapid Transit Company, New York, N. Y., 5000 type P-4 bonds, 211,600 circ. mil capacity, 46 in. long; New York (N. Y.) Railways, 2500 type P-4-P bonds, No. 00 capacity, 14 in. long.

H. W. Johns-Manville Company, New York, N. Y., has moved its Chicago office to larger quarters in a building which it will occupy at Michigan Avenue and Eighteenth Street. The main floor is divided into sales showrooms for the many products handled by this company, among which are asbestos roofing, siding and lumber, packing, pipe and boiler covering, electric insulation, clothing, builders' specialties, and numerous appliances for the steam and electrical engineer.

Prest-O-Lite Company, Inc., Indianapolis, Ind., is building a new storage-battery plant involving additional floor space of 45,000 sq. ft., or one-third of its present floor space. The new plant will be ready for operation by Dec. 1, 1915. In the meanwhile operations are being conducted in the Murphy Building, Indianapolis. This company is also engaged in establishing storage-battery service stations at all of its branches. Twenty branches have been so equipped up to the present time.

Midvale Steel Company, Philadelphia, Pa., now in control of a syndicate headed by William E. Corey, formerly president of the United States Steel Corporation, was reorganized with the election of Joseph Entwisle as president; William P. Barba, formerly general manager, as vice-president, and Mr. Corey, Percy Rockefeller and Samuel M. Pryor as directors. Mr. Entwisle was elected president temporarily in order to facilitate the transfer of stock. He will be succeeded by Mr. Corey at the next meeting of the board, which will be held in New York.

Ohio Brass Company, Mansfield, Ohio, has received an order for 107,000 catenary hangers and other accessories from the Chicago, Milwaukee & St. Paul Railway for what is known as the third and fourth sections of its new electrification. This order constitutes half of the equipment of this kind necessary to be installed on the 200 miles of these new sections. This manufacturing company has also received an order from the Interborough Rapid Transit Company for 5000 standard-type rail bonds for the new elevated tracks now under construction in Queens County, Long Island.

Harry Vissering & Company, Inc., Chicago, Ill., whose automatic sand dryer was described in the ELECTRIC RAILWAY JOURNAL for Sept. 11, have made a number of installations on other electric railways besides the San Antonio (Tex.) Traction Company. Among these may be mentioned the Northampton (Mass.) Street Railway, Holyoke (Mass.) Street Railway, Coney Island & Brooklyn Railroad, now a part of the Brooklyn Rapid Transit System, Knoxville (Tenn.) Railway & Light Company, Des Moines (Iowa) City Railway, Seattle (Wash.) Municipal Railway, and Rhode Island Company, Providence, R. I. The Rhode Island company purchased a dryer in December, 1912, and reported recently that it had not spent 1 cent for repairs.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., in order to encourage the spirit of thrift among its employees, has just established a savings fund which offers facilities to the employees for the handling of their savings accounts. This fund is open to any employee of the company wherever he may be located, and he may become a depositor at any time and discontinue at any time. The amount of the deposit cannot be less than 10 cents and may be any multiple thereof and the deposits must be made from each regular pay. The deposit, however, is limited to one account, the amount of which in any one year cannot exceed $500. The idea of this is that the plan is intended as a method of encouraging the employee to save his earnings and when he has been successful up to this point, allow him to handle his own finances. Interest is paid on the deposit at the rate of 4½ per cent and is credited semi-annually. The Westinghouse company acts as a trustee and guarantees the deposits and interest. The rules provide that an amount of $100 or less may be withdrawn without notice, but an interval of two weeks must elapse before subsequent withdrawal can be made, and for withdrawals more than $100, notice of one week must be given. An auditing committee not to exceed seven persons is to be elected by the depositors from among their own number, which committee shall be given an opportunity to examine the condition of accounts at semi-annual interest periods, the findings of which shall be published.

ADVERTISING LITERATURE

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued a bulletin listing its various railway supplies.

Standard Machinery Company, Auburn, R. I., has issued a catalog describing its various types of foot and mechanically operated presses, including an aluminum slide armature notching press.

Stone & Webster Engineering Corporation, Boston, Mass., has issued a bulletin which contains illustrations of the new coal gas plant of the Fall River Gas Works Company, which was designed and constructed by this engineering corporation.

Holophane Works of General Electric Company, Cleveland, Ohio, has issued a lighting handbook. This publication covers the general subject of illuminating engineering from the practical standpoint and contains as well elementary technical data on lighting and data on the engineering performance of the products which this company manufactures.

S. K. F. Ball Bearing Company, New York, N. Y., has issued a reference folder for the various bulletins recently published by this company, each of which includes separatey the following subjects in their relation to ball bearings: general bulletin, railway lighting generators, hangers, textile machinery, automobile worm drive, electric motors, street railways, paper-making machinery, grain-milling machinery and machine tools.

Standard Railway Supply Company, Cincinnati, Ohio, has issued a folder describing its new improved "K-I" splicing sleeve. In this new sleeve the ends of the trolley wire, when in position in the sleeve, are bent downward, thus making it possible to lessen the thickness of the metal on the side opposite the wedges where least needed, and increase the thickness of metal over the wedges where most needed.

G. C. Reiter, Canton, Ohio, has issued advertising literature describing its various types of gongs for street cars or emergency wagons. The gong shells are manufactured from a special analysis of bell steel. It is stated that they give a loud, clear ring and will not crack, break or lose their tone under any conditions of service or atmosphere. The gong shells will fit any attachment. They are pressed, not cast. The types illustrated in the catalog include single-stroke foot gongs of the horizontal and vertical types, single-tap inside-striking foot gongs, single-stroke roof or hood gong, rotary vertical-type multiple-ringing gongs for foot, roof or hood, and multiple-ringing pneumatic gongs.

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SAN FRANCISCO AS A CONVENTION CITY

In spite of its distance from the East, San Francisco was the logical place in which to hold the convention this year. The exposition was, of course, the great attraction. It was the magnet for the selection of San Francisco as the convention city by nearly all of the national associations which have held conventions this summer. The American Electric Railway Association had another compelling reason. Its members on the Pacific Coast had for many years loyally sent representatives to different cities in the East for the annual convention, and it was only fair that they should have the compliment of a return visit at some time, and this was the logical time. In spite of the distance which the trip required for many of the delegates there was a satisfactory attendance of delegates from the East. While not as many were present as at recent Atlantic City conventions the attendance was good compared with those at other national conventions which have been held in the Far West during 1915. The depression in business undoubtedly kept many away who would otherwise have been present, but the attendance was representative, and those who took the trip were well repaid. There is a spirit of enthusiasm and energy which characterizes all work on the Pacific Coast, including that of the electric railways, which no one can realize until he has actually lived in the Far West and has seen the work accomplished there.

LOWER COMPANY SECTION DUES

The association has been generous to the company section members in reducing the annual dues 60 per cent. These dues are as low as is consistent with the dignity of a national association. A certain minimum is also essential to proper appreciation on the part of the individual, for what costs nothing is valued correspondingly. The association has shown that the individuals are not sought as members for the income they would produce, but that it desires to serve the company members which support it by making their employees better employees. We believe that a chief function of the company section is to foster local loyalty and co-operation. While local associations are excellent they cannot be as effective when independent as when bound to a national society. It should be much easier henceforth to form sections if only for the rather selfish reason that the present local members in a community can save money by becoming section members, and to be such they must have a section to join. But the mere reduction in dues is not alone going to enlarge the membership greatly. The fact of the reduction must be widely advertised and the company section programs kept at such a high standard of attractiveness and value that the men will not only come in but stay in. We anticipate a year of great company section activity as a result of this association action.

SAFETY CODE CONFERENCE COMING

President Allen in his San Francisco address mentioned the work of the National Bureau of Standards in the preparation of an electrical safety code, and stated that the association has been actively co-operating with the bureau. This is a most important matter and time is now at a premium for getting in constructive suggestions, as the Washington conference is less than three weeks off. During the past few days there have been several important conferences in the East, in which the association was represented and much progress was made. Some details in the preliminary edition of the proposed rules aroused considerable opposition, as was natural. It was only by putting something tangible into the hands of the operating and constructing engineers that these objectionable details could be brought to light. They will undoubtedly be eliminated. President Allen has certainly done his best to bring out the facts from the railway standpoint.

AMMUNITION FOR THE PROGRAM COMMITTEE

The award of the company section medal at San Francisco to J. W. Bury, assistant superintendent of transportation Manila Electric Railroad & Light Company, for his paper on courtesy serves to remind the section program makers of a means which is at their disposal for stimulating latent literary talent. It is an honor to the section as well as to the individual to have such an award. Moreover, with the number of sections as small as it now is, there is more chance to obtain the medal than there will be later. Mr. Bury's paper, which was delivered in Manila on April 6, 1915, was briefly abstracted in the issue of the Electric Railway Journal for May 29, page 1033. The spirit of it can be gathered from the following quotation from our abstract: "The platform man has peculiar temptations to be discourteous, and the public blames a great deal of its discomfort in transportation on the car conductors. The motormen, who are to blame for many of the conductors' troubles, should co-operate with the latter in the matter of courtesy. The inspectors have an excellent opportunity to promote pleasant relations between platform men and the public." If the award of the medal will act to help the program committees in bringing out papers of this type it will be worth much more than its cost. An excellent beginning has been made in the past two years.

PAPERS AND ADDRESSES AT SAN FRANCISCO

The San Francisco conventions were characterized by a number of important addresses by men of national reputation on leading topics of the day, notably the papers by ex-Senator Bourne, B. J. Arnold, J. W. Lilienthal and Paul Shoup. The address by Mr. Shoup, which we hope to be able to give in extenso next week, is but briefly abstracted in the present issue of the ELECTRIC RAILWAY JOURNAL. In it he contrasted the governmental policies toward the railroads and agriculture and advocated education of the public. Mr. Lilienthal told of the possibilities of improving the inside conditions of a corporation in an equally large way and of the proper methods of treating the employees and the public. His address is abstracted elsewhere in this issue. We commend both of these papers to the thoughtful consideration of railway men. All such can apply the principles of welfare work for the public and for employees as were clearly enunciated by Mr. Lilienthal. The position of the electric railway companies of the present day would be very much better if the doctrines described by him had been more generally followed in the past. Indeed, his paper might well be considered in the light of an elaboration of the code of principles.

The address of the president of the association is always an important document and should be considered among the notable addresses at San Francisco. Mr. Allen gave a vivid picture of the problems now before the industry and of its present condition. In nearly all sections of the country the situation confronting the electric railways of the country is the same, and the cumulative effect of this condition spread over a number of years has brought new construction of electric railroads to a standstill. The condition cannot be ascribed to the business depression entirely or even largely. The properties, it is true, have suffered from this cause in their gross receipts, but the trouble is far deeper and is one which will not be greatly relieved even if there should be a revival of general business unless there are other alleviating conditions. The differences between the electric railway industry and others which can increase their prices or reduce their service as the occasion demands are not properly understood by the general public, which instead of lightening the burdens of the electric railways seems intent on increasing them.

How best to overcome this is the chief problem, not only before the industry but also before those who believe that the prosperity of the country is dependent largely upon the proper development of its transportation facilities. To assist the association in helping to solve this problem Mr. Allen has recommended certain changes in the organization of the association by which a closer relation will be created between it and the Manufacturers' Association. The committee to which his suggestions have been referred is a strong one, and until a definite plan is formulated no opinion can be expressed. As we view the situation the manufacturers can help in two ways. One of these is the work which they have been doing in connection with the exhibits. This they have done well. The other is a broader work to which they have yet hardly put their hand. Whether the two rather dissimilar tasks can best be performed by two organizations or by one, and whether the plan of making the Manufacturers' Association an affiliated association is the best remains to be determined. These are the questions which the new committee is to decide and upon which it will report, presumably at the next regular meeting.

HELPING THE EXECUTIVE

The address of G. B. Willcutt before the Accountants' Association emphasized in noteworthy fashion the important part that accountants' reports, ordinary and otherwise, play in administrative work when they are properly compiled, compared and analyzed. The problems confronting modern executives have in late years increased so much in volume and complexity that very broad knowledge and experience on their part is necessary for quick and correct decisions on questions submitted to them. In this state of affairs the modern executive to be successful is forced to depend on his analysis of facts that have been collected and arranged for his instantaneous and continuous use. Here the accountant has already done much, as is shown by the comprehensiveness of the work described by Mr. Willcutt, but the end is not yet.

In a sense the accountant and the executive are inclined to look at financial and operating statistics from two widely differing points of view. The accountant, it has been said, primarily wants a bird's-eye view of the status of the corporation at a particular moment or the general results at the end of a particular period. The mind of the executive, however, works differently, for he wants a "cross-index" of the accountant's information at all points and for all periods so that he can study the entire or partial history of all or any portion of the corporation's activities. The difference, we would conclude, is inclusiveness of vision, and it is only by acquiring as far as possible the executive's breadth of view that the accountant can intelligently and thoroughly furnish the executive with all of the data which he requires.

In this connection, we are inclined to believe that the mass of statistical work carried on by operating departments in calculating economies would better be handled by the accounting department to a large extent. Aside from the fact that the resulting figures would probably be unbiased and more reliable by virtue of being compiled in a department having no axes to grind, this plan would by actual practice give the accounting department the desired wider view of the executive's problems and his needed information. Similarly we believe that the accounting department should act on its own initiative in ascertaining the data that are required for successful operation as the industry continues to develop, instead of passively awaiting executive instructions. In other words, what the committee on passenger-accounting has done this year in hunting down old daily reports now valueless to the traffic and schedule departments, the ideal accountant will correspondingly do for all information, old and new, that the executive is using or can use.

THE SCIENCE OF TRANSPORTATION

To one who reads the reports presented before the Transportation & Traffic Association the impression is inevitable that the problems of this branch of the industry are rapidly approaching the field of applied science, and the time when the transportation official was interested only in personal experiences and measured his success solely by the indefinable qualities involved in the handling of men seems certainly to be passing. In its place has come an era of consideration of mechanical devices, traffic checks, schedule construction and the like, in which the elements of calculations based on definite general factors begin to loom large.

In this light the first report of the newly-formed committee on standards comes at a significant period, and though this committee's work for the past year was limited to the establishment of a code of procedure, the way has now been paved for the establishment of definite data on transportation practices. Naturally the most obvious material of this kind is to be found in the code of rules, and as evidence that the present code has reached a final form may be cited the fact that this year's committee on rules suggested in its report but three revisions. All of them were in the interurban code, one having to do with the flagging rule investigation and the other two, which had been submitted before previous conventions, involving certain modifications in the slow-speed-track indication and in the position of classification signals on the car. The latter revision proposed front-end signals located at the middle of the car end instead of near the roof, providing for a definite indication of the direction of extras and sections that are passed on sidings, and it is somewhat surprising that the association in convention should have failed to approve a change designed solely to avoid confusion.

Practically the whole of the report of the association's committee on passenger traffic was devoted to consideration of one-man car operation, and although no definite recommendations could be made, the data submitted were remarkably comprehensive and especially valuable in view of the comparative novelty of this form of transportation unit. The finding that one-man cars are used by more than 30 per cent of the companies replying to the committee's inquiry was decidedly interesting, as was also the apparent limitation of the service to cities of 25,000 population. However, the statement of car-mile earnings averaging 14.5 cents with operating expenses of 12.7 cents was hardly encouraging. In fact it gave an impression of unprofitable lines that could hardly be operated at all if the one-man car was not used. Certainly so small a margin between revenues and expenses is not going to pay overhead charges and a profit besides, so that as it stands the one-man car can hardly be classed as having demonstrated its success in general. Nevertheless, the fact that but comparatively few cars especially designed for one-man operation are as yet in service makes it certain that better results may later be obtained than are indicated by these figures, and since the report established the perfect practicability and actually improved safety of the one-man car, there are undoubtedly conditions under which it will prove decidedly advantageous.

Consideration of mechanical devices also constituted a large part of the report on fares and transfers, and it is very much to the committee's credit that its agitation of the necessity for issuing transfers mechanically should have resulted in the actual commercial development of such a machine within the last few months. In consequence, the strong argument that was contained in the report for a motor-driven fare box with the penny-counting mechanism eliminated may be expected likewise to produce results. In connection with the general subject of fare collection this committee cited the experiences of three companies with the use of front-end collectors at congested points. In two cities very good results had been obtained, but in one case a rather unsatisfactory statement was submitted, the introduction of the extra fare collectors effecting no increase in the number of cars passed through the congested district. As a matter of fact the movement of the cars in this instance was entirely dependent upon the traffic policemen, and in consequence the decreased loading time produced no improvement. Obviously, failure of front-end collection under such conditions cannot be ascribed to any inherent disadvantages in the system, and as the committee indicates in its conclusions, the value of this method may be said to depend largely upon the circumstances surrounding its operation.

As usual, the committee on express and freight traffic presented a very comprehensive and interesting report. One of the most significant facts put forward was that, judged on the basis of the railways making returns to the committee, the passenger earnings for 1914 were practically 1 per cent less than those of the previous year, while the freight earnings actually showed for the same period an increase of approximately 5 per cent. With this evidence in view it would be difficult to disagree with the implied belief of the committee that many expenditures now made with the expectation of making really negligible increases in passenger business might better be devoted to the cultivation of the far more fertile field of freight and express traffic.

Undoubtedly the discussion on the influence of stops on schedule speed in the report of the committee of schedules and time-tables was one of the most interesting features of all of the wealth of information presented during the course of the convention. Beginning with average figures obtained from a large number of tests in actual city service, the committee developed curves showing the relation between stops and schedule speed, and these indicated that, where a schedule with twelve stops per mile gave a schedule speed of 9.2 m.p.h., a decrease in the number of stops to eight per mile would increase the schedule speed to 10.8 m.p.h.—an improvement of 17 per cent, or more than enough to make many a bankrupt road pay dividends. It would be difficult to provide a more potent argument than this for the skip stop or any other method of operation whereby the number of stops in city service could be decreased. Indeed, the importance of this phase of the committee's work can hardly be overestimated; primarily because the influence of stops on city schedules and, in turn, on operating expenses has been recognized only vaguely up to the present time. It is well worthy of continued study.

A BUSY YEAR FOR THE ENGINEERS

It is only when one contemplates the accumulated results of the year's work by the Engineering Association committees that he can realize how much there was to be done and still remains to be done. The year's work was not only well done, but the reports were completed promptly and carefully scrutinized by the standards committee. The following bird's-eye view of a few of the high points in the committee work may aid in forming a just estimate of the work.

The scope of the work carried through by the outgoing committee on equipment is extraordinarily extended, and one is led instinctively to wonder whether it would not be better in future to divide it, if necessary forming new committees, so that the present burden of detail borne by the chairman could be lightened. To the ensuing committee, for example, there have been assigned already three subjects for consideration at the suggestion of the standards committee, and in addition, there are investigations of such importance as those on the new designs for a standard journal brass, for a limit-of-wear gage for wheels, and for a standard brakeshoe, head and key, which have been submitted by the outgoing committee as requiring continued study. The investigation of any one of these matters, to say nothing of the new subjects that may be assigned by next year's executive committee, involves a great deal of individual time and effort, and it seems somewhat unfair to impose so much upon a single committee.

In this year's report the committee on power generation departed from its custom of submitting papers on special topics, and although it might be expected that the alternative of making specific recommendations regarding practice and standards would detract from the interest that has attached to previous reports, this proved to be anything but the case. In fact, the report outlined a method for analyzing power station costs that was decidedly novel and contained much material productive of study. In this were presented charts covering operating costs which were based upon the curve of "peak ratio," the reciprocal of the load factor, and it was suggested that this be adopted instead of the load factor as a basis for unit performances. Certainly, this plan has much to recommend it, and it will be interesting to see whether the proposal will aid in clarifying power station cost analyses.

The electrical engineers have contributed liberally to this year's progress most tangibly in the report on power distribution. The specifications on overhead line material are a fitting complement to those on 600-volt, overhead trolley construction. They should be especially acceptable to the small road, for whose particular benefit they were prepared, in enabling it to buy as wisely as the large one with its corps of skilled engineers. These specifications will also simplify the preparation of others for a.c. and higher-voltage d.c. construction, which must be taken up soon. One of the most troublesome little but fundamental difficulties of an electrical nature has been that involved in specifying lightning arrester grounds. Signal operating conditions, electrolytic corrosion and ground resistance all come in to complicate the situation. A compromise seems now to have been reached.

Unquestionably the most notable contributions contained in the report of the committee on way matters were the specifications for track special work with particular reference to its physical and chemical properties, and the quality of workmanship. While in time, doubtless, these specifications will be amended to meet street and interurban railway track requirements, the provision of a definite working standard represents a long stride in the right direction. Moreover, the fact that the manufacturers were deeply interested in seeing these specifications adopted is another important point in their favor. Now that the specifications have been approved by the way committee, the manufacturers and the standards committee, they merit general use by way engineers, especially, so that any weaknesses that may develop can be corrected at the earliest possible date. With these definite standards, special work may be inspected at the mills in a manner which will meet with the approval of manufacturers, or when it is known that these specifications are to measure the quality of workmanship, the liability of controversy, even when special work is inspected at the point of delivery, is practically eliminated.

The feature of the report of the committee on heavy electric traction was a study of modern electric locomotives in which a comprehensive compilation was made of data regarding existing designs both in this country and in Europe. This disclosed a decided lack of uniformity in practically every factor entering into electric locomotive construction, and the committee was led to the conclusion that an attempt to standardize either electrically or mechanically would be premature. No doubt this is broadly true, but it is unfortunate that the committee did not have a chance to express itself (owing to the practically simultaneous dates of publication) on some of the details cited in connection with the ideal locomotive that was outlined in E. H. McHenry's paper before the International Engineering Congress. There would seem to be many points in favor, and few against, the latter's timely suggestion to limit electric-locomotive driving-wheel loads to some such figures as 40,000 lb., and consideration of this matter from a practical standpoint by the committee could hardly fail to be of great interest and real value.

The Industry and the Association*

Electric Railways Confront Serious Problems Due on One Hand to the Attitude of the Public and on the Other to the Business Depression—More Active Participation of Lawyers and Manufacturers in the Work of the Association Is Desirable

By C. LOOMIS ALLEN
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THE association appreciates the support and the loyalty that has always been accorded by its Pacific Coast members, and it was very largely with the idea of showing appreciation of that support and loyalty that it was determined by the executive committee in 1913 that in 1915 the association should hold its convention at a point where its Pacific Coast members could observe at first hand its methods and manner of working, and the association could receive the benefit that would come from the discussion and suggestions of its far Western members. In the early days of the association it was the habit to hold the annual convention in cities in different sections of the country, but when it was decided to hold the 1909 convention in Denver many of us were apprehensive as to the result of holding the meeting in a city so far west. But the benefits to the industry and to the association warranted the expenditure of the money and the sacrifices of time necessary for the journey. In voluntary associations similar to the American Association interest in the work and the welfare of the association can best be engendered and continued when its members are in close touch and are each doing some definite thing for the industry or the association.

The association, in its personal contact with the Pacific Coast members, expects to receive an inspiration and impetus that will make for bigger things to the industry and the future work of the association. The field is a large one and workers with energy and ideas were never in such great demand as they are at the present time.

The committee which has had in charge the arrangements for this convention has done its work well. It has been fortunate in that its membership included capable men on the Pacific Coast who have taken care of the thousand and one details in a highly creditable manner.

As in former years, the committee on subjects has been charged with the duty of providing suitable programs for the midwinter meeting and for this convention. It is sufficient to say that the program prepared for the midyear meeting could not have been improved upon. The program for this convention likewise merits the approval of the delegates.

The Electric Railway Industry

Much has been said in recent years as to the extent to which our industry was suffering from the attacks of political demagogues and irresponsible reformers, but serious as has been the effect of these attacks, it passes into insignificance as compared with the situation that has confronted the electric railway industry during the past twelve months. Municipal ownership, partnerships with municipalities, state regulation and home rule have from time to time been sources of great concern to the owners of electric railway securities and to those who have been responsible for their successful operation. Business depression has prevailed throughout the United States, with few communities excepted, and has wrought such havoc in the earnings, both gross and net, as to most seriously affect the values of securities that have been purchased by investors and has almost completely destroyed the market for electric railway securities with the private investor. Perhaps figures can best demonstrate the condition of our industry.

The bureau of fare research, in our home office, receives monthly the statements of gross earnings, operating expenses and net earnings from a large number of our members. A combined statement from twenty-five of the larger companies in different parts of the country, selected not with a view of seeking extreme conditions, shows that for the year ending June 30, 1915, there was a decrease of $3,601,948 in gross income, a decrease of $1,516,025 in operating expenses, and a decrease of $2,083,394 in net income as compared with the year ending June 30, 1914.

Based on these figures, it can be truthfully said that the gross earnings are showing a decrease over the previous year, operating expenses a relative increase over the previous year, and that the result is a consequent large decrease in the net earnings. This condition does not permit a very attractive statement to be presented to the investment banker or private investor, nor does it permit the conscience of the fair-minded utility man to urge the private investor to invest in securities of electric railways.

The desire on the part of the electric railway men to render high-grade service and to meet the wishes of the patrons of the electric railway and the reasonable orders of public service commissions in relation to service, is necessarily restricted by reason of the falling off in net earnings and the consequent failure to interest capital so that improvements can be made that will permit of the higher grade service.

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*Annual address of the president of the American Electric Railway Association delivered on Oct. 5, 1915, before the convention in session in the Native Sons of the Golden West Building, San Francisco, Cal.

In the operation of the electric railway four parties are at interest—the public, which is the consumer; the employee, who gets his living from the money paid by the consumer; the state and the municipality, which in the form of taxes, receive a share of the earnings, and the investor, who gets his money in the shape of bond interest or dividends on capital stock. If we are to have successful railway operation, all four parties at interest must be satisfied, which means that each must be reasonable in his demands. If the public makes demands for unnecessary service, or for rates that are too low, labor and capital, state and municipality, one or the other or all of them, must forego their fair share. If labor is unreasonable in its demands for increased wages, if the state and municipality take an undue share of the earnings in the form of taxes, and if the rates of fare are too low so that the capitalist is made timid and is fearful that his investment will be jeopardized or made less valuable, the man who has the cash to invest will shrink from the purchase of electric railway securities and put his money at work in other fields where the consumer, laborer and the taxing powers will permit him the security for his capital and a rate of return on the money that he advances which makes it attractive to him.

This is not a theory that confronts the industry—it is a condition—and never has it been quite so clear to the electric railway industry as at the present time. It would seem as if it was but an ordinary business proposition to convince the American people that our business is no different from any other business and that successful business corporations are the corporations that build up the country. No municipality was ever built or prospered by the aid of business concerns facing failure or financial embarrassment. Quality of service to our patrons or consumers is dependent wholly upon the securing of capital to provide the facilities for rendering such service. Put the industry in a position so that capital is attracted to it, and high-grade service can and will be rendered to the consumer. Let the conditions now prevailing throughout the country in the matter of rates of fare, demands from employees for higher wages, the enactment of more stringent laws, or of new forms of taxation, and we will continue to have, until some of these conditions are modified, a timidity on the part of the investor—affecting not only the sums of money now invested, but which will bring about an absolute lack of the offering of new capital, so necessary to the electric railway industry if it is to render that "good service" which we all desire to give to our patrons.

The American Electric Railway Association

The association offers to its members, through its officers, executive committee and standing committees, a means of putting before the American public in such form as can be easily understood, the facts which should make for a better understanding by the American public of the unfavorable conditions that confront the industry and of the remedies that are necessary to put the industry in such a position that the development of existing lines, the extension into new territory and the building of new lines in undeveloped territory will go forward.

President Wilson said to us in Washington: "So I say that if your earning capacity is the capacity to earn the public confidence, you can go about your business like free men. Nobody is going to molest you and everybody is going to say, 'If you earn big profits; if you have treated the people from whom you are making your profits as they ought to be treated; if you treat the employees whom you use in earning those profits as they ought to be treated; if your methods of competition are clear and above reproach; why, then, you can pile these profits as high as the Rockies and nobody will be jealous of it.' Because you will have earned them in a sense that is the handsomest sense of all."

Surely, the President points out a course that should be easy for us in the electric railway industry to follow. We must take the people into our confidence—not partially, but completely. We must treat our consumers and patrons fairly, and we must treat our employees as they ought to be treated. Have we not been derelict in our duty to the industry by a long period of almost unbroken silence and a complete failure to inform the public as to the real conditions confronting the industry? Have we not been too content and too self-satisfied and taken the business offered to us without any sufficient effort to sell our product in the same manner that the merchant undertakes to sell his product? The merchant of to-day does not place his goods on the shelf and wait for the customer to come and select the things that are absolutely necessary to him. On the other hand, he proceeds to sell his goods by informing his patrons and consumers of their high quality and in offering them in the most attractive method possible, and he so makes a satisfied consumer.

Our membership, both company and individual, stands back of and is pledged to the truths laid down in our code of principles, and the tenth principle in that code is, "Full and frank publicity should be the policy of all transportation companies to the end that proper information may be available to the investor and the public." Let us proceed to translate these words into deeds.

The activities of the American Association during this last fiscal year have greatly increased in extent and efficiency, and I believe mark a milestone in association work of which we may all be proud. It would take me too long a time to enumerate all of these activities or to pay proper tribute to those to whose enthusiasm and hard work they are owing, but it is my purpose to call attention briefly to some of the most important.

It was determined early in the year to hold the midyear meeting in the city of Washington, and two committees, one representing the American Association, the other the Manufacturers' Association, were appointed and worked out the details of this meeting. A program of excellently prepared papers occupied the time of two sessions of the association, and President Wilson, at the afternoon session, in one of the most important addresses he has yet made, clearly announced the policy or attitude of his administration towards the business interests of this country. The dinner in the evening was well attended, and it was with the satisfying knowledge that the meeting had been a great success that the members left for their homes.

The committee on the cost of passenger transportation service has completed in a year and a half the work which, as outlined, would ordinarily have taken three years. The volume containing its report will be printed and distributed to member companies about Nov. 1, and it is sufficient to say that it is the best authority or book extant dealing with the relation between elements of cost and the elements of service in electric railway transportation.

I feel that the committee on public relations, although hampered by lack of funds, has at least laid the groundwork for its future usefulness to the industry. An enthusiastic meeting was held in January of this year, at which the work to be accomplished was placed in charge of sub-committees and a bureau of public relations was organized and a director appointed. A very large amount of time and thought was devoted to means and methods, and it seems certain that during the ensuing twelve months decisive progress will have been made in the work which the committee proposes to accomplish.

The committee on federal relations this year has once more demonstrated its value to the industry. As the result of a hearing arranged by that committee before the Interstate Commerce Commission on the question of the jurisdiction of the commission over purely urban electric lines in the matter of the reporting of accidents the commission has rendered a decision favorable to the companies. As this has been a point in dispute between a number of companies and the commission this decision is an important one.

This year there has been organized a committee to deal with a subject second to none in its importance to the industry. Our committee on valuation, while proceeding with the care and deliberation that the importance of the subject demands, has completed its organization and will, without doubt, present within a reasonable time a report that will be of great value to every member company.

A special committee was appointed last May for the purpose of investigating the question of the amount of dues paid by members of company sections. This committee has gone into the subject carefully, and in its report to the executive committee recommended that the dues of such members be reduced from $5 to $2 per annum. The executive committee has approved this change and a proposed amendment to the constitution was sent to all member companies some thirty days ago for action at this convention. Those of us who have studied this question believe firmly that this reduction will result in considerably increasing this class of membership. In my opinion, the company section movement, inaugurated in this association with the organization of The Milwaukee Railway & Light Company section on March 18, 1912, is one of the most important and at the same time least appreciated factors for good at the command of our member companies. An investigation of the workings of any one of the six company sections now in existence, ranging in membership from twenty-five to nearly 400, will convince any executive that the formation of such a section upon his property will prove an immediate asset which will bring results of the greatest benefit both to the company and to the men.

The committee on education has during the past year inaugurated educational courses for shop, power house, line and track employees of member companies. Very wisely, in my opinion, it has turned over to a recognized institution the details of solicitation and distribution, while maintaining a strict supervision over the subject matter. In this way it has been able to put at the service of such employees an opportunity for thoroughly educating themselves in their work at a moderate cost.

The industry is under a debt of gratitude to the heirs of the late Anthony N. Brady, who have authorized the American Museum of Safety to make an award of a gold medal to the company which each year does the most toward conserving the life and health of its patrons and employees. Reports submitted in the competition during the year 1914 evidenced the great interest that electric railways are taking in the matter of accident prevention, and the winning company, the Boston Elevated Railway, may well be proud of having secured this award in the face of the competition it had to meet.

Throughout the year the association's magazine, *Aera*, has maintained its usual high standard. As time goes on the value of the magazine becomes increasingly evident. It is the official mouthpiece of the association and offers a means of communication between the organization and its members. It is accomplishing substantial results in its treatment of problems confronting electric railway officials and employees, and one of its most important functions, which it has fulfilled admirably, lies in the giving of widespread publicity to the executive and operating viewpoint of electric railway problems. During this year 367 railway men have contributed material for publication in the columns of the magazine. The necessary and material support furnished by the manufacturers during the past year is greatly appreciated. More and more it is being impressed upon those engaged in this important part of the industry that *Aera* is their magazine and in supporting it they are aiding one of the great forces of our industry.

Last year at the suggestion of this association there was organized a national joint committee on overhead and underground line construction. This year, through its representatives on the joint committee, the association has been an active participant in the work. This committee has a large field of important work before it. The various interests represented in the organization of the joint committee are working in harmony with a hearty spirit of co-operation. The results of its labors will be of great value to the electric railway industry and other utility interests.

Mention should be made of the participation of the association's representatives in the conference called by the United States bureau of standards to consider its proposed safety rules. By means of inquiries addressed to its member companies, the association is collecting a considerable amount of valuable data for the use of our representatives. In this work various state and sectional associations have been invited to co-operate with us and the response to this invitation indicates that the work of our representatives will have an important influence upon the character of the rules to be finally promulgated by the bureau of standards.

That the association is an instrument which at any time can be used to further the interest of the industry was proved by the way in which the question of jitney buses was handled during the past year. Coincident with the appearance of the jitney bus, a special committee composed of four executives was appointed to consider and to make recommendations to the various companies as to the manner in which the menace of the jitney could best be treated. Within a surprisingly short time a report was prepared embodying a very extensive and close study made of the situation by the four gentlemen serving on this committee, and was accompanied by a statistical and technical study of jitney-bus operation prepared by the bureau of fare research. The committee has also arranged for the supplying of the companies with much supplemental information. This was emergency action and clearly demonstrates that in the association the industry has that central organization which is absolutely necessary to meet emergencies of such serious import.

During the year the association's offices in New York were moved from the building of the Engineering Societies at 29 West Thirty-ninth Street to a new building at 8 West Fortieth Street. The force at headquarters had worked under great disadvantage due to the unsuitable arrangement of the offices. Such arrangement did not permit of an economical use of the space paid for, nor for the efficient transaction of the large amount of work handled. The question was considered carefully by the executive committee and the decision to move was arrived at after several months of study. The new quarters afford an efficient working layout and a saving in rent this year of about $1,700 and an annual saving thereafter of about $1,200.

With our affiliated associations the trend has been in each case for progress. The accomplishments of these twelve months will compare most favorably with any similar period in the past. During the year thirty-eight committees have been at work. The results of their studies and investigations are set forth fully in the reports to be presented at the various association meetings.

In the Accountants' Association, the committees on express and freight accounting and passenger accounting will present a joint report on the allocation of expenses, which will be useful to many of our companies. The joint committee on engineering-accounting has started upon a work which, when completed, will be of great value, and a great number of our companies will welcome its helpful suggestions regarding inventory methods.

In the Engineering Association, the report of the committee on way matters is particularly timely in its recommendation of a standard specification for special work. The specifications submitted by the committee on power generation for fuel, lubricants and boiler tubes will also prove interesting and valuable.

The Transportation & Traffic Association takes a notable step in the institution of a committee on standards. This committee has before it a work of the utmost importance in the standardization of the methods employed in the transportation end of the industry. It brings forth important recommendations as to procedure in the association. Reports of the other committees bear testimony to the fact that the Transportation & Traffic Association is abreast of the times.

Your president, in accordance with past procedure, begs to submit for your consideration the following recommendations:

It seems desirable that the knowledge and experience of those officers of our member companies connected with the legal department be utilized for the benefit of the association and the industry as a whole, and with this in view, I recommend that consideration be given to a plan for bringing the members of the legal department more closely in touch with association work.

In the development of association work and activity, it has been clear to many of the past officers that there was a force vitally interested in the success and progress of the industry which has never been fully recognized or given its proper place in association life and activities, and I refer to those individuals who, though not directly engaged in electric railway operation, make their living from the manufacture of material and supplies that are used specifically in the electric railway industry.

During the period of reorganization of the American Street Railway Association, there was organized as an allied association the American Electric Railway Manufacturers' Association. Our own association has never fully recognized the worth, the strength and the help that the members of that organization can bring to the industry. Our engineers, our accountants, our transportation and our claims organizations are our children —we call them affiliated associations. We have been prone to make use of the Manufacturers' Association in times when they were useful to us, and when we have asked for their assistance it has always been most cheerfully given. The time has now arrived, in my judgment, when full recognition should be rendered to the Manufacturers' Association and a proper charter granted by the American Association, so that it will be co-equal and recognized in all ways the same as the Engineering, Accountants', Transportation & Traffic and Claims Associations.

Some of our member companies in the American Association have undertaken the great work of educating their employees in the details of the industry from which they earn their living. It is a most admirable work and one that will bring most favorable results to the industry when it reaches its full fruition. Some of the smaller companies have undertaken to do this to a lesser degree, and all members recognize to-day the great power for good that the employees engaged in the electric railway industry can have upon our difficult problems when they are educated as to what these details and difficulties are. By taking fully into our confidence and granting the necessary rights and charter to the manufacturers, we will bring to the industry another large body of men who are dependent upon the industry for their living, and who, when they are told the story of what we are trying to accomplish and the difficulties that are encountered, will add thousands of men to the forces that will make for a better understanding on the part of the public as to our problems.

I have talked to the executives of some of the manufacturers and they realize the possibilities that have heretofore remained unused, and I can say to the members of this association that the plan which I suggest for your earnest consideration has their full approval.

Mr. Allen's Quartet of Interests

"*IN the operation of the electric railway four parties are at interest—the public, which is the consumer; the employeé, who gets his living from the money paid by the consumer; the state and the municipality, which in the form of taxes, receive a share of the earnings, and the investor, who gets his money in the shape of bond interest or dividends on capital stock. If we are to have successful railway operation, all four parties at interest must be satisfied, which means that each must be reasonable in his demands.*"—C. LOOMIS ALLEN.

The Value of Railway Statistics*

Executives and Accounting Heads of Electric Railways Are Realizing Benefits of Statistics in Administration—Various Financial Statements Are Explained from Point of View of Valuable Statistical Information Obtainable Therefrom

By GEORGE B. WILLCUTT
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EXECUTIVES are realizing more and more the benefits to be derived from electric railway statistics, and consequently are constantly calling for new and additional information of this character. The most general compilation of statistics, and one universally adopted, is that contained in the various forms of reports issued by railways. The simplest form of monthly report usually embraces a balance sheet, an income statement, a statement of additions and betterments, and occasionally a statement of profit and loss. Of these the balance sheet, from its comprehensive character, is unquestionably the most valuable collection of statistics available for the executive and financial heads.

BALANCE SHEET STATISTICS

It is true that every fluctuation in the financial condition of a company is reflected in the surplus as it appears upon the balance sheet, and that the statement of income and profit and loss for any given period will disclose the details of the difference which exists between the surplus at the beginning and the surplus at the end of the period. Yet there are many other fluctuations in financial conditions which have a vital bearing upon the company's existence and which are not reflected in the income. Too much emphasis, therefore, cannot be laid upon a comparison of the principal fixed assets for the purpose of determining the increases thereof, because such increments disclose the essential disposition of the funds of the company.

A comparison of the current assets of an electric railway, as between two dates, is also important. The value of such a comparison lies primarily in the fact that under normal conditions there should be no great amount of current assets, it being assumed that materials and supplies are not included under this caption. In general an electric railway collects its money as it goes. If it has miscellaneous properties, however, it collects rent. As a matter of accommodation, it sometimes sells a little power. Aside from its regular passenger business, it may also transport freight or other commodities. When the payments for such services are not currently made, the items appear as current assets in the balance sheet. If, therefore, there is any perceptible or distinctive increase in the current asset figures, it is evident that the collections are not being properly made, or that, more to the point, funds are being diverted in the way of advances to subsidiary companies or to individuals, etc.

Any fluctuations in the fixed debt of the corporation should be ascertained, and if an increase is shown upon the balance sheet, a search should be made for a corresponding increase in the fixed or other assets. If there is not in general a uniformity in the increase of the fixed debt and the fixed assets, the question immediately arises as to what disposition was made of funds raised; or, on the other hand, how funds were raised if not disclosed among the liabilities.

An increase in the current liabilities of an ordinary public service corporation suggests that the bills owed by the company are not being paid promptly, or that unusual expenses perhaps involving construction have been incurred. In any event, such fluctuations awaken immediate inquiry, the primary end of any statistics.

INCOME STATEMENT STATISTICS

The income statement, as usually prepared, embraces revenues from the various sources, as well as operating expenses, fixed charges and surplus for the month and fiscal year to date with sundry detail statements supporting the same. The form involving accounts for the fiscal year period accrued to date is of much benefit as representing a fair average condition for comparative purposes, but the monthly comparison, in spite of so much time and attention being devoted to its preparation by most companies, unfortunately in many cases has not afforded the satisfactory results expected.

Despite efforts to avoid fluctuations by prorating charges so as to distribute them in an equitable manner over the time that is actually covered by them, sundry and numerous charges for undue amounts occasionally appear. These sometimes result from the operating department forces being engaged in such months upon more than the average amount of work charged to operating expenses and to a lesser extent upon that of an addition and betterment or accounts receivable character, though the total payroll and consumption of material may remain about the same. Deferred and delayed charges beyond the knowledge or control of the auditing department result in lighter charges one month, with a corresponding increase when later received. These fluctuations for lengthy periods are equalized and furnish the true average cost of operation, but the comparison of monthly expenses, for the reasons referred to, generally involves much labor without corresponding satisfactory returns.

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*Abstract of a paper delivered before the San Francisco convention of the American Electric Railway Accountants' Association on Oct. 5, 1915.

Much has been written and discussed as to the merits and advantages of the different units of comparison, but without doubt it has been the experience of most companies that no one unit will satisfactorily meet the requirements for the details of the many accounts. Percentage-of-gross-earnings, revenue-passenger, track-mile, car, car-mile, car-hour, car-day and kilowatt-hour bases, etc., all have their merits, and frequently it is necessary to make comparisons on more than one basis to gain the greatest advantages. On whatever basis compiled, the resulting figures are merely an indication of certain conditions existing, all of which must be thoroughly analyzed and investigated to obtain the real, true and full facts and benefits therefrom.

PROFIT AND LOSS STATEMENT

The form of monthly report should include a profit and loss statement showing in full detail the character of the various entries, which, by reason of their direct bearing upon surplus, are of the greatest importance. These should receive careful consideration by the executives in connection with the remaining report figures submitted.

With companies maintaining renewal or depreciation accounts, a full detailed statement of all charges against such reserve accounts should be prepared and made an essential part of the report, as otherwise many expenditures or obligations incurred would fail to receive the proper attention. The provisions of the Interstate Commerce Commission's system of accounts and the accounting requirements of many public utility commissions, demanding the creation and use of renewal and depreciation reserves, will undoubtedly lead to the preparation and incorporation into reports of the statement suggested where this has not already been done.

STATEMENT OF ADDITIONS AND BETTERMENTS

A statement of additions and betterments is generally made a part of the monthly report, but such a statement should show explicity the full details of the work. Thus it would advise the executives fully as to the work performed during the month, and would also act as a check upon the mechanical and operating departments, which, with a natural desire to reduce their operating expense accounts, occasionally distribute more to addition and betterment charges than an impartial and conservative action would warrant.

Similarly a statement of work performed other than for the company and charged to accounts receivable could be compiled and included in such report to advantage. This should show the various pieces of work under way, the charges to each during the month and the cost to date.

MISCELLANEOUS STATISTICS FOR EXECUTIVES

Supplementing the foregoing statements, others may be prepared. For example, one showing the main details of bills and accounts receivable, and also of bills and accounts payable, as noted upon the balance sheet in totals, will enable the executives to keep in closer touch with such assets and liabilities and to take such action as conditions may require.

A full and complete analysis and statement of sinking fund accounts, showing the invested and the uninvested portions, with detailed lists of securities in the former and the cost prices thereof, cannot fail to prove of interest and service to the officers and directors and to keep them fully conversant with the actual requirements and conditions of such funds.

Detailed statements of "other securities" held in the treasury as temporary investments or otherwise should also be prepared and furnished. These, with the corresponding statements of sinking fund securities, will act as a guide to the officers and directors in connection with any inspections and checking of such securities that they must make.

There are probably no ledger accounts which come in for more attention and criticism from the public auditor in his periodic examinations than unadjusted or other suspense accounts, and none which require more detailed or specific analyses and explanations. Innumerable charges and credits may be involved in the figure shown on the balance sheet, and sometimes for considerable amounts. To furnish full information such entries should be shown separately under proper and distinguishing captions. When suspense accounts are used, a detailed and full analysis should always be prepared, supplementing the net figure shown upon the balance sheet and showing a comparison with corresponding figures of such date as the occasion or conditions warrant.

The usual form of balance sheet comparing totals with corresponding figures of a year previous is of much benefit, as it reflects the business of the year. By reason, however, of the cumulative character of the figures involved, a comparison of the figures of one month with those of the month previous is of further benefit in directing attention to transactions which have occurred since the issuance of the previous yearly statement. To obtain the full benefit therefrom, explanations should be rendered for the fluctuations shown.

While the extent to which the smaller details of the operating, revenue and expense statistics are inspected and considered by the chief executives depends upon the organization of the controlling corporation, those bearing upon the receipts by lines and the principal expenditures for maintenance of track and roadway, maintenance of rolling stock, operation of cars, power expenses and the heavier subdivisions of miscellaneous and general expenses, are unquestionably of much service to them. Among the latter class of statistics, various data and compilations involving injuries and damages, such as lists of the various kinds of accidents with fatalities resulting therefrom, statistics as to claims presented and rejected, settlements effected, damage suits pending, expense of claim and legal departments for the period, car-mileage and passenger figures based on accidents occurring, will also prove of much value.

A general statement of receipts and disbursements for the period since the previous report, properly subdivided, will be of benefit to the executive heads on many occasions, and when supplemented by additional data showing by firms, etc., the heavy or otherwise extraordinary payments which have been made during the period, will in sundry instances prove of special interest. Incident to the disbursements, a report can also be furnished showing the numbers of employees and the total amounts of monthly payrolls by departments, with the same information for the portion of the fiscal year accrued to date.

Statements covering (*a*) extensive pieces of work under way with costs to date and further expenditures of labor and material required for completion, (*b*) heavy purchases to be made in the near future and (*c*) capital and other large and unusual payments of any character required to be made in the next thirty to sixty days, will prove of great benefit and assistance to the executives.

A "forecast," compiling the receipts of the company for months ahead as estimated or otherwise determined and the known or estimated expenditures during the same period in fullest detail, will prove valuable to all interested in the financial prospect of the company, many of whom are frequently at distances remote from the railway itself and planning and working to finance the property and to provide funds to meet its requirements. It is surprising under ordinary circumstances to find how close one can compute, largely on an average basis, the various classes of receipts and expenditures involved.

The cost of money does not receive in all cases the full share of attention which it requires. At times like the present, when money is scarce and interest rates are high, the subject becomes of great importance. When fully and accurately determined, including all expenses in connection with new loans or extensions, sales of securities, etc., the cost of money is found to be far different from what it appears after a casual or less thorough study of the subject. The interest, discount, commissions and sundry incidental expenses frequently result in a figure from 30 per cent to 40 per cent in excess of the nominal rate.

STATISTICS FOR ACCOUNTING HEADS

It is almost unnecessary to refer to the value of statistics to accounting heads, as such are the essence of accounting and auditing work. It may be said, however, that analyses of many of the items appearing on the trial balance are most essential. Besides the many detailed statements of balance sheet entries, etc., previously suggested for reports, similar ones for interest earned on bonds, notes and other securities with maturities; insurance and taxes, etc., paid and unexpired; interest payable on bonds and notes, and other accruing liabilities will enable the accounting heads to determine the correctness of the various balance sheet entries corresponding thereto. A most important detail is the analysis and prompt checking of entries of bond interest paid and unpaid each month by a comparison of the actual number of each series of coupons unpaid, as shown by an examination of the books or records in which the paid coupons are filed, with the ledger records of them. Any discrepancy existing between the two sets of records should be immediately investigated, for a delay in so doing would probably render the correction much more difficult.

The principle of making an inventory of insurance and taxes paid in advance should be occasionally applied to the more tangible assets, such as material and supplies, live stock and miscellaneous equipment, railway cables (cable operation still being a material factor with a few railway systems), etc. These statistics will enable the accountant to determine any adjustment entries required to correct the figures upon the balance sheet.

The Evils of Government Ownership*

Tendency Toward Centralization of Power Needs Checking—Government Enterprises Have Not Been Efficiently Conducted — Government Ownership Tends to Destroy Individual Initiative and Removes Hope of Reward—It Necessitates a Changed Concept of Government

BY JONATHAN BOURNE, JR.

Formerly United States Senator from Oregon

THE problem of municipal ownership of public utilities involves no fundamental principles different from those involved in the problem of national ownership of such utilities as railways, telegraph lines, water powers, etc. The difference is one of degree and detail rather than of principle.

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I am strongly opposed to public ownership, whether municipal or national, except in those cases where it is necessary to have government control in order to promote the public health, as in the case of water supply systems. My opposition is based not so much upon the question of relative cost of operation as it is upon the effect public ownership has upon the government itself, and upon the enterprise of its citizens.

In a comparative way, it matters little if cost be increased and efficiency reduced. More expense and less convenience are ills of a superficial nature and do not affect the larger interests of the people in a vital way. But the bad effect of public ownership upon the government itself, whether municipal, state or national, is of more than temporary concern and cannot be measured in terms of dollars and cents. The evil effect of public ownership upon the creative, constructive spirit of enterprise among the most active and capable of our people, constitutes a menace not only to the welfare of this generation but also to our continued progress.

The desideratum of all government should be the protection of its citizens and only such restraint of individual action as is absolutely necessary to insure the desired protection of all its citizens. As an incentive to individual enterprise and as a stimulant to individual initiative, the government should afford every citizen the largest opportunity for activity with hope of commensurate reward consistent with the rights of all.

Public ownership tends to destroy this initiative and to remove the hope of reward. Except in rare instances, it tends to discourage efficiency by removing competition. This is true in the case of both municipal public utilities and national utilities.

Once established, public ownership will continue until its destruction has been wrought. Once overthrown, individual enterprise will not be restored until public ownership has brought its own ruin. Legislation can easily destroy but it cannot build up. The most it can do is to give opportunity and incentive for individual activity.

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*An address delivered before the San Francisco convention of the American Electric Railway Association on Oct. 6, 1915.

The objection based on the effect of public ownership upon government itself is particularly applicable at this time when there is such a strong tendency toward the centralization of governing power in the hands of a few. We observe this tendency most strongly in municipal government where the city commission is supplanting the city council. With this concentration of power necessarily goes not only responsibility for the exercise of that power, but opportunity for its selfish use. Selfishness and ambition so generally control human action that great delegation of power will always be a menace to popular government. I grant that, in most instances, where power and responsibility have been bestowed upon a few individuals, there will be, in the early stages of the exercise of that power, a special effort to render efficient and satisfactory service. This will be true for two reasons: (1) Public attention will be centered upon the management of the office in which power has been centralized, and, (2) with the change in powers of the office there will go a change in the selection of the incumbent with special effort to secure the services of a man who will be both capable and faithful. With the novelty of the change worn off, and with public attention diverted, there will be placed in power men who will use their authority to promote their own political, personal or financial self-interests.

That they would have the power to do so is readily apparent. If we were to add to the present number of government civil employees all those who are now employed by railway, telegraph, telephone, electric railway, express and water transportation companies, we would have a force of government employees numbering more than 3,000,000. In the last ten Presidential elections, the President has been chosen by a plurality varying from a little more than 7000 to 2,500,000. I have no hesitancy in asserting that under government ownership of all these public service corporations, those employees and their friends would invariably control the government under our political system. There would be insistent demand for service in governmental employment. Outside labor would strive to secure government employment. There would be dissatisfaction in private enterprise.

Thus, there would be established in the public mind the view of the government as an employer. The individual citizen would be encouraged to look upon the government, not as an institution which he should support, but an institution which should support him. With a multitude of government positions available, the citizen denied the privilege of government employment would feel that he had been discriminated against. The higher wages paid, the fewer hours of labor and the longer vacations accorded to government employees would cause constant unrest among those engaged in private enterprise of practically similar character of work and requiring a corresponding degree of ability and effort. There would become deeply embedded in the minds of the people the idea that the government is a great entity, separate and distinct from themselves, to which they can look for every service they may need. This attitude of mind would be entirely destructive of that spirit of patriotism which is nourished by the citizen who regards himself as a supporter of the government rather than its dependent. Instead of studying to devise a new and desirable service which he himself can render in return for satisfactory compensation from his fellow citizens, his tendency will be to think of some new service the government can render for him.

An employer of workmen in private enterprise would come to look upon the government not as an aid to him through maintaining of equal opportunity, but as a rival since the government would be competing against him in the employment market. Where the activities of the government are limited, as they now are, to practically those operations which are necessary for the preservation of public peace, health and safety, that rivalry in employment between public and private enterprise does not exist, but just to the extent that the government engages in undertakings which can as well be left to individual enterprise, it becomes a competitor with its own citizens and the destroyer of equal opportunity.

The magnitude of the public service, under a system of government ownership, would inevitably throw public employees into politics and make them a factor in every campaign, municipal, state or national. While it is true that in former years public service corporations were a factor in politics and had undue influence in nominating conventions, that situation does not exist to-day. Public service corporations are not a controlling factor in American politics and their managers have no more influence than should be exercised by any other citizens having similar personal and property rights and interests.

Instead of taking public service institutions out of politics, public ownership would throw them into politics. For the purpose of promoting their own selfish interests, public employees would organize and pursue whatever means might seem most likely to secure legislative and administrative changes for the advancement of their own interests. Their influence would be directed to the support of that candidate who promised most for the fulfillment of their desires. Aided by an organization of public employees scattered throughout city, state or nation, an administration would possess a practically overwhelming advantage over any party or faction which sought to succeed it.

Some people profess to believe that the political influence of an army of public employees could be overcome by the establishment of a system of classified civil service examination. Theoretically this is true, but it must be remembered that although appointments may be made in part as a result of competitive tests, yet in every system of government employment the higher officers control promotions, demotions, transfers and removals, thus exercising such power over subordinates as to make them practically subservient in politics, where the administration in power is concerned. The President of the United States, the governor of a state and the mayor of a city have under their direction a body of men who may be easily organized as an active factor in politics.

Whether that organization shall exert its influence in support of the administration or against it will depend upon the attitude the administration has maintained toward the employees themselves. The extent of the influence of the employees will be measured largely by their numbers. So long as government activities are limited to ordinary government purposes, this influence will not be a menace. If extended by adding to the present government employees all those engaged in public service enterprises, the influence would be large enough and active enough to wield the balance of power in every political campaign.

Advocates of government ownership of public utilities assert that government regulation has been a failure, and assume that government ownership and operation will be a success. But possession of a certificate of appointment to public office does not bestow upon the recipient any supernatural powers. The men who have been unable to solve successfully the problems presented under government regulation will likewise be unable to solve the problems presented by government operation. Quite likely their mistakes and shortcomings would be less conspicuous, but since they would have more problems to solve it must be assumed that their mistakes would be more numerous.

Every question of rates, character of service, or protection against unfair discrimination, which is now presented for the consideration of regulating commissions, would also be presented for determination by a board having control under public ownership.

If any man believes that government ownership will solve the rate question, let him study the parcel-post rates established by the Postmaster-General, under which the postage charged for a long haul is greater than the sum of two charges for two shorter hauls making up the longer distance.

If any man believes that discrimination can be avoided by public ownership let him study the facts in the blue-tag order under which in 1910 the Postmaster-General ordered certain publications transported on freight trains, although paying exactly the same rates and therefore entitled to the same service, while competing publications of practically the same character and catering to the same trade were transported on mail trains.

Let every student of this phase of the subject consider the manner in which the lines of the Federal Reserve Bank districts were drawn, resulting in favoritism to certain sections of the country.

Let him keep in mind the efforts of the Secretary of the Treasury to extend special financial favors to certain districts and certain industries.

If there can be such discrimination in the postal service and in the management of the Federal Reserve Banking system, upon what theory shall we assume that there would not be discrimination in the government operation of railroads, telegraph and telephone lines, and other public utilities? Under government ownership of the telegraph there would be swung over the heads of the press of the country a club no less threatening than that which now swings over the heads of the bankers of the country.

As I have already indicated, the question of cost and efficiency under government ownership is of relatively slight importance. It is of little consequence compared with the problem of keeping our government free from paternalism, giving equal opportunity to all citizens and encouraging individual enterprise, and yet this economic question must not be overlooked. No doubt the government as owner and operator of public utilities could make some improvements, and eliminate some duplications that would result in diminished cost of operation, but these savings would be more than offset by waste, increased expense and diminished service in other respects.

Many people assume that our own Post-office Department is efficiently and economically conducted, but reference to the report of the joint Congressional committee on railroad mail pay, submitted to Congress on Aug. 31, 1914, and published as House document No. 1155, will show by citation of numerous instances that government methods of accounting are inadequate and unreliable, and that supervising officials are vacillating and unbusinesslike in the handling of large problems presented for their official determination.

Study of the records of the reclamation service shows that in a large number of instances government engineers, in whom great confidence was placed, made estimates of cost of construction which proved so grossly inaccurate that settlers were deceived, to their injury.

The records of the forest service show that during the period from 1900 to 1914, inclusive, the total receipts from sales of timber, grazing privileges, timber settlements, fines, etc., amounted to $17,060,528, while the government expenditures for the maintenance of forest service amounted to $40,927,109.

Across the border in Canada we have had a very practical and convincing demonstration of the kind of efficiency we may expect from public ownership. Canada undertook the construction of the National Trans-Continental Railroad from New Brunswick to Manitoba, 1804 miles in length, and government officials estimated the cost at $61,415,000. By the end of 1914 the commission having charge of construction had spent a total of $173,000,000, or $95,899 per mile, or nearly three times the original estimate. Another commission was appointed to investigate the work of the construction commission, and reported that $40,000,000 had been absolutely wasted through bad judgment, carelessness or maladministration. The character of construction was in many instances not suited to the territory traversed, or determined by a judicious estimate of the traffic to become available. Incompetence was apparent in almost every branch of the work. The road cost three times as much as other roads constructed by private enterprise. The company which had agreed to lease, equip and operate the new line refused to carry out its agreement on the ground that the road was not completed even after the enormous expenditure stated, and that, because of the large construction cost, the company could not pay a rental equivalent to 3 per cent on the capitalization, as provided in the agreement.

These practical illustrations of results of government ownership and operation are exactly what might reasonably be expected. It would be absurd to expect that the government could pay higher wages, reduce the hours of employees, dispense favor to political or personal friends of public officials, and at the same time give service as good as could be rendered by private enterprise and at a less cost.

Undoubtedly many evils exist in private operation of public service enterprises. Improper acts should be prohibited by criminal statutes imposing penalties so severe and making punishment so certain that violation would be extremely rare. But prevention of dishonest acts does not require government ownership. Advocates of that policy propose a remedy far worse than the disease. They base their theories upon the false assumption that efficiency goes with public employment. They close their eyes to all dangers arising from the construction of a huge public service machine which could be, and certainly would be, utilized by administrative officials to perpetuate themselves and their friends in control of government, national, state or city.

Most of the dishonest management of public service corporations has been due to the failure of directors to direct. Manipulation of the affairs of a concern for the benefit of a few officers or stockholders has been made possible and encouraged by centralization of control in the hands of one or two men. The dictator has subordinated the interests of all to the interests of a few. Such also has been the world's experience in government.

What we need in this country to-day is a check upon the tendency to centralize power. In private corporations we need directors who will perform their duties even against the desires of a would-be dictator. In government we need legislative officers who have full appreciation of the responsibility resting upon them and who have the courage to perform their duties even in defiance of an arbitrary executive, whether in a mayor's chair, in a governor's mansion or in the White House.

Selfishness and ambition so generally control human action that great delegated power must always be a menace. It is certainly axiomatic that centralized power in an individual or commission can only produce results commensurate with the integrity, ability, experience and unselfishness of the individual or individuals constituting the commission.

Government ownership necessitates government regulation. Failure of government regulation necessitates the failure of government ownership. Success of government regulation eliminates the necessity or desirability of government ownership.

Because public ownership inevitably increases the political power of the executive, because it tends to overthrow popular or truly representative government, and because it destroys individual initiative, I am opposed to it as a policy to be adopted by either local or national government.

The Larger Aspects of Welfare Work*

Welfare Work in Its Relation to Public Interests as Well as to Employees—Analysis of San Francisco Welfare Platform and the Public Response—Code of Commandments Based on Confidence in Ultimate Fairness of the People

By JESSE W. LILIENTHAL
President United Railroads of San Francisco, San Francisco, Cal.

THE subject of this address may have been meant to have reference to what an employer does for his employees or to what the utility does for the public at large, or both. It will be assumed, however, that welfare work for any is for the welfare of all.

Public welfare is a varying quantity and very often an elusive quantity. For one thing, public welfare may mean what is actually for the public weal or it may mean what the public believes to be for its own welfare. And it may mean one thing at one time and another thing at another time, or one thing in one place and another thing at a different place. So it may be, as it has now become the fashion to proclaim, that what is best for the public is best for the utility. Yet even with this conceded, we shall still find ourselves always brought back to the question of what is really best for the public. It sounds Machiavellian to declare that for all practical purposes that should be assumed to be for the public's greatest good which for the moment it deems to be for its greatest good.

In the man of conscience the feeling is strong that he wishes to guide the people into the right path; that it is not necessary that they must first stumble and fall and bruise themselves before they can find the right path. We are not all agreed as to this, and yet it is a very practical question that those charged with the duty of managing public utilities ought to endeavor to solve correctly, because on its correct solution depends the success of our management and the right standing before the bar of public opinion. We certainly cannot succeed with the public if it has in its mind any question in regard to our absolute good faith, whatever the merit or lack of it, in the things that we offer.

One of the things making up the so-called public welfare program of the United Railroads of San Francisco was the establishment of a monthly magazine, distributed to each of its 3500 employees, as a means of communication between the men and the company. I contribute in each number a short talk to the men over my signature as president. A little while ago I received a very bright, well-written letter from the wife of a motorman, saying, among other things, that she judged from my articles I often felt "lonesome." I have been taking a long time to weigh that statement. I may not yet have caught her meaning. Was it that, notwithstanding the earnest effort made to propitiate the public, it had turned the cold shoulder? And yet we have been doing those things which were intrinsically right under every code of morals and which also appeared to be the things demanded by the existing state of public sentiment.

A brilliant journalist, who had read one of these messages to the men in which I asked why we had apparently not overcome the popular ill-will toward us, recently said that I was striking a false note. I was told that I should not lose sight of the fact that the company, whether willingly or unwillingly, was a prize participant in a rising economic battle, and that armed peace was the best we could hope for. Furthermore, the only way to make popular what was undoubtedly an unpopular corporation was to grant to employees all that they wanted and whenever they wanted it; to do the same thing for the city for the benefit of its competing municipal lines; to surrender to the jitney for love of the little fellow; to extend service whenever asked for; to equip and operate lines regardless of expense and to reduce fares to the Cleveland basis.

I am still smarting under that criticism. This doing your duty by the public costs money, and if it breed resentment rather than good-will, or even if it only fail to eliminate existing ill-will, would not the expense better be withheld? I do not forget the exceptional circumstances under which our particular utility is operating. We have a successful and growing municipally owned and operated system, all of it competitive to our own, and consequently our company is constantly a thorn in the city's side. The municipal lines pay wages and provide conditions that we cannot afford, and this makes it necessary for us to take the ordinarily indefensible position of preventing, while we can, the organization of our men. This in turn makes us anathema with organized labor and its sympathizers. Then, too, the public accepts it as an undoubted fact that we have secured valuable franchises through the bribery of public officials, and the press does not allow it to forget that the so-called graft prosecution failed to secure more than one conviction.

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*Abstract of an address delivered before the San Francisco convention of the American Electric Railway Association on Oct. 5, 1915.

WELFARE PLATFORM OF COMPANY

I accepted the presidency of the United Railroads of San Francisco only because I thought that I saw an opportunity to render public service. I meant to start right with the public, and to that end began my administration with a formal statement—a sort of confession of faith—in which I acknowledged it to be the primary duty of a public utility to serve the public adequately and considerately. I pledged the company to keep scrupulously out of politics and promised that, if an attempt were ever made to influence public opinion, it would be done openly and in the name of the company. I declared it as my only motive for taking office that I was ambitious to improve the relations between the people and the company and invited the frankest criticism and the most cordial co-operation on the part of the public to that end. Finally, in recognition of the strong sentiment in favor of municipal ownership that had been manifested in a recent election held to provide money for the extension of the city lines, I declared that I had no fault to find with the advocates of municipal ownership even of street car lines, but believed that if such ownership should obtain, the properties themselves could be operated with the greatest good and with the largest profit to the public if intrusted to private management under public regulation.

TREATMENT OF EMPLOYEES

Then, with the desire to treat the employees as generously as the revenues of the company would permit and at least as well as they would be treated by impartial arbitrators (in the case of an organization formed, demands made and refused, and a strike threatened), we voluntarily granted a substantial increase of wages. We devised a plan for insuring the lives of all employees for a period of three years and upward, without any physical examination on behalf of the insurance company and without any cost to the men for premiums or otherwise, the families of the three-year men receiving $250 in case of death in the service, of the four-year men $500, and of those having served five years or upward $1,000. Each employee was allowed to select his own beneficiary arbitrarily. This insurance meant giving to the men something that many of them, quite apart from the expense of insurance, could not give themselves. The man with tuberculosis, with cancer, with Bright's disease or with a weak heart was insured along with those who were organically sound. This was better than a wage increase, for there was no assurance that any of the latter would be husbanded.

Then, realizing as a paramount duty that as far as possible we must stop killing and maiming people and that to accomplish this we must depend on the vigilance, the loyalty and the intelligence of the platform men, we said that, taking the sum paid in the previous year by way of damages for injury to persons or property as a basis, we proposed to give the entire amount that might be saved over this sum in succeeding years to these platform men in the exact proportion represented by the time contributed to the service.

Finally, it appeared upon investigation that many of our employees had fallen into the hands of loan sharks and were paying as high as 10 per cent a month for loans. Many of these men had the best of records, with excellent characters, but through stress of outside claims, sickness in the family, financial distress and the like, had found their wages inadequate for meeting abnormal conditions and had nothing to take to the pawn-broker or remedial loan association as collateral. We said to such men: "We will lend you the money that you need, without any security, taking from you simply your own promissory notes, payable in such installments as you may yourselves determine to be practicable in view of other demands upon you, and bearing interest at the rate of 5 per cent per annum." Our files are now full of graceful acknowledgments for this aid, testifying eloquently to the good accomplished.

RESPONSE OF THE PUBLIC

When this program was announced we felt that the new management was keeping faith and looked for grateful response on the part of the public. There was a great deal of commendation, to be sure, but I am not certain that the true sentiment of the people at large was not voiced by a prominent and influential local newspaper, which said editorially in double-leaded type: "The street car workers are men; they are not children to be coddled. President Lilienthal and his directorate should have heard what Lincoln Steffens and Austin Lewis told the New Era Club about welfare work the other day. Welfare work! The United Railroads might as well save its time and money. 'The only way to help labor,' said Lincoln Steffens, 'is to help labor to help itself.'" In other words, employees want nothing from employers that they do not demand and demand in a position where they can enforce their demands.

I have always believed in labor unions. Perhaps I do not believe in them so much as formerly. It is, of course, an indefensible position to maintain that employees shall not be permitted to organize. Even advocates of the open shop stop short of that. Yet in San Francisco we are confronted by a condition and not a theory. Organization of the company's employees would mean inevitably and logically a demand for the same wages, hours and other conditions that are conceded by the municipal lines, under the terms of the city charter, to men working on a track literally alongside of our own. A demand would mean a refusal, because the company cannot concede the demand, and a refusal would mean a strike, which would be a calamity for the company, the public and the men. We have, therefore, been placed in the incongruous position of having to discharge men whose only fault may have consisted of joining the union, because the alternative was inevitable disaster.

It does not seem to be enough to be good 364 days in the year. You must be good the whole 365 days, and to be good you must do the things that the public wants you to do and refrain from doing those things to which it objects. We have tried, in the interest of peace and good feeling, to meet this view, too. At the outset of my administration I said that I would always grant to the city anything that it wished, but that I had no right to forget that, just as officials of the city were trustees of the people, I was a trustee for the creditors and stockholders of the company and therefore must exact a reasonable equivalent for any property rights surrendered. Yet we discovered in a recent experience that we had been sowing the wind.

Such an equivalent for a right proposed to be surrendered was recently asked by the company and promptly conceded by the Board of Supervisors. Their ordinance carrying out the terms of the agreement, however, was vetoed by the Mayor, a majority but not a sufficient number of the supervisors voting to override the veto. The right in question was therefore exercised by the city without giving the equivalent. Upon an appeal to the courts the company's motion for an injunction to restrain the exercise of the right was granted. Unfortunately, however, this has proved to be a case of being good only 364 days in the year, and apparently in consequence of our legal victory the company is once more under the ban of excommunication. The injunction, at this time of writing, is being violated, and boastingly violated, forcing the company to contempt proceedings.

What moral shall we deduce from all this? What is the public welfare? And what should be the course of conduct of a public utility? It is, of course, axiomatic that in things done or omitted the presumption is in favor of a popular public utility, assuming that any such exists, and against the unpopular public utility. When the latter takes a step forward in a matter that should win popular approval, it is likely to be charged with moving from fear and not from public spirit or the desire for public welfare. Yet is that a reason for not making the effort to propitiate the public—shall we refrain from taking this step forward because our motive in so doing may be impugned?

CODE OF COMMANDMENTS

I have laid down for myself the following code of commandments to govern my management:

1. Accept loyally and without reservation the now universally proclaimed doctrine that a public utility is the servant of the people. The courts of last resort have so declared, and the public utilities have bowed their heads in meek submission. Whatever the resources or lack of resources of the utility, adequate service must be rendered. The requisite capital must somehow be provided, the matter of adequate return being irrelevant, except in the sense that the right exists to appeal to the rate-making bodies to provide for reasonable compensation for the service rendered. Do not wait until pressure is brought to compel adequate service. Anticipate the public demand. Keep your door wide open to every complaint. Forestall criticism by inviting recommendations, and in all close cases give the public the benefit of the doubt.

2. Give the affairs of the utility the widest publicity. The public is entitled to know what you are doing and how you are getting on. Conditions may be unfavorable, and you may fear that publicity might affect your credit, but you should not ask for credit that you do not deserve, and perhaps your misfortunes when frankly told may beget the public sympathy and good-will which you so sorely need. Nothing is so engaging as complete candor. When I have been interviewed by the reporter of a newspaper, however unfriendly, I have answered every question directly and fully. As a result it has happened to me at least once that when such candor has not changed the tone of the unfriendly newspaper the reporter has insisted that this attitude be changed or that someone else be assigned to his task. I have gone to men who have assailed me and sought to explain to them my reasons for doing the things that they have criticised. This has sometimes led to a change of front or, as in the case of at least one newspaper editor, to a statement that my position was justified, but that his newspaper to hold its circulation must continue to print the news to please patrons.

3. Treat your employees fairly and, as far as your resources will permit, generously. The man who is well fed and well clothed, who has a reasonable amount of time for play and recreation, who is in a position to save a little for a rainy day or toward the owning of his own home, who feels that his superiors are always ready to receive suggestions or to redress real or imaginary grievances, who is not exposed to nagging and hectoring by officious subaltern officers, who enjoys the right of appeal, who is made to feel that all the employees of the company, from the president down, are members of one family, each having the same paramount duty to serve the public and the employer—such a man will give the best results.

It might be well to have a council, composed of representatives of the men and the chief executive officers of the company, meet once a month to consider measures for the improvement of the service and the increase of efficiency. The representatives of the men should be selected for a certain period by secret ballot—say one from each carhouse. In that way the most popular man would be chosen and through him all the employees of that carhouse would feel that they had a mouthpiece. A new election should perhaps be held every six months or year. This plan will at least furnish a sort of safety valve without providing much of a nucleus, if any, for agitation or organization.

4. Keep out of politics. The public utility is the target for the politician. Those who are not venally dishonest have, at least in recent years, found that attacks made upon it are the short cut to popularity. Those who are venal have found the strike bill the most lucrative source of revenue, and it has seemed necessary to go into politics to keep such men out of office. Where the only purpose of the utility in so doing has been to eliminate such as these, the motive is, of course, ethically justifiable. But all know to what abuses this has led. The utility, to accomplish practical results, has had to build up a political machine. Having through this machine acquired the power to defeat injustice, to stifle bad bills and prevent biased judgments, it is tempted to use this power for affirmative selfish ends and the temptation generally proves irresistible. Then the people, feeling themselves throttled, are driven to rebel and are themselves led into excesses by the desire for revenge. It is from these excesses that we are now suffering.

5. The alternative remedy involves the next commandment—appeal to the public for fairness and justice. Deem it your right and duty to influence public opinion. Complain of the wrongs that are done to you. Expose the methods of corrupt or unfair politicians. Combat the arguments of muckrakers and pseudo-reformers. Never allow an untrue charge to remain unchallenged. Circularize the public. Buy space in the newspapers. Participate in public discussions. Above all, however, remember that whenever you do anything along these lines you must do it openly and in the name of the company. Do not hide behind reading notices. Do not have paid agents masquerading as independent gladiators.

I place my confidence in the ultimate good sense and fairness of the people. Our salvation must be worked out through them, because after all, under our system of government, the power to deal with us rests with them, and we shall not win our battle until we make them feel that we are doing our duty by them. We must be politic enough to recognize our masters and public-spirited enough to be willing to make every effort to deserve the good-will of the people. The task will not be so difficult, if, as we should, we cultivate a frame of mind that makes this a labor of love.

Foundation Principles of Valuation[*]

Address Based on Electric Railway Resettlement Cases—Author Discusses the Purpose of Valuation, Detailed Methods, Overhead Expenses, Non-Physical Values, Depreciation, Amortization, the Purchase Clause—Social Aspect and Needs of the Industry Are Also Treated

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IT is purposed to circumscribe this discussion and deal largely with the serious condition in many cities where a resettlement or readjustment of franchise rights, privileges and corporate equities is under way, either by sale of the property direct to the city, or better, by giving the city a sufficient interest in its management to insure its understanding of the many and complex problems which are involved.

PURPOSE OF VALUATION

Fundamentally it would seem strange that a given property could have more than one definite value, but a little study will reveal the fact that different viewpoints may require quite different methods of procedure. Thus at the present time valuations are being made with the following purposes in mind: (*a*) The purchase or transfer of the property; (*b*) rate-making; (*c*) capitalization; (*d*) taxation, and (*e*) accounting.

The tendency of the later valuations is to cover a much wider scope than formerly, such as the following classification of elements of value:

1. Physical Value—Representing the bare construction cost of the existing tangible property "used and useful" in the operation of the company:

2. Overhead Percentages or Super-Charges—Representing actual expenditures which are incurred in addition to the bare construction cost to obtain the true cost of reproducing new a completely organized and operative property, known as "cost to reproduce new" and for brevity sometimes called "cost new."

3. Development Expense.—Covering all items of cost actually incurred in producing the property over and above those appearing in the existing plant. These may be grouped under:

(a) Semi-Physical or Plant Development Cost—Representing certain charges incurred during the years of development of the property which are not likely to appear in the inventory of the present property.

(b) Non-Physical Values.—Representing the cumulative cost of developing the business.

4. Other Non-Physical Values—Such as remaining franchise value or future earning capacity of the property under the franchise terms, and any other miscellaneous values or rights held. Both purchase value and cost of developing the business are more specific definitions of two of the several elements which are ordinarily included in the omnibus term "going value"[†] as usually understood.

5. Present Value—Cost new, less depreciation which has accrued from the time of organization of the property to the date of valuation. This involves a determination of the present condition of the physical property with regard to the remaining life of its various constituent parts.

These various elements are sometimes reduced into two main groups, viz.: Tangible and intangible values. The commissions usually carry the investigation still further, including all other tangible assets, usually represented on the balance sheet by other assets, bills receivable, and cash or working capital. They also inquire into the history and status of the stocks and bonds and the "book value" or "original cost" or both.

Thus the valuation of a modern property has now reached an exceedingly complex stage, involving not only a detailed historical analysis of the property from the beginning, but also a prediction as to its future possibilities up to the end of its franchise. This in turn requires a very definite knowledge of the past development of the community itself with respect to other communities similarly situated and a fairly accurate estimate of its future growth. Hence in a complete valuation there are many elements of value to be considered, of which the bare construction cost represents only one important element. Which of these elements of value should be given the greatest weight will be determined by the purposes in view.

The frequent misconception of the necessity of separate valuations for different purposes largely arises from the failure to understand the economic relations between the purposes above cited and the various elements of value that should be determined in a complete valuation. With a complete valuation based upon scientific methods of analysis, there necessarily need be no inconsistency in the use of its various component parts for different purposes. Thus, present value plus development charges or franchise values may become the basis for sale or transfer; cost new plus development charges or franchise values for capitalization purposes; cost new for rate making purposes* (except where contractual relations specifically require the recognition of other elements of value), and finally, present value for taxation purposes.

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[*] Abstract of an address delivered before the San Francisco convention of the American Electric Railway Association on Oct. 7, 1915.

[†] "Going value" is a term that has been widely used to represent values in excess of the cost new value of the property. It was used for many years to represent the values that were commonly accepted as existing, although the method of determining this value usually consisted in capitalizing the profits from operation. In this case the going value represented that part of the commercial value, on an earning basis, in excess of the physical value or cost new. In later years, when the question of rates based on a fair return on the value of the property was much discussed, it became evident that going value should be defined more clearly, or, better still, be replaced by other well-defined and computable elements of value, which should be based on consideration other than income from rates, themselves in question. This has resulted in the substitution of the values above mentioned and similar elements of value for the more general and indefinite term "going value."

DETAILED METHODS OF APPRAISAL

In connection with the detailed methods of appraisal the following points should be noted:

Verification: In an appraisal the methods, unit prices, quantities and sub-totals at least should be clearly set forth for future verification. Lately there have been several flagrant instances in which the appraisals submitted in very important cases have been so curtailed in statement, either deliberately or otherwise, as to make it practically impossible to check them without further retention of the appraiser and part of his force. This submersion of details may be brought about either through the loading of unit prices with overhead percentages or by the failure to make a complete statement of unit prices and quantities, or both. Any reputable engineer should be willing to have his appraisal analyzed in detail by those competent to do so.

Alternatives: Where questions are encountered which cannot and ought not to be settled by the appraiser, these should be set forth as alternative totals or values. For example, it is often desirable to set out questionable items of joint ownership, plant development—such as change of grade, repaving, reconstruction of bridges, removal of obstructions, etc.—and to compute such elements of value as are dependent upon rate of return upon several different rates.

Construction Schedule: As the cost to reproduce new basis of valuation is generally accepted, at least as a starting point, the property should be assumed to be built up on a definite and reasonable construction schedule. In the case of obsolete property it is often practically impossible to reproduce to-day a property built under a different state of the art, and it therefore becomes necessary to set out as "development expense" the values representing additional inventory or work done in constructing under "original conditions." The total thus represents "full reproduction cost" of existing property covering not only expenditures under present-day conditions but also those in addition thereto necessarily incurred under former conditions.

Unit Prices: Unit prices constitute the most important element of judgment in the appraisal. In general, they are usually taken as of to-day. Yet in cases of commodities of widely fluctuating prices (for example, copper), average prices over a considerable term of years are certainly justified, or else trend prices in the case of price movements clearly in one direction. The real reason for pricing as of to-day is to give the owners of the property, as far as possible, credit for such appreciation in value as has taken place since its organization and to give the prospective purchaser knowledge of the value of the items involved.

Sub-Contractor's Profit: Unit prices are usually made on the basis of a sub-contract for items of purely construction work in which sub-contractor's profit is included; this also in the case of fabricated equipment installed by the manufacturer.

Substitution: Critics of the cost-to-reproduce-new theory point to the inconsistency of valuing property and using prices as of to-day, when these prices are applied under conditions which governed during the actual construction of the plant. This contention is not serious, for in usual cases the problem of a substitute plant is not being considered—that is, a plant of new and modern design, laid out to accomplish the same work as the old plant. Appraisers must reproduce in kind and under present conditions and take care of any injustice done thereby under development expense.

Land Values: Usually land is appraised on the basis of a willing seller to a willing buyer, as shown by the reported values of transactions in adjacent territory. For street railways this plan would seem to be eminently fair, inasmuch as present-day prices unquestionably reflect appreciation in value. Particularly is this so in the case of right-of-way, which may show an appreciation far in excess of the normal rise in values for corresponding territory unserved.

Appreciation: Basic land values, exclusive of improvements, are now increasing approximately as the 1.7th power of the population of a normal city—in some districts as rapidly as the square of the population. As the same law appears to hold for the normal earning power of property within the last decade, it appears that normal appreciation is going on at about the same rate as the increase in earnings. The fair and proper basis for land values would seem to be to appraise the land for free sale as of to-day, exclusive of all building improvements thereon. In addition thereto damages resulting from the destruction of original buildings may be admissible as development expense unless absorbed by the appreciation on the land.

Right-of-Way: In the case of right-of-way the factor of increase over normal sale value of adjacent land necessary to reproduce prices actually paid by railways for a continuous right-of-way, clearly reflects the result of damages to adjacent property. This factor of increase has been recognized by many commissions as applying to agricultural lands. The same fundamental reasoning applies to private rights-of-way in cities. But it is clear that extraordinary appreciation in land values served by rapid transit lines will in time far outweigh any factor of increase originally considered.

OVERHEAD CHARGES OR CONTINGENT PERCENTAGES

Overhead percentages, dependent upon the character and continuity of construction and methods employed as well as upon the completeness of the appraisal and of the basic records of construction, should be included as part and parcel of the physical value. In general such overhead percentages include the following:

(A)—CONSTRUCTION OVERHEAD

Organization, engineering and incidentals, ranging from 5 per cent to 15 per cent on equipment and construction accounts respectively, are herein included. Organization covers general office expense, securing bids, preparing contracts, purchasing materials, construction salaries, superintendence and legal expenses of construction, etc. Engineering covers the preparation of plans, specifications, contracts, supervision, progress reports, estimates for payment, shop inspection, tests and field engineering. Incidentals cover all construction expense outside of the contract, such as extras due to change in design, interference with work, trial operations, insurance during construction, etc. Real estate usually should carry 5 per cent to cover cost of title, survey of tracts and legal fees. For rolling stock 5 per cent is usually sufficient. Stores, tools, furniture and fixtures, etc., may carry 5 per cent for purchasing, handling and drayage, and possibly an additional percentage for omissions in case of an approximate checking of the inventory.

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*Later, under amortization, the necessity for ultimately reducing to a present value basis is discussed.

(B)—CORPORATE OVERHEAD

Legal expenses, carrying charges, bond discount and brokerage usually total about 10 per cent, applied to all items or to the primary totals. Of this, 5 per cent represents the cost of securing the money. Carrying charges, or interest and taxes during construction, are derived from the prevailing interest rate applied to the actual investment during a definite period of construction, but over only one-half of the period. Bond discount should be considered as legitimate cost incurred in the creation of an operative property.

The foregoing physical or semi-physical items of value are grouped with the items of tangible property and should be considered as such. They should, however, be clearly set forth so that their relative values in the appraisal are easily ascertainable.

General Contractor's Profits: These may or may not be included, depending upon the scope of the primary overhead. The general contractor is supposed to turn over a completely organized, equipped and operating property, without involving extra administrative cost to the owner. This method, however, is not always followed now, and it seems a better plan to cover the necessary items in the construction and corporate overhead percentages, especially where the company has a completely equipped organization, capable of constructing as well as of operating.

Promoter's Profits: Such profits have been definitely excluded on the ground that the company should be compensated in some way for past losses if any were incurred. Yet legitimate costs of promotion are included in the corporate overhead on all properties, and in the case of new properties on which no development expense is computed promoter's profit in some form should be allowed commensurate with the risk involved.

Unprotected Investment: In the absence of a definite contract between the city and the company as to investment, service or return, it has been found necessary to compute the corporate overhead charges on two bases—one assuming the investment protected by such a contract, and the other assuming an unprotected investment. While a total of 10 per cent seemed fair in the first instance, a total of 15 per cent did not seem unreasonable in the second—that is, 8 per cent for bond discount and 7 per cent for carrying charges, etc.* Thus there is a clear distinction between a situation where the company is forced to admit the possibility of partial confiscation at the end of its franchise period, and one where both parties desire to perpetuate the property on a sound and mutually fair financial basis provided for by contract.

NON-PHYSICAL VALUES OR INTANGIBLES

It is a source of gratification that in the later resettlements and decisions intangible values are receiving more and more recognition. Of course, everything depends upon the purpose of the valuation and the theory of its application.

(A)—FRANCHISE VALUE OR REMAINING EARNING CAPACITY

When the contractual relationship between the municipality and the company is such that a franchise value is clearly recognized and admitted, the method of ascertaining this is simple. The accounting process is to find the present worth of future net earnings under the actual franchise conditions, agreements (inter-corporate or otherwise) and ordinances. There is nothing visionary about this value provided two important conditions are fulfilled—namely, that the contractual relations between the city and the company be maintained, and that the company do justice to the public in the matter of service and the preservation of its physical property. The determination of franchise value involves a complete study of the financial, operating and historical development of the property. It may involve a readjustment of accounts to provide for reasonable service, proper maintenance charges (to operating expenses instead of capital account), depreciation caused by age and wear, amortization of non-physical values and possible equalization of franchise grants. It is very likely to involve also a study of the results of unification versus competition or severance of the property into two distinct operating parts, such as urban and interurban (there being kept in view, of course, the possible purchase of the urban lines by the municipality). With the correctness of the accounting as reflected in the operating ratio assured, a determination must then be made of the probable growth of the community and the revenue resulting from its riding habit. Conservatism must be employed in scaling down abnormal rates of growth in population, riding habit and the resulting revenue. The difference between the estimated net income and the amount of interest assumed to be paid, thus represents franchise value.

Allocation of Earnings: The simplest case arises where all franchises expire at the same time, but such a condition is rare. In many cases franchises may run into the dozens and overlap on account of original competitive conditions now removed by consolidation. Owing to the different franchise terms the allocation of earnings over several different parts of the same line or route becomes necessary. This has usually been done by simply distributing the earnings according to the car mileage operated. This method approaches more nearly the theoretically exact method, as the car mileage over the various sections is proportioned to the traffic.

Severance: Here arises the perplexing question where the central part of an extensive district traction system is taken over by the city, the outlying lines being required to stop at the city limits and transfer passengers. Severance and dismemberment cannot result in other than decreased operating efficiency, decreased public convenience and riding habit of the public, increased administration expenses, etc. If this were not the case. the already proved and generally accepted theory of the advantages of unification, both to the public and the company, would fall to the ground. The severance of an outside interurban system, depending largely upon the urban lines for its entrance into the city, seems even more serious than the dismemberment of a local city system, the parts of which are not absolutely codependent.

Rights at Expiration: The Chicago resettlement plan of 1906-1907 presents some interesting phases. Although many of the franchises had admittedly expired, the valuation commission allowed franchise value for eighteen additional months, this being the minimum time which would be required by the city to acquire the property through court proceedings. Note that the commission recognized the absolute necessity for service to the public, or conversely, if the public denied the existence of value until a new system was completed, it should go without service in the interim.

Contractual Rights: The Toronto situation is also of extreme interest, for although the company restricts its operations to the thickly settled district within the old city limits and will not make extensions outside, its right to continue to "skim the cream" is unquestioned.

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*For one line the average bond and note discount for recent years was more than 10 per cent. In San Francisco, between 1906 and 1909, the average bond discount for improvements, betterments and extensions was about 20 per cent on a 5 per cent bond interest basis. (The bonds were issued at 4 per cent.) In Chicago, after the rehabilitation, the average bond and note discount was more than 5 per cent, while at the present time in Chicago and Cleveland first mortgage securities approximate par.

At present the company is paying more than 20 per cent of its gross earnings to the city, but when valued in 1913 the earning power under its franchises running until 1921 was found to be more than the value of the physical property then existing.

Service: The right to regulate service directly offsets franchise value and when unreasonably or fully exercised may lead to its entire extinction. It thus follows that the company can expect to substantiate franchise value only when entrenched behind adequate service. Yet what is an adequate service standard? This subject, however, is too complex and far-reaching for more than its bearing on franchise value to be here mentioned.

(B)—DEVELOPMENT EXPENSE

Two significant items of value are here involved: (1) The "plant development expense" incurred in the construction and development of the property existing at the time of the valuation, but for which nothing appears in the inventory; (2) the cost of producing or developing the business as a "going concern." This second item again involves a distinction between the cost of purely commercial development or business organization and the expenditures arising out of property superseded in the past. These development items, therefore, classify themselves into major groups—physical and non-physical—the former pertaining to the property and the latter to the business.

Plant Development: In physical development charges it is not difficult to draw the line between existing property and superseded property. In the Third Avenue Railroad appraisal in New York, these development charges on existing property were separated still further into "operative" and "investment." The former covered preparation for construction, piecemeal construction, repaving over duct lines, etc. The latter covered leased and non-operative property and new construction not yet in commission. Under existing plant development would also come the expense of change of grade and street improvements, the building and rebuilding of bridges, tunnels and viaducts in which no title is allowed to the company, the removal of obstructions preparatory to construction, the excess cost of plant and real estate over that allowed at the time of the appraisal, etc.

Superseded Property: In determining the cost of superseded property everything depends upon the completeness and correctness of the existing records of historical development of plant. In several recent instances it was found possible to go back forty or fifty years and trace the development from horse to cable, from cable to electric, and finally from distributed to centralized power plant operation. A few companies have religiously preserved books and even vouchers, so that the entire plant can virtually be reconstructed from year to year with reasonable accuracy from detailed capital additions and subtractions.

Developing the Business: In determining the commercial development charge or cost of attaching the business, a fundamental assumption must be made—namely, that the company is entitled to a "fair return on the actual investment" honestly and judiciously made, not only at the present time but also during the preceding "lean" years. This assumption forms the basis for accrued deficits or "deferred earnings." It is indeed a hopeful sign that this theory is receiving more and more consideration from regulative authorities. It has been used by the French and Swiss governments in the acquisition of their national railway systems, and also by the Wisconsin and Michigan commissions. In its application the plant is reconstructed year by year, the true operating ratio being adjusted for incorrect distribution of expenses as between operating and capital accounts, and proper reserves for depreciation and other necessaries being included. The balance, or net income, is applied to the actual investment as found. Then the cumulative difference between the fair return assumed and the actual return, compounded, represents the development charge if there is a deficit. Naturally there will be some difference in the final result as superseded property is left in capital account year by year or charged to operation through the depreciation reserve. This is caused by the different compounding effect in the two cases. Where radical changes in the system are involved, such as from cable to electric, it seems more logical to spread the cost over a term of years, while small items can be charged against each year's account.

In this connection a clear distinction between street railways and other utilities should be recognized. Since the cost of developing the business of a street railway is not comparable with that of producing a light, gas or telephone business, going value applies in a far less degree to the railway and may in fact disappear in a system having enjoyed a monopoly from the start. The only item of cost that could then be considered as constituting going value would be the cost of extending non-paying branches into sparsely settled territory under municipal compulsion or for forestalling competition. The resultant operating loss constitutes an element of value, by some termed going value but more properly included as a part of development expense.

Fair Return: The author makes no attempt to specify generally what constitutes a fair rate of return upon which to base this development charge. Unless specifically instructed by a court or commission, or guided by some unusually definite principle or local development, it is usually advisable for one to compute alternative values at 6, 7 or 8 per cent or higher, according to the cost of money during the period and in the locality considered. The most tangible principle that has apparently guided both courts and commissions is that the percentage of "fair" return should increase with the risk involved: i.e., should depend upon the probability of guaranteed revenue, the security of the franchise, the character and powers of public supervision, the character of service demanded, etc. Here again the matter of rates, service and return are completely interwoven. There is one situation, however, in which the foregoing principle must be modified—that is, in the case of a distinctly losing return or a property financed and constructed on too optimistic a plane. Here the owners must be content with a lower rate of return than might be reasonably expected for a property more judiciously built. Hence, the theory of deferred earnings must be based upon a reasonable expectancy of ultimate profitableness.

DEPRECIATION

It is a curious commentary upon the rapid progress of utilities that some operators still deny the existence of depreciation and solemnly proclaim their ability to keep a property in a condition 100 per cent good, whatever that may mean. It can be proved that, when a property is old enough so that the cycle of life of its longest-lived depreciable element has expired and a renewal is due, the average "condition" of all the depreciable elements cannot be more than 50 per cent good—i.e., 50 per cent of the service value (plus salvage)—and that a higher percentage would be economically unsound. This does not mean that half of the total investment has disappeared, because some elements, such as land values, do not depreciate. With 85 per cent depreciable and 15 per cent salvage, the 50 per cent theory would result in an economical over-all condition of only 65 per cent.

Renewals an Operating Expense: In obtaining the true operating ratio for computing intangible values, it is essential to include an adequate charge for renewals. It is unfortunate, however, that a distinction is ever made between the maintenance and renewal accounts. Wherever possible there should be a blanket reserve to cover both in order to do away with fine and arbitrary distinctions. Part of such reserve, however, should be represented by actual cash or some negotiable securities. Paper reserves do not buy cars and rails when the time comes for the renewals if the money market is unfavorable. A depreciation or renewal fund is the best guarantee of the permanence of the investment and the good-will of patrons.

Appreciation: It is not well to place any faith in the assumption that appreciation will exactly offset depreciation. In using present land value rather than the value at which the property was acquired, a company receives the benefit of appreciation. Consequently the present value must be obtained to determine the extent of depreciation.

Distinctions: In two recent valuations depreciation was determined by considering the life and the salvage value * * * for all items of property that are normally considered "depreciable," and by using a wearing life for each article based upon the length of time during which it should be able to render efficient service. In some valuations it has been thought desirable to distinguish depreciation caused by one or more of the following: normal wear, obsolescence, inadequacy, age, deferred maintenance and casualties. In most cases, however, these distinctions have not been made, and the tendency of official bodies to do away with the finer distinctions seems to be increasing.

Overhead Charges: Some controversy has arisen as to the propriety of depreciating overhead charges, as well as physical property. For practical reasons these should be depreciated, and the necessity therefor is pointed out under the later heading of "amortization."

Straight-Line-Payment Method: Much confusion seems to have arisen in the terms describing the method of computing depreciation. The practical problem, however, resolves itself into a very simple proposition. Given a cost new and a salvage value at the end of the life (which may either be scrap value or relaying value, in the case of rails), then how much money will be required annually on the average to renew the worn part at the end of its life? This is the simple straight-line or uniform method. The only distinction arising is whether this annuity is to be compounded. For example, the annuity for a twenty-year life would be in the one case 5 per cent flat; in the other case, 3.02 per cent. This method has been erroneously termed the "sinking-fund method," but it is simply the real "straight-line method" of depreciation with annuities compounded on a sinking fund plan. It is general practice to consider the annuity as being set aside at the end of the fiscal year. It is not clear, however, why an amount should not be set aside monthly, as in Cleveland. This would still further reduce the equivalent annuity rate.

All the variations in computing the annuity are caused by the different methods of handling it. A graded rate of compounding might even be devised so as to make it easier on the company now and heavier in the later years. Yet it is a question whether this is sound financing, unless there is assured future protection for the continuing investment by an indeterminate franchise or an adequate purchase clause. Some have suggested a method of depreciating at a fixed rate upon a decreasing principal (present value), but by itself this does not seem to meet conditions at all.

The renewal fund should receive full credit for all salvage value returned from the sale of scrap and all interest on the fund. In this connection it is manifestly unwise for a fund to earn only 2.5 per cent in the bank while it could earn from 5 per cent to 7 per cent in the property. Under proper safeguards as to public supervision of investment, there is no logical reason why the fund should not be thus reinvested for extensions and betterments, thus automatically decapitalizing as much of the property as is constantly disappearing.

Equal Annual Payments: In an exhaustive analysis of this subject of depreciation and valuation, a special committee appointed by the American Society of Civil Engineers came to the conclusion:

> 1. That rates should be based upon present values —that is, cost to reproduce new less the accrued depreciation.
> 2. That the equal-annual-payment method of computing depreciation should be used.
> 3. That depreciation allowances should be credited to the capital accounts from time to time and not distributed as dividends, and that replacements should become charges against capital.

This committee, having apparently accepted the dictum of the courts for present value as the basis of rates, proceeds to apply the straight-line method accordingly and computes depreciation on a decreasing investment value. This, of course, would result in burdening the company during its later years. The net result is, therefore, a composite one, based upon: (*a*) A decreasing original investment on account of depreciation; (*b*) an increasing rate of depreciation, as applied, and (*c*) a fixed return on said decreasing investment. While apparently this method will result in lower rates than that using cost to reproduce new as the basis of rates, this is actually not so. The author prefers the simpler straight-line method in which the annual depreciation is applied uniformly upon the original cost to reproduce new, and not figured as an adjusted rate upon a decreasing investment from year to year.

Until a better understanding is had by the industry in general it is recommended that the straight-line method in its simplest form be studied in connection with the establishment and maintenance of a renewal fund so invested as to earn interest at as high a rate as possible. Unless the fund grows faster than the cost of renewals, the compounding automatically will not ensue and the resultant lower annuity charge for depreciation cannot be utilized.

Amount of Charge: Usually operators look aghast at the proposition of applying from 15 per cent to 20 per cent of the annual gross earnings for upkeep of property, including maintenance and renewals. Formerly 7 per cent to 10 per cent was all that could be spared for upkeep, and occasionally 12 per cent to 14 per cent. From experience with the results of railway operation, however, even 18 per cent to 20 per cent (on a 5-cent fare) may not be found too much.

Basis of Analysis: The use of a certain per cent of gross earnings is simply an empirical method. To arrive at such a percentage scientifically the cost of upkeep should be studied more accurately—that is, on a car-mileage basis for rolling stock; on both a track and a car-mileage basis for track; on a kilowatt-hour basis for power stations; on a car-mileage basis for overhead trolley, and on a life basis for the remaining property. These studies may then be reduced to a fixed percentage of gross earnings for the particular railway. This percentage may not apply to any other line except very approximately, as will be evident in contrasting a short-haul prosperous property like that in Toronto with a long-haul property which may be just barely able to make a living.

AMORTIZATION

The most significant step taken by the courts and the commissions in recent decisions is the recognition of intangible values under certain restrictions, the clear intent of which is that, if recognized, these intangible values are to be amortized as rapidly as possible[*] so that the non-physical part of the values thus recognized in a resettlement plan shall be retired within a reasonable period. This is eminently sane and practicable and the only way in which to secure the one desirable result aimed at—that a utility shall be conceived, organized and operated as a perpetual or continuing investment, and at the same time be so managed that the public will ultimately pay such a rate of fare as will result in a fair return on the present value of the property.

The Purchase Clause: The public and the courts have definitely set their faces toward resettlement. Let no more time be spent, therefore, in worrying about whether immediate municipal ownership or ultimate municipal ownership is the thing the people want. Time will decide which one of these planks, if either, is to go into municipal platforms. Companies should cease wasting their energies in opposing a public movement that will surely come in spite of opposition if it is economically sound, and direct their energies toward the terms of the purchase clause and the conditions of a resettlement franchise.

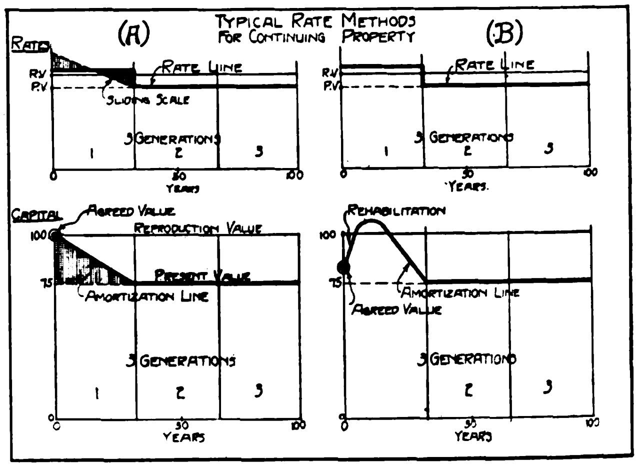
Continuing Investment: First let the tangible part of the agreed valuation stand absolutely as a perpetual and continuing investment, carrying a funded debt which will automatically refund itself under the conditions imposed because the real or tangible property is there upon which to base a new issue of certificates. The property will be there if properly maintained and renewed, and the courts will not permit confiscation. Then retire the intangible values and provide for the accrued depreciation, and the fundamental investment will take care of itself.

Typical Resettlements: It is time to prove to the courts and the commissions that railway investments can be made practically as sound as savings bank investments. Several plans have been worked out, notably those in the Chicago, Kansas City and San Francisco resettlements. They differ somewhat in franchise conditions, but the central idea is to put tangible property behind intangible values, so that if ultimate municipal ownership should prove to be the policy of the country it will come without destroying investment values or curtailing service during the time of its coming. On the other hand, if it does not come the companies will have so managed their properties that the public will have repaid out of earnings every honest dollar invested. And the public in time will eventually receive its service from the companies' hands at a price which will pay a legitimate and agreed return upon the actual physical value of the property then producing the service.

SOCIAL ASPECT

It is necessary only to refer to the financial history of railroad, industrial, light and power, and electric railway properties during recent years to show that something is radically wrong in the methods of development. While a street railway property is as near a guaranteed monopoly as could be devised, it has apparently fallen behind other utilities in which there is considerably more risk. Under the crucial test of the last year this is particularly true. Thus, in comparing the five months, July to November, inclusive, 1914, with the same months of the previous year, the net earnings of a selected group of utilities and steam railroads show relative growth in the following order: Electric light and power systems, total utilities (including earnings not apportioned), gas companies, steam railroads (decrease) and electric railways (decrease).

The general effect of the war abroad seems to be a decline in the gross and net earnings for all of the utilities. The decline in electric railway net earnings evidently was not caused entirely by the jitney bus and the automobile, for the same characteristic decline occurred in the electric light and power and gas fields. Yet these factors were felt, and while the inroads upon city lines by the irresponsible jitney bus seems to be becoming less dangerous, owing to the adoption of suitable regulations and the realization on the part of the jitney owners as to what cost of service and depreciation mean, the outlook for interurban roads is not so encouraging. This is caused by the constantly increasing number of privately-owned automobiles in the country districts and the rapidly-growing good-roads movement.



FOUNDATION PRINCIPLES—CHARTS SHOWING TWO TYPICAL RATE METHODS FOR CONTINUING PROPERTY

Cost New versus Agreed Value: Probably the majority of railway men will contend that higher fares offer the only solution for the future. The problem must, however, be analyzed further. For the purpose of argument, the accompanying figure contrasts two methods of meeting the tendency of the times toward the rates based on present value, which condition is presumed to be consummated at the end of only one generation:

A. Rates for the present based on reproduction value or cost new, with gradual amortization of the intangible values and shrinkage during the first generation (thirty-three and one-third years).

B. Rates based upon an agreed or resettlement value (including some intangible allowances), with a certain period of rehabilitation during which renewals are added to capital, and with a similar amortization of intangibles.

The first method represents conditions that are desired; the second, conditions that are being forced upon the industry. It can be proved mathematically that, even with completely amortizing within one generation the shrinkage caused by depreciation, the total payment required during the 100-year period shown will be somewhat less than if rates are based perpetually on cost new. This assumes a normally operating property, requiring only normal renewals and not rehabilitation. The illustrations, however, both Case A and Case B, start with existing conditions in the railway industry working toward the present value basis, and it appears that during the first generation the average rates in Case A, starting with reproduction value only, will be actually somewhat lower than if based on present value or agreed value plus rehabilitation costs, as in Case B. Yet both rates will be higher than if based perpetually upon the reproduction value only, owing to the amortization assumed.

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[*] Such values may be classified generally as follows: (*a*) Superseded property or values extinguished through the rapid development of the art; (*b*) plant development cost incurred on items of existing physical property; (*c*) general development expense, or amount of deferred earnings accumulated through lean-paying years; (*d*) franchise value where contractual relations provide for same; (*e*) corporate overhead as previously defined—including legal expenses, carrying charges, bond discount and brokerage, cost of consolidations and reorganizations, preliminary legal and technical expense prior to actual construction, etc.

Sliding Scale: If one could assume a sliding scale of rates which would result in the same average rate required during the next generation, there would be a gradual transition from present-day to future conditions. This is indicated by the sloping rate line in Case A. The rates would necessarily be higher at first. This may be thought impracticable, but consider the converse proposition—that is, percentage return on investment. For in Massachusetts the sliding-scale system of both rates and return has already been put into effect by one of the utility commissions, with results far better than anticipated. In this case (Boston Gas Company), the company deliberately reduced its rates from 90 cents to 80 cents per 1000 cu. ft. in order to earn the higher rate of return allowed by the commission.

The author therefore submits the proposition of a combined sliding-scale method of railway fares and return on investment. Railways have already had experience with the flexible-fare principle in Cleveland, which is a long step in advance, although one is not at all convinced that the American public prefers the kind of service that 3 cents will buy rather than that which 5 cents should buy. But Cleveland did not go far enough. There should be an element designed to encourage the maximum efficiency in operation with a definite reward therefor. Let a combination of the Chicago, Cleveland and Boston methods be worked out, giving both flexibility and reward for efficiency. Obviously, too, adequate service must be an essential factor. The exact basis of rates will not become so important a matter, for in the end the sum total appropriation through a long term of years for return on investment plus amortization will not vary much, whatever the original basis of capitalization. This is the all-important point and the one usually lost sight of, owing to the rapidity of growth of railway properties in this country. Of course, if no amortization is considered, the reproduction or cost new value basis will be easier on the rate payers of this generation, while the present value basis will cost less in the end.

THE NEEDS OF THE ELECTRIC RAILWAY INDUSTRY

The electric railway industry should frankly meet these new conditions by a policy that is founded upon the desire and the necessity of correctly informing the public. It should use the new weapons of publicity, standardized accounting and efficiency methods of management. The preservation of records should be encouraged. Co-operative resettlement plans with equalization of franchise terms, adequate service standards and the protection of the investment should be worked out fairly and sanely. The industry should give its moral support to valuations clearly made in the spirit of fairness to both sides, and not oppose all valuations, fair or unfair, as a sort of trespass upon some imaginary rights, even though established by long practice. Finally, the American Electric Railway Association, representing $2,500,000,000 of funded debt and the same amount of invested capital and contributing to the economic and social welfare of perhaps one-half of the population, should take advantage of probably the most important opportunity of its career, and cheerfully and intelligently assist the commissions, the courts and the public gradually to educate themselves to a thorough understanding of the problems of the industry.

SUMMARY

Intangible or non-physical values are receiving more and more recognition, including past losses on a fair actual investment.

Historical development and predictions for the future are becoming essential in the comprehensive study of values.

Detailed inventory is apparently essential to acceptance by courts and commissions.

Every valuation should be so presented as to be readily checked by a competent authority. Submersion of essential details is not in accord with proper procedure.

Definite construction schedules should be assumed in reproducing the property, estimating carrying charges and computing life.

Fluctuating commodity prices should be averaged over a term of years, using trend prices or the weighted average.

Reproduction cost new should consider original as well as present conditions of construction.

Appreciation cannot be held to offset depreciation, as a general principle. It may be computed as well as depreciation if necessary.

Overhead percentages of from 15 per cent to 25 per cent in addition to the bare inventory are to be considered reasonable elements of the cost new of a physical property.

Franchise values can be based only upon definite contractual relations. Adequate service as defined by public rights thereunder is essential to the computation of correct franchise values.

Cost of attaching the business, or going value, can be definitely computed only where accurate records have been preserved.

Renewal funds and amortization of intangible values are a first and prime condition of the permanency of investment.

Depreciation (renewals) is an operating expense to be provided for by a definite monthly reserve or appropriation, compounded.

Renewal funds should be invested and preferably put back into new property, in order to secure the maximum compounding effect.

The simple straight-line method of depreciation, compounded, serves all essential purposes.

Maintenance and renewals appropriations should be consolidated wherever possible.

All resettlements should be made on the basis of a continuing investment, carrying permanent funded debt irrespective of ownership.

Amortization may then be confined to the intangible values, not to the funded property.

A fair rate of return should be dependent upon the risks involved and should increase with the risk.

Valuation and rates form a problem for the second and third generation, not alone the present.

A sliding scale of fares and return best meets conditions of maximum productivity.

Resettlement valuations are of the maximum ultimate importance at present. The industry should support fair methods and not oppose all valuations.

The electric railway industry should meet new conditions with the weapons of publicity, standardized accounting and friendly co-operation with the courts and the commissions.

Electric Railway Accounting Review*

Formation and Early Development of Accountants' Association —Body Has Broadened the View of Electric Railway Accountants and Solved the Many Problems Accompanying the Industry's Growth—The Spirit That Should Rule the Accountants

By P. V. BURINGTON

Secretary The Columbus Railway, Power & Light Company, Columbus, Ohio

On March 23 and 24, 1897, there was gathered in the Hollenden Hotel, Cleveland, Ohio, through the personal appeal of a few accountants of the principal street railways of the United States, a group of sixteen representatives for the purpose of forming an accountants' association. Such an organization was then formed under the name of the Street Railway Accountants' Association of America as a separate body from the American Street Railway Association. At Philadelphia on Sept. 29, 1905, the association was reorganized under the name of American Street and Interurban Railway Accountants' Association as an affiliated part of the American Street and Interurban Railway Association. At the 1910 convention at Atlantic City the name of the association was changed to correspond with the change of name in the railway association to that of the American Electric Railway Accountants' Association, which is the name now borne.

The first meeting at Cleveland was one of great interest, made so by the fact that electric motive power was so rapidly taking the place of horse and cable power that the old system of accounting was fast becoming obsolete and something had to be done to meet the requirements of the new condition. One of the principal things accomplished was the appointment of a committee on standard classification of accounts. This committee was very active in its work and submitted a tentative classification to the first annual convention at Niagara Falls in October, 1897. With some revision this was adopted at the Boston convention in September, 1898. Owing to its directness and elasticity this classification, with but minor changes, stood the test of ten years' use by the greater part of the street railways of the country until the advent of the interurban railways.

It was then recognized that another new condition must be met and the association proceeded in a thorough manner to solve the problem. The Interstate Commerce Commission and the railroad commissions of various states were now becoming interested in what the railway accountants were doing, and as a result the association was importuned to work with them to the end that a system of accounting might be formulated that would harmonize with the needs of both the railways and the commissions. Through laborious work of the committee of this association an exhaustive classification was adopted and promulgated in 1909 by the Interstate Commerce Commission and the association, and from that time to the present only a few changes have been made. Railway commissions of many states have adopted the system, the last one being Ohio, as of Jan. 1, 1915.

Aside from this important work the association has been the means of bringing out in accountants the best that is in them by intelligent and wholesome contact; by creating a spirit and enthusiasm which has annually returned them to their duties with higher ideals of responsibility and usefulness; by creating a broader view of things involving both their personal welfare and the welfare of those with whom they are associated in interest, and by opening up to them countless other things of greater value connected with the utilities they represent. Each meeting of the association has been filled with thorough discussion of every subject presented, and it would be difficult to name at this time any one theme relating to the needs of the accountants during these past years that has not been brought to a satisfactory conclusion.

Every member of the association has always been assured of the fact that if he had accounting troubles and perplexities of his own, he would receive the most patient and interested hearing possible at the meetings and, in ninety-nine cases out of a hundred, would obtain a complete solution of his difficulties either at the meetings or through the proper committees or literature of the association. The organization has therefore been worth while and has proved beyond question the wise foresight and earnestness of the few who gathered in Cleveland in March, 1897. In its progress it of course owes much to the loyalty and valuable assistance of the managing heads of the railways, as well as the American Electric Railway Association as a whole.

In connection with this brief review it is proper to consider what this organization stands for under the present day methods of financing and management. Paul R. Jones, secretary Cities Service Company, New York, makes these pertinent remarks in the September number of *Doherty News:*

"When the public utility company was largely a family affair, simple accounting systems and methods were the rule. In recent years certain factors have raised the auditing department of the public utility organization from a purely clerical status to that of one of its most important departments. The need of immense volumes of capital for improvements and extensions in growing communities required a more comprehensive accounting system. The old system of accounting proved unsatisfactory to the financiers and to the bond and stockholders, as well as to the managements of public utilities, and the rule-of-thumb methods were no longer accepted. The need of accurate information regarding the financial and operating conditions of the properties in which money was to be invested became apparent, and the accounting departments were called upon to furnish and devise satisfactory systems of accounting which would give the necessary information to the investors and at the same time assist the management in economical operations."

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*Abstract of a paper presented before the San Francisco convention of the American Electric Railway Accountants' Association on Oct. 5, 1915.

This statement briefly but distinctly covers the accounting requirements of to-day, and every accountant should not only realize his advanced position but should imbue himself with the spirit of making good—(1) by knowing the things required of him; (2) by setting about to do them; (3) by taking the initiative when he sees that ideas and facts he may possess would be valuable to his company, for under the business methods of to-day the thirst of aggressive managers is for the best there is, and (4) by maintaining unquestioned loyalty to his company, as in no other way can he merit a return of loyalty. This spirit has been the ruling incentive in all of the work of the association, and who shall say that its members are not making good after this struggle of eighteen years?

Prepayment Cars and the Accountant*

Non-Statistical Review of Prepayment Idea in Relation to Development of Car Construction, but Particularly in Relation to Devices for Collecting Fares—Fare Boxes Analyzed and Compared—Old Accounting Reports Too Often Still Prepared

By R. J. CLARK

Comptroller Metropolitan Street Railway, Kansas City, Mo.

IN general, prepayment cars have demonstrated their ability—all other things being equal—to increase earnings, reduce expenses, decrease accidents and provide an outlet for inventive genius that has in some cases deferred charges to obsolescence and in all cases resulted in the position of the company being improved with the traveling public. Yet if managers and accountants generally have been interested in the wonderful ingenuity and variety of the new types of car construction, what can be said of the equally great development made in collecting and accounting for fares. It is but natural that the accountant should become as much interested in the wealth and variety of fare devices as he is, or has been, in the development in car construction and reconstruction with the attendant effect on capital, income and expense accounts.

The first prepayment car was ordered by an American company in 1907, the chief idea, or the one receiving the greatest attention, being that of having the fare registered instead of accounted for by the employee. Since then it has been interesting each year to watch the development of the money-counting fare box and see how the inventors strive not only to overcome the mechanical difficulty of counting coins accurately according to value with the small differences in diameter between some of them, but also to overcome service and climatic conditions and the untiring efforts of dishonest conductors. These developments have continued until last year there were exhibited electrically-operated recording fare boxes, and no doubt at this convention recording fare boxes capable of receiving and recording not only coins but ticket fares are exhibited.

It is possible that the installation of fare boxes may overcome an objection sometimes heard that prepayment cars in spite of their separate and enlarged exits and entrances slow down the schedules and thus more than offset the saving effected by redeeming lost and overlooked fares, because the passengers having the exact fare ready may board and deposit it and pass on into the car without waiting for those needing change, as is now necessary where fare boxes are not employed.

The principle of fare-box collection is to relieve the conductor of all inconvenience and responsibility of handling cash and incidently to remove any temptations from handling it, to prevent substitution of fares, and finally to insure the company against carelessness or negligence on the part of even honest conductors whereby fares are lost through failure and oversight to ring them up. The development of this principle has resulted in two well-known types of fare boxes being placed on the market—the locked box and the non-locked recording fare box. The former receives and retains every fare deposited, and the conductor is supplied with change by satisfactory and inexpensive methods. The non-locked box records the fare, and the money is afterward released to the conductor for the purpose of making change. It is certain that with the prepayment type of car a fare box is essential or at least advisable.

There are two types of locked box, portable and stationary. The principle is exactly the same, i.e., the reception and secure retention of all money collected. The portable boxes cost about $10 each, but on account of having to provide a box for each conductor instead of a box for each car—as in the case of the stationary locked box and the non-locked recording box—about twice as many portable boxes are required as stationary boxes. In the case of the Metropolitan Street Railway, three times as many would be required on account of having to account for earnings between states.

The great advantage (exclusive of original cost and maintenance) of the portable fare box is that it can be removed from the stand on which it ordinarily rests on the prepayment car and at rush-hour periods be passed by the conductor to those passengers who cannot get near enough to the stationary locked or non-locked recording box to deposit their fares. Moreover, it can be used on cars not yet converted to the pay-as-you-enter type. From many years' experience the writer knows that their cost of up-keep is very small and the cost of operating, i.e., distributing, collecting and counting contents and keeping conductors supplied with change, would not be much more expensive than the present method. The lower original cost and lower maintenance charges of this type of box recommend it, and in addition it has not the intricate mechanism to get out of order or to be tampered with or manipulated by the dishonest conductor, that recording fare boxes have.

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*Abstract of a paper presented before the San Francisco convention of the American Electric Railway Accountants' Association on Oct. 5, 1915.

The comparative advantages and disadvantages of the different types of fare boxes may be briefly summarized as follows:

NON-LOCKED RECORDING BOXES

Disadvantages or defects as compared with

(a) Register System

1. As these boxes are stationary it is possible to use them only on the prepayment type of car, and only about 60 per cent are of that type.

(b) Locked Box (Portable)

1. Johnson, Dayton and International, with the fare register each reccommends, would mean high installation costs and correspondingly high maintenance expense.
2. On account of the stationary feature it is not always possible for passengers to get near enough to deposit their fares.
3. Their adoption would perpetuate the present cumbersome system of handling cash, and it would be counted six times where it is now counted five and where it should be necessary to count it only once.

Advantages as compared with

(a) Register System

1. They embody the principle of fare-box collection—that is, they insure the company against carelessness and negligence, even on the part of honest conductors, whereby fares are lost through failure or oversight to ring them up, and they prevent the substitution of one class of fare for another by dishonest conductors.

(b) Locked Boxes

1. The coin, having passed through the machine, registers its value and is immediately available for change-making purposes.

LOCKED BOXES

Disadvantages or defects as compared with

(a) Register System

1. It is asserted that their operation would necessitate a system of collecting or distributing the boxes, counting the contents and providing the conductors with change. This objection is greatly exaggerated and is possibly caused by inexperience and the fear that naturally arises when a change is first contemplated.
2. It has been asserted that the company loses because slugs, mutilated coins and counterfeit coins are deposited as fares. This is not so serious a loss as might at first be expected. American silver is not mutilated to the extent that Canadian silver is, and yet the losses in Toronto were comparatively insignificant. As regards slugs, conductors are usually human enough to dislike having anything "put over" on them, and they watch very carefully the fares deposited and never hesitate to call the passenger's attention to an improper coin.
3. It has been stated that because no register readings accompany the fares deposited in the locked boxes, petty stealing is made possible in the treasurer's office. It is always difficult to eliminate this type of dishonesty, but during the writer's seventeen years' association with the Toronto Railway this happened only once. With a proper system installed this sort of petty thievery is practically impossible.
4. It has also been stated that there is the possibility of the box and contents being stolen, but this is not likely to happen any more frequently than hold-ups occur at the present time.
5. Another argument against the portable box is that the conductor may substitute a box for the company's regular box. This is a remote possibility, but such an occurrence has never been heard of.

[Note: The only serious objection in the writer's opinion to this type of box is the fact that as it becomes filled with nickels it may become heavy enough to cause the conductor inconvenience in operating on cars not converted to the pay-as-you-enter type.]

LOCKED BOXES

Advantages as compared with

(a) Register System

1. They relieve the conductor of all inconvenience and responsibility in handling cash, and incidentally remove any temptation that might arise from such a source. Moreover, they prevent the substitution of one class of fare for another and insure the company against carelessness and negligence even on the part of honest conductors, whereby fares are lost through failure or oversight to ring them up.
2. Cash is handled and counted only once and not five times, as now occurs.

(b) Other Boxes

1. While recording boxes prevent the substitution of fares and insure the company against carelessness, they do not relieve the conductor of the inconvenience and responsibility of handling cash or remove the temptation that arises from this to the extent that locked boxes do.
2. The locked boxes offer absolute security.
3. The locked boxes also have greater efficiency in that they can be used as stationary or portable boxes.
4. Their low installation and maintenance cost has already been mentioned.
5. The portable locked boxes can be used on any type of car without waiting for it to be converted to the pay-as-you-enter type. (The stationary locked box is limited in use to prepayment cars.)
6. They can be used on a route where two collections are made on each half trip.
7. Cash is handled and counted only once and not six times, as would be the case with the recording boxes.
8. In the early stages it was possible to "pick" the locks, but assurance is now given that the locks have been so improved that this is no longer the case.

Inventors and manufacturers have improved upon the register until they have exhibited registers which not only record the cash and different ticket fares on each trip but total same, print in the time, car number and conductor's number. It would appear that the time is approaching when the progressive accountant can fulfill his long, long wish to procure an earnings sheet on which neither pen nor pencil is required by the conductor or in the auditor's office. Possibly these things would have come without prepayment, but they did not, so that prepayment must be credited with instituting progressiveness in fare receiving and recording devices.

In the future, too, the prepayment car may be responsible for a transfer-issuing machine. The writer hopes that some one will invent a machine whereby without increasing the burden of the conductor he can record the number of passengers boarding and alighting from his car at different points along the route. Such a machine would be of incalculable value to the transportation department in regulating service.

All the past developments brought problems to the accountant. When he had only to accept the driver's turn-in and later merely count and record the contents of the receptacle, things were easy. But difficulties increased when he had to compare the conductor's turn-in with the register readings, and many and extensive checking systems were developed. Too often, however, in addition to making the new reports and meeting the new methods of accounting made necessary by the adoption of prepayment cars with fare boxes or improved recording registers, he has had to prepare statements and reports along lines laid down before the invention of these devices. The ordinary accountant revels in statistics and reports, but he delights to have his reports used. One of this year's committees has referred to the time and effort spent each day in preparing reports of daily earnings by routes, by car-hour, by car-mile, etc., although the accountant and the management know that these reports do not show traffic conditions.

Development of the Electric Railway[*]

Electric Railway History Divides Itself into Definite Characteristic Periods—The Development Has Been Accompanied by Marvelous Technical Progress—The Public Service Character of Electric Railways Is Coming to Be More and More Generally Understood

By JAMES H. McGRAW
President McGraw Publishing Company, Inc., New York

A TREMENDOUS industry has been created in about thirty-five years. Its inception was largely due to American genius, and its early development to American courage and capital. It has kept pace with the best in American industrial life and has gone hand in hand with other important developments that have made this country the leader of the world in material prosperity and those things that make for the convenience and comfort of its people.

The magnitude of this great industry is indicated by the present capitalization of more than $4,500,000,000, exclusive of the large amount of capital invested in the immense industries required to supply these railway companies with apparatus in the way of cars, electrical equipment, generating apparatus and rails. But it is not alone in the increase in passengers carried by these railways, from 2,023,010,292 in 1890 to more than 12,000,000,000 in 1912, that the importance of the electric railway as a factor in the comfort, health and prosperity of the citizens of this country can be measured. The new means of transportation thus created gave a quicker and more comfortable way of traveling from home to place of business, from city to country and between adjoining cities.

The history of the development of the electric railway divides itself naturally into three periods which appear in the history of all great developments. First there is a period of preparation in which mystery veils important physical and economic facts and laws, but hardy and curious pioneers gradually bring these facts and laws to light. Then comes a time when invention crowds invention as the accumulated knowledge demands application and, in fact, we may call this the period of application. And finally there comes the period of adjustment as the world learns to use effectively the new tools placed in its hands.

Period of Preparation

In the period of preparation I shall pause only long enough to pay my tribute to those now nearly forgotten pioneers whose scientific curiosity lead eventually and naturally to important inventions. Hardly had Faraday and Henry discovered the laws of the electromagnet and the principles underlying the electric motor before attempts were made to apply the new motive power to transportation. Davidson, Davenport, Farmer, Page and others constructed operative electric cars but were handicapped by the limited supply of electric power available, the only source in their day being the primary battery. Professor Page, under the patronage of our government, constructed a high-speed electric locomotive in 1857 and demonstrated the possibility of electric traction. The commercial future of the electric railway, however, was determined by the invention of the dynamo when the nineteenth century was about two-thirds passed, and then practical inventors hastened to apply the crude experience of the earlier pioneers.

Period of Application

Most of my hearers will remember that about 1888 Frank J. Sprague had just completed the installation of an electric railway at Richmond, Va., the largest of the kind by far in the country. His principal competitors were Stephen D. Field, formerly a resident of this city, Charles J. Van Depoele, the brilliant Belgian whose early death was a great loss to the industry, Leo Daft, still living, Sidney H. Short, who was later to play an important part in the electrification of the tramways in Great Britain, and H. H. Bentley and Walter H. Knight, who together built the first underground electric conduit railway in the country, on Euclid Avenue in Cleveland. The work of these men marked the beginning of the period of application.

The statistics of 1890 show a total length of electric railway track of 8123 miles, of which 1262 miles, or 15 per cent, had been equipped for electric operation and 488 miles with cable, while on 5661 miles animal power was still used and steam power was employed on 711 miles. Some 2,000,000,000 passengers were being transported every year and the gross income from all sources was a little more than $91,000,000 annually.

The next twelve years were characterized by expansion and great hopes. During this time most of the city railways in the country were changed over to electric operation and many lines were projected into the suburbs, although the development of the system of polyphase transmission at high tension with converter substations had not proceeded far enough at that time to make the modern interurban railway possible. The total number of miles of track of street railways increased from 8123 to 22,577, or an increase of 178 per cent. Of these 22,577 miles, 21,908 miles were equipped with electricity, leaving only 259 miles operated by animal power, 241 miles by cable power and 169 miles by steam power. During this period also the number of passengers paying fare had much more than doubled, increasing from 2,023,010,202 to 4,774,211,904. At its end there were 140,769 electric railway employees drawing annually $88,210,165 in salaries and wages.

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[*] An address delivered before the annual convention of the American Electric Railway Association in San Francisco, on Oct. 8, 1915, on the occasion of the presentation of a testimonial from the Panama-Pacific Exposition Company to the associations commemorative of the 1915 meeting.

[NOTE—In opening his address, the speaker referred first to the important influence exercised on the industry by the American Electric Railway Association and the allied Manufacturers' Association. He then gave a short account of the first meeting of the Railway Association held in Boston in 1882, at which no papers were read, following this by stating some titles of papers presented at early meetings. He also mentioned the organization of the American Electric Railway Manufacturers' Association at Saratoga in 1903. He then continued in part as above.—EDS.]

Period of Adjustment

The satisfactory development of electric railway traffic along well established lines is indicated by the increase in the number of fare-paying passengers to 7,441,144,508 by 1907, a 56 per cent increase, with a nearly proportionate track mileage increase from 22,577 to 34,403, or 52 per cent. There were 221,429 employees who received annually $150,991,099. But the corporate organizations inherited from the horse-car days were found to be as crude and to grow obsolete almost as rapidly as the apparatus used during those times. It soon became evident that the small property was much more expensive to operate proportionately than the larger one, and consolidation became the order of the day. In fact, the half decade from 1902 to 1907 might be called the period of consolidation, and in the latter year the existence of more than one electric railway company in any city was exceptional.

Then came a period of regulation which might be termed the characteristic of the next half decade, from 1907 to 1912. Up to ten years ago railway companies, both steam and electric, had been considered by the public as well as their owners more in the light of private enterprises than of public utilities. But a change had to come. The growth of the railways had made the public more dependent upon them and led to a perfectly legitimate demand that the public should have something to say as to the operation of these lines and at the same time should throw its protection about them by preventing them from becoming the victims of destructive competition. Publicity of accounts was also required. For many years previous a few states had had boards of regulatory commissions known usually as railroad commissions. In most states, however, the power of this board was enlarged or a new board was established under the title of Public Service Commission, and the responsibility of the company to the public as well as the public to the company was more generally recognized.

As I intimated at the outset, we are now in a period of adjustment. The importance of the modern railways to civic development has been demonstrated. The electric railway is one of the most important factors in the growth and prosperity of any city. It has become so necessary to the life of the ordinary person that, while in 1890 the average number of times which every person in the entire country paid fare on the street cars each year was only thirty-two, but this figure rose to sixty-one in 1902, to eighty-seven in 1907 and to 100 in 1912. To render this service required 282,461 employees who were paid $200,890,939 annually.

An important element of the progress described has been in the coincident technical development. In the generation of power, for instance, the sizes of the units are constantly on the increase, and whereas a decade ago 5000 kw. was about the maximum for a single machine, the builders of turbine generators are now producing units of six or seven times that size. Improvements in the art of insulation manufacture and of high-tension transmission-line construction have proceeded at equal pace. Voltages of from 10,000 to 15,000 were regarded as high not very long ago, but to-day plants are being designed for voltages of 100,000 or more. Similarly inventive genius has been at work in improving the methods for transforming this high-tension energy to lower voltages for distribution purposes.

In my belief, we are passing now only across the threshold of an enormous development in the application of electricity to the transportation problems on the continent. Indeed, the wide diversity of the possibilities in its use under heavy electric traction conditions has received a very practical illustration during the past year, through the opening of the new lines of the Norfolk & Western Railway and of the Pennsylvania Railroad in and near Philadelphia, and the adoption of the same motive power for one of the links in the transcontinental line of the Chicago, Milwaukee & St. Paul Railroad.

It would not be fitting for me to close this review without a reference to the growth of the idea of the public service character of electric railways as well as other utilities. Their primary obligation is now recognized to be that of giving good service, and this idea is the foundation of the code of principles which was adopted by the American Electric Railway Association as a guide to its members just one year ago. The railway is the servant of the public, but the public must not forget that the servant is worthy of his hire. The railways sell transportation but they give service, by which I mean those benefits which come with good transportation. For example, the agency which permits the city toiler to live in the country, which raises the value of real estate, which reduces physical fatigue and which conserves the worker's time is giving service. .

And there is need for more service which will be furnished if capital can be attracted to the railway business. The population of this country is growing rapidly, but it is a well-known fact that the needs for transportation in any community increase in even a greater ratio than the population. Nevertheless, the agencies to supply this need are lagging behind. Unless capital can be assured of a fair return on a fair investment in these properties, it will go to other fields. Vast as are the figures of the traffic done by the electric railway companies of the country, but few cities are yet adequately supplied. The possibilities in the way of a light package express and freight service within the boundaries of the urban community and between city and country have hardly been touched. A few trunk lines have installed electric locomotives, but many more would find it advantageous to do so.

The foundation of the civilization of the Roman Empire lay in the magnificent roads which it built connecting its provinces and main cities. Wherever Roman influences went the roads followed, making access easy from one part to another and carrying not only the soldiers of Rome, but its greater armies of peace and commerce. With the boundless possibilities of this country in the way of progress and undeveloped lands improvements in this modern means of communication between the city and country and between different parts of a city should be encouraged. With the close of the present terrible war in Europe this country is bound to receive, in my opinion, the largest flood of immigrants which it has ever experienced. From the desolated fields of Europe and from its grinding burden of taxes man will come to this land of ours where those of different nationalities and different tongues live in amity together. We must provide for better means of communication and transportation than are now possessed so that our transportation facilities will keep pace with the needs of the increasing population. If this is done I believe that we may look forward to the years following the close of the war as the most prosperous which our country has ever known.

The American Association Convention

The Delivery of Two Striking Addresses, the Reduction in Section Members'. Dues, the Proposal to Enlarge the Allied Family, the Presentation of Reports on Cost of Passenger Transportation Service and Taxation Matters Were Notable Features

Tuesday Morning Session

PRESIDENT C. LOOMIS ALLEN opened the thirty-fourth annual convention of the American Electric Railway Association on Tuesday, Oct. 5, 1915, and introduced as the representative of Hon. Hiram W. Johnson, Governor of California, Hon. Chester H. Rowell, editor of the *Fresno Republican*, who delivered the address of welcome. He referred to the invention of cable cars used for climbing San Francisco hills as the first mechanical street transportation. Dwelling upon the subsequent sociological development, he said that modern city transportation has meant the growth of cities, the breaking up of slums and has made possible the industrialization of modern life. Modern sanitation and modern transportation, which make it possible to concentrate work and distribute residences, are the two things that make the modern city possible. They have a social value beyond estimate.

President Allen then read his annual address which is abstracted elsewhere in this issue. On motion of C. L. Henry, Indianapolis & Cincinnati Traction Company, the reading of the executive committee report was dispensed with and Secretary-Treasurer E. B. Burritt read a recapitulation of his report, which was accepted. Mr. Burritt first outlined briefly the status of the association in regard to membership and finance, and told something of the routine work of his office. He also gave the usual data, summaries of which appear in the accompanying table. He stated that comparatively few resignations had been received as a result of the increase in dues. Also fifteen new company members and 626 new individual members had been received during the year, the total of company section members now being 853.

CONDENSED FINANCIAL STATEMENT

Cash on hand, Oct. 1, 1914	$5,175.80
Receipts, year ending Sept. 30, 1915	87,164.67
Total cash	$92,340.47
Expenditures during year ended Sept. 30, 1915	81,675.69
Balance in bank, Sept. 30, 1915	$10,664.78
Bills receivable Sept. 30, 1915	8,209.68
Total	$18,874.46
Bills payable, Sept. 30, 1915	9,388.71
Balance as of Sept. 30, 1915	$9,485.75

MEMBERSHIP STATISTICS TO SEPT. 30, 1915

	This Year	Last Year
Company members enrolled	364	379
Number which have paid dues	343	361
Individual members enrolled	3,012	2,884
Number who have paid dues	2,787	2,762
New company members	16	23
New individual members	630	900

The principal activity, in point of time, of the bureau of fare research has been the making of a number of special studies concerning the various phases of the cost of passenger transportation service. The collection of financial and statistical data and of information concerning the progress of various rate cases has been continued and information has been furnished to a number of member companies and to association committees. The information collected is an integral part of the association files.

The information bureau received 377 requests for information from 184 companies, in complying with which a number of special investigations were necessary. The bureau has followed closely the spread of the jitney movement and has endeavored to keep its files up to date on all phases of this problem. It has on file practically all ordinances enacted so far and in addition a number of legal decisions relating thereto as well as the rules formulated by a number of public service commissions.

On account of the fact that the space occupied by the association at the United Engineering Societies Building was not adapted to the requirements of the office force, after a thorough investigation by a special committee the new quarters at 8 West Fortieth Street, New York, were secured. As a result the association has an efficient working layout at a saving of something over $1,200 annually in rent.

Program for Tuesday

ADDRESS OF WELCOME—
Annual Address of the President.
Annual Report of Executive Committee.
Annual Report of Secretary-Treasurer.
Reports of Committees:
  Subjects—C. L. Henry, chairman.
  Education—H. H. Norris, chairman,
  Representing Association at the American Good Roads Congress—E. C. Faber, chairman.
  Valuation—L. S. Storrs, chairman.
  National Joint Committee on Overhead and Underground Line Construction—W. J. Harvie, delegate
ADDRESS—"Welfare Work," Jesse W. Lilienthal.
Reports of Committees (Continued):
  Company Membership—James E. Gibson, chairman.
  Company Section Medal—S. G. McMeen, chairman.
  Federal Relations—Arthur W. Brady, chairman.
  Anthony N. Brady Medal—A. W. Brady, chairman.
  Compensation for Carrying United States Mail—Capt. A. R. Piper, chairman.

Program for Wednesday

Reports of Committees:
  Electrolysis—Calvert Townley, chairman.
  Ways and Means—J. H. Pardee, chairman.
  Company Sections and Individual Membership — Martin Schreiber, chairman.
  Dues of Company Section Members—J. D. Mortimer, chairman.
  Changes in Constitution and By-Laws—R. I. Todd, chairman.
  Relations with State and Sectional Associations—R. P. Stevens, chairman.
  Public Relations—Thomas N. McCarter, chairman.
ADDRESS—"Evils of Government Ownership," Hon Jonathan Bourne, Jr.
Reports of Committees (Continued):
  Operation of Motor Vehicles—B. I. Budd, chairman.
  AERA Advisory — H. C. Donecker, chairman.
  Insurance—H. J. Davies, chairman.
  Standards for Car Loading—S. W. Huff, chairman.

Program for Thursday

Reports of Committees:
  (a) Cost of Passenger Transportation Service—including Report of Bureau of Fare Research—J. D. Mortimer, chairman.
ADDRESS—"The Foundation Principles of the Valuation of Electric Railways," Bion J. Arnold.
  General Discussion.
Reports of Committees (Continued):
  Taxation Matters—T. W. Wilson, chairman.
  On Recommendations contained in President's Address.
  Resolutions.
  Nominations.
Unfinished Business.
Election and Installation of Officers.

Program for Friday

Presentation of bronze plaque by C. C. Moore, president Panama-Pacific International Exposition, to C. Loomis Allen, president American Electric Railway Association, followed by an address on "The Development of the Electric Railway," by James H. McGraw.

Sixty-seven committeees appointed by the five associations have held seventy meetings during the year. During the year eighty companies sent in 17,227 reports to the Hooper-Holmes Information Bureau and the bureau returned reports on 2135 names.

After the acceptance of the report President Allen announced as members of the convention committee on resolutions C. S. Sergeant, Boston Elevated Railway; J. J. Stanley, Cleveland Railway, and Jesse W. Lilienthal, United Railroads of San Francisco.

On motion of Mr. Henry, naming the following committee on recommendations contained in the president's address, the convention confirmed the nomination of A. W. Brady, Union Traction Company of Indiana; T. N. McCarter, Public Service Railway; E. W. Rice, General Electric Company; Guy E. Tripp, Westinghouse Electric & Manufacturing Company, and Gen. George H. Harries, Omaha Electric & Power Company.

C. L. Henry then read the report of the committee on subjects, including the mid-winter meeting program, which the committee had arranged, and stating that the San Francisco program had been prepared after several meetings. The report was signed by the chairman and M. C. Brush, H. C. Clark, L. P. Crecelius, R. E. Danforth, C. S. Mitchell and William Tichenor.

In the absence of chairman H. H. Norris, ELECTRIC RAILWAY JOURNAL, President Allen commended to the attention of members the printed report of the committee on education. In its report the committee explained that the courses for shop, power-house, line and track men, approved last year by the association, had been inaugurated, and that on July 1, 1915, the following number of students were engaged in the courses mentioned: Electrical shop courses, thirty; mechanical shop course, six; combined mechanical and electrical course, twelve; line and track-work course, six; power-house and substation course, forty-one, and combined line and track-work, and power-house and substation course, four. Employees of forty-four electric railway companies are represented in the enrollment. The committee pointed out the limitations of correspondence construction, warning students against expecting too much from it, but pointing out how gratifying results can be achieved.

The report was signed by H. H. Norris, chairman; H. A. Bullock, Martin Schreiber, W. L. Robb, A. M. Buck and V. Karapetoff.

The report of the committee representing the association at the American good roads congress was not read at the appointed place on the program but an abstract will be found later in this report.

VALUATION

The report of the committee on valuation was read by C. S. Sergeant. In the report the committee recognized the general dissatisfaction with the existing methods of valuing public utilities, the diversity of opinion among public service commissions and the lack of consistency in the decisions of state and federal courts. To establish a set of sound and defensible principles out of this mass of conflicting opinions will require a vast amount of painstaking labor in the accumulation and critical examination of the material for the purpose of determining whether principles can be evolved which have not heretofore governed the consideration of this question. This will require the work of a specialist and necessarily a fund to carry on such work. It would be advisable to have the report of the specialist critically examined, not only by the members of the committee, but by the representatives of utilities not represented on the committee, in order that all viewpoints may be considered. The committee recommends a preliminary appropriation of $500 to create a fund for starting the work. Outside contributions could be obtained for carrying the work to a conclusion.

The committee has made arrangements for the publication of a complete and up-to-date bibliography on the subject of valuations for distribution to member companies, the funds for such work having been appropriated by the executive committee at its last meeting.

The committee's report was signed by L. S. Storrs, chairman; H. H. Crowell, Gerhard Dahl, C. S. Sargent, W. H. Sawyer, J. N. Shannahan, Martin Schreiber, B. E. Tilton and C. G. Young.

Secretary Burritt next read the report of the national joint committee on overhead and underground line construction, which is abstracted briefly below:

As the accredited representative of the American Association on the national joint committee on overhead and underground line construction, W. J. Harvie reported that eight meetings had been held and that the following standing sub-committees had been appointed: On underground and undergrade crossings; on electric wires over electric railway tracks; on trolley contact wire crossings; on structural works; on insulation; on conductors, and on clearances. The meetings have been largely attended and, as the committee is large, a committee on plan and scope was appointed to direct and co-ordinate the work of the sub-committees. The sub-committees are now actively engaged in a study of the newly-suggested specifications for wire crossings for public utilities, produced by a committee representing the different classes of utilities in interests of the State of Pennsylvania, and recommended to the Public Service Commission of that State by that committee for adoption.

Jesse W. Lilienthal, whose address on welfare work was the notable feature of the day, was then introduced by President Allen. An abstract of this address appears earlier in this issue. As his address closed, Mr. Lilienthal was greeted with an outburst of the warmest applause, which was continued until he was obliged to rise in acknowledgment. President Allen then called upon James H. McGraw, ELECTRIC RAILWAY JOURNAL, to lead the discussion.

Mr. McGraw who, like the others present, had not had an opportunity to read the paper in advance and had not expected to be called upon to discuss it, said that no offhand statement could give adequate expression to what he felt regarding the paper read by Mr. Lilienthal. It was not a mere statement of welfare work, not a mere statement of personal experience covering two years as president of this great property. The address, said Mr. McGraw, points the way, it goes to the heart of the greatest problems confronting the electric railways. Their problems to-day are serious and many, from many angles more serious than ever before. It has been said that no public utility can permanently succeed so long as it has the public sentiment of its community against it. Mr. McGraw dwelt upon Mr. Lilienthal's code advising the telling of the whole story honestly and fairly. The electric railway properties, he said, should and must be saved. They can only be saved through the proper winning of public support. He believes, as all do who have given this subject of public relations some thought, that public approval can be won. He predicts that the method adopted by Mr. Lilienthal in San Francisco will win out so that public sentiment in the city, which has been so bitter and so hostile toward the electric railway corporation, will come around and the public will thank it for what it has been doing and the way in which it has been doing it.

Gen. George H. Harries was next called upon to discuss the paper and said there was no question as to the accuracy of reasoning set forth with uncommon clearness and a frankness for which all should be grateful. Thanks to the continued preaching of a few faithful apostles, the policy of open and frank discussion has been welcomed in the association meetings, as an example of the possibility of winning public approval to this policy of actively seeking to educate the public to a knowledge of the companies' position. He cited a personal experience with a property which had been managed in the old-fashioned way, quoting the proverb of the British army to the effect that an Afghan properly attacked is less formidable than an Afghan attacking and said, there is nothing in being afraid of your community.

He had taken the sting out of an editorial accusing the company of being in politics by printing a vigorous statement of its impartiality and lack of interest in politics, in paid advertisements in all the newspapers, including the one running the editorial. The Business-men's Association is now conducting, through a committee with the assistance of expert investigators, a study to determine the cash cost of the property from the beginning and will next consider with expert assistance the question of a fair return on the investment. General Harries said that this property will ultimately have peace and a square deal. Absolute honesty and frankness based on a desire to serve will win.

Chairman James E. Gibson presented the report of the committee on company membership. In its statement the committee merely reported briefly upon its activities during the year in securing additional company members for the association. The report stated that fifteen companies had joined during the year, and that those still remaining outside of the Association are all small companies, and it is probable that they will gradually be absorbed into membership.

The report was signed by James E. Gibson, chairman; J. J. Caufield, C. S. Ching, F. W. Hild, George L. Radcliffe, Samuel Riddle, M. S. Sloan and R. W. Spofford.

FEDERAL RELATIONS

General Harries then read the report of the federal relations committee. The report first called attention to the fact that the various measures which were strongly urged during the previous year and occupied much of the time of the committee were scarcely heard of during the past year. It cannot be assumed that these measures have been permanently abandoned, but doubtless Congress will be slow to enact legislation which will add to the embarrassments and burdens of carriers in these unusual times. The committee, however, referred to the Cummins act, approved on March 14, 1915, providing that the shipper of baggage and other merchandise shall state in writing the value of the goods. While this act was aimed primarily at steam railroads it is also of interest to the electric carriers.

The committee's report also contained an extended reference to the hearing held by the Interstate Commerce Commission on Dec. 18, 1914, at the request of the association in regard to reporting by electric carriers of purely urban accidents and the decision of the commission that such accidents need not be reported. Thus far the Interstate Commerce Commission has not taken up the valuation of the electric lines. The committee finally urged the importance of securing recognition by Congress and the Interstate Commerce Commission of substantial differences between electric and steam railways. When federal legislation affecting carriers is proposed, the operation of steam railroads is ordinarily in mind, but there is always danger that the wording of the act will include electric lines as well.

The report was signed by A. W. Brady, chairman; F. W. Brooks, L. S. Cass, E. G. Connette, H. H. Crowell, Frank R. Ford, E. C. Foster, George H. Harries, Paul Shoup, L. S. Storrs and J. T. Wessels.

The company section gold medal was next awarded to J. N. Bury, local superintendent Manila Electric Railroad & Light Company, and George G. Whitney, Washington Railway & Electric Company, Washington, D. C., received honorable mention.

Before closing the session President Allen announced the appointment of R. I. Todd, Indianapolis Traction & Terminal Company, Indianapolis, Ind.; L. C. Bradley, Birmingham Railway, Light & Power Company, Birmingham, Ala., and Gen. George H. Harries as a committee on nominations. The two committee reports remaining on the morning's program were put over for early attention on Wednesday.

Wednesday Morning Session

At the American Association held Wednesday morning, Oct. 6, 1914, the first business was the presentation of the report of the committee on the Anthony N. Brady medal, by C. S. Sergeant. This report recommended a few slight changes in the conditions of competition for the medal.

The report of the committee on compensation for carrying United States mail was then read by W. H. Collins, Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.; and on the president's recommendation the convention moved a vote of thanks for the courteous consideration given the committee by Senators Bourne, Weeks and Bankhead. An abstract of this report follows:

COMPENSATION FOR CARRYING UNITED STATES MAIL

The report of the committee on compensation for carrying United States mail consisted of a résumé of its activities during the year. In pursuance of the work begun under the preceding committee, data sheets were sent out early in October, 1914, by the bureau of fare research, to which was delegated the work of compiling and preparing the needed detailed information. The results of the analysis handed to Senator Bourne, chairman joint Congressional committee, on Nov. 11, 1914, included the following material:

1. Letter of transmittal, containing draft of proposed bill and Exhibit I, showing mail revenue together with operating revenues, expenses and taxes, and car-miles for all companies rendering full and compartment car service.

2. Exhibits II and III, consisting of an itemized study of costs as prepared by the Boston Elevated Railway and the Omaha & Council Bluffs Street Railway.

3. Exhibits IV and V, consisting of a copy of a previous communication to the Hon. John A. Moon, chairman of the House committee on post-offices and post roads (dated Dec. 11, 1913).

After Nov. 11, 1914, a large amount of additional information was furnished to the joint Congressional committee, and a second conference was held in Washington on Nov. 30, 1914, at which a tentative draft of a bill prepared by the joint Congressional committee was presented and discussed. This bill was further analyzed and criticised in a letter to Senator Bourne, dated Dec. 2, 1914, and substitute provisions were therein proposed.

Prior to expiring on Dec. 1, 1914, the joint committee presented to Congress on Nov. 30, 1914, a preliminary report, reading in part as follows:

"Early in our investigation hearings were granted to representatives of electric lines, but we found that conditions applicable to transportation over steam roads and over electric and cable car routes were so entirely different as to necessitate independent investigation and reports. Since our report of Aug. 31, 1914, we have devoted our attention to the matter of transportation over electric and cable car routes and have collected a vast amount of data and worked out a tentative plan. We find that the time has been insufficient to verify the data collected and to satisfy ourselves of the desirability of the tentative plan evolved. * * * Should Congress desire the electric and cable mail pay study completed it will be necessary to extend the life of our joint committee. In such event, we respectfully recommend that the time for submission of our final report be extended from Dec. 1, 1914, to on or before April 1, 1916."

The life of the joint committee, however, was not extended and it expired on Dec. 1, 1914. Pending developments concerning the continuance of this committee, a bill has been prepared embodying the results of the studies which had been made. It was planned in case the committee was not continued to have this bill introduced in Congress by one of the members of Senator Bourne's committee, as representing, although of necessity unofficially, the conclusions reached by the joint committee. It appeared later that this was not feasible, and under date of Jan. 11, 1915, Henry S. Lyons for the A. E. R. A. committee submitted to Senator John W. Weeks of the Senate post-office committee certain amendments to the post-office bill, H. R. 19,906, the adoption of which would not have placed the handling of United States mail by electric lines on a remunerative basis, but would have helped to lessen the loss which the present basis of pay constantly entails. At the same time there was submitted to Senator Weeks by the bureau of fare research certain desired information, together with a copy of a proposed bill approved by the A. E. R. A. committee, authorizing and directing the Postmaster-General to adjust the compensation to be paid electric and cable car companies for the transportation of mail. A conference was held in Washington on Jan. 29, 1915, which availed nothing and Congress adjourned without affording the electric railways relief.

Since that time the activities of the A. E. R. A. committee were confined to the giving of such assistance as possible to individual companies in their efforts to have their compensation for carrying United States mail placed by the Postmaster-General on a less unsatisfactory basis. There is said to be hope for ultimate success along the lines on which it has been working, and it is recommended that provision be made for further prosecution of the work.

The report was signed by A. R. Piper, chairman; W. H. Collins, P. N. Jones, H. S. Lyons, J. K. Choate, T. C. Cherry and H. A. Nicholl.

Next the association received and accepted with businesslike dispatch the reports of the committees on electrolysis and ways and means, read by the secretary, on company sections and individual membership, read by E. J. Blair, Chicago Elevated Railways, on dues of company section members, read by W. F. Ham, Washington Railway & Electric Company, Washington, D. C., on changes in constitution and by-laws, read by R. I. Todd, Indianapolis Traction & Terminal Company and on relation with state and sectional associations. These reports are abstracted below.

ELECTROLYSIS

The American Association committee on electrolysis stated that it has stood ready to act upon any matters which might properly come before it, but has felt that it could best accomplish the purposes for which it was appointed by keeping in touch with the activities of a similar committee of the Engineering Association and with the association delegates to the joint national committee to consider electrolysis. The joint national committee is making satisfactory though slow progress in harmonizing the various interests, while engineering and technical questions were understood by the committee to be under study by the Engineering Association committee on electrolysis. The continuation of the American Association committee was recommended. This report was signed by Calvert Townley, chairman; R. P. Stevens and L. E. Woodbridge.

WAYS AND MEANS

The committee on ways and means of the American Association reported that at the 1914 convention there was approved an amendment to the constitution and by-laws by which the dues of the company members of the association were increased from a minimum of $15 and a maximum of $600 to a minimum of $25 and a maximum of $750. The new scale became effective as of the fiscal year 1915, during a period of great financial depression which has seriously affected the revenues of the railroads throughout the country. Despite this, however, the member companies accepted the new scale with barely a word of complaint, thus manifesting not alone that they were satisfied that the increase was a necessity but also that they were convinced that the returns justified the additional expenditure.

The substantial character of the returns to the association from company members under the new arrangement is shown by the fact that during the entire year, ended Sept. 30, 1914, the receipts from company annual dues amounted to $38,328, whereas up to Sept. 13 of this year the total of dues from company members was $51,806, an increase of $13,478 or 35 per cent, with seventeen days of September, 1915, remaining in which to obtain additional collections.

The resignations during the year owing to dissatisfaction with the increased dues were, without exception, from companies paying comparatively small amounts of dues, the highest paid under the old scale by any one of these companies having been $100. The total number of companies withdrawing on this account was twelve, the total amount of money involved, on the basis of the new scale being $900. The total number of companies withdrawing during the year was thirty-five, which, on the basis of the new scale of dues means a loss to the association of $2,675, this, of course, including the amount which would have accrued from companies which resigned because of the institution of the new scale. Another very satisfactory condition is the small number of delinquent member companies on Sept. 13, 1915, these totalling but twenty-one, with a maximum amount of dues involved of $1,775.

The individual membership, while showing no increase in the net, should be considered as satisfactory, inasmuch as during the year between 600 and 700 new members were enrolled, which would have brought about a substantial increase in the total had it not been for the loss of Manufacturers' Association members because of their failure to attend the San Francisco convention.

The bureau of fare research has been maintained throughout the year and data of permanent usefulness have been developed by its director. It was the understanding that the association would appropriate $2,500 per year toward the maintenance of this bureau and that the balance, up to a maximum of $5,000, would be contributed by various member companies. The members of the committee on the cost of passenger transportation service have already contributed $2,000 toward the cost of the bureau, but it has not been thought wise to ask for contributions from the members generally in view of the fact that the receipts of many of the companies have shown serious reductions in the past year. It is expected, however, that the committee on the cost of passenger transportation service will underwrite the bureau to some further extent so that, if possible, the resources of the association will not be drawn upon for anything more than the total amount originally set aside for the maintenance of the bureau.

The ways and means committee indorses the proposal to reduce the dues of members of company sections. This would undoubtedly result in material increases in the individual membership of the association, as well as broadening substantially the scope of its influence. The recommendation contemplates the distribution only of the magazine *Aera* to such members, therefore reducing the expense to the association, though not altogether proportionately to the reduction in dues from $5 to $2. The increased membership, however, will readily compensate for this reduced fee.

Measures of economy have been practised during the year just closed, the most obvious of which is the removal of the headquarters of the association from the United Engineering Societies' Building to the building at 8 West Fortieth Street, New York City. This change brought about a gratifying reduction in the amount of rent per year and in addition provides a more convenient and advantageous layout of space for the headquarters officers.

The report was signed by J. H. Pardee, chairman; H. C. Clark and H. C. Donecker.

COMPANY SECTIONS AND INDIVIDUAL MEMBERSHIP

The American Association committee on company sections and individual membership reported that the membership of the association has been increased during the year to approximately 3700 and that the list of company sections has been increased by the addition of the Chicago Elevated Railway Company section, No. 6, which, beginning on April 17 with 139 members, has increased its membership to 178. A number of companies are interested in the formation of sections. The committee issued during the year a pamphlet explaining the advantages of company section work. The committee indorsed the recommendation of the special committee on company section dues, stating that the proposed lowering of the dues would remove the objections of a large number of railway employees to affiliation with the association.

The report was signed by Martin Schreiber, chairman; E. J. Blair, H. A. Bullock, B. C. Edgar, H. H. Norris, R. P. Stevens and G. G. Whitney.

DUES OF MEMBERS OF COMPANY SECTIONS

The American Association committee appointed to consider the matter of dues paid by members of local company sections, recommended the creation of a class of membership to be known as company section members to which any employee of a member company shall be eligible. It was recommended further that the dues should be $2 per year, that each such member should receive a copy of the association magazine and that all members of sections should be entitled to vote for officers of company sections under the conditions prescribed by the section by-laws.

The committee pointed out that company section membership at the present dues will probably be limited to those employees who may be drawn from the supervisory force, or who by virtue of technical training feel that they are entitled to look forward to supervisory positions in the future. The present dues place membership beyond the reach of all but the better-salaried employees. Utility of membership in a company section is not appreciated by the ordinary run of mechanics and trainmen. Electric railway operation presents many problems, the control of which lies largely with the employee. One of the prime purposes which led to the inauguration of the company section movement was to give an opportunity for discussing these problems, and this requires that the membership be drawn liberally from all departments and occupations in the employer companies. The committee did not believe that subsidies in the form of payment of parts of annual dues for employees would solve the problem, but they believe that a reduction in the dues as recommended would do so.

CHANGES IN CONSTITUTION AND BY-LAWS

The committee on changes in the constitution and by-laws of the American Association recommended the changes necessary to provide for a new grade of members to be known as company section members, as recommended by the special committee appointed to consider the matter of dues of individual members who are members of company sections, and to permit revision of the constitution and by-laws at special as well as regular meetings.

In place of specifying the publications which are to be received by company section members, the committee recommended that this be left to the discretion of the executive committee in order that these members might be furnished with as many publications as can be afforded. With the exception of the implied limitation as to the publications to be furnished to company section members, it was recommended that they have all the privileges of individual membership.

The purpose of the recommended changes as to amendments was to make it possible to amend the constitution and by-laws at the mid-year meeting. In order, however, to safeguard the by-laws, it was recommended that in all cases the same provision be made as previously existed in connection with changes in the constitution, namely, that a copy of the proposed amendment shall have been sent to each of the active members at least thirty days prior to the date of the meeting at which it is to be acted upon.

The report was signed by R. I. Todd, chairman; L. S. Storrs and E. B. Burritt.

RELATIONS WITH STATE AND SECTIONAL ASSOCIATIONS

At a meeting of the committee to consider relations with state and sectional associations on Jan. 11, 1915, it was decided to collect information concerning electric railway associations touching on the location, functions, affiliations, dues, costs, membership, etc., in order to determine, if possible, ways and means by which the expense to members of associations might be lessened and the duplication of work eliminated.

As a result of a consultation with T. C. Martin, executive secretary of the National Electric Light Association, concerning the working of that association in its geographical sections, the committee concluded that the plan maintained in that association is impracticable so far as the American Electric Railway Association and other electric railway associations are concerned. At this time there does not appear to be any feasible way of affiliating state and sectional organizations with the national association involving the matter of dues.

The committee suggested that the association arrange to insure the attendance at the annual meetings of representatives of the various associations so that the work of the year in different localities can be discussed. If the suggestions offered later are carried out, at subsequent conventions there will be better results as to attendance of association representatives at such meetings. It was further recommended that the executive committee of the American Association arrange to insure the attendance at the annual meetings of each state and sectional association of a representative of the American Association who will set forth the need for co-ordination of effort and explain the methods by which this may be brought about.

Another suggestion was that the committee on sectional associations be instructed to consider the development of standards to the end that matters of standard practices or equipment may develop ultimately through the American Association and thus avoid the adoption of a standard by a sectional association which is inconsistent with one already approved by the national association. If the electric railways of the country were a unit in pushing the adoption of a basic code of operating rules the advantages to this industry would be apparent.

The committee also recommended that there be instituted a plan by which the state associations will keep the national headquarters in touch with legislation in their respective districts. Laws of the utmost importance to railways are constantly being passed in the various states. The association headquarters could serve as a clearing house for information of this kind.

The report was signed by R. P. Stevens, chairman; H. C. Donecker, Patrick Dubee, Ernest Gonzenbach, J. F. Hamilton and C. L. S. Tingley.

The report of the committee on public relations was next read by Charles N. Black, United Railroads of San Francisco. It referred to the appointment of four subcommittees at the meeting held in New York on Jan. 25, 1915. On account of the illness of J. H. Pardee his sub-committee had been unable to meet, but the others have done considerable work. They have found, however, that the carrying out of their proposed plan on a large scale will require a fund larger than it has been possible for the association to provide out of its regular revenues. The committee recommended that its work be continued and that it receive an appropriation sufficient to enable it to do its work in a broad way.

The address on "The Evils of Government Ownership," prepared by former United States Senator Jonathan Bourne, Jr., was read by Charles L. Henry in the necessary absence of the writer. The address is given in full elsewhere in this issue. The convention passed a vote of thanks for the very able paper prepared by Mr. Bourne, following which A. H. Ford, Cumberland County Power & Light Company, Portland, Me., read the report of the committee on insurance abstracted below.

INSURANCE

The committee on insurance reported that data sheet 140, for 1914, calling for information in regard to insurance, fires, fire losses and fire-prevention equipment, was filled out and returned to the association by 160 companies. The combined reports showed the following data: Amount of insurance carried, $205,684,548; amount of premiums paid, $964,383; amount of fire losses, $202,512; amount recovered, $167,408; ratio of recoveries to losses, 82.6 per cent; premiums per $100 of insurance, 47 cents; losses per $100 of insurance, 10 cents; recoveries per $100 of insurance, 8 cents; ratio of losses to premiums, 21.3 per cent; ratio of recoveries to premiums, 17.35 per cent, and number of fires, 235. Table A attached to the committee's report shows these data by states. The committee expressed its regret that so few companies furnished the statistics called for. Compilations of the causes of fires and the classes of property damaged could not be made at all on account of lack of data. The committee appended to its report an index of all reports made to the American Association and the Engineering Association on the subjects of fire prevention and insurance and the discussions thereon. A similar table was made a part of last year's report, but was not printed in the proceedings.

The report was signed by H. J. Davies, chairman; E. J. Cook, A. H. Ford, F. A. Healy and F. J. Spaulding.

J. J. Reynolds, Boston Elevated Railway, read the report of the committee on the operation of motor vehicles, J. V. Sullivan, Chicago Surface Lines, that of the *Aera* advisory committee, and W. F. Ham, the report of the committee on standards for car loading, all of which were passed without discussion. Abstracts of these follow.

MOTOR-VEHICLE OPERATION

The report of the special committee on motor-vehicle operation to the American Electric Railway Association stated that in sixty cities reporting, the number of jitneys show varying decreases from 100 per cent to 19 per cent. Wherever the requirement of a reasonable bond or license is exacted, the immediate effect has been to decrease the number of vehicles operated. There has also been a decrease due to economic causes, irrespective of regulation, and where railway companies have tried the operation of the jitney, in spite of the efficient methods employed, it has been proved conclusively that the business is unprofitable, notwithstanding the fact that in these instances overhead or shop costs were absorbed in other operations of the companies.

Statistics covering 163 cities in which jitney buses are operated show that 112 of these cities have passed regulatory ordinances and that such measures are under consideration in fifteen other cities.

The committee again urged that railway companies should place before the public the fullest information in regard to the jitney. A quantity of data concerning the operation and regulation of the jitney has been collected by the secretary of the association and is on file for the use of member companies, and the widest use should be made of this material. Some companies have not as yet been confronted with the jitney problem, but the history of the movement shows that it may come upon them without warning, and it is especially important that they inform themselves, through the association's data, of the experience of other companies and by so doing be prepared to meet such situations as may arise.

It was recommended that the work of the committee be continued during the ensuing year, to consider among the other phases of the situation the following: (1) A study of the legal phases of ordinances and state laws regulating jitney traffic. (2) A compilation of rules adopted by public service commissions for the operation of jitney buses. (3) A study of the procedure of regulating commissions in granting applications for the right to operate jitney buses.

The committee recommended also that the association should at this time begin a thorough investigation of the motor bus (distinct from the type of automobile known as the jitney) as a feeder, auxiliary or competitor of electric railway traffic, and that a committee should be appointed to consider the subject.

The report was signed by Britton I. Budd, chairman; H. G. Bradlee, William A. House and C. L. S. Tingley.

THE ASSOCIATION MAGAZINE

The *Aera* advisory board directed attention to the fact that the magazine is now in its fourth year. It was founded for the purpose of furnishing a means of intercommunication among the members and a convenient means of reference, and to give permanency of record of the association work. Since its institution it has given monthly an authoritative and lasting account of the association's activities, has marked the progress of the tremendous volume of committee work conducted continuously, and has kept the members in close touch with plans for the future. It is a needed and dignified form of advertisement for the association, being the association's publicity *per se.*

The committee includes representatives from each of the affiliated and allied associations who are charged with the duty of developing interest among the different associations along their respective lines, such interest manifesting itself in contributed articles touching upon the work of the various departments. Despite the pronounced business depression during the year, a very satisfactory quota of advertising has been obtained and the committee expressed its appreciation of the work of Charles C. Pierce, representing the Manufacturers' Association, for what he had done in this direction. The committee believed that the current year would see the magazine nearly if not entirely self-supporting. The circulation is 5800 copies. Attention is drawn in the report to the change in typographical arrangements made during the year and particularly to the new cover design.

The report is signed by H. C. Donecker, chairman; E. H. Baker, J. K. Choate, J. H. Hanna, L. T. Hixson, C. G. Rice, J. V. Sullivan and C. B. Wells.

The American Association Committee on Standards for Car Loading stated that while there had been a number of responses to a request for data on standards for car loading it had proved impracticable to get these into form for presentation in time for the October meeting. The committee therefore requested that it be permitted to present its report at the mid-winter meeting of the association.

The Wednesday session ended with a statement by Gen. George H. Harries, Omaha Electric & Power Company, Omaha, Neb., of the value of the publication of the decisions of public service commissions begun the first of this year. He said that only fifty member companies had subscribed for the reports and urged that more companies take advantage of the service.

Following the session the members of the association attended an illustrated lecture on the methods of illumination employed at the exposition, by W. D'A. Ryan, illuminating engineer General Electric Company.

Thursday Morning Session

The first item on the program for Thursday, Oct. 7, 1915, was the presentation of the report of the committee on cost of passenger transportation service, which was read by Charles N. Black, United Railroads of San Francisco.

COST OF PASSENGER TRANSPORTATION SERVICE

In its report the committee directed attention to the report of the director of the bureau of fare research to the association, which covers the scope of the work performed by that bureau under the general direction of this committee. The committee states further that F. W. Doolittle, director of the bureau, has nearly completed the preparation of the monograph on "Studies in the Cost of Urban Transportation Service," the completion and printing of which could not be accomplished in time for submission to the convention. It should, however, be completed in time for distribution with the volume of current proceedings.

The committee recommended further that the work of the bureau of fare research be discontinued upon completion of that now in hand and revised when funds for the support of the bureau become more readily obtainable.

The report of the committee was signed by James D. Mortimer, chairman; Charles N. Black, Henry D. Bradlee, Thomas N. McCarter and Paul Shoup.

An outline of the monograph mentioned above is given below.

STUDIES IN COST OF URBAN TRANSPORTATION SERVICE

PREFACE

PART I. THE OCCASION FOR COST OF SERVICE

CHAPTER 1. CREATING THE STREET RAILWAY

Introduction. Obtaining of franchises. Promotion expenses. Financing the enterprise. Cost of change of motive power. Expenses incurred in consolidation. Receivership. Unproductive capital expenditures. Influence of capital investment on cost.

CHAPTER 2. THE STREET RAILWAY AS A GOING CONCERN

What creating and operating the going concern contributes to cost. Organization of the corporation. Organization of the traction utility. The work of the transportation department. Rolling stock department. Way and structures department. Purchasing and stores department. Accounting department. Legal department. Employees' welfare. Work of safeguarding the public.

PART II. ELEMENTS OF COST

CHAPTER 3. THE ANATOMY OF THE 5-CENT FARE

Proportionate division of 5-cent fare. Street railways of United States, 1912, 1907 and 1902. Typical urban surface railways. Elevated and subway. Proportionate division of labor, material and expense. The street car nickel and the jitney nickel. Proportionate division of fixed and variable costs. Proportionate division of terminal and movement cost. Proportionate division of revenues and expenses throughout day.

CHAPTER 4. TENDENCY OF OPERATING COSTS

Growth of the industry. Increase of service furnished due to area served and consolidation. Increased length of ride for the single fare. Decrease in receipts per passenger due to increased use of transfers. Effect of changes in speed, change of equipment and frequency of service on cost. Increase of municipal requirements. Increase in unproductive investment. The decreased purchasing power of the 5-cent fare as compared with the general increase in the cost of money, labor and material. General conclusions.

CHAPTER 5. UTILITY CAPITAL AND ITS REPLACEMENT

Relation of utility capital to cost of service. Purposes of valuation of street railway property. Sale, taxation, basis of reasonableness of public requirements, condemnation. Theories: market value, sacrifice and equivalent agency. Methods: security values, book values, reproduction estimates, appreciation and depreciation, going value. Replacement of utility capital: adequacy of provisions for insuring replacement, inadequacy of statistical data, theories of measurement of replacement insurance reserves.

CHAPTER 6. ACTUAL RETURNS IN THE TRACTION BUSINESS

Relation of reasonable return to cost of service. Actual returns upon various theories of value. Factors determining the reasonableness of returns in the traction business.

CHAPTER 7. UNITS OF COMPARISON

Unreliability of the single unit of comparison; adaptability of specific units to general analysis. Use of units of comparison in cost analyses. Practical limitations of accounting classifications and statistical data. Fixed and variable expenses, treatment of specific accounts. Typical schedule of apportionment. Technical notes on statistical processes to determine functional relation between units of comparison and operating cost items.

PART III. ELEMENTS OF SERVICE

CHAPTER 8. TRAFFIC CHARACTERISTICS

Peculiarities of the public demand for service. Typical traffic characteristics. Use of models. Statistical measurement of traffic variation. Effect of variations on loading. Difficulty of estimating service required. Seat-miles and passenger-miles. Controlling factors in the plan of study to be adopted.

Chapter 9. Traffic Surveys

Function of the organization. Field work. Office work. Supervision. Type of organization. Purpose of survey.

Chapter 10. Traffic Observations

Frequency and regularity of collection of data. Preliminary work. Length of period of observation. Data to be taken on field. Loading estimates. Data to be recorded. Recording data.

Chapter 11. The Application of Traffic Data

The determining factors in schedule making. Minimum headway. Meeting points. Use of trippers. Traffic requirements. Transition period. Short routing. Other considerations. Average length of ride. Average length of ride of standing passenger. Traffic data in service cases. Frequency of heavy loads. Factors affecting ratio of seats to passengers. Factors affecting determination of standard of loading. Relation of maximum to average loading. Instantaneous ratios not significant. Necessary factors in loading rules. Permissible variation from normal service.

Chapter 12. Prescribed Standards of Service

Regulation of service. Methods of defining adequate service. Prescribed standards: New York, Milwaukee, St. Louis. Variation in prescribed standards. Recommended standards: Chicago, Philadelphia, St. Louis, Pittsburgh, San Francisco, Kansas City, Providence, Cincinnati, Winnipeg. Difficulty in formulating standards. Diversity. Car capacities. Variation of passenger demand. Cost of service. General conclusions.

Chapter 13. Psychological Aspects of Street Railway Service

Importance of the psychological aspects of car service. Results of tests in Cleveland and Milwaukee as to impressions of actual and reasonable headway, comfortable load, rate of fare and service. Definition of satisfactory service. Satisfaction with service. Impressions of courtesy of conductors, route and destination signs, transfers, reasonable walking distance, trail and center-entrance cars, service in other cities. Conclusions.

PART IV. SPECIAL PROBLEMS

Chapter 14. The Paying Haul—Cost of Extending Fare Limits and Lines

Effect of expansion of cities on area served for single fare. Relation of extensions of passenger haul to other service and cost. Methods proposed for determining paying haul. Ford "car-mile" formula. Bradlee "car-haul" formula. "Load factor" formula of C. N. Duffy. Typical problems analyzed: (1) Cost of extending single-fare point into second-fare zone; (2) cost of extending existing line by construction. Determination of paying haul upon passenger-haul or car-haul basis.

Chapter 15. The Paying Haul—Cost of Service and the Zone System of Fares

The American system of flat rates for urban passenger transportation service. Reasons for adoption. Advantages and disadvantages. Recent progress away from flat rates. Factors opposed to and favorable to change. Zone system of fares: advantages and disadvantages. Cost factors involved in construction of zone system of fares: necessary information, basis apportionment of cost. Typical problem analyzed.

Chapter 16. Cost of Complying with Service Standards

Effect on cost of variation of number of car-hours required under service standards at various periods during the day. Index of concentration of service as a function of cost. Typical problem analyzed: (1) analysis of cost of service during various hours of the day; (2) effect on cost of increase of rush-hour service; (3) effect of uniform service throughout twenty-four hours. Comparison of cost per car-hour and return on investment during various periods of the day under above conditions.

Chapter 17. Cost of Extending the Transfer Privilege

Growth of the transfer privilege and effect on revenues and cost of service. Causes of development of transfer ratio: advantages and disadvantages of free transfers. Typical problem analyzed: effect on revenues, diversion of traffic from old to new routes, possibility of fraud, influence on riding habit, increase of number of rides on cost.

Chapter 18. Cost of Competing Forms of Transportation

Influence of transportation on city growth. Effect of competing transportation agencies on cost of service. Forms of transportation developed in American cities: walking, private conveyance, public conveyance. Field of competition as limited by cost to individual, cost to community, comparative service and costs of jitney and street railway.

Chapter 19. Effect of Rate of Fare on Riding Habit

Public interest in rate of fare. Purposes of studies of riding habit. Factors affecting riding habit: facilities, topographical conditions, climatic condition, temperamental characteristics, competitive facilities, special conditions. Experience of various cities. Increase in riding habit with increase in population. Technical notes on statistical processes to determine degree of correlation of riding habit and rate of fare.

Chapter 20. The Problem of Rapid Transit

Time as a factor in transportation. Comparison of transit facilities in other cities. Unwarranted conclusions. Cost factors of rapid transit systems. Necessary traffic density. Comparison with cost of operation with surface lines. Suggestions for improvement of present surface traction facilities: skip stops, trail-car operation, traffic regulations and routing.

PART V. REGULATION AND THE COST OF SERVICE

Chapter 21. Regulation and the Cost of Service

Cost and value of service theories. Considerations which have made cost of service a controlling question in rate regulation. The cost of service theory and efficient management. Importance of cost of service in the two types of regulation: regulation by contract and continuous regulation.

Chapter 22. The Cleveland Experiment. Events Preceding the Tayler Ordinance.

First proposals of Tom L. Johnson in 1903. Results of trial of 3-cent and 4-cent fares. Status of competitive franchises and in the courts. The "holding company" plan. Rejection of proposals for renewal of existing franchises after arbitration. Joint use by competing companies of track to public square. Abandonment of Central Avenue line. The "curative ordinance." Mayoralty campaign of 1907. Further efforts for a "holding company." Neutral railway company. The "security franchise." Lease of property to municipal traction company. The beginning of 3-cent fare. The Schmidt street railway law. Defeat of "security franchise" on referendum. Receivership of Municipal Traction Company. Increase in fares under receivership. Preliminary proposals for a settlement franchise. More efforts at competition. Arbitration. The mayoralty campaign of 1909. Decision of Judge Tayler.

Chapter 23. The Cleveland Experiment (Continued). The Tayler Ordinance and Defects in Its Operation as Disclosed at Arbitration

The provisions of the Tayler ordinance. Difficulties during first period of operation. Amendments of July 14, 1911. Changes in rate of fare. Events preceding arbitration. Defects of plan based on allowances. Issues presented at arbitration. Difference between interest fund and corporate surplus. Deficiencies in allowance for maintenance, depreciation and renewals. Deficiencies in allowance for operation. Findings of arbitrators on allowances. Status of sundry reserves under the ordinance. Legal right of company to overexpend allowances. General conclusions drawn from facts presented at arbitration.

Chapter 24. The Cleveland Experiment (continued). Efforts Since Arbitration to Reduce Cost of Operation to Permit Continuation of Low Fares

Termination of lines in center of city. Designated stops. Increased schedule speed. Decreased accident hazard. Policy with respect to extension of lines. Paving costs. Control of traffic. Short-routing.

Chapter 25. The Cleveland Experiment (continued). Service Rendered Under Ordinance Regulation

Factors affecting service. Density of traffic. Short-routing. Type of district served. Types of rolling stock. Loading and collection practice. Car movement as assisted by skip stops, trailer cars, near-side stops, traffic ordinances. Transfer points. Car loading. Basis of investigation. Measurements of service as compared with standards applied elsewhere. Length of ride. Riding habit. Psychological factors in measuring service. General conclusions.

Chapter 26. The Cleveland Experiment (continued). Actual Cost of Service Under Ordinance Regulation

Financial results for two ordinance years ended Feb. 28, 1915. Deficiency in allowances under the ordinance. Lack of provision for depreciation. Analysis of balance sheet of Dec. 31, 1914. Unit costs of service. Paying haul. Cost of increasing service to Wisconsin and Chicago standards. Conclusions.

Chapter 27. The Milwaukee Experiment. Events Preceding the Railroad Commission of Wisconsin Decisions of Aug. 23, 1912

Agitation for 4-cent fare in 1896. Determination of reasonableness of ordinance by United States Circuit Court. Early adjudications of value and cost. The 1900 franchise. Railroad commission law of 1905. Agitation for 3-cent fare in 1906. Audits and appraisals. Testimony on cost

Chapter 28. The Milwaukee Experiment (continued). The Decision of Aug. 23, 1912, and Its Rescission Jan. 30, 1915

Synopsis of decision on reasonableness of rates of fare. Cost factors determining reasonableness, joint costs of urban, suburban and interurban service, basis of valuation, depreciation allowances, and rate of return. Appeal on contractual nature of 1900 franchise. Events preceding the Woehsner appeal. Cost calculations for succeeding years. Synopsis of rescinding decision of Jan. 30, 1915. Withdrawal of appeal by city.

Chapter 29. The Milwaukee Experiment (concluded). Cost of Service and Decisions on Line Extensions, Zone Systems, Transfers and Service Requirements

Commission's cost basis of extending fare limits. Events preceding order of zone system of fares. Synopsis of Commission's order. Cost factors in orders extending transfer privilege. Service standards: description of factors affecting service in Milwaukee: synopsis of Commission's orders on service, cost factors and service standards; experiments of short-routing and skip-stop practice. Conclusions.

FOUNDATION PRINCIPLES OF VALUATION

The address on the above topic was then read in extended abstract by the author. An abstract of this address is printed elsewhere in this issue of the Electric Railway Journal. A supplementary abstract will appear in a later issue. The speaker was listened to with close attention and he was warmly applauded at the close. A vigorous discussion followed.

Prof. C. L. Cory, Dean of the College of Mechanical and Electrical Engineering University of California, was called upon to open the discussion. He stated his agreement with, and emphasized the significance of the fundamental features of Mr. Arnold's statements. The importance of fully understanding that a property may have different values to be used for different purposes he considered to be very great. He gave a closely-reasoned statement pointing out that a community should protect the downtown traffic of the electric railway company. His argument was based upon a statement which formed an underlying feature of Mr. Arnold's paper. This was to the effect that it does not make any difference who owns the street railway system, but the service is all important. The public must be served for all time, hence the investment must be perpetuated. As soon as one begins to think that the investment may be depreciated, it follows that service must deteriorate. The greatest economic result is obtained when the best service is given at the lowest cost that gives a fair return on the time, money and brains invested. A depreciation fund invested in extensions is better for the community than a sinking fund. By way of illustration Professor Cory stated that he is familiar with a large property on the Pacific Coast which has made extensions amounting to 50 per cent of its entire property in five years, when it would have been unable to obtain all of the money for these extensions on reasonable terms through investment bankers. He said that there is another important point, the importance of which professors of political economy do not always realize. This is the social side of the problem. He mentioned the development of numerous attractive suburbs resulting from a uniform fare and believed that a suburban fare varied according to mileage is against the common good.

In this connection he asserted that it is quite impossible for a railway of the ordinary kind to maintain its investment if the public allows any economic change to come about which will rob that system of its exclusive enjoyment of the downtown business. If some other transportation system takes the cream of the downtown business, the fares to the suburbs must be greater. Such a plan is against the common good. It makes no difference in this respect whether the investment is made by a municipality or by a private company. Regarding the question of divorcing urban and interurban lines, which Mr. Arnold had discussed under the head of severance, as an item which must be considered in value, Professor Cory cited a recent case in a city of the Northwest which is the center of what is popularly termed "an empire served by a unified urban and interurban system." There was an investigation of the possibility of divorcing the urban and the metropolitan system, and after careful study it became apparent to the public and the city authorities that a separation would cause the public to suffer. As level streets and good paving shortly made the municipality a favorable field for jitney buzzards, the city had no great desire for the local business and the lack of necessity for readjustment stood as a demonstrated fact.

C. E. Grunsky, president American Engineering Corporation, San Francisco, read in discussion a carefully-prepared statement which he opened by agreeing with Mr. Arnold's statement in regard to the unfortunate results to owners from the invention by somebody of the word "depreciation." Depreciation has nothing in common with amortization except that the current lessening of worth which the word denotes has been made a measure of the rate at which capital should be amortized. Any writing off of the depreciation when a rate base is to be established is fundamentally wrong.

Mr. Grunsky did not favor land appreciation in valuation, although it has been forced upon engineers and accountants who have been put to it to find some fair way to protect owners against unreasonable handling of depreciation. He protested strongly against the assumption that because depreciation exists the service lessens in value, or that capital has been amortized because a certain amount of depreciation has accrued. In other words, the amortization of capital is a matter apart from depreciation and it is unfortunate that the loose use of terms has led the courts and some of the public service commissioners into error. Early losses are not elements of value but should be taken into account when a rate is being determined so that the owner may receive protection. On the theory of unlimited life no change in efficiency is to be assumed. Lessening of worth of any shares should have no bearing upon the charge for the service rendered. The San Francisco Municipal Railways, although pointed to now as a financial success, have not yet stood the test of the cessation of exposition traffic and nothing is said of the added burden on passengers who can no longer travel where they wish on a single fare or of the burden upon the competing company. In conclusion, he agreed with, and emphasized the importance of Mr. Arnold's statement on necessity for an arrangement which would give both flexibility and reward for efficient service.

General Harries referred to Mr. Arnold's paper in an appreciative way, saying that it might be taken by member companies as a safe and sure guide prepared in the form of a text-book. Commenting upon the unfair competition with electric railways that has recently developed, he pointed out that though it may endure for a time in violation of the fundamentals of honest policy it was, because of that violation, predestined to certain failure. Mr. Crecelius explained that the subject matter of Mr. Arnold's paper has long been under consideration by the association, and that there has been a strong sentiment in favor of preparing a suitable property ledger.

TAXATION MATTERS

The report of the committee on taxation matters was next received and filed. This report directed the attention of the association to changes in tax laws affecting street railways as reported by the following States: California, Connecticut, Maryland, Oregon, Pennsylvania, Rhode Island and Virginia. The most important of these follow. In California Senate amendment No. 38 (Chapter 46) will be presented to the voters at a special election on Oct. 26, 1915. The amendment abolishes the State Board of Equalization and substitutes therefor a Tax Commission, but does not provide in any way for the appointment of the Tax Commission or for the number of members of same. The provisions of this amendment are very broad and can be construed to mean that the Legislature, at each biennial meeting, can define that certain classes of property can be assessed solely for State purposes or otherwise. Another bill in this State provides that a fund of $75,000 be appropriated to investigate and report upon the existing matters of revenue and taxation.

TABLE I.—TAXES PAID BY ELECTRIC RAILWAY COMPANIES OVER A PERIOD OF YEARS

Year	Operating Railway Revenue	Taxes	Taxes Percentage of Operating Railway Revenue
1902............	$247,553,999	$13,078,899	5.28
1907............	418,187,858	19,755,602	4.27
1912............	567,511,704	35,027,965	6.26
1914............	308,579,255	21,583,158	7.00

Figures for 1902, 1907 and 1912 from United States Bureau of Census—for 1914, the result of summary from data sheet 138.

In Connecticut every corporation operating a steam or electric railroad, or street railway, and carrying on business for profit in the State, must pay annually a tax upon the gross earnings from all sources from its operations in the State, that is, its gross operating income as defined for railroads by the Interstate Commerce Commission. The tax rate on gross earnings of steam or electric railroads, other than street railways, is 3½ per cent; the rate on gross earnings of street railways is 4½ per cent. The amount of taxes paid during the year in any town on the real estate not used exclusively in the business of such corporation, or of any corporation all of whose property is operated by such corporation, is to be deducted from the amount of the tax upon such gross earnings.

In Oregon a bill was passed which prohibited the

TABLE II.—SHOWING SUMMARY BY STATES OF TAXES PAID BY ELECTRIC RAILWAYS, 1904 AND 1914

State	Companies Replying	Year Ended 1904					Year Ended 1914				
		Railway Operating Revenue	Municipal Tax	State and County Tax	Federal Tax	Total Tax	Railway Operating	Municipal Tax	State and County Tax	Federal Tax	Tota Tax
Alabama	2	$1,324,088	$18,477	$14,957	....	$33,434	$231,658	$101,461	$101,937	$2,961	$206,359
Arkansas	1	290,091	4,963	10,688	....	15,651	580,346	21,606	33,070	2,870	57,546
California	2	1,794,833	37,193	74,398	....	111,591	5,548,050	37,612	260,546	3,997	302,155
Colorado	1	2,040,146	98,298	2,940	....	101,238	3,212,881	64,726	10,833	5,946	81,505
Connecticut	1	4,584,795	19,890	245,218	....	265,108	8,085,399	37,351	520,305	23,853	581,509
District of Columbia	1	1,930,359	111,618	1,913	....	113,531	3,003,273	153,779	6,387	9,989	170,155
Florida	2	306,100	2,184	2,650	....	4,834	639,427	11,850	10,735	1,410	23,959
Georgia	2	1,347,256	20,286	19,872	....	40,158	3,232,050	76,873	78,523	5,345	160,741
Illinois	3	6,305,971	361,988	82,486	....	444,474	9,743,901	679,274	125,689	15,487	820,450
Indiana	2	2,218,489	39,976	109,297	....	149,273	3,925,306	54,986	222,564	8,472	286,022
Iowa	3	1,319,193	....	32,319	....	32,319	2,887,238	....	134,408	3,766	138,174
Kansas	2	337,546	4,642	1,835	....	6,477	858,237	44,992	11,512	2,407	58,911
Kentucky	1	2,048,264	119,291	61,188	....	180,479	3,166,482	180,118	109,138	7,130	296,386
Louisiana	1	3,084,656	188,734	67,357	....	256,091	4,398,507	351,618	143,289	18,899	513,806
Maine	2	917,989	12,033	10,316	....	22,349	1,414,277	34,569	34,040	2,193	70,802
Maryland	1	5,440,942	467,633	26,756	....	494,389	9,203,839	1,045,269	68,122	23,811	1,137,202
Massachusetts	8	20,954,966	427,680	1,031,642	....	1,459,322	31,839,121	806,128	1,205,186	58,666	2,069,980
Michigan	2	946,845	19,620	33,427	....	53,047	1,652,211	59,140	28,685	3,624	91,449
Minnesota	1	619,172	....	17,752	....	17,752	1,313,564	....	65,130	2,382	67,512
Missouri	2	13,655,481	669,584	79,848	....	749,432	19,314,955	998,744	186,834	28,119	1,213,697
Nebraska	1	1,564,640	86,035	24,622	....	110,657	2,966,214	180,014	46,784	6,328	233,126
New Hampshire	1	285,827	....	5,896	....	5,896	477,113	....	23,925	872	24,797
New Jersey	2	636,679	21,706	6,605	....	28,312	1,203,320	25,346	46,683	2,912	74,941
New York	10	23,915,957	772,840	381,712	....	1,154,552	42,345,624	1,809,718	768,231	116,869	2,694,818
North Carolina	1	114,351	4,239	1,250	....	5,489	252,242	8,685	4,723	1,067	14,475
Ohio	5	10,028,660	279,956	278,582	....	558,538	15,391,555	429,167	861,587	35,478	1,326,232
Pennsylvania	12	28,388,841	393,155	1,168,924	....	1,562,079	42,981,951	361,948	1,551,976	124,394	2,038,318
Rhode Island	1	2,754,655	113,044	54,093	....	167,127	5,379,149	281,152	160,575	15,811	457,538
South Carolina	1	92,003	1,392	990	....	2,382	200,620	2,520	3,055	655	6,210
Tennessee	2	1,194,209	33,116	26,654	....	59,770	2,390,674	83,219	91,052	7,271	181,542
Texas	5	1,875,230	44,603	17,750	....	62,358	5,886,901	151,664	111,587	11,806	275,057
Virginia	1	62,290	1,318	1,094	....	2,412	131,282	3,270	2,036	548	5,851
Wisconsin	1	2,698,641	2,549	102,141	....	104,690	4,110,718	11,677	278,313	10,457	300,447
Canada	4	1,247,271	38,277	11,757	....	50,073	6,596,841	223,567	69,685	....	293,253
Hawaii	1	327,461	....	15,473	....	15,473	615,583	....	30,125	1,640	31,765
Total United States	83	$140,183,165	$4,378,048	$3,997,172	....	$8,375,220	$237,968,085	$8,108,476	$7,307,440	$565,792	$15,981,708

levying of a greater amount of revenue in the taxing district than the larger amount levied on the assessed value of the same property in either of the two years immediately preceding plus 6 per cent; provided, however, that the levy may be increased by the voters of the taxing district at a general election, or a special election called for the purpose of voting on such proposition.

In Pennsylvania a new law imposes a tax on the sale of or agreement to sell capital stock, and upon the delivery or transfer, the tax being at the rate of two cents for each $100 face value of stock.

House Bill No. 113 in Virginia fixes the situs for taxation of rolling stock of electric street railway companies and provides for the assessment thereof and the taxation of such rolling stock, and the apportionment of the taxes among the several counties, cities, towns and school districts, in or through which any such electric railway is located. This bill makes no distinction in the rate of taxation between such rolling stock and other property of the companies, but simply provides for its distribution locally. It may be a little more troublesome to the companies, but otherwise is unimportant. House Bill No. 102 increased the fran-

TABLE III.—SHOWING PERCENTAGES OF TAXES TO ELECTRIC RAILWAY OPERATING REVENUE, 1904 AND 1914

State	Number of Companies	Year Ended 1904				Year Ended 1914			
		Municipal Per Cent	State and County Per Cent	Federal Per Cent	Total Per Cent	Municipal Per Cent	State and County Per Cent	Federal Per Cent	Total Per Cent
Alabama	2	1.392	1.128	.....	2.520	4.300	4.340	0.126	8.766
Arkansas	1	1.710	3.675	.....	5.389	3.720	5.700	0.495	9.965
California	2	2.072	4.140	.....	6.212	0.678	4.680	0.072	5.430
Colorado	1	4.820	0.144	.....	4.964	2.010	0.336	0.185	2.531
Connecticut	1	0.436	5.340	.....	5.776	0.462	6.430	0.295	7.187
District of Columbia	1	5.180	0.099	.....	5.279	5.070	0.211	0.330	5.611
Florida	2	0.715	0.866	.....	1.581	1.853	1.680	0.221	3.750
Georgia	2	1.508	1.475	.....	2.983	2.380	2.434	0.165	4.979
Illinois	3	5.740	1.308	.....	7.048	6.970	1.283	0.159	8.412
Indiana	2	1.800	4.920	.....	6.720	1.398	5.680	0.215	7.293
Iowa	3	.....	2.450	.....	2.450	.....	4.660	0.013	4.675
Kansas	2	1.374	0.545	.....	1.917	5.230	1.343	0.281	6.854
Kentucky	1	5.830	2.980	.....	8.810	5.690	3.450	0.225	9.365
Louisiana	1	6.120	2.187	.....	8.307	7.980	3.260	0.429	11.669
Maine	2	1.310	1.124	.....	2.434	2.442	2.406	0.155	5.003
Maryland	1	8.570	0.492	.....	9.062	11.380	0.741	0.259	12.380
Massachusetts	8	2.040	4.920	.....	6.960	2.530	3.780	0.184	6.494
Michigan	2	2.075	3.530	.....	5.605	3.575	1.737	0.219	5.531
Minnesota	1	2.870	.....	.....	2.870	.....	4.960	0.181	5.141
Missouri	2	4.900	0.585	.....	5.485	5.170	0.963	0.145	6.378
Nebraska	1	5.500	1.575	.....	7.075	6.070	1.578	0.213	7.860
New Hampshire	1	.....	2.062	.....	2.062	.....	5.020	0.183	5.203
New Jersey	2	3.413	1.040	.....	4.450	2.109	3.880	0.242	6.231
New York	10	3.230	1.594	.....	4.824	4.270	1.815	0.275	6.360
North Carolina	1	3.720	1.093	.....	4.813	3.442	1.872	0.423	5.737
Ohio	5	2.790	2.790	.....	5.580	2.790	5.580	0.231	8.601
Pennsylvania	12	1.387	4.120	.....	5.507	0.844	3.610	0.289	4.740
Rhode Island	1	4.100	1.992	.....	6.092	5.220	2.984	0.296	8.500
South Carolina	1	1.512	1.075	.....	2.587	1.260	1.517	0.327	3.104
Tennessee	2	3.028	2.441	.....	5.469	3.480	3.810	0.304	7.594
Texas	5	2.378	0.948	.....	3.326	2.575	1.895	0.201	4.671
Virginia	1	2.118	1.760	.....	3.878	2.490	1.550	0.415	4.455
Wisconsin	1	0.095	3.821	.....	3.916	0.284	6.780	0.254	7.319
Canada	4	3.070	0.943	.....	4.013	3.385	1.057	.....	4.442
Hawaii	1	.....	4.720	.....	4.720	.....	4.910	0.266	1.763
United States percentage of railway operating revenue	83	3.125	2.850	.....	5.975	3.410	3.070	6.717	5.702

chise tax on street railways from 1 per cent upon gross receipts to 1⅛ per cent. This was the only bill passed by the Legislature increasing the tax burdens upon street railways.

Indiana has appointed a committee to investigate the tax laws of other States and make recommendation at the next session of the Legislature, which will meet in 1917.

According to the reports received, the committee found a noticeable falling off in the amount of tax legislation aimed at street railway corporations, owing no doubt largely to the change of public sentiment toward corporations in general. A data sheet was sent out to all of the companies and replies from eighty-three were tabulated as shown in the accompanying tables. The comparison of the figures of 1904 with 1914 shows an increase of 69.7 per cent in the gross earnings and 90.8 per cent in the amount of taxes.

The committee concluded that the electric railway industries are no doubt bearing an unfair proportion of the tax burden, and some concerted efforts should be made to secure the enactment of uniformity in tax laws by which the taxing of street railways would be removed from local control, and either fixed on a fair percentage of gross earnings or else assessed on a valuation which would be determined by a central taxing commission, the basis of the valuation to be distinctly stated by the commission and such taxes to be in lieu of all other taxes. At present the tax is assesed under such a variety of names and for such varied purposes that the general public, and very often the street railway officials, are not aware of the excessive amounts borne by the railways as compared with the burden borne by other properties. By adopting such a method as a tax on gross earnings in lieu of all other taxes, the claim which is so often made, that the public service corporations are not bearing their just proportions of the tax burden, could easily be refuted.

The report was signed by F. W. Wilson, chairman, for the committee.

AMERICAN ROAD BUILDERS' ASSOCIATION

The committee appointed to attend the fifth American Good Roads Congress, held in Chicago Dec. 14 to 18, 1914, under the auspices of the American Road Builders' Association, as representatives of the American Association reported that the members had attended the congress and as a result believe that the American Road Builders' Association should receive the attention of the American Association. In the opinion of the committee, it now has and will continue to have an important effect upon the electric railway industry. The object of the American Road Builders' Association is to extend the "good roads" movement: to use its influence to see that public money appropriated for road building is wisely expended, and to bring about an improvement in the manner of construction and maintenance of highways and of materials used for those purposes. The committee believed that the engineering features of good road building, including the construction and maintenance of paving in city streets, are so closely related to electric railway work that the exhibits at the annual meeting of the Road Builders' Association and the discussion of the science of good road building will be sources of valuable information to the Engineering Association.

Another point is that the "good roads" movement, which is national in scope, will quite naturally increase the use of privately-owned vehicles and thus divert a certain amount of traffic from the interurban railroads. The general improvement of the highways will also have an important bearing upon taxes, property values, development of territory, etc. Whether the additional traffic derived from such development of territory will be sufficient to offset the loss sustained by the increased use of privately-owned vehicles is a matter which should receive the study and attention of a special committee. The committee therefore recommended attendance upon future meetings of the Road Builders' Association by a committee containing representatives of the American and Engineering Associations, and that this committee, in addition to attending the meetings, should study the "good roads" movement as it affects the electric railway industry and collect data relating thereto, making its report to the association. Incorporated with the report of the committee was a copy of the proceedings of the congress.

The report was signed by E. C. Faber, chairman; C. D. Emmons and C. N. Wilcoxon.

The report of the nomination committee, read by R. I. Todd, Indianapolis Traction & Terminal Company, was as follows: For president, Charles L. Henry, president Indianapolis & Cincinnati Traction Company; for first vice-president, L. S. Storrs, president The Connecticut Company, New Haven, Conn.; for second vice-president, Timothy S. Williams, president Brooklyn Rapid Transit System, Brooklyn, N. Y.; for third vice-president, John J. Stanley, president The Cleveland (Ohio) Railway; for fourth vice-president, J. H. Pardee, president Eastern Pennsylvania Railways, Pottsville, Pa. The report of the nominating committee was adopted in full by the convention and the ballot cast by the secretary. In assuming his new duties, President Henry said he would devote his best efforts during the coming year to aid the enterprises of the association.

In connection with the report of the nominating committee Gen. George H. Harries explained that John A. Beeler, second vice-president of the association, had requested that his name should not be considered by the committee as he had a number of plans to carry out which would make great demands upon his time. General Harries said that all the members could testify to their warm regard for Mr. Beeler and on their behalf expressed the hope that in a short time he would again be an active operating man in the field of electric railway transportation.

The report of the committee on resolutions, presented by C. S. Sergeant, Boston Elevated Railway, contained an appreciation of the courtesies extended to the convention delegates by the member companies, civic bodies and individuals in the several far western cities. The thanks of the association were extended particularly to the San Francisco committees of the Manufacturers' Association which provided for the entertainment and transportation and which made other local arrangements for the convention, and to the technical press for its effective co-operation in carrying out the work of the association generally. A final clause in the resolutions urged members to make every effort to secure adequate regulation of motor-vehicle competition.

After accepting the report of the committee on resolutions the convention formally adjourned. The exercises scheduled for Friday are described on page 767 of this issue. They formed a part of the entertainment program of the convention and consisted of the presentation of a bronze plaque to the American Electric Railway Association and the American Electric Railway Manufacturers' Association in commemoration of the holding of the 1915 meeting at San Francisco. The address delivered by James H. McGraw on this occasion on "The Development of the Electric Railway" is abstracted earlier in this issue.

Accountants' Papers and Proceedings

President Mitchell Reviews Work of Year and Submits Question of Separate Meeting Place and Time for Association—Delegates Discuss the Value of Statistics in Administration, Taxation, Passenger Accounting and Various Technical Points of General Interest

Program for Monday

Annual Address of the President.
Annual Report of Executive Committee.
Annual Report of Secretary-Treasurer.
Reports of Committees:
- Standard Classification of Accounts—H. L. Wilson, chairman.
- Accounting Definitions—Frederic Nicholas, chairman.
- Representing Association at Convention of Railway Commissioners—W. F. Ham, chairman.
- Education—George G. Whitney, chairman.
- Express and Freight Accounting—E. L. Kasemeier, chairman.
- Passenger Accounting—L. T. Hixson, chairman.
- Joint Report, Passenger and Express and Freight Acounting—Co-Chairmen: L. T. Hixson and E. L. Kasemeier.

ADDRESS—"Taxation of Electric Railways," Prof. Carl C. Plehn.
Report of Committee:
- Transportation-Accounting—Co-Chairmen: M. R. Boylan and J. K. Choate.

Program for Tuesday

PAPER—"Electric Railway Accounting—A Review," P. V. Burington.
PAPER—"The Merits of Prepayment Cars, from the Viewpoint of the Accounting Department," R. J. Clark.

C. S. MITCHELL
President

Tuesday—Continued

PAPER—"The Value of Statistics to Executive and Accounting Departments," George B. Willcutt.
Report of Committee:
- Claims-Accounting—Co-Chairmen: H. J. Davies and H. K. Bennett.

Program for Wednesday

Reports of Committees:
- Engineering-Accounting—Co-Chairmen; F. H. Sillick and C. R. Harte.
- Life of Railway Physical Property—Co-Chairmen: R. N. Wallis and Martin Schreiber.

Changes in Constitution and By-Laws.
ADDRESS—"Treatment of Charges for Rent of Tracks and Facilities and Rent of Equipment," Paul Shoup.
PAPER—"The Importance of Accrued and Accruing Accounts from the Viewpoint of the Certified Public Accountant," John F. Forbes, C.P.A.
ADDRESS—"Some Neglected Problems in Electric Railway Accounting," Henry Rand Hatfield.
Reports of Convention Committees:
- (a) Resolutions.
- (b) Nominations.

Election and Installation of Officers.

Monday Afternoon Session

PRESIDENT C. S. MITCHELL, comptroller Pittsburgh (Pa.) Railways, called the first meeting of the Accountants' Association to order on the afternoon of Monday, Oct. 4. After the printed minutes of last year's meetings had been distributed, President Mitchell read his address, which is in part as follows:

"At the convention last year, on the recommendation of M. W. Glover, secretary Mobile Light & Railroad Company, Mobile, Ala., a resolution was adopted providing for a rearrangement of the committees of the association, and the appointment of certain standing committees, a majority of whose members should hold over from one year to the next in order to give continuity to the work of the committees. This was undoubtedly a step forward in providing for the constructive work of the association, as those members who appreciate their appointment and do conscientious work have an opportunity to carry forward their ideas, while such members as do not take an interest can and should be replaced by members who will bring new thoughts into the committees.

"The resolution referred to provided for a representation of five members from this association on the joint committee on transportation-accounting. The Transportation & Traffic Association at its last convention did not act on the matter of increasing its membership from three to five. The matter was taken up with the president of that association and on Nov. 12, 1914, its executive committee passed a resolution that a joint committee of ten members would be too large for effective work, and that better results would be obtained from a committee of six, as originally provided for. It was voted, therefore, that the representation of the Transportation & Traffic Association remain as originally constituted, and that a recommendation be made to the Accountants' Association that its membership on the committee also be limited to three men. In order that the committee might proceed with its work, three members were appointed for the current year with the approval of the executive committee of this association, but some action should now be taken as to the future membership of this committee.

"One year ago all lines of business were affected by a general business depression, and as there was some possibility of a loss in revenue to the American Electric Railway Association by the withdrawal of member companies on account of the increased scale of dues, it was the unanimous opinion at the first meeting of the new executive committee that the revenues for the year should be carefully guarded and the expenditures minimized without interfering with the progressive work of the different associations. At the same time it was recommended that all committee meetings be dispensed with at the mid-year meeting held in Washington, D. C. With this in mind at the time of committee appointments, assignments were made, as far as possible, of members who could meet as often as necessary without contracting large traveling expenses. With an improvement in business conditions generally, it is hoped that more liberal appropriations will be made in the future for the work of this association.

"The reports presented this year speak for themselves and indicate how thoroughly the committee work has been done. Special attention should be called to the work undertaken by this association through its committee on education. The lectures arranged for this year include an elementary course, a feature which should appeal strongly to such clerks engaged in street railway work as have not had an opportunity to study the theory of accounts. A better understanding on the part of the average office employee, through a knowledge of accounts, of the purpose to be attained by the work upon which he is engaged, would no doubt result in increased efficiency. Each accounting officer should appoint himself a booster for the cause and make every effort to enlist not only the employees under his own immediate jurisdiction but those employees in other departments whose duties are of a clerical nature.

"Effective as of July 1, 1915, the Interstate Commerce Commission issued its accounting bulletin No. 9, containing decisions upon questions raised in 346 cases under the uniform system of accounts for electric railways. The commission acknowledges the co-operation of the committee on a standard classification of accounts in the preparation of this bulletin. These decisions are invaluable to street railway accounting officers, and the association is indebted in no small measure to the members of this committee for the part they have taken in this work. On account of the great number of questions submitted by electric railway accountants from all sections of the country, the members of this committee are required to write several thousand letters a year, and it should be borne in mind that the time of its members and the stenographer's services, postage, etc., are all contributed without expense to this association.

"For some time past the association has had a special committee on overhead charges, but in spite of diligent effort made this year to have some of the most experienced accountants accept membership on this committee, it was found impossible to complete the committee for service during the year. This is a subject which, to be handled successfully, requires the judgment of experienced accountants and engineers, and it is herewith recommended that its study be delegated to the joint committee on engineering-accounting.

"Since the meeting last year the United States Internal Revenue Department has issued a new form (No. 1031 revised) to be used by corporations in making a return of their annual net income, under Sec. 2 of the act of Oct. 3, 1913. In this is incorporated a supplementary statement requiring that certain detailed information be furnished, a greater part of which is not a matter of convenient record with those companies who keep their accounts in accordance with the uniform system of accounts for electric railways prescribed by the Interstate Commerce Commission, now used by electric railways quite generally. It is therefore suggested that a committee of this association be delegated to take up the matter of more uniformity in the accounting methods required of electric railways in making their reports to the different departments of the government.

"The association's attention is called at this time to the report of the committee on the federal income tax, presented at a conference of the National Tax Association in San Francisco last August. This committee recommends a complete restatement and clarification of the law, there being general dissatisfaction with its complexity and strong objection to several of its provisions which are contrary to the principles of just taxation, work unnecessary hardship and result in unfair discrimination between various classes of taxpayers. There is a possibility of this law being amended by Congress at its next session, and it is suggested that electric railway accountants familiarize themselves with the report of this committee and discuss its merits with their representatives in Congress.

"As to the future of the association, the question of a separate meeting time and place is submitted for thoughtful consideration. Under such conditions a larger attendance could be secured of the younger men engaged in street railway accounting work, if the association were to meet at such a place as would best suit the convenience of the majority of the members, and at a time when other department heads were not absent from their duties attending the meetings of the affiliated associations. At the same time, more actual work would be done in two or three full-day sessions and greater good accomplished if the attention of members were not diverted by exhibits and entertainments."

EDUCATION AND OTHER REPORTS

After the reading of the president's address, reports were received from the executive committee and from the secretary-treasurer. Reports were then read for various committees as scheduled.

The committee on education simply presented as its report to the association the minutes of the meetings held on March 22, 1915, and June 17 and 18, 1915. These meetings were taken up with discussion of details of administration of the educational courses, and they were duly reported in the columns of this paper from time to time during the last few months.

After this report an announcement was made to the effect that Edward C. Stothart of the Charleston Consolidated Railway & Lighting Company, Charleston, S. C., had been awarded the $50 prize for the best paper submitted on the eighth lecture of the accountants' correspondence course. This was noted in the ECTRIC RAILWAY JOURNAL of Sept. 18, page 594, and the prize paper was abstracted in the issue of Oct. 2, page 665.

The committee on accounting definitions in its report directed attention to the important work now being undertaken by the committee on accounting terminology of the American Association of Public Accountants. At the annual meeting in September, 1915, this committee, starting with the first of the alphabet, defined thirty-four terms beginning with "a." This first installment included, for example, definitions of "additional capital," "additions to capital" and "amortization," all of which touch matters that are involved in the systems of accounts prescribed by public service commissions. As it appears that the American Association of Public Accountants will give serious attention to definitions for the next few years, the committee of the American Electric Railway Accountants' Association recommended that a committee on accounting definitions be continued and that such a committee for the next year ask the committee of the American Association of Public Accountants for an opportunity to be heard or to submit views by correspondence in connection with the definition of terms that may directly affect electric railways. The report was signed by Frederic Nicholas, chairman; R. N. Wallis and G. A. Harris.

The committee of W. F. Ham, chairman; Henry L. Davies and C. L. S. Tingley reported that it had represented the association at the twenty-sixth annual convention of the National Association of Railway Commissioners held in Washington, D. C., Nov. 17-20, 1914. The proceedings of this convention are in print and may be procured, at nominal cost, from the Law Reporting Company, 115 Broadway, New York. The subjects discussed covered a wide range of matters vital to all public utilities, including railroad taxation, plans for ascertaining a fair valuation of railroad property, railroad capitalization, statistics and accounts. The report of the committee on statistics and accounts of electric railways was spread upon the minutes of the convention without being read and, therefore, without discussion or action.

STANDARD CLASSIFICATION OF ACCOUNTS

The committee on a standard classification of accounts reported that it met with Interstate Commerce Commission representatives in Washington last January, when two days were devoted to going over publications which the commission proposed to issue. During the year the commission issued an index to the uniform system of accounts for electric railways. This index, composed of about twenty-eight pages, superseding the six-page one found in the back of the publication on the uniform system of accounts, afforded a very quick reference to the general accounts and the primary accounts. Not only is the reference page given but the section and note references as well.

A few months ago Accounting Bulletin No. 9 was sent out by the commission to all accounting carriers. This embodies decisions upon questions raised since the uniform system, effective on July 1, 1914, was adopted, as well as revised decisions on important questions previously submitted. It includes 346 cases and has two complete indices, one by accounts and one by topics, comprising in all thirty-five pages. Since the copy was given to the public printer eighty-two cases were submitted directly or through the commission to the committee for decision, the answers for which were pubished in *Aera*.

While the committee does not assert that the new system is perfect, from one year's use by a large number of companies there is reason to believe that it is reasonably so, and its adoption by many of the state commissions strengthens this opinion. The only change made during the year is one under the general instructions relating to the road and equipment accounts. In the original issue permission was granted to a company to charge the cost of an addition or betterment (where the amount was less than $200) to the appropriate operating expense account if it so desired. This option was taken away by an order of the commission effective on July 1, 1915, from which date all charges for improvements and betterments must be included in the road and equipment accounts regardless of the amount involved.

The committee states that although the association has not yet published the uniform system of accounts, it is the intention to provide in the near future a single book embodying the text of all the accounts, the index and all case decisions. Member companies may then purchase direct from the association as many copies as desired.

The report was signed by H. L. Wilson, chairman; W. F. Ham, W. H. Forse, Jr., P. S. Young and Robert N. Wallis.

EXPRESS AND FREIGHT ACCOUNTING

The report of the committee on express and freight accounting last year contained a brief outline covering the method of handling freight business and making reports and records. On account of the inquiries received since that time from members doing a freight business, the committee this year deemed it advisable to supplement the preceding report by outlining the methods for handling interline business and explaining other matters in connection with freight transportation accounting. Under the heading of "Interline Waybilling Arrangements," therefore, the present committee discussed the forms used; the arrangement for interline billing with the audit office settlement; waybills; waybill corrections; abstracts and division statements; statement of difference and correction account; summary and settlement; tracing unreported waybills; astray freight, and misrouted freight.

Concerning the interchange of equipment the committee decided that, to prevent delay and cost of transferring, it was advisable to let cars go through to destination. In order that the company owning the car might be paid for its use, however, some definite method should be adopted to provide for such car rental or use. The rate for such a freight trail car should be high enough to make the using company handle the shipment promptly and return the car at the earliest possible time, but it should not be so high as to prevent the use of one company's cars by another in these through carload movements. The lines in Indiana, Michigan and Ohio, comprising the Central Electric Railway Association territory, have an agreement to charge 50 cents for every twenty-four hours or fraction thereof, with a minimum charge of 50 cents against each company using the car each time on its lines. This agreement also provides that a junction agent should, for billing purposes, make to the auditor of the company owning the car (with a copy to the auditor of his own company), a report showing car initial, number, loaded or empty, road delivered to, exact time of day and date.

Furthermore, the committee stated that a majority of the interurban roads are now using the unit waybill for local shipments, making four or more parts, two of which go with the shipment, one part being the delivery receipt and the other part the expense bill. At nearly all important stations weekly credit is extended to large patrons, and it is, therefore, necessary to make two additional copies of bills which cover freight moving prepaid—one to be used as a receipt to shipper when collection is made at end of week, the other to be used by the station cashier. At some station, these "prepay charge" bills represent 30 per cent of the total bills made. Under these circumstances the committee felt that it was exceedingly advantageous to use a machine in preparing the bills on account of the less effort required and the greater ease of deciphering. Typewriters are now being made for this purpose. They are shiftless machines, using only capital letters, and are provided with special tabulating mechanism. The committee strongly recommended that this feature be looked into as it might save much labor and trouble now experienced by reason of illegible bills.

The report was signed by E. L. Kasemeier, chairman; H. B. Cavanaugh, A. E. Dedrick, Walter Shroyer and H. H. Read.

PASSENGER ACCOUNTING

The committee on passenger accounting reported that it was surprised to note from a perusal of the forms forwarded by the various companies that auditing departments still continue to prepare reports and statistics containing information necessary and valuable to the management and transportation departments when the fare was invariably a nickel, transfers were unknown, cars were of a uniform size, and the present-day interurban, with its infinite variety of fares, was unknown. Much of the information laboriously compiled for these daily reports has lost its value to the traffic and schedule departments. Nevertheless, the auditing department in many cases continues to prepare daily comparative and cumulative statements giving the earnings of each route or division in dollars and cents, the earnings per car-hour and per car-mile. The original object of these reports was not only to show the management the profitableness of each route, but to enable it to gage the traffic conditions and schedule requirements. To-day most of these elaborately compiled reports do not give this information. Frequently a preponderance of reduced fare tickets exists on one line or route, or one route may be essentially a transfer-passenger carrying route. In either case, the earnings per route, per car-hour or per car-mile do not show traffic conditions or schedule requirements. The introduction of front-end collectors in congested districts also tends to lessen the value of showing earnings per car-hour and per car-mile by routes. For this reason many companies are ascertaining their schedule requirements by traffic counts made by inspectors on various parts of the system. In the committee's opinion, therefore, the auditing department should co-operate with the transportation department and give the passengers per car-hour and per car-mile. This would enable the management and the transportation department to form some idea of the profitableness and the schedule requirements of each route. For those routes where no traffic count is made this information could be readily obtained by the accounting department from the data contained in the conductors' reports.

The committee stated that the most valuable statistical information on interurban lines in addition to the usual car-hours and car-miles is the revenue per passenger-mile by trains. Under present conditions, this information is impracticable on account of the cost of obtaining it. When available, however, it should be supplemented by reports showing the passengers on the car at various points, inasmuch as a small train earning per passenger-mile might mean congestion for a short ride and empty cars the balance of the trip; while larger earnings per passenger-mile might be received from a moderate load for the long haul.

While it was believed that the reduction in fares has reached its limit, there is an increasing tendency in the use of ticket fares, and the committee felt that if the companies should join in adopting a uniform size of ticket, inventors and manufacturers would be induced to widen their field for manufacturing and distributing ticket-counting machines. Reports from several companies showed that they no longer laboriously counted the tickets by hand, but obtained the earnings by weighing the tickets received from each conductor or fare box.

It appeared to the committee that the handling of cash might be improved and simplified. Instead of the collections being turned over from one employee to another and finally by the cashier at the head office to the bank, there would be a great saving in time if these remittances could be made directly to the bank by the agent or conductor. In some cases the bank is so anxious for the railway company's account that it collects the money from the local cashier.

The report was signed by L. T. Hixson, chairman, R. J. Clark, John M. C. Horn, T. B. MacRae and Irwin Fullerton.

DISCUSSION ON PASSENGER ACCOUNTING

This latter report brought out a general discussion of the relative merits of the bag system and the carhouse receiver system of taking in cash tickets and transfers. Those participating were A. H. Kayser, general auditor San Diego (Cal.) Electric Railway; T. P. Kilfoyle, auditor Cleveland (Ohio) Railway; F. W. Frost, secretary-treasurer San Francisco-Oakland Terminal Railways, Oakland, Cal.; G. B. Willcutt, secretary and comptroller United Railroads of San Francisco, San Francisco, Cal.; J. H. Neal, general auditor Boston (Mass.) Elevated Railway; W. G. Nicholson, secretary and auditor Omaha & Council Bluffs Street Railway, Omaha, Neb.; W. F. Ham, vice-president and comptroller Washington Railway & Electric Company, Washington, D. C.; President Mitchell, and Secretary M. R. Boylan, general auditor Public Service Railway, Newark, N. J.

In San Diego, according to Mr. Kayser, the cash is taken from the carhouses to the main office, where instead of being sent to the bank it may be turned over to another company under the same control. Mr. Frost told how his company's method of picking up packages and counting at the main office gives more protection, is cheaper and gives reports by lines early in the afternoon of the succeeding day. Mr. Mitchell mentioned a small line which has the money taken directly to the banks by carhouse employees, the money not being counted by company employees after it leaves the conductor's hands. Mr. Boylan told how the receiving system has eliminated shortages, disputes and arguments, for although there might be shortages in tickets or transfers and registers, there were none in cash. Mr. Willcutt described a reduction in shortage since bell-punch days. Mr. Kayser thought that the elimination of any question between the company and men as to the amount turned in justified the expense of a receiving clerk.

According to the statement made by Mr. Neal, until three years ago the Boston Elevated Railway had used the bag system, and when the union asked for the carhouse receiving system the company pointed out that it would cost from $25,000 to $50,000 more. Such a system was put in, however, and the expense was found to run about as estimated. Desiring to count tickets at the same time as cash, the company has put in a new machine, which counts 60,000 tickets an hour, to count these automatically while the receiver counts the cash. When the cash is brought into the main office, it is counted a second time by a machine that both counts and wraps. This company uses a lot of the money for the payroll, part of which comes up for payment every day.

ADDRESS ON TAXATION

By a change in the program the joint report on passenger and express and freight accounting was postponed until Tuesday, and the scheduled joint session with the Transportation & Traffic Association was omitted, as no report of the committee on transportation-accounting was in hand. The remainder of the session was then devoted to an address on "Taxation of Electric Railways," by Prof. Carl C. Plehn, University of California, Berkeley, Cal.

Professor Plehn took as the key to his discussion a consideration of the burden of taxation as it affects the investment. He said that the taxes on all classes of public utilities appear to be growing faster than the capital invested therein, faster than the net earnings and faster than the gross receipts. It was highly desirable to determine accurately how much the burden of taxation is and how fast it is growing, which, surprising as it seems, is not now known. His paper then described an attempt to work out a method of establishing a practical measure or index of the tax burden, in order to show clearly just what the incidence is on electric railways and other public utilities.

Professor Plehn's remarks were discussed by Mr. Neal and Mr. Ham, who supplied particular instances in order to show the need of giving close consideration to local conditions in attempting to work out a method that would be susceptible of being applied to companies generally.

Tuesday Afternoon Session

The first business on the program on Tuesday was the reading of the following joint report on passenger and express and freight accounting, postponed from the day before.

The committee on passenger accounting held a joint meeting with the committee on express and freight accounting in Chicago on June 15, 1915, when the subject of allocation of passenger and freight earnings and expenses was considered. As stated in the report of the joint committee with the Transportation & Traffic Association in 1911, and also in the report for 1912, it is impracticable, if not impossible, to make an exact segregation of the expenses. Many of the large items can be easily divided, but there are numerous accounts which must be prorated on the most reasonable basis in view of the labor involved. The present committee felt, therefore, that the general plan outlined by the 1911 committee is the best obtainable under the existing conditions. In view of the fact, however, that the 1911 report was based on the old Interstate Commerce Commission classification, the committee revised the former report so as to make it fit the classification which is now in use.

It was jointly recommended that the committee on passenger accounting and the committee on freight and express accounting be consolidated, as all matters can be handled by one committee. The report was signed by L. T. Hixson and E. L. Kasemeier, co-chairmen; R. J. Clark, Irwin Fullerton, J. M. C. Horn, T. B. MacRae, H. B. Cavanaugh, A. E. Dedrick, H. H. Read and Walter Shroyer.

In the discussion of this report Mr. Kayser suggested that items for losses, damages and injuries might be prorated on the basis of located passenger and freight items instead of totals. Others discussing the paper were B. W. Fernald, auditor San Francisco-Oakland Terminal Railways, Oakland, Cal.; H. A. Culloden, secretary and auditor Pacific Electric Railway, Los Angeles, Cal.; I. A. May, comptroller The Connecticut Company, New Haven, Conn., and T. W. Gregory, director East St. Louis & Suburban Railway, East St. Louis, Ill. President Mitchell mentioned that the report more particularly applied to interurban properties handling carload freight. Mr. Kilfoyle moved that the report be received and filed, and its recommendation, that the committee on passenger accounting and the committee on express and freight accounting be consolidated, be taken up under the head of new business. When the recommendation later came up it was adopted, and it was decided to have a new committee of five members.

After the foregoing discussion was ended, P. V. Burington, secretary the Columbus Railway, Power & Light Company, Columbus, Ohio, read his paper on "Electric Railway Accounting—A Review." This was followed by a paper on "The Merits of Prepayment Cars from the Point of View of the Accounting Department," by R. J. Clark, comptroller Metropolitan Street Railway, Kansas City, Mo. Abstracts of these papers are published elsewhere in this issue.

Mr. Clark's paper brought on a lively discussion, in which considerable attention was devoted to the probability of the future development of a satisfactory transfer-issuing machine and a smaller and simpler transfer. Those participating in the discussion were Mr. Neal, Mr. Kilfoyle, Mr. Ham and Secretary Boylan. Mr. Neal agreed that the development of mechanical devices had been one of the important results of the introduction of prepayment cars. In his opinion, the motor-driven coin box, while it cannot be used on short runs, where it must be shifted frequently from one end to the other, is a valuable innovation that is bound to be permanent. He believed that the ideal transfer will carry only date, time, car or conductor's number and location from which and to which issued. The elements necessary for a successful transfer-issuing machine are already in existence in different devices, notably in employees' time clocks. In using transfer-issuing machines the line should be divided into sections and only from two to twenty points should be covered by one machine.

Mr. Kilfoyle stated that in Cleveland the company used a locked fare box with no registering devices whatever. Mr. Ham said his company in Washington was using the register system entirely, but had recently ordered ninety to 100 cars with the prepayment feature. Replying to a query from Secretary Boylan, Mr. Neal said that with an improved transfer and automatic machine there would be no occasion for having the slip longer than 2 in. or 2½ in. In his response Secretary Boylan pointed out that this would help secure the essential small size in a transfer machine to go on the platform with a fare box and leave table room enough for the conductor. Mr. Neal said the ideal machine would be a transfer machine and fare box combined, with one motor and one stand.

At this point George B. Willcutt, secretary United Railroads of San Francisco, read his paper on "The Value of Statistics to Executive and Accounting Departments." This is published elsewhere in abstract form. President William Tichenor of the Claims Association then announced that as a report from the joint committee on claims-accounting had not been received, the scheduled joint meeting of the Accounting and Claims Associations would be unnecessary.

Wednesday Afternoon Session

The program for the Accountants' Association on Wednesday afternoon was opened by a joint session with the Engineering Association with President Mitchell of the former association in the chair. Two reports were presented—one on engineering-accounting and one on the life of railway physical property, as shown below. In connection with the former report, it was explained that the section dealing with the development of a continuous inventory related not to the entire property but only to stock materials. Next year, according to President Crecelius of the Engineering Association, the committee will have the subject of a continuous property ledger to work on as a result of a recent decision that was arrived at by the executive committee.

ENGINEERING-ACCOUNTING

The report of the joint committee on engineering-accounting was to cover the following: (a) Cost accounting: draft of set of standard forms for use with the system recommended by the 1914 committee. (b) Revision of subdivisions of operating maintenance accounts to meet the requirements of the new Interstate Commerce Commission classification. (c) Development of a proper ledger looking toward the maintenance of a continuous inventory.

COST ACCOUNTING FORMS

The cost accounting system recommended by the 1914 committee contemplated a set of correlated forms on which to record various particulars for each job or undertaking. The duty laid upon the 1915 committee to draft a set of forms for use with this system was found to be a perplexing one, for each member company had its own peculiarities of organization and other local conditions which in many cases seemed to necessitate widely differing methods of compiling and forwarding reports. The present committee therefore departed somewhat from the letter of its instructions, and instead of embodying in its report a set of blanks to be considered as standard, it submitted two sets of blanks which were selected as in most particulars covering all the requirements of the system, leaving it to the member companies to choose, each for itself, such features as might seem best to suit its own individual requirements or to cull out from these blanks such features as might serve to amplify the system which it already had in operation. The forms submitted include the following: Series A—details of estimated cost of material and labor covered by application; details of estimated salvage material (including scrap) to be abandoned, removed or replaced and returned to stores or to be used on the work; application for authority to proceed with and for appropriation to cover cost of additions, betterments, replacements and ordinary repairs; notification of completion of work; final accounting statement showing distribution of amount expended; report of salvage material returned to stores; Series B—estimate sheet, including on reverse side actual or estimated original physical cost of structure to be improved or replaced; distribution sheet for expenditures; notice of completion of work, and certificate of completion of authorization.

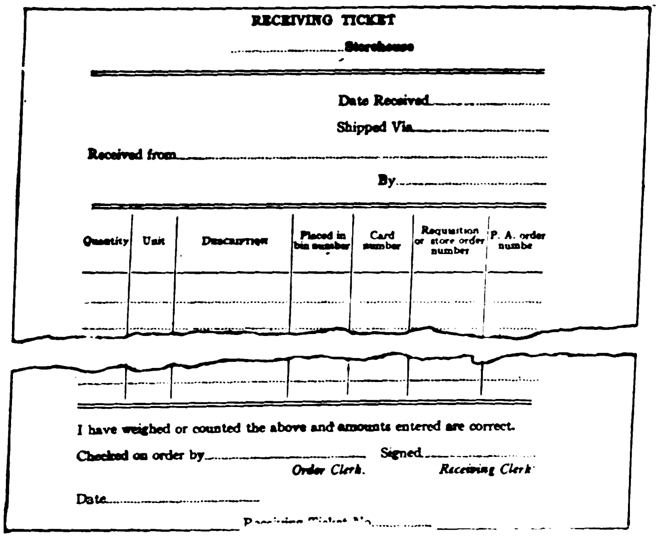
REVISION OF SUBDIVISIONS OF MAINTENANCE ACCOUNTS

The 1914 convention of the Accountants' Association having adopted the uniform system of accounts for electric railways as prescribed by the Interstate Commerce Commission, effective on July 1, 1914, the joint committee made a rearrangement of the maintenance and operating sub-accounts under the same or similar accounts of the new classification. Inasmuch as there appeared to have been made no subdivisions of the traffic and general expense accounts, it was not thought necessary to repeat the commission captions for these.

In making the modifications the committee was impressed with a doubt as to the value of such minute detail and intricate subdivisions, but it did not feel justified under its instructions in making any amendments or simplifications. It recommended, however, that the matter of operating and maintenance account subdivisions receive further study by future committees with a view of simplification.

CONTINUOUS INVENTORY

The term "continuous inventory" was understood to mean a record of stock materials on hand which at all



RECEIVING TICKET

................Storehouse

Date Received................

Shipped Via................

Received from................

By................

Quantity	Unit	Description	Placed in bin number	Card number	Requisition or store order number	P. A. order numbe

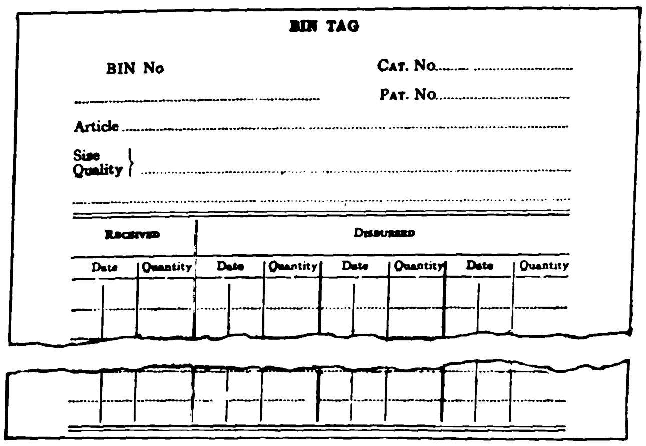
I have weighed or counted the above and amounts entered are correct.

Checked on order by................ *Order Clerk.* Signed................ *Receiving Clerk*

Date................

Receiving Ticket No................

CONTINUOUS INVENTORY—FORM I—SHOWING ORIGINAL RECEIVING TICKET (8½ IN. X 11 IN.)



BIN TAG

BIN No .... CAT. No................

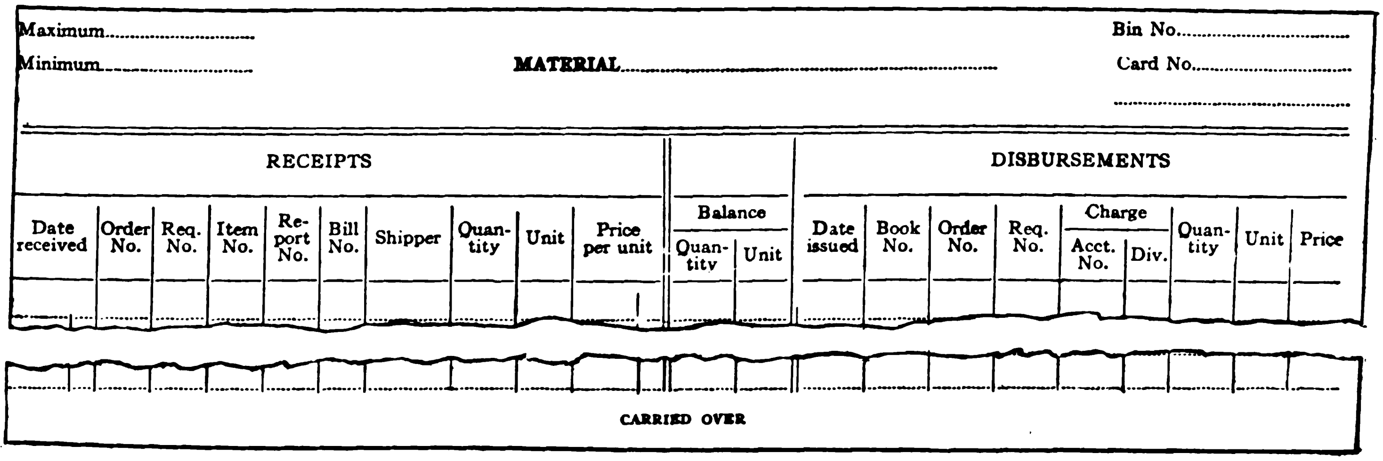
PAT. No................

Article................

Size } Quality } ....

Received		Disbursed					
Date	Quantity	Date	Quantity	Date	Quantity	Date	Quantity

CONTINUOUS INVENTORY—FORM II—SHOWING BIN TAG (4 IN. X 6 IN.) TO BE USED (SAME ON REVERSE SIDE)



Maximum................ Bin No................

Minimum................ **MATERIAL**................ Card No................

....

RECEIPTS										Balance		DISBURSEMENTS								
Date received	Order No.	Req. No.	Item No.	Report No.	Bill No.	Shipper	Quantity	Unit	Price per unit	Quantity	Unit	Date issued	Book No.	Order No.	Req. No.	Charge		Quantity	Unit	Price
																Acct. No.	Div.			

CARRIED OVER

CONTINUOUS INVENTORY—FORM III—SHOWING CARD RECORD (11 IN. X 7½ IN.) OF MATERIALS CARRIED IN STOCK (SAME COLUMNS ON REVERSE SIDE) times would be so nearly correct as to obviate the necessity of taking periodical inventories for the purpose of adjusting the records to conform with the facts. A prime requisite for the maintenance of such an inventory is adequate, convenient and safe storekeeping facilities, safeguarding more or less expensive materials not only from theft but from hurried appropriation for legitimate purposes without proper record.

Adequate receptacles, such as boxes, bins or what not, should be designed to meet the necessities of the various kinds of materials to be stored within them, and each bin should be numbered very distinctly. As far as is possible, similar kinds of materials should be stored in adjacent bins. An agreed-upon classification of materials should be compiled, authoritative names being used so as to avoid confusion in terms. This classification should be in great detail, as it is a mistake to try to call too many things by the same name.

Firmly attached to each bin or receptacle should be a "bin card" (Form II), on which should be shown the bin number and the storekeeper's stock card number (Form III), as well as the various numbers of the purchasing agent's orders on which the particular kind of material has from time to time been ordered. On the bin cards the store-tender should, with scrupulous care and promptness, tally the quantities of materials deposited in each bin. This record should be made at first hand and with reference only to the actual physical count or measurement of the materials themselves, and without reference to some previous record of receipt. Simultaneously with the recording on the bin card of the receipt of stock materials, a record of the receipt of those materials should be compiled.

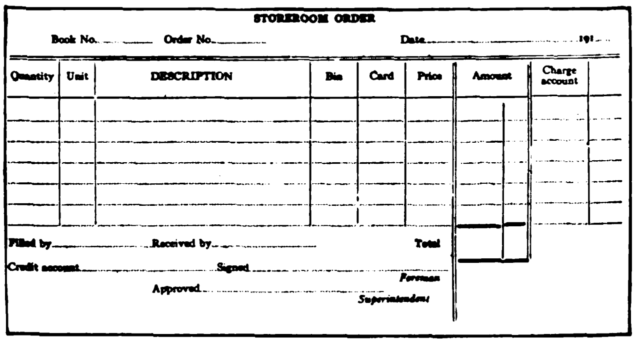
The receiving ticket (Form I) should set forth the following particulars: date of receipt, route by which shipment has been received, name of the seller, quantity and unit of quantity, and description of the material. It should also show the number of the bin into which the material has been placed, and the stock card number. Space is also provided in which to indicate, if desirable, the requisition or storehouse order number, and the purchasing agent's order number. The receiving ticket should also embody a certificate on the part of the receiving clerk that he has weighed or counted the materials covered by it, and that the amounts entered are correct. Needless to say, this record should be so scrupulously correct as to preclude any subsequent disputes with shippers as to receipt of materials.

In the storekeeper's office should be kept a card record of the materials carried in stock, a separate card being kept for each bin. As a sample of such card record Form III is shown, on which are indicated the number of the bin and the classification and name of the material. These stock cards are numbered consecutively, and in a prominent place at the top should be indicated the maximum and minimum quantities of that particular kind of material to be carried in stock. This has been found to regulate almost automatically the quantities of stock materials, preventing an overstocking and avoiding the possibility of running out of materials. It will be noted that the stock record card does not provide for the carrying of money value balances. On it are indicated with respect to receipts, the dates received, the purchasing agent's order number, the requisition number, and sundry other reference numbers, as well as the name of the shipper, quantities, units of quantities, and unit prices.

To return to the bin card (Form II), the blank space provided for tallying should be utilized for recording disbursements as well as receipts, and the tally of the quantity on hand as indicated by the bin card should at all times agree with the actual quantity of the material contained within the bin. Upon the accuracy with which this record is kept in a large measure depends the subsequent accuracy of all records, and the store-tenders should immediately report any discrepancies in order that prompt adjustment may be made.

No material should be disbursed without proper order or requisition duly signed by proper authorities. Forms IV and V are suitable. Form IV is a straight storehouse order calling for date, quantity and units of quantity, and description of materials required, and indicating expense or other account number to be charged with the materials. As this order is filled by the store-tender, he should mark in the space provided the bin number from which the materials have been disbursed. Form V is a requisition for material calling for approximately the same information, but addressed to the purchasing agent as well as to the storekeeper. This form may be accepted by the storekeeper as a straight storehouse order provided he has in stock the particular kind of material for which it calls. If he has not and does not wish to lay in a stock, this requisition may be forwarded to the purchasing agent as his authority for buying the materials to be subsequently charged directly without passing through the stores accounts.

From the storehouse order (Form IV) or the requisition for material (Form V) in the storekeeper's office, a record of the disbursements is entered on the credit side of the stock card (Form III), showing the following detail: Date of issue, book and order number of the



STOREROOM ORDER

Book No.............. Order No.............. Date.............................191...

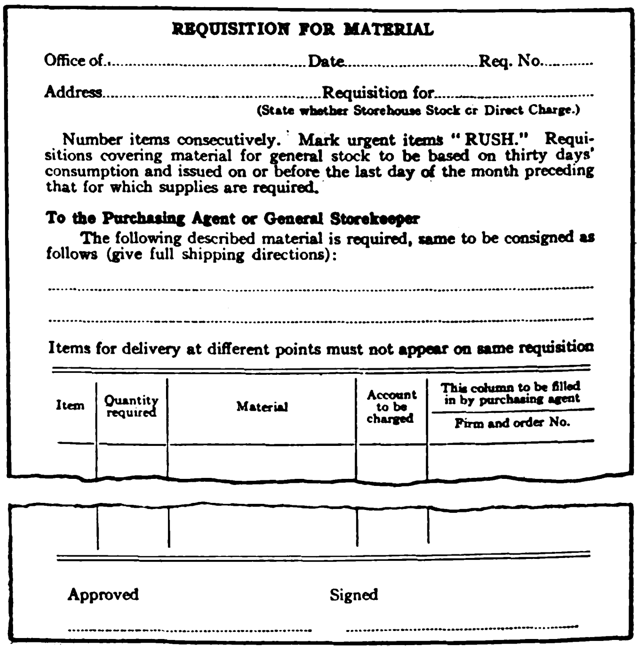
Quantity	Unit	DESCRIPTION	Bin	Card	Price	Amount	Charge account

Filled by.............................Received by............................. Total

Credit account.............................Signed............................. *Foreman*

Approved............................. *Superintendent*

CONTINUOUS INVENTORY—FORM IV—SHOWING ORIGINAL STRAIGHT STOREHOUSE ORDER (9 IN. X 4⅜ IN.) FOR MATERIALS AND ACCOUNT TO BE CHARGED



REQUISITION FOR MATERIAL

Office of.............................Date.............................Req. No............

Address.............................Requisition for.............................

(State whether Storehouse Stock or Direct Charge.)

Number items consecutively. Mark urgent items "RUSH." Requisitions covering material for general stock to be based on thirty days' consumption and issued on or before the last day of the month preceding that for which supplies are required.

To the Purchasing Agent or General Storekeeper

The following described material is required, same to be consigned as follows (give full shipping directions):

....

....

Items for delivery at different points must not appear on same requisition

Item	Quantity required	Material	Account to be charged	This column to be filled in by purchasing agent Firm and order No.

Approved............................. Signed.............................

CONTINUOUS INVENTORY—FORM V—SHOWING ORIGINAL REQUISITION (8⅞ IN. X 11 IN.) FOR MATERIAL ADDRESSED TO PURCHASING AGENT

Bin No.......................... Card No.......................... Classification..................................

RECEIPTS								BALANCE ON HAND			DISBURSEMENTS						
Date	References		Shipper	Quantities		Price Per Unit	Value	Quantities		Value	Date	References		Quantities		Price Per Unit	Value
	P. A. Order	Audit No.		Number	Unit			Number	Unit			Req'n No.	Audit No.	Number	Unit		

CONTINUOUS INVENTORY—FORM VI—SHOWING RULING AND CAPTIONS OF LOOSE-LEAF STOCK MATERIAL LEDGER (19 IN. X 10½ IN.)

storehouse order and the requisition number, the distribution of accounts, and the quantity, units of quantity and unit price of the material disbursed. It will also be observed that the stock card (Form III) provides a column in which to indicate the balance in quantities of the materials on hand. The balances on these cards should at all times agree with the balances indicated upon the bin cards (Form II).

The receiving tickets (Form I), after entry upon the debit side of the storekeeper's stock card (Form III), should be attached to the shipper's invoice covering the materials, and should be forwarded to the accounting department. Likewise, the storehouse orders (Form IV) and the requisition for materials (Form V), which may have been honored by the storekeeper, are also forwarded to the accounting department. These records form the bases of debits and credits in the final stock material ledger, kept in the accounting department.

Form VI shows a loose-leaf stock material ledger, which in its captions indicates bin numbers, stock card numbers and classification by names, which invariably should be identical with those in the previously described records. In the accounting department on the debit side of the ledger are entered the receipts showing dates, purchasing order numbers or other reference numbers, names of shippers, quantities and units of quantities, unit prices and total values. These entries are based upon the original receiving tickets substantiated by the shipper's invoice, and should there be any discrepancy between the two, they should then be adjusted. On the credit side of the stock material ledger should be entered the disbursements, indicating the dates, requisition or other reference numbers, quantities and units of quantities, unit prices and total values, this record being compiled from the individual storehouse orders or requisitions. At this point the money values of each storehouse order or requisition are computed and extended in the accounting department, based on the unit prices paid as indicated on the debit side of the stock material ledger. Should the unit prices vary from time to time, a careful averaging of such prices will insure accurate valuations.

In the center column of the stock material ledger are provided spaces to indicate balances of the quantities and money. The quantity balances should agree with the quantity balances indicated on the stock card (Form III) and on the bin card (Form II). A simple method of insuring this agreement is to make frequent tests in the following manner: The store-tender in honoring a storehouse order (Form IV) or a requisition (Form V) indoses on the back of it the quantities remaining in the bin after he has made the disbursement. This storehouse order or requisition, as it is entered on the stock card (Form III) in the storekeeper's office and subsequently on the stock material ledger in the accounting department, gives the stock-card clerk and the stock-ledger clerk an opportunity to compare balances.

The committee stated that it had before it the records of one member company in which the system described had obviated the necessity of taking a physical inventory for more than seven years. During the year ended Dec. 31, 1914, with transactions of receipts and disbursements aggregating $2,500,000 and involving a total stock value of approximately $300,000 of materials classified under several thousand different names, the net adjustment of stock material values amounted to only $85. In concluding the committee emphasized the fact that the value of the final result depends almost entirely upon the prompt and painstaking accuracy with which the initial records and the subsequent entries are made.

The report was signed by F. H. Sillick and Charles Rufus Harte, co-chairmen; M. W. Glover, C. H. Lahr, J. C. Collins, H. A. Gidney, Martin Schreiber, C. H. Clark, J. P. Ripley and J. P. Barnes.

LIFE OF RAILWAY PHYSICAL PROPERTY

The committee on the life of railway physical property reported that it had seemed unnecessary to take up any new phases of the subject referred to it. It is co-operating with the sub-committee on bibliography of the American Association committee on valuation, and expects later to furnish members with a bibliography which will bring its 1912 list down to date.

Past endeavors have convinced the committee that any attempt to collect from member companies any data concerning the life of railway property which can have any ultimate value is merely a waste of effort, at least until such time as data concerning actual conditions shall have been gathered and have stood the test of varied and conclusive experience. The complicated character of the factors which enter into the life of railway physical property was thoroughly discussed by the committee in its 1913 report. Therein the committee set forth the following basic elements affecting the usefulness of such property: (a) Use; (b) climatic and soil conditions; (c) maintenance; (d) inadequacy; (e) obsolescence; (f) the human element; (g) the public demand, and (h) earnings.

In the committee's opinion a study of this list and a consideration of the further complications and variations resulting from local conditions are sufficient to demonstrate the futility of attempting to gather figures of the life of railway property which shall be generally applicable or which may be "averaged," "compiled" or even "compared" except after the fashion of rule-of-thumb. It appears utterly futile to attempt to gather the experience in regard to a great number of units after the manner of human mortality tables. It is mere guesswork to fix the time when any given unit will go out of service, and therefore idle to construct any scientific conclusions upon such a basis. It may be argued that, as with human life tables, it is possible to take a large number of experiences and by averaging them secure an "expectancy." Even if that were true, the time is yet far distant when the industry will have existed long enough to make available sufficient experience to form a basis for such expectancy. The youth of the art and its rapid development make any experience thus far obtained of little value.

The committee believes, therefore, that any estimate of future life, whether regarding an individual unit or a group, is at best a guess and an uncertain and inconclusive one. It notes with satisfaction that there seems to be on the part of regulating commissions, valuation experts and other authorities an increasing recognition of the soundness of this belief. Less and less weighty seems to be the theory that it is possible to predetermine how long a certain unit of property will continue to give service, either through an examination of its own condition or by a comparison with other similar units, which in other places and under other conditions (no matter how similar) may have completed their usefulness. Such a predetermining process is at times necessary, but even then it is coming to be generally recognized as merely an estimate that is largerly a matter of judgment rather than of scientific determination.

The report was signed by Robert N. Wallis and Martin Schreiber, co-chairmen; A. R. Patterson, W. H. Forse, Jr., R. F. Rifenberick and J. H. Hanna.

FINAL ACCOUNTANTS' ADDRESSES

After the joint engineering-accounting session the Accountants' Association in its final meeting listened to three addresses by Paul Shoup, president Pacific Electric Railway, Los Angeles, Cal.; John F. Forbes, C.P.A., of Haskins & Sells, San Francisco, Cal., and Henry Rand Hatfield, professor University of California, Berkeley, Cal.

In opening his subject of "Treatment of Charges for Rent of Tracks and Facilities and Rent of Equipment," Mr. Shoup took advantage of his presence with the accountants to mention some of the problems which executives would like to have the accountants solve for them, such as what actually, not theoretically, becomes of the fund created by depreciation charges when the need for the depreciated article or any substitute therefor has passed, and others of an equally perplexing nature. Mr. Shoup spoke highly of the depreciation fund, saying that a very respectable depreciation fund rather elbowed the sinking fund out of the way. It is true that there should be some provisions in mortgages looking to certain conditions being fulfilled before dividends are paid or property alienated, but perhaps the time will come when there will be provisions not for a sinking fund but for a depreciation, obsolescence and amortization fund that shall take precedence over any dividend payments and shall be reinvested for the company's benefit. In relation to the particular subject of rents, Mr. Shoup advanced some arguments based upon his company's experience in favor of treating rents as fixed charges rather than operating expenses, following steam railroad practice. In the following discussion Mr. Ham described the national situation in regard to this question and the disadvantages, complications and burdens that would result from treating rents otherwise than as operating expenses, in view of the great diversity of conditions between urban and interurban developments.

Mr. Forbes' topic was "The Importance of Accrued and Accruing Accounts from the Viewpoint of the Certified Public Accountant." He pointed out that financial statements should be considered in their entirety, for items which alone have one meaning will have their significance greatly altered. when read in relation to other items. Mr. Forbes presented details illustrating how operating expenses may be stated in such a way as not to permit the accounts to fulfill their function of furnishing a basis for intelligent comparisons. He devoted special attention to railroad commission expenses, depreciation and taxes, and said that interest on bonds is the one accruing account almost invariably handled properly.

Professor Hatfield, who is the author of well-known works on accounting, had for his subject, "Some Neglected Problems in Electric Railway Accounting." He advanced some interesting new ideas concerning some important fundamental problems that have received special consideration by public utilities since the advent of commission regulation. In discussing the basis for valuation he rejected some of the theories which have been most prominently advanced and said that attempts to form a principle resting on equity have led to hopeless confusion. In the case of public utilities a consideration more fundamental than equity is that having to do with the attraction of capital for developments. This brings up the question of risk, as well as the important one of new competition. Professor Hatfield pointed out the inconsistency of allowing high returns as an offset for possible losses and then demanding that the high rates be reduced in the few cases where the enterprise proved successful. The neglected phase of the valuation problem, therefore, concerns the question of whether the investor is to take risks or whether the public is to go along at a dead level, foregoing the economies coming from new inventions. Professor Hatfield then discussed the real nature of the difference between capital expenditures and charges against revenue.

END OF PROCEEDINGS

After these addresses the association took up the reports of convention committees and on motion of Mr. Kilfoyle, amended by Mr. Neal, voted to dispense with the committee on overhead charges. This action, in line with the recommendation in the President's address, was deemed advisable in view of the fact that under the Interstate Commerce Commission classification future overheads are definitely covered. Mr. Kilfoyle as chairman of the resolutions committee then presented the various resolutions of thanks, and Mr. Neal read the report of the nominating committee.

In accordance with the latter report, new officers were elected as follows: President, T. P. Kilfoyle, auditor Cleveland (Ohio) Railway; first vice-president, L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; second vice-president, H. A. Culloden, secretary and auditor Pacific Electric Railway, Los Angeles, Cal.; third vice-president, G. C. Whitney, chief clerk Washington Railway & Electric Company, Washington, D. C.; secretary, M. R. Boylan, general auditor Public Service Railway, Newark, N. J.

The following members, besides the officers, were chosen for the executive committee: H. B. Cavanaugh, auditor Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio; P. V. Burington, secretary The Columbus Railway, Power & Light Company, Columbus, Ohio; F. E. Webster, treasurer Massachusetts Northeastern Street Railway, Haverhill, Mass., and F. H. Sillick, comptroller Hudson & Manhattan Railroad, New York.

Sessions of Engineering Association

Committees Reported on Lightning Protection, Standards, Power Distribution, Equipment, Buildings and Structures, Power Generation, Way Matters, Heavy Electric Traction and Electrolysis and Other Subjects—Wood Preservation Discussed—President Crecelius Scores Neglect to Use Association's Standards

Program for Monday

Annual Address of the President.
Annual Report of Executive Committee.
Annual Report of Secretary-Treasurer.
Reports of Committees:
  Lightning Protection—D. E. Crouse, chairman.
  Standards—H. H. Adams, chairman.
  Power Distribution—A. S. Richey, chairman.

Program for Tuesday

Reports of Committees:
  Block Signals for Electric Railways—J. M. Waldron, chairman.
  Joint Sub-committee on Block Signal Rules—L. H. Palmer, chairman.
  Transportation-Engineering — Co-Chairmen: R. N. Hemming and P. N. Jones.
  Equipment—W. G. Gove, chairman.
  Buildings and structures—C. F. Bedwell, chairman.

Program for Wednesday

Reports of Committees:
  Engineering-Accounting—Co-chairmen: C. R. Harte and F. H. Sillick.

L. P. CRECELIUS
President

Wednesday—Continued

Reports of Committees (continued):
  Life of Railway Physical Property—Co-chairmen: Martin Schreiber and R. N. Wallis.
  Constitution and By-Laws.
  Power Generation—J. W. Welsh, chairman.

Program for Thursday

Reports of Committees:
  Way Matters—C. S. Kimball, chairman.
ADDRESS—"Some Factors Affecting the Application of Wood Preservation to Electric Railways," Carlile P. Winslow and Clyde H. Teesdale.
Reports of Committees (Continued):
  Heavy Electric Traction—E. R. Hill, chairman.
  Electrolysis—A. S. Richey, chairman.
General Business.
Report of Committee on Resolutions.
Report of Committee on Nominations.
Election and Installation of Officers.
Installation of Officers.

Monday Afternoon Session

PRESIDENT L. P. CRECELIUS opened the San Francisco convention of the American Electric Railway Engineering Association on Monday, Oct. 4, 1915, with a vigorous address, in which he scored the failure of electric railways to take full advantage of the standards that had been adopted by the association, and outlined the vast scope of the committee work accomplished during the past year.

"The past year," he said, "differs from former years of our association's activities, I believe, only to the extent that matters which have been pending for some time have in the majority of cases been brought to a successful conclusion by our various standing committees. This is evidenced by the report of the committee on standards. The association is now in a position to take on a considerable amount of new work, and is therefore in need of subject matter for investigation by these committees. I have pointed out before that the subjects for consideration must be important and timely and of more than purely local interest. They should comprise matters of vital interest to the electric railway industry as a whole. Minor questions should be submitted to the *Aera* Question Box, which has been found in the past year to be a very profitable source for the interchange of ideas. Our membership seems to have shown considerable interest in it, and this feature of the *Aera* is commended to your consideration. Examination of the reports of our various standing committees indicates the interest, thoroughness and good work accomplished during the year. Accordingly, all credit for the successful outcome of the recommendations contained therein belongs to our members and to the representatives of the manufacturers who have participated in the preparation of these reports.

"There are two matters of paramount interest which I desire to bring to your attention and which, in my opinion, must receive the very earnest consideration of our association. They are, first, the question of arousing more interest in the use of our standards and recommendations which are now available to all, due to the distribution of the Engineering Manual; and second, membership.

"In regard to the first matter, a sub-committee of the committee on standards was appointed to investigate the extent to which the standards and recommendations of the Engineering Association were being used by the member companies. Conditions revealed by this investigation were very unsatisfactory and indicated that our standards are not being used as much as the great value of this work justifies. Now, it seems that advantage should be taken of important work of this character. It must be that member companies fail to appreciate that this work is carefully prepared by the ablest men in our association and thus is of immense value. It follows, therefore, that a primary duty of the association will be to bring this question to an issue and to devise ways and means by which the great importance of our standards will be brought home to the member companies for the purpose of stimulating interest in their use.

"In regard to the question of membership, there has been pointed out in former addresses the great desirability of a large membership in the association, and undoubtedly this is so well understood that the point need not be made again. In line with this question, however, the officers of this association and the American Association have hit upon the plan of including company section members in the membership of the association under an arrangement which, it is felt, will induce a very large class of individuals to join. To make this possible it was necessary to add an amendment to the constitution of the Engineering Association, which will be submitted to this convention for approval. The matter, however, should not end here, and every member of the association is urged to give the question of membership his personal attention. The secretary-treasurer's annual report on the finances, when presented for your consideration and approval, will indicate that the expenses incurred by the Engineering Association are somewhat larger than last year. This was not due, however, to the fact that the affairs of the association have been less economically administered. It was due altogether to the very large amount of co-operative work with other societies and associations, requiring frequent and prolonged conferences by our representatives.

The scope of the Engineering Association's activities is reflected by the following statement of co-operative work carried on with other societies and associations: (1) In connection with the preparation of a National Electrical Safety Code by the National Bureau of Standards, regarding which a number of conferences have been held. (2) Representation on the national joint committee on overhead and underground line construction, the activities of this committee having been very pronounced during the past year. (3) Discussion on clearances for heavy electric traction with the American Railway Association and the American Railway Engineering Association. (4) Electrolysis, with representation upon the national joint committee upon this subject. (5) Fire protection rules and car wiring, in connection with the National Fire Protection Association. (6) Cable stranding, with the American Institute of Electrical Engineers. (7) Standards of design for block-signal apparatus, with the Railway Signal Association. (8) Consideration of the boiler code of the American Society of Mechanical Engineers.

"In addition to the large amount of work indicated above, the details of which fell to the lot of the representatives of our various committees, they have also found time to cover fully the questions submitted to them by the executive committee and included in reports which are to be considered by this convention. Consequently the year has been a very busy one for our standing and special committees. I have the further pleasure to report that the committee on standards has finally included in its report a proposed schedule of regulations covering the style of specifications to be adopted by the association, and you have already observed by examination of the advance copies of the reports that this year marks an epoch in that the committee on power generation has been successful in bringing forward valuable recommendations to be adopted by the association.

"To sum up, the year's work has been found to have been one of unusual activity in regard to co-operation with other societies upon very important questions and in the completion by our standing committees of many matters pending from previous years. It follows, therefore, that the duties devolving upon the secretary and his office force have been unusually heavy, and I have great pleasure in calling attention to the very able and satisfactory manner in which this has been taken care of by him. In closing, I desire to express again my great appreciation of the honor you have conferred upon me, and I wish to add that I will always have a deep interest in and regard for the welfare of the Engineering Association."

The report of the executive committee of the Engineering Association was then presented by Secretary-Treasurer Burritt, who read the minutes of the meeting held on Nov. 10, 1914, and recorded in the issues of the ELECTRIC RAILWAY JOURNAL for Nov. 14, 1914, page 1103, and Dec. 12, 1914, page 1301. He also gave the results of two letter ballots, one under date of March 4, 1915, directing that the joint committee on engineering accounting, Engineering Association branch, consider the continuous inventory as covering the entire physical property of electric railways rather than stock materials alone, and the other dated Aug. 18, 1915, approving the amendment of the constitution to provide for the new proposed grade of company section members.

As secretary-treasurer of the Engineering Association Mr. Burritt reported that the expenditures had exceeded the appropriation of $4000 by $459.13, largely due to the numerous meetings of the national joint committee on overhead and underground line construction. He gave the following data:

EXPENDITURES DURING PERIOD FROM OCT. 1, 1914, TO SEPT. 30, 1915

Executive committee	$333.78
Committee on building constructions	105.65
Committee on electrolysis	60.92
Committee on equipment	512.36
Committee on heavy electric traction	......
Committee on lightning protection	221.05
Committee on membership of purchasing agent	......
Committee on nominations	......
Committee on power distribution	749.28
Committee on power generation	425.76
Committee on standards	287.02
Committee on subjects	20.85
Committee on way matters	856.37
Meeting of the American Society for Testing Materials	22.65
Committee on block signals	235.75
Committee on engineering accounting	68.86
National joint committee on overhead and underground line construction	496.38
Committee on transportation engineering	43.35
Miscellaneous	19.10
Total	$4,459.13
Engineering Manual	715.42
Proceedings	2,557.83
Total	$7,732.38
Proceedings (accounts payable)	540.88
Grand total	$8;273.26

The total membership on Sept. 15 was 1871, exactly the same as on Oct. 1, 1914.

Both of these reports were approved as read, after which E. J. Blair, Electrical Engineer Chicago Elevated Railways, and Charles Rufus Harte, Construction Engineer The Connecticut Company, were appointed as a committee on resolutions.

LIGHTNING PROTECTION

The report of the committee on lightning protection was then read in abstract by Mr. Blair, who explained the recommendations in detail. In this report the committee presented data and recommendations on lightning arresters and their installation on cars and on the line. Definitions of the following five types of arresters offered for use on car equipment were given: Multipath spark-gap type; resistor-rod, spark-gap, magnetic type; resistor-rod, spark-gap, mechanical circuit-breaker type; condenser type with shunted resistance and series spark gap, and electrolytic type. For equipment purposes it was recommended that the choke coil should be made of at least ten turns of wire wound on a wooden core with a mean diameter of 5 in.; that the lightning arrester, of whatever type, and the choke coil should be located as near the trolley base as practicable; that the leads to the arresters should not be less than No. 6 wire, the connections being first mechanically strong and then soldered; that a system of inspection be adopted which will provide ample assurance that the lightning arrester is constantly in good order, and that the flashover point of the arrester be set at a voltage as close to the maximum operating voltage of the system as practicable.

Attention was directed to the fact that the lightning protection feature had not been sufficiently considered in connection with car wiring, which may be easily arranged so as to jeopardize the equipment in spite of use of the most efficient lightning arresters. It was therefore recommended that any connection which permits the lightning current to closely parallel controller cables should be avoided; that the placing of a wire carrying lightning current near and parallel for any considerable length to a wire where damage can be done by an induced charge should be avoided; that the carrying of a lightning arrester connection which extends from the roof of a car to an arrester situated near the floor of the car directly back on itself to the top of the car to a circuit breaker or other connections to the apparatus should be avoided, and that wires connected to the opposite terminals of a lightning choke coil should never be brought within 12 in. of each other.

On the subject of lightning arrester grounding the committee believed that, with a view of preventing induction, the proper location for the car arresters is on the roof. The following recommendations on this subject were also made: That the size of wire used in lightning arrester grounds should not be smaller than No. 6 and that the wires should be of copper; that the ground wire should be separate from other car ground wires and should be as short and straight as possible; that the wires in the lightning-arrester circuit should not be run in conduits and, when possible to avoid it, they should not be run adjacent to magnetic material; that all wires in lightning-arrester circuits should have their connections well soldered, and in case steel cars are used that the lightning-arrester ground should be connected to the nearest steel structure after the fact has been established that this point of connection has intimate and continuous contact through the steel framing of car and ground connections to the motor frame.

Consideration of data secured by the preceding committee indicated that the use of line lightning arresters materially aids in protecting car equipment. Present practice consists in installing from two to seven arresters per mile, about five per mile being the most common practice and this, under ordinary conditions, should give satisfactory results. After describing the different types of line arresters in common use the committee reported its conclusions as follows: Any arrester for use in line service should be compact, rugged and mounted in a well-made weatherproof box. It should also be so designed that an inspection of all parts is easily feasible. The protection afforded by arresters on overhead lines is as important to the safety of car equipments as it is to the trolley wires and stations. An arrester which is to be placed in service for line protection should have as an inherent quality a positive ability to disrupt or prevent the dynamic arc. Any failure in this respect would result in a short-circuit which, owing to its possible remoteness, might prove difficult of detection.

On the subject of line lightning-arrester grounding, regarding which the various interests have not been able to agree, it was recommended that line lightning-arrester ground wires should be connected to a good earth ground and also to the track rail except under the following conditions: Where the current flow on the connections from track rail to earth would exceed an average of ¼ amp. during any twenty-four-hour period, this average being determined by considering the algebraic sum of the currents, and where a.c. track block signals of the double-rail type are used. Where the foregoing exceptions exist, and in order to prevent doing away with the rail connections, it was suggested that the connection be made from the line lightning arrester to both earth ground and track rail, but that there should be installed in the circuit between the point where the rail connection joins the lightning-arrester ground wire and the earth ground itself a suitably-designed air gap. The committee thought that under some conditions it would be perfectly safe to make the solid connections to both rail and earth without the air gap, but had not sufficient information from signal manufacturers to warrant qualification of the recommendation. The committee explained in detail the reasons for the recommendations and included the results of tests made by Prof. Adolph Shane, of the State University of Iowa, giving resistances of various types of grounds. The report stated that the resistances of lightning arrester grounds less than 5 ohms cannot be expected and even under good conditions they may be as great as 50 ohms. Interurban and suburban track well ballasted with rock or coarse gravel may be considered as insulated for the purposes of lightning protection, whereas interurban and suburban tracks not carefully ballasted and sometimes in intimate connection with the upper surface of soil and ordinary city track furnish an added assurance of a good ground connection. On the well-ballasted class of track the connections from rail to earth ground are more necessary for lightning protection than on the other two types, but on the other hand, the objections to the connection will exist more often on such construction.

The committee recommended that the ground connection should be of solid copper wire, not less than No. 4 in size, securely fastened to the back of the pole and, except as noted, well bonded to track rails and either extended as a ground coil or well soldered into a ground pipe. In any case at least 8 ft. of the lower exposed portions should have a non-metallic protection, and any change in direction of the ground wire should be made by easy curves.

The report was signed by D. E. Crouse, chairman; E. J. Blair, J. Leisenring and F. R. Phillips.

In the discussion F. I. Fuller, Vice-president Portland Railway, Light & Power Company, stated that no line or car lightning arresters are used in Portland, Ore. In reply to an inquiry as to how often the inspection of lightning arrester equipment should be made, Mr. Blair pointed out that, in addition to the periodical tests, there should be a general inspection after each electrical storm. Replying to an inquiry as to whether the work of this committee would be continued, Mr. Crecelius explained that, although the work of the committee on lightning protection was at an end, the equipment, power distribution and other committees would carry on the work in a general way.

STANDARDS

The report of the committee on standards was then abstracted by W. G. Gove, superintendent of equipment Brooklyn Rapid Transit System, who pointed out that this report was submitted as a first draft which would doubtless be improved in the course of adapting it to general needs. He explained the need of standards in line with those which had been approved by other engineering organizations that have already devoted considerable study to similar subjects. Mr. Crecelius warmly commended the work of the committee on standards, whose report was then adopted with a vote of thanks. An abstract of the report follows:

The Engineering Association committee on standards reported that in addition to its work of approving the standards and recommendations of the standing committees it had investigated the extent to which association standards and recommendations are being used and had drafted a style for the make-up of specifications. The results of the canvass to determine the extent to which the standards are being used was not satisfactory and another canvass was considered necessary. Regulations governing the style of specifications were proposed, and it was stated that the association's recommended specifications on splice bars for girder and high T-rails and for the manufacture of open-hearth girder and high T-rails were in general constructed in accordance with these regulations. Appended to the proposed regulations was a list of standard abbreviations, symbols, etc.

The committee recommended for adoption as a standard a design for a spectacle for left-hand, upper-quadrant, 90-deg. semaphore signals, for which a drawing was given.

In general the committee indorsed the recommendations of the several standing committees as covered in their respective reports. The following items covered the most important independent actions of the committee. The standards committee recommend that the specifications for concrete poles be incorporated in the Engineering Manual; that the standardization rules of the A. I. E. E. be given further study, as they have been revised since being considered by the committee; that the standard clearance diagram for semaphore signals be referred back to the committee on block signals for joint consideration with the committee on heavy electric traction; that the boiler code of the A. S. M. E. be referred back to the committee on power generation for further consideration; that the general specification and form of contract for railway structures be disapproved as not suitable for adoption as a standard or a recommendation; that action on type "C" track construction will be withheld until after the convention; that the proposed classification of soils be not adopted as recommended practice but that it be inserted in the manual under "Miscellaneous Methods and Practices"; that the change of the title "Recommended Symbols for Recording Surveys" to "Conventional Signs for Recording Surveys" and the adoption of the signs used by the Interstate Commerce Commission with modifications superseding the present recommendation be disapproved and that the matter be referred to the executive committee for consideration jointly with other committees in order that all symbols may be included in the revision; that the recommended design of rolled-steel wheels of 2½-in. tread and 21-in. to 37-in. diameter be referred back to the committee on equipment for consideration in conjunction with the design of contour of tread and flange, and for further study as to the thickness of rims.

The above report was signed by H. H. Adams, chairman; Martin Schreiber, vice-chairman; C. F. Bedwell, C. H. Clark, W. G. Gove, J. H. Hanna, E. R. Hill, E. B. Katté, C. S. Kimball, F. R. Phillips, A. S. Richey, W. H. Sawyer and J. W. Welsh.

POWER DISTRIBUTION

The Engineering Association committee on power distribution then reported on the following: Concrete poles, tubular steel poles, specifications for overhead line material, overhead crossings of electric light and power lines, standard stranding cable, rubber-insulated wire and cable for power distribution purposes, A. I. E. E. standardization rules, clearance diagram for semaphore signals, joint use of wood poles and suggestions for succeeding committees.

On the subject of concrete poles it was stated that poles had been made according to the committee's designs during the past year and tested at Rochester, N. Y. The results of the tests showed that in general the theory previously presented was correct, but that the constants involved in the formulas would need to be modified. The data of the tests were given in an appendix and a revised specification was presented. An article by C. L. Cadle on "The Method of Manufacturing Concrete Poles in Rochester, N. Y.," was also given in an appendix. As a result of the tests and the experience of the committee the following facts were recorded: Failure of a pole is always due to stretching of the reinforcing rods on the tension side. A failure is always preceded by the appearance of hair-line cracks in the concrete on the tension side at rather frequent and regular intervals from the ground line up. It is advantageous to use a high grade of reinforcing steel to secure the maximum tensile strength. Plain round reinforcing rods are essentially as satisfactory as twisted or other rough rods because in general the rods will elongate before they slip in the concrete. A larger number of small rods is preferable to a smaller number of large rods on account of the better distribution of reinforcement that may be secured for a given amount of steel and because a greater bonding contact surface is presented to the concrete. The reinforcement need not be uniform throughout the length of the pole, but may be cut off as the top of the pole is approached. A pole with uniform reinforcement will break at the ground line, while one with tapered reinforcement will break off at some point above the ground, depending upon the taper of the reinforcement. A concrete pole has an element of safety in it, as a failure of the pole will not in general allow it to fall to the ground. It is difficult at times to pull over a pole after failure, even though it is inclined at a large angle from the vertical. The committee reported progress only but recommended as follows: That the investigation of the subject of concrete poles be continued; that the material in the report be accepted as a statement of the best practice known to the committee at this time, and that the formulas and tables of the deflections for a square, uniform-section pole presented in previous reports be considered as tentative only and not as final values.

Under the head of tubular steel poles the committee recommended certain modifications of the specifications, the computed deflections, and the pipe tables.

The changes in the specifications recommended were for the purposes of requiring a ground sleeve unless otherwise specified, permitting cold as well as hot swaging of joints, making the detail of joint construction specification more specific, providing for the painting of poles before loading for shipment as general practice, and making more specific the directions for making the deflection tests.

The committee also recommended the substitution of new pole and pipe tables for those previously printed in the Engineering Manual. The pole table gave data for poles in common use, and the pipe table listed thicknesses and weights of pipe which have now been agreed upon by pipe manufacturers. It was stated also that the modulus of elasticity of steel for pole purposes is now well settled at 29,000,000 and this value has been used in computing the deflection given in the pole table. A derivation of cantilever formula more complete than that given on page 13, of the pamphlet *Ds 3a* of the Manual was offered, as the older one applied strictly only to poles of uniform diameter. A set of curves was also given to show graphically the results of calculation by means of the committee's new formula and those used by two manufacturers.

The committee presented a set of specifications for overhead line material which represented results of detailed study of current practice and requirements in this line. These included fifty-five articles and covered general requirements, iron and steel fittings and wood cross-arms, all being illustrated, where possible, with dimension drawings accompanied by tables of tolerances.

In regard to revision of existing specifications the power distribution committee recommended certain revisions of sections 81 and 82 of the recommended specifications for overhead trolley construction in order to meet objections which have been raised and to conform with the ideas of the special committee on lightning protection, the report which is abstracted elsewhere in this issue. A number of other changes in this specification were also made with a view to providing a greater exactness.

The committee's report contained also brief references to the following matters: A statement of the formation of the national joint committee on overhead and underground line construction, with the circumstances leading up to it, was given. A statement was made to the effect that the committee had not approved certain changes in the standard stranding table recommended by the A. I. E. E., and that the president of the Engineering Association has appointed C. L. Cadle and W. W. Brown to represent the association in connection with further consideration of the subject by the subcommittee on stranding of the standards committee of the A. I. E. E., the standards committee having stated that it would recommend the amended table for tentative adoption pending ratification by several associations. It was explained that certain suggestions in regard to the standard specifications for rubber-insulated wire and cable had been received from W. A. Del Mar, chairman of the committee on wire and cable specifications of the Association of Railway Electrical Engineers, but that these had been received too late for action by the present committee.

There was only one comment made by the committee on the A. I. E. E. standardization rules, namely, that it was desirable to point out a definite dividing line between the transmission system, the substation and the distribution system as defined by rules 388, 389 and 390. A brief report was made of the results of conferences with other committees on the subject of a clearance diagram for semaphore signals, as a result of which it was agreed that the committee on block signals should submit this year a revised clearance diagram with certain agreed recommendations. The recommendation was made that the portion of the report of the committee on joint use of poles, comprising the specifications and drawings, be reprinted as a part of the Manual, together with the exact wording of the action of the American Association with regard thereto. The following subjects were suggested for reference to succeeding committees: Further consideration of the subject of concrete poles, including deflection formulas and tables for tapered sections; further specifications for overhead line material including especially a standard thread for pins and insulators and a specification for structural steel cross-arms and fittings; consideration of the use of aluminum cable with specifications; collection of data preparatory to possible standard specifications for high-voltage direct-current and alternating-current overhead construction.

The report was signed by A. S. Richey, chairman; G. W. Palmer, Jr., vice-chairman; E. J. Blair, C. L. Cadle, D. E. Crouse, Charles Rufus Harte, R. H. Rice, Gaylord Thompson, and C. F. Woods.

In discussing this report S. L. Foster, Chief Electrician United Railroads of San Francisco, pointed out a number of details in the specifications for overhead line construction in which the recommendations were not in accord with San Francisco practice. In most cases which he cited the San Francisco standards called for heavier construction. For example, anchor rods were upset at the ends so that the diameter at the base of the thread would equal the full diameter of the rod, ¾-in. bolts were used in several places where the specifications called for ⅝-in. bolts, and iron plates 18 in. square were used instead of wooden dead men. Replying to Mr. Foster's comments, Mr. Harte pointed out that, in preparing these specifications the committee had attempted to select that form of construction which seemed the most agreeable compromise of the standards approved by the various organizations that were interested.

Mr. Crecelius explained that it was not the desire that the committee compile a set of standards which represented the highest degree of perfection yet attained in this construction lest in so doing many companies would seem to be following bad practice. Although one set of standards could not be expected adequately to meet local requirements in all parts of the country, yet it was very desirable that specifications of some form be adopted as standard. There would be two advantages in this, first, it would be in a measure a helpful guide when public utility companies find themselves still more generally under the scrutiny and regulation of public service commissions, and second, it would make for better prices from manufacturers. The action of the committee on standards on each of the eight specific recommendations in the report was then approved by the convention.

Tuesday Afternoon Session

On Tuesday the Engineering Association held a joint session with the Transportation & Traffic Association, at which the subject of block signals was taken up. This is reported under the proceedings of the Transportation & Traffic Association.

EQUIPMENT

After adjournment of the joint meeting the regular sessions of the Engineering Association were continued, and W. G. Gove, Brooklyn Rapid Transit System, presented the report of the committee on equipment. He read also two letters which had been received recently by the committee objecting to certain clauses in the recommendations regarding the specifications for quenched-and-tempered steel axles and for case-hardened gears.

These were the only criticisms that were received. In regard to the former, this subject had received very careful attention by the entire committee, but if the objection was valid it could be incorporated later. The same is true also of the latter subject, and the committee wished it understood that in such a rapidly-developing science changes would necessarily have to be made from time to time. An abstract of the report follows:

The committee on equipment of the Engineering Association presented revised standard specifications for heat-treated and annealed carbon-steel axles, shafts and similar parts, the proposed changes being material in character and the titles being changed to read "Specifications for Quenched-and-Tempered Carbon-Steel Axles, Shafts and Similar Forgings" and "Annealed Carbon-Steel Axles, Shafts and Similar Forgings." In this connection it was stated that certain manufacturing interests have claimed that the minimum requirement of 22 per cent elongation and 45 per cent reduction in area are too severe, requiring drastic treatment. However, the committee has been unable to find any conclusive evidence to this effect and is content that the above minimum requirements are proper and entirely reasonable.

The committee submitted as an appendix to the report a statement on the subject of proof-testing forgings to determine their soundness after being quenched and tempered. This included drawings to show the method of applying the test and a design for a gage to determine the set after testing. A table of the various heights of the drop to be used with different sized axles was also included. The appendix was submitted as a general guide for the members of the association.

The report included a statement from the sub-committee on flexible stranding which had acted with the stranding committee of the A. I. E. E. In this statement the abandonment of the term "extra flexible" was recommended so that, at least for the present, there would be only one degree of flexibility above the present A. I. E. E. standard—this new grade to be known as "flexible." A table of the new grades of flexible cables was appended to the report in order to ascertain whether it met with general approval.

Specifications for gears and pinions were submitted in full in the report, two classes of material, namely, case-hardened and forged carbon steel being covered, as these were the grades in most general use. The specifications, both for gears and for pinions, have been made as broad as possible in order not to impose any unnecessary hardship upon the manufacturer, as it is recognized that a rapid development in gear and pinion treatment is going on at the presnt time.

With regard to the new design of journal brass for heavy electric traction the committee stated that the numerous details involved in the consideration of this subject make it impossible for the committee entirely to complete its investigation and to make a definite recommendation for the present year. However, a great deal of work has been accomplished which will be of value in the future consideration of the subject, and it is recommended that this be continued for investigation by the ensuing committee.

With regard to the long-standing subject of wires and cables for power equipment with special reference to fire protection the committee submitted as an appendix to its report a revision of the code rules on car wiring, the committee having been informally advised by representatives of the electrical committee of the National Fire Protection Association that that organization would immediately promulgate these proposed rules if approved by the American Electric Railway Engineering Association.

A revision for the specifications for air-brake hose which was presented in the report involves changes in several minor details such as the use of three-ply instead of four-ply hose for the ¾-in size and the use of ¾-in. in place of the ⅞-in. size wherever this appears. With regard to the design of the limit of wear gage for wheels the committee stated that it has considered various types, including the limit gage recently adopted by the Central Electrical Railway Association. Up to the present time, however, the committee has not been able to design a satisfactory form of gage that will be generally acceptable and it is recommended, therefore, that this subject be continued for investigation by the ensuing committee.

In connection with the revision of steel-wheel designs the committee submitted sheets covering detailed dimensions of rolled steel wheels with diameters of 21 in. to 37 in., inclusive, for adoption as recommended design. A study of this matter has developed the fact that there is considerable dissatisfaction with the present standard design of tread and flange contour, and inquiry has brought the information that the contour of flange shown on the association's standard drawings is used only to a small extent. The wheel designs, therefore, carry the present tread and flange contour and are arranged to fit the present standard axle, but the committee recommends that the ensuing committee on equipment be instructed to investigate and report on the advisability of a change in the standard tread and flange contour, this being particularly desirable in view of the action of the Central Electric Railway Association in adopting a standard contour of its own which is different from that of the Engineering Association's standard design.

The report covered also a review of the standards contained in the Manual, in which it was recommended that the standard brakeshoe be revised because of the fact that the line of pressure of the brake head on the shoe is not properly located and produces uneven wear. The standard for height of platforms for city cars was recommended for elimination. The recent development in small-sized motors necessitates that the design of axle for such motors be standardized and it was recommended that this subject be referred to the ensuing committee. With regard to the standardization rules of the A. I. E. E. the committee recommended that they be referred to the association for approval in so far as they affect the scope of the committee on equipment.

Action was taken by the committee on standards regarding the various recommendations of the committee on equipment as follows: Revision of specifications for quenched-and-tempered carbon-steel axles, shafts and similar forgings approved as a standard; revision of specifications for annealed carbon-steel axle shafts and similar forgings approved as standard; specifications for case-hardened forged-steel gears and pinions and for quenched-and-tempered forged carbon-steel gears and pinions approved as a recommended specification; revision of specification for air-brake hose approved as a recommended specification; dimensions of rolled-steel wheels of 2½-in. tread and from 21 in. to 31 in. in diameter referred back to the committee for consideration in connection with the design of contour of tread and flange and further study as to thickness of rim, the same action being taken with regard to the standard design for 3-in. and 3½-in. treads; revision of tread and flange contours referred back to the committee for further study; the proposed rules for car wiring and the report on proof-testing of forgings approved for inclusion in the Manual; elimination of standard height of platform for city cars now shown in Manual approved; standardization rules of A. I. E. E. referred back for further consideration in view of the fact that they have been further revised by the A. I. E. E. since their consideration by the committee.

The report of the committee on equipment was signed by W. G. Gove, chairman; W. E. Johnson, W. W. Brown, R. H. Dalglish, F. W. Garrett, F. R. Phillips, R. M. Hemming and L. N. Clark.

BUILDINGS AND STRUCTURES

The committee on buildings and structures then made its report. General specifications and form of contract for railway structures, provision for expansion and contraction in restrained concrete structures, fire protection rules and the design of a standard fireproof substation building of 1000-kw. capacity were the subjects presented. The form of general specifications and contracts submitted by the 1914 committee were revised somewhat, the "Agreement" portion being greatly shortened. Certain other changes were made in the form to protect the owner in case of action for damages. This revised form was submitted for adoption as a recommended specification, but was disapproved by the standards committee, inasmuch as it was thought that the specification and form of contract were not suitable for adoption as a standard.

Provisions for expansion and contraction in restrained concrete structures of both the plain and reinforced type were submitted for discussion and an expression of opinion from the convention as to what special features would be desirable for future study. Numerous examples of methods of providing for expansion and contraction were illustrated in the report, particular attention being given to illustrate the methods used for various portions of restrained and unrestrained structures. Rules for fire protection were again considered by this year's committee and the general fire rules as presented at the 1914 convention were recommended to the committee on standards for their approval. Fire protection rules as relating to heating apparatus were also presented by this year's committee. Both sets of rules were approved by the standards committee.

The report was signed by C. F. Bedwell, chairman; R. C. Bird, L. C. Datz, J. H. Frank, F. H. Miller, William Roberts, H. G. Salisbury, Terrence Scullin and H. G. Throop.

The recommendations of the committee on standards on this report were then read and approved. E. J. Blair, Chicago Elevated Railways, spoke of one reference in the report of the committee on buildings and structures to the proposed safety rules of the Bureau of Standards at Washington, and urged members of the association to communicate any suggestions they might have to A. S. Richey, chairman of the committee on power distribution. C. W. Stocks, statistician American Electric Railway Association, explained that the committee in charge of these rules had held a meeting in Washington on Sept. 29-30, and expected to hold another in New York on Oct. 6, at which representatives of the bureau would be present. He explained he had copies of the rules at convention hall for the inspection of anyone.

H. J. Kennedy, San Francisco, in commenting on the report on buildings and structures, criticised the proposed design of substation as being cramped, and Charles Rufus Harte, the Connecticut Company, agreed with him. In reply Mr. Stocks said he understood the design to be that of an actual substation.

A vote of thanks was then passed to the committees on equipment and on buildings and structures for the comprehensive reports they had presented.

Wednesday Afternoon Session

At the Wednesday afternoon session of the Engineering Association, following the joint session with the Accountants' Association which is reported as a part of that association's proceedings, the secretary read the report of the committee appointed to recommend the previously-mentioned changes in the constitution and by-laws, which was then adopted. The report of the committee on power generation was abstracted by the secretary, this being given in part in the following paragraphs:

POWER GENERATION

In its report to the Engineering Association the committee on power generation departed from its custom for several years past of presenting individual papers. The committee aimed instead to make specific recommendations regarding practices and standards, and in consequence, submitted an analysis of steam-power station costs, which elaborated the standard classification of accounts of the Interstate Commerce Commission in so far as this applied to the cost of manufacture of steam power. The I. C. C. classification numbers, 45-47, 50, and 52-56 were used as a basis, all definitions appearing in the I. C. C. classification applying under the subdivision classifications, but the I. C. C. numbers had added to them sub-numbers, according to the Dewey decimal system. The matters of engineering and operating data records and of the information that should be recorded on various blanks and forms were also discussed, together with the details of cost records covering the operation of any particular power plant.

The committee submitted as a proposed standard for the association specifications for lap-welded and seamless boiler tubes, and these were approved by the Association's standards committee. Specifications for the purchase of fuel were also outlined, these being in the form of a contract made out in blank for furnishing coal to an electric railway company. The purchase of power station lubricants by specifications was discussed at length, several existing specifications being cited and analyzed. It was considered, however, that a rigid specification, covering the physical and chemical characteristics of lubricants is inadmissible at the present time, and only a tentative form of specification was presented.

The standardization rules of the American Institute of Electrical Engineers were then taken up by the committee. Owing to the somewhat radical changes relating to the ratings of apparatus, a matter which affects all purchasers of electrical machinery, it was recommended that the rules should be submitted for the consideration of the members of the association, rather than by the members of the committee alone. In connection with this suggestion, however, the committee on standards recommended that the subject be given further consideration in view of the fact that the rules have been further revised by the A. I. E. E. since their consideration by the power generation committee.

As appendices to the report there were submitted a method of analysis of steam power station costs which included a standard set of charts to illustrate the variable factors entering into the final result, and also a method for determining standard values for B.t.u., ash, and sulphur in coal that is used for fuel.

The report was signed by J. W. Welsh, chairman; R. J. S. Piggot, A. B. Stitzer, E. D. Smith, W. H. Roberts, G. H. Kelsay, E. H. Scofield and Fay Woodmansee.

Following the presentation of the report there was read a written communication upon it from E. H. Scofield, engineer power and equipment, Twin City Rapid Transit Company. He suggested that since the report was prepared as a basis upon which to make further investigation of the subject, it would be highly desirable for five or six separate plants to arrange to exchange data. This could then be gone over collectively for the purpose of formulating a plan for carrying out plant analyses which would be generally acceptable as a standard. In commenting on the great detail of the report E. J. Blair, electrical engineer Metropolitan West Side Elevated Railway, Chicago, thought that care must be taken to avoid too great detail in analyses of this sort lest the system become unduly complicated. Charles R. Harte, construction engineer Connecticut Company, agreed in general with this view but pointed out that while the refinements need not be followed by the smaller companies it would, nevertheless, be desirable to specify the lines which the more minute analyses should follow in order to render comparable the records of plants where minutæ were important. In reply to an inquiry as to the basis of comparison that had been found most suitable for oil and coal fuels it was suggested that the number of

British thermal units per kilowatt-hour would be most convenient, although the method of burning the oil would be found to influence results. Formal action was taken by the Engineering Association on two specific recommendations of the power generation committee, namely, that which prescribed specifications for lap welded and seamless boiler tubes, this being adopted as a standard specification; and that which prescribed specifications for the purchase of fuel, this being accepted for publication in the Engineering Manual. In commenting upon the adoption of the report as a whole, the chairman pointed out that the secretary had received a surprising number of requests for boiler-tube specifications and stated that he believed the work of the committtee would be very generally useful to member companies.

Thursday Afternoon Session

On Thursday afternoon the report of the committee on way matters was presented before the Engineering Association. In this it was stated that failure to secure the approval of the committee on standards for the four recommended types of track foundation submitted at the 1914 convention had made further consideration of this subject necessary.

WAY MATTERS

The recommendations of the committee were based upon the consensus of opinion of track engineers as obtained through communications. Through the courtesy of the engineering department of the United Railways & Electric Company of Baltimore, Md., the committee obtained an analysis of the track construction used in forty-one cities, nearly all of which had a population of more than 100,000. An analysis of these data resulted in the following percentages on a mileage basis for the types of construction submitted in the 1914 way committee report:

Type 2	23 per cent	1,718.1 miles
Type 3	2 per cent	142.5 miles
Type 4	47 per cent	3,415.9 miles
Type 5	21 per cent	1,531.4 miles
Type 6	3 per cent	253.9 miles
Modification Types 3 and 4	4 per cent	278.8 miles

An analysis on the basis of preferences gave the following percentages:

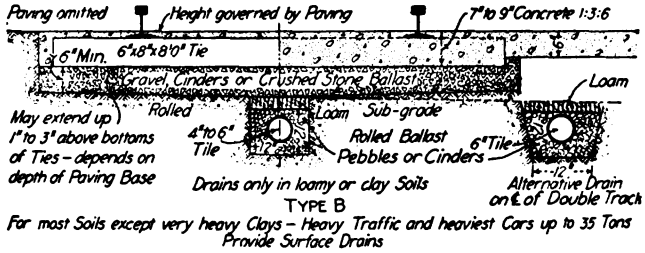
Plain ballasted construction	62 per cent
Solid concrete construction	21 per cent
Concrete slab sub-ballast construction	5 per cent

Additional information concerning bearing power and classification of soils was included in this year's report. Attention was directed to the great variety of designs in track construction for paved streets now in use. In an appendix a number of typical designs were presented for the purpose of record. Based upon an analysis of the information available, the committee recommended the elimination of Type D, or solid-concrete track construction, substituting therefor Type C, or the concrete slab sub-ballast construction. The committee also recommended the elimination of Type A because it was special. It was also the opinion of the committee that the proper classification of soils found in average city streets was desirable, and that way engineers should make an analysis of the soils before deciding what was the proper type of foundation to be used.

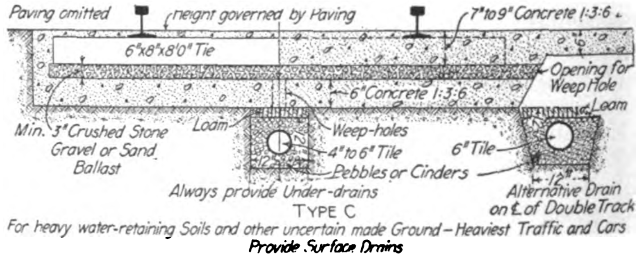
Two types of track foundations were submitted for adoption as recommended designs, Type B construction submitted in the 1914 report with slight modifications, and Type C as submitted in the same report. The Type C, or the concrete slab sub-ballasted construction was recommended for conditions of soil that required a form of construction that would distribute the load over the sub-soil more effectively than the ballasted construction. Of the two types of track foundation that were thus recommended the committee on standards adopted Type B or the ballasted construction, and withheld its approval of Type C until this type of construction had been discussed by the delegates at the convention.

PAVEMENT

The selection of the proper pavement in the track allowance, the committee believed, was one of purely local character and in most instances as local as individual streets. It was consequently recommended that each installation be investigated carefully. The conditions to be considered should include the vehicular traffic, the car traffic, the grade and crown of street the class of property adjacent, the ability of the company to afford the best material, the type of rail, and the proximity and cost of material. It was the consensus of opinion of the committee that the unit type of pavement was superior to the monolithic or sheet pavement and, based upon the relative usefulness of various kinds of paving in the track allowance, pavement materials were graded as follows: Granite block, Medina sandstone block, treated wood block, brick, scoria block, asphalt block, sheet asphalt, bitulithic, bituminous macadam, sandstone block and water-bound macadam. No attempt was made to grade concrete pavement, because the committee believed that it had been in use so short a time that little was known of its utility.


Paving omitted
Height governed by Paving
7" to 9" Concrete 1:3:6
6" Min.
6"x8"x8'0" Tie
Gravel, Cinders or Crushed Stone Ballast
Loam
May extend up 1" to 3" above bottoms of Ties – depends on depth of Paving Base
Rolled
4" to 6" Tile
12
Loam
Sub-grade
Rolled Ballast
Pebbles or Cinders
6" Tile
12
Drains only in loamy or clay Soils
Alternative Drain on ℄ of Double Track
TYPE B
For most Soils except very heavy Clays – Heavy Traffic and heaviest Cars up to 35 Tons
Provide Surface Drains

TRACK CONSTRUCTION FOR GENERAL USE


Paving omitted
Height governed by Paving
7" to 9" Concrete 1:3:6
6"x8"x8'0" Tie
Opening for Weep Hole
6" Concrete 1:3:6
Loam
Min. 3" Crushed Stone Gravel or Sand Ballast
Loam
Weep-holes
4" to 6" Tile
12
Pebbles or Cinders
6" Tile
12"
Always provide Under-drains
Alternative Drain on ℄ of Double Track
TYPE C
For heavy water-retaining Soils and other uncertain made Ground – Heaviest Traffic and Cars
Provide Surface Drains

TRACK CONSTRUCTION FOR UNSTABLE SOILS AND UNDER HEAVIEST TRAFFIC

The study of pavements and pavement materials led the committee to draw the following conclusions: "Too much stress cannot be laid on the methods of installation of any paving because so much of the wear and life of paving depends on its proper installation, and after installation its inspection and maintenance." For the consideration of future committees it was recommended that a specification be formulated to cover the manufacture and installation of various types of paving which may be used in connection with the car tracks. Such a specification should include the proper foundation, type of filler and cushion.

Acting upon the recommendation of the 1914 committee, this year's committee took traffic counts in seven cities: Chicago, Cincinnati, Washington, Brooklyn, Syracuse, Montreal and Anderson, Ind. In the opinion of the committee these counts indicated that the form submitted in the 1914 report did not answer entirely the requirements of taking traffic counts from the street-railway standpoint. Accordingly a new form was recommended. The committee was also of the opinion that the principal item of interest to street railway engineers was the proportion of traffic which the track space bears to the remainder of the roadway. The traffic counts indicated that there was no definite relation between the width of roadway, kind or condition of pavement, class of vehicular traffic and kind of rail. It was noted, however, that a smaller percentage of traffic used the track allowance on the wide roadways than on the narrow ones. It appeared that habit had more bearing on the use of the track space by vehicular traffic than any other cause. The committee concluded that traffic counts, to be of any value in the selection of pavement, should be carried over a series of years during the life of the pavement, a record being made during the original construction of the sub-soil, drainage, kind of paving, foundation, foundation of the track, kind of rail, the manner in which the paving was laid, quality of the material, the vehicle and car traffic, the habit of the vehicles in keeping in the roadway or track space, the kind and quality of the paving material, the subsequent rate of wear, if possible to obtain, and the points where deterioration occurs and its causes. A general summary of the traffic counts taken in tabulated form accompanied the report.

Special Work Specifications

The way committee, co-operating with a committee representing a number of the important special-work manufacturers, presented general specifications for three types of special work, namely, solid manganese-steel construction, cast steel with hard center and rolled rail arms, iron bound with hard center. It was also recommended that this subject be continued, and that standard specifications for the types of special work not covered, as well as several important matters in connection with standard layouts, be considered by future committees. These specifications were recommended for adoption and were approved for insertion in the Manual by the standards committee.

The revision of recommended designs of 7-in. and 9-in. joint plates with special reference to sizes of bolt holes and fits was considered in detail, and the committee was unable to secure tests from which definite conclusions could be drawn. It, therefore, recommended the continuance of the subject. It also considered the question of joints for plain girder rails and submitted recommended designs for 7-in. 80-lb. and 7-in. 91-lb. plain girder rails. These were approved by the standards committee.

Recommended Changes in the Manual

This year's committee reviewed the existing standards and recommendations contained in the Manual. It was the committee's opinion that the symbols for recording surveys as shown in the Manual were too small to be of practical use and it recommended as a substitute the conventional signs for recording surveys adopted by the American Railway Engineering Association and the Interstate Commerce Commission, with such modifications and additions, however, as were necessary to make them apply to electric street and interurban railways. The standards committee disapproved the recommendations of the way committee that these symbols be adopted as recommended practice, and referred the entire subject to the executive committee for consideration jointly with other committees so that all symbols could be included in the revision. Other important revisions in the Manual included the withdrawal of the designs for standard section rails as shown in the Manual and the substitution therefor of 80-lb., 90-lb. and 100-lb. standard sections. The 7-in., 100-lb. plain girder rail was withdrawn as a recommended design because there had been no demand for it. The 7-in. 91-lb. plain girder rail, which was very widely used, was substituted for this heavier section.

The committee recommended the 80-lb., 90-lb. and 100-lb. per yard, standard-section rail for general track construction on private right-of-way and for streets where the type of pavement permitted. For track construction for light service in connection with deep-block pavement, a 7-in. plain girder rail weighing 80-lb. per yard was recommended, and in similar construction but for heavy service the 7-in., 91-lb. per yard plain girder rail was recommended. For track construction for heavy service in connection with deep-block pavement in congested sections of narrow city streets where the vehicular traffic was largely confined to the pavement in the track allowance, the committee recommended the association's standard grooved girder rails. All of the recommendations of the committee for revisions in the Manual as regards plain and grooved girder rails were approved by the standards committee.

The report was signed by C. S. Kimball, chairman; E. H. Berry, R. C. Cram, C. W. Gennet, Jr., W. F. Graves, E. M. Haas, H. F. Merker, L. A. Mitchell and E. P. Roundey.

Following presentation of the report W. D. Chamberlain, assistant engineer United Railroads of San Francisco, said that his company had had very good results from the Trilby type of rail. They were using one weighing 106 lb. per yard.

A. E. Harvey, chief engineer Metropolitan Street Railway, Kansas City, said that the type of construction used in Kansas City was almost identical with that recommended by the committee. He considered the matter of drainage very important, and spoke in favor of the use of brick as a pavement because it was very simple to repair. He doubted the advisability of including the composition for special work in specifications. The proposed specifications included not only the required composition but told what the material must do, and if the desired results are obtained the composition is unimportant. He doubted whether the design for the joint plate shown with the 7-in. rail would stand the strain where high-grade bolts were used. Finally he made a strong plea for standardization in special work, and said that his company had recently had occasion to ask for bids and found a great difference in prices quoted for special work for the first casting and for succeeding castings. With standardization a saving of from 16 per cent to 25 per cent might be obtained.

B. P. Legare, chief engineer maintenance of way and construction United Railroads of San Francisco, described the track construction used in that city. Drains are used only in certain localities. Good results have not been obtained with brick, probably because a good quality of brick was difficult to obtain in the Pacific States. He considered a 9-in. rail better than a 7-in. rail because two lines of bolts could be used.

Edward M. Boggs, consulting engineer, Oakland, Cal., strongly indorsed the use of drains, which he believed to be almost as important as the rails themselves. Sometimes when the water has a flow of marked direction a drain is advisable outside the track on the uphill side, but usually the drains should be under the center of each track rather than one put between the tracks. In any soil except sandy soils money for drains is well spent.

E. J. McIlraith, Seattle, Wash., said in that city the railway company had adopted as standard a solid concrete construction without crushed stone. It appealed to them because, with a cushion of sand or with ballast, vibration could not be prevented and the ties would begin to pump. The company had experienced no difficulty in providing time for the setting of the concrete on the street and rerouted the cars or used temporary crossings. He recommended that greater care should be taken to line up and smooth the under surfaces of the special work. Generally the upper surface was carefully prepared, but little attention was given to the under surface.

E. B. Entwisle, chief engineer Lorain Steel Company, referred to some slight changes which he would like to suggest in specifications for special work. These were in the size of the test piece and in the time of its heat treatment as the specifications required a heat treatment with the special-work casting. He also strongly indorsed the statement of Mr. Harvey in regard to standardization and said that each section of rail required for the special work some forty different types of patterns, which the manufacturers not only had to make but had to store until they were used. Mr. Chamberlain said that San Francisco practice indicated a 7-in. rail to be generally unsatisfactory. In one instance a 7-in. 106-lb. rail with eight bolts in a single line at each joint had been laid adjacent to 9-in., 137-lb. rails with twelve 1-in. bolts. The latter required no repairs after several years, although it had been necessary to repair the joints in the 7-in. rails.

In closing the discussion on the paper, Charles H. Clark, engineer maintenance of way Cleveland Railway, said that 1⅛-in. plates on 7-in. rails would not buckle and would doubtless eliminate much joint trouble on such construction. He pointed out that a 7-in. rail is really stronger than a 9-in. rail because of the greater overturning moment of the latter. Wood pavements had been made standard in Cleveland, he said, because they had been found to outlast brick pavements three to one. Five-and-one-half-inch granite paving blocks are large enough for all depths of pavement and smaller blocks are now being recommended by some manufacturers.

He agreed with Mr. Harvey that it is not feasible to specify what the manufacturer shall put into the rails if the strength tests are also specified. Switches and mates can and should be standardized. The cost of white-oak ties in Cleveland is 83 cents against $1.62 for steel ties, but the latter have been adopted for standard construction. Construction costs have been materially reduced by the use of the steel tie because less work is required in track laying. Although he admitted that a drain under the center of the track was desirable, Mr. Clark had found that trouble was often experienced as a result of the failure to replace such drains when sewer laterals were connected with trunk lines in the street center. He therefore recommended that track drains be placed under the center of the street where they were less likely to be disturbed by conduits of various kinds.

The action of the committee on standards in approving as recommended design the several recommendations of the committee on way matters was unanimously sanctioned by convention action. In addition to the various recommendations appearing in the preliminary printed list, still another recommending the adoption of specifications for special work was approved by the association as a recommended specification and ordered included in the official report.

WOOD PRESERVATION ON ELECTRIC RAILWAYS

In a paper presented by Carlile P. Winslow and Clyde H. Teesdale before the American Electric Railway Engineering Association the authors discussed at length the present situation in regard to the preservation of wood throughout the country in general and outlined the factors that were involved in the technical aspect of wood preservation, paying special attention to the annual costs of treated and untreated timber for various uses. Examples of the method of working out the annual charges on ties for use on interurban lines and for use in tracks laid on paved and unpaved streets were cited to explain the methods commonly used in arriving at these charges, but it was shown that comparatively little data regarding the life of both treated and untreated ties were as yet available.

In general the authors considered that the life of an untreated tie in a paved street would vary somewhere between ten years and twenty years, and owing to the high cost of replacement, the life was a serious matter. With treated ties, however, a life of between twenty years and thirty years was a reasonable assumption, and that possibly even a life of forty years, or twice the life of the rail, might be attained.

The saving involved by the application of preservative treatment to poles was also briefly considered, this being stated to give the largest comparative economy. The authors considered that the brush treatment would add at least three years to the life of the pole and that the open-tank treatment would add ten years and possibly more. On this basis the latter process would involve a saving of from 20 cents to 30 cents per pole per year.

As a summary in conclusion the authors stated that track in paved streets appeared to offer the widest proportionate field for the application of a preservative treatment to ties, owing to the heavy expenses involved by renewal. With the exception of poles to be used in inaccessible localities, the use of treated poles was generally recommended, even a two-coat brush treatment generally producing economy. The lack of published authentic data covering the life of various species, both treated and untreated, in the various conditions to which the woods are subjected by the electric railway companies, permits of no accurate determination of the economic aspect in the use of treated material. In consequence the authors recommended a systematic collection, compilation and analysis of the results obtained for the various companies throughout the country, and suggested action to this effect on the part of the American Electric Railway Association.

HEAVY ELECTRIC TRACTION

The several recommendations of the committee on heavy electric traction were approved as recommended by the committee on standards after the presentation of this report and the report as a whole was adopted, the thanks of the association being extended to the committee for its diligent work. This report is abstracted below:

The committee on heavy electric traction of the Engineering Association submitted in its report a minor revision in the standard diagram for clearance lines for third-rail working conductors, and also submitted a standard definition for third-rail gage whereby this is described as the distance measured parallel to plane of top of both running rails between gage of nearest running rail and inside gage line of third-rail. The committee recommended two designs for use in connection with third-rail protection, one of which is the overrunning third-rail protection used by the Pennsylvania Railroad and the other being the under-running rail protection of the New York Central Railroad.

The committee also presented a compilation of data on general types of electric locomotives. An analysis of the tables submitted with this indicates that of the total of 301 domestic locomotives listed, 38 per cent are used in connection with 600-volt d.c. third-rail operations, the remaining 62 per cent being used in connection with some form of overhead trolley. Of the locomotives using overhead contact 72 per cent are operated in connection with a.c. systems.

The practice of using forced ventilation was stated to be becoming quite general, especially where a.c. or high-voltage d.c. equipments are used, a distinct weight and cost economy resulting which more than justifies the provision and maintenance of the blowing apparatus.

A great divergence appears in practice in the design of the mechanical parts of the locomotives, especially in the wheel and arrangement and the method of drive. For high-speed operation leading and trailing wheels are provided on the majority of the roads. In some cases, even where the speeds are low but where the line contains numerous curves, it has been thought advisable to provide trucks to prevent oscillation and excessive side pressure. The majority of foreign locomotives use two-wheel trucks. However, the latest type of New York Central locomotive has the guiding truck equipped with motors.

Four methods of drive are cited: (1) Motors mounted rigidly on the axles, a design which makes it obviously impossible to carry the motor on springs. (2) Motors geared to the axles either directly or through quills and driving springs, a scheme that provides practically no flexibility transversely although the motors may be spring mounted. (3) Motors geared to jackshafts which are in turn connected with the driving wheels by means of side rods, this scheme providing spring support for the motors with the maximum amount of flexibility and freedom of movement that exists with steam locomotives. (4) Motors connected to jackshafts by means of main rods, and drivers connected to jackshafts by means of side rods, a plan which has the same flexibility of mounting as the previous case but which has been used in this country only for the high speed service of the Pennsylvania terminal in New York.

It is the opinion of those who use motors located on or near the axles that the high center of gravity which is claimed to produce improved riding qualities is not necessary to give good riding qualities provided that the running gear is so designed as to avoid setting up of an oscillatory tendency.

An interesting feature of electric locomotive practice is the fact that the weight for driving axle ranges from 30,000 lb. to 55,000 lb.—considerably less than the axle weight used for steam locomotives, which ranges from 40,000 lb. to 68,000 lb. Another important feature of the mechanical design of electric locomotives is the short rigid wheelbase which ranges from 6 ft. 6 in. to 13 ft. for domestic locomotives. Also, as the source of the power for the operation of electric locomotives is not on the locomotive itself, but is in the power house, it is feasible to construct electric locomotives with almost unlimited power or capacity by providing a sufficient number of driving axles and motors.

In conclusion it may be said that electric locomotives have been built and operated to perform every kind of railroad service in excess of the maximum capacity for which steam locomotives have been built for similar service. It is, however, too early to attempt to standardize electric locomotives either electrically or mechanically. The report was signed by E. R. Hill, chairman; C. H. Quinn, J. M. Bosenbury, W. S. Murray, Hugh Hazleton and E. B. Katté.

ELECTROLYSIS

The report of the committee on electrolysis was then presented by E. J. Blair, electrical engineer Metropolitan West Side Elevated Railroad Company, Chicago, who explained that the committee had consulted with and assisted the national joint committee on this subject and was now awaiting the further action of that body. The report of the national joint committee would pave the way for further action on the part of the Engineering Association's electrolysis committee whose continuation be recommended. The last-named commitee reported that it had been represented by E. J. Blair on a special committee on lightning protection which had agreed to certain limitations as to allowable current flow over a lightning arrester ground connection joining track and ground. Thus, as the committee on electrolysis believes that no appreciable harm can result to foreign sub-surface structures with the current specified (0.25 amp., average), it has at least tentatively approved the proposition of the special committee.

In explanation of the position taken by the electrolysis committee, it may be said that the committee was principally concerned in the matter of grounding lightning arresters, and has heretofore been opposed to the grounding of the same arrester to both earth and track rails, on account of the feeling that the use of the proposed plan might add to the current on sub-surface structures. Other committees, however, such as those on power distribution and equipment, have favored the connection of line lightning arresters to both an earth ground and the track rail on account of the more efficient protection which might be secured thereby.

The committee also called attention to a typographical error in the pipe resistance tables as printed in connection with the report appearing on page 379 of the 1913 *Proceedings*. In the lower, right-hand corner of the pages 138, 136 and 146 should read respectively 13.9, 13.9 and 14.8. The report was signed by A. S. Richey, chairman; E. J. Blair, E. B. Katté and G. W. Palmer, Jr.

After discussion in which H. P. Bell, C. R. Phenecie and S. L. Foster participated the report of the committee on electrolysis was accepted.

NEW OFFICERS

C. H. Clark then presented the report of the nominating committee, in accordance with which officers were elected as follows: President, John Lindall, superintendent rolling stock and shops Boston Elevated Railway Company, Boston, Mass.; first vice-president, F. R. Phillips, superintendent of equipment Pittsburgh Railways Company, Pittsburgh, Pa.; second vice-president, G. W. Palmer, Jr., electrical engineer Bay State Street Railway Company, Boston, Mass.; third vice-president, W. G. Gove, superintendent of equipment Brooklyn Rapid Transit System, Brooklyn, N. Y.; secretary-treasurer, E. B. Burritt, New York. Members of the executive committee in addition to the officers were elected as follows: E. R. Hill, consulting engineer Norfolk & Western Railway, New York; C. S. Kimball, engineer maintenance of way Washington Railway & Electric Company, Washington, D. C.; C. L. Cadle, electrical engineer New York State Railways, Rochester, N. Y., and C. F. Bedwell, assistant engineer Public Service Railway Company, Newark, N. J.

Transportation and Traffic Meetings

Committee Reports on Rules, Schedules, Block Signals, Accident Prevention by Motion Pictures, Freight and Passenger Traffic, Handling Fares and Training Employees Were Among the Matters Discussed During the Convention of the Transportation & Traffic Association

Program for Monday

Annual Address of the President.
Annual Report of Executive Committee.
Annual Report of Secretary-Treasurer.
Reports of Committees:
  Rules—W. H. Collins, chairman.
  Construction of Schedules and Timetables—Alexander Jackson, chairman.
  Definitions—H. C. Donecker, chairman.
  Transportation - Accounting — Co-chairman: J. K. Choate and M. R. Boylan.

Program for Tuesday

Reports of Committees:
  Block Signals for Electric Railways—J. M. Waldron, chairman.
  Joint Sub-committee on Block Signal Rules—L. H. Palmer, chairman.
  Transportation-Engineering—Co-chairmen: R. N. Hemming and P. N. Jones.
ADDRESS—"Relation of Electric Railways to Agriculture," Paul Shoup.
Report of Committee:
  Standards—L. H. Palmer, chairman.

M. C. BRUSH
President

Program for Wednesday

Reports of Committees:
  Claims-Transportation—Co-chairmen: R. P. Stevens and B. B. Davis.
  Freight and Express Traffic—F. D. Norviel, chairman.
  Passenger Traffic—P. P. Crafts, chairman.

Program for Thursday

Reports of Committees:
  Fares and Transfers—J. E. Duffy, chairman.
  Training of Transportation Employees—C. S. Ching, chairman.
General Business.
Reports of Convention Committees:
  (a) Resolutions.
  (b) Nominations.
Election and Installation of Officers.

Monday Afternoon Session

THE sessions of the American Electric Railway Transportation & Traffic Association convention in San Francisco began on Monday, Oct. 4, 1915, President M. C. Brush calling the meeting to order at 2 p. m., and presenting the annual presidential address. In this he said in part:

"The organization of the committee on standards is one of the most important steps which the Transportation & Traffic Association has taken since its organization. This committee has before it the work of standardizing the methods and practices now in vogue in the transportation and traffic end of the industry, and there can be no doubt but that, as time progresses, the results of this committee's work will be of increasing value. An important function of this committee is to encourage the use of correct methods and to bring these out into definite shape as standards for the guidance of the industry. Briefly stated, the purposes of this committee are: (1) The handling of standards and recommended methods and practices. (2) The consideration of reports of committees prior to their printing for presentation to the convention. (3) The compilation and editing of the transportation manual and the syllabus of proceedings.

"Another departure this year is the formation of a joint committee with the Claims Association. This committee has conducted an interesting investigation on the use of moving pictures. In view of the wonderful development of the moving-picture art, the recommendations brought out by the committee are particularly timely. The committee urges that the investigation be continued next year.

"The committee on training of transportation employees has done an important work in the compilation of State laws on various subjects which are now on file in our office for the benefit of member companies. Its recommendations as to a program for improving courtesy on the part of trainmen, on certain questions of discipline and on watch inspection methods will, doubtless, meet with the approval generally of those in charge of our companies.

"The committee on rules has done some valuable work. It is interesting to note that the number of our member companies who are not using the standard codes is but a very small percentage of the whole. The joint sub-committee on block-signal rules has made notable progress in the preparation of the block-signal code, covering all types of signals.

"The committee on passenger traffic presents some interesting data in connection with the subject of one-man car operation. In its investigation of the effect of privately-owned automobiles on interurban and suburban roads the committee was unable to obtain any specific results, as the companies generally have made no systematic study of this question. It would seem desirable that next year's committee be instructed to continue this study.

"The report of the committee on fares and transfers shows that companies generally are giving little thought to any improvement in the methods of issuing transfers. The committee presents an interesting study on fare collection on center-entrance cars and includes an instructive comparison of various prepayment methods. It also makes some timely comment on the use of fare boxes.

"The work of *Aera* deserves hearty support from all hands. I urge a more general contribution to the Question Box. This is a valuable feature of the magazine which should be made use of consistently.

"There is before the Transportation & Traffic Association for action a proposed amendment to the constitution to provide for a new class of individual members consisting of company section members. I desire to emphasize the importance of the change in the constitution and urge its adoption. The marked success of several companies in creating company sections is of decided interest, and I cannot too strongly urge other companies to follow the examples already set."

Secretary Burritt then read his annual report, showing an existing membership of 634 enrolled in the Transportation & Traffic Association.

The report of the committee on rules was read by W. H. Collins, Fonda, Johnstown & Gloversville Railroad, this being given in abstract in the following paragraphs.

RULES

The committee on rules of the Transportation & Traffic Association recommended that the following rule and note concerning the display of markers be substituted for present rule 104 covering rear-end signals: "The following signals will be displayed, one on each side of the rear of the train and as markers to indicate the rear of the train: By day, green (or yellow) flags or marker lamps not lighted; by night, green (or yellow) to the front and sides and red lights to the rear except when the train is clear of the main track, when green (or yellow) lights must be displayed to the front, side and rear: Note: It is recommended that on roads where one-car trains are operated no markers be used by day."

The committee recommended again to the convention the rules for classification signals, which were submitted by the 1914 committee, as a substitute for the present rules 105, 106 and 107. The changes consisted in the use of flags in addition to lights at night and their location at the middle of the front end of the train instead of at the height of the markers.

With regard to the investigation of the flagging rule in accordance with the instructions of the 1914 convention, the committee recommended the following addition to rule 159 after the first sentence: "If unable to get dispatcher where a train register is maintained, the train may proceed on its time-table rights, executing all train orders." The committee is of the opinion that the present rules represent best practice in connection with flagging procedure, and the block signal rule has been changed to agree with this, as shown in the report of the joint committee on block signals.

In accordance with the resolutions passed by the executive committee at its meeting on Oct. 12, 1914, the committee on rules is now in a position to pass upon any question of train-order interpretation submitted to it through the secretary of the association. One such question of interpretation has been acted upon and the matter has been referred to the executive committee for its approval.

The committee also renewed the recommendation made before the 1913 convention with reference to rule 113 of the interurban code. This covers the present slow-speed signal, which consists of a yellow flag by day and a yellow light by night placed beside the track to indicate that the track is in condition for speed not to exceed a limited number of miles per hour. The proposed rule plans for the addition of a green flag and green light on the same side of the track to indicate that normal speed may be resumed, the objection to the old rule being that the use of yellow for two indications, first as a caution signal and second as a signal to resume normal speed convey conflicting information and on double tracks might not be observed because the present signals are placed on opposite sides of the track.

An appendix to the report provides a joint index which shows by numbers the rules of the two codes, city and interurban, which are either similar or in a general way cover related subjects. This permits the combining of the two codes.

The report was signed by W. H. Collins, chairman; L. H. Palmer, vice-chairman; Edward Dana, W. R. W. Griffin, Sam W. Greenland, C. E. Morgan and W. C. Callaghan.

Referring to proposed rule 104, and after discussion by H. A. Nicholl, Union Traction Company of Indiana, and L. H. Bradley, Stone & Webster Management Association, the rule was adopted after elimination of the words "or yellow" appearing in parenthesis. The note under rule 104 was omitted. After discussion the three proposed revisions of the rules for classification signals were approved except for the elimination in each of the words "at the middle," these applying to the location of the signal on the front end of the train. The association then adopted the code of rules as standard with the amendments as made at the San Francisco convention.

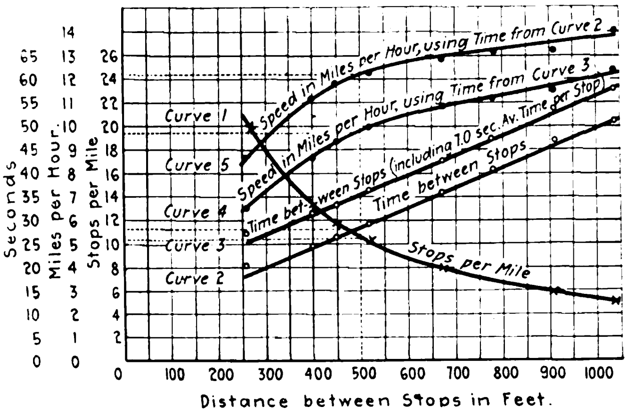
Following this the report of the committee on schedules and time-tables was presented in abstract by the secretary. This report, after considerable discussion on the subject of near-side stops, skip stops, elimination of time points and traffic counts, was accepted as a progress report with instructions to the incoming executive committee to continue a committee on this subject. An abstract of the report follows:

SCHEDULES AND TIME-TABLES

The report of the committee on construction of schedules and time-tables before the Transportation & Traffic Association took up in detail a number of subjects of special importance at this time. A résumé of the practice in telephone train dispatching on four different city railways was submitted in tabular form, together with an outline of the method of operation which involved no unusual features. All of the companies believed in the advisability of using private branch telephones in connection with the telephone dispatching system, claiming that the private phone is serviceable in cases of emergency when the regular dispatching phone between termini is not available. The advantages of the telephone dispatching system over schedule operation were said to be that constant supervision is obtained over all the lines at all times, that a record is available of the location of all cars operated all day, and that an uneven headway is quickly noted, making it possible to space cars better under extraordinary conditions. In addition, two of the companies claim decreases of 50 per cent and 66 per cent respectively in the force of street inspectors. However, the committee did not feel justified in making any recommendation on the telephone dispatching system at the present time and believed that the subject deserved further consideration.

The report contained also a remarkably clear and concise description of a method for taking, recording and filing traffic data obtained from traffic counts. This covered the use of observers, known as car timers, who are stationed along the line at the points of maximum load, transfer points to other lines, points of divergence and terminals, and they record the car number, time of arrival and load for each car as it passes. Every line is covered at least once in two weeks and the large trunk lines at least once a week. Charts are prepared from the data thus obtained. Another method of developing traffic data was cited in connection with the preparation of "distribution charts," similar to the diagrams that have heretofore been referred to as "characteristic curves" in the ELECTRIC RAILWAY JOURNAL. According to the committee, these, when properly taken and recorded, allow a much deeper study into the elements which govern traffic. In their preparation two observers may be placed on each car, one at the front platform and the other at the rear. At each stop throughout a trip each observer records the street, the time and the number of passengers boarding and leaving. One of the observers is supplied with a stop watch and with this he records the length of stop in seconds. Each trip is then charted graphically. This chart has the length of the trip in miles, to scale, as a base, and as a vertical scale shows the passengers boarding and leaving. A continuous algebraic sum of the boarding and leaving passengers can be developed to give a load line, and the stop-watch record can be developed to show the average length of stops and the average passenger interchange. The committee considered that charts of this type are invaluable.

Possibly the most important subject discussed in the report was that of the influence of stops on schedule speed. As a result of several thousand observations taken on representative city lines of one railway system, the average stop was found to be seven seconds in length, and this value was used in connection with other data in compiling a set of curves to indicate the relation between the number of stops per mile, the speed of the car and the time required to cover the distance between stops. In preparing these curves the time required for covering different distances was noted, from which the speed between stops was computed and plotted against the distance between stops, as was the time consumed between stops. Then using the average length per stop of seven seconds, and adding to this the time consumed between two consecutive stops, the speed was computed for this time and distance, and as before, plotted against the distance between stops.



RELATION BETWEEN STOPS PER MILE SCHEDULE SPEED AND OTHER FACTORS

In the accompanying chart, curve No. 1 represents the number of stops per mile in relation to the distances between stops. Curves Nos. 2 and 3 indicate the time required to run between stops, No. 3 including the average stop of seven seconds. Curves No. 4 and No. 5 show the speed in miles per hour as calculated from the time shown by curves No. 2 and No. 3 and the distances involved.

The committee took up also the effect of fully vestibuled platform prepayment type cars on scheduled speed, accidents, etc., and presented data obtained from observations timed from the instant that the car came to rest until the car started, regardless of incidental delays of passengers in boarding. For each type of car about 2000 passengers were timed as they were boarding. The accompanying curves show the accumulated average boarding time per passenger on cars with three different types of platform. The curve *A* represents the time for fully-inclosed cars; curve *B* for cars with inclosed platform but equipped with gates instead of doors, and curve *C* for cars with open platforms and without gates or doors. A supplementary curve is made for type *C* from which are excluded observations of all movements during which a full stop was not made. The three cars had available rear platform standing spaces of respectively 26 sq. ft., 28 sq. ft. and 27 sq. ft. In type A the height from street to step was 14½ in. and from the step to the platform 17 in., while for types B and C the respective dimensions were 12½ in. and 17 in. and 14½ in. and 17⅜ in.

The times per single passenger are as follows:

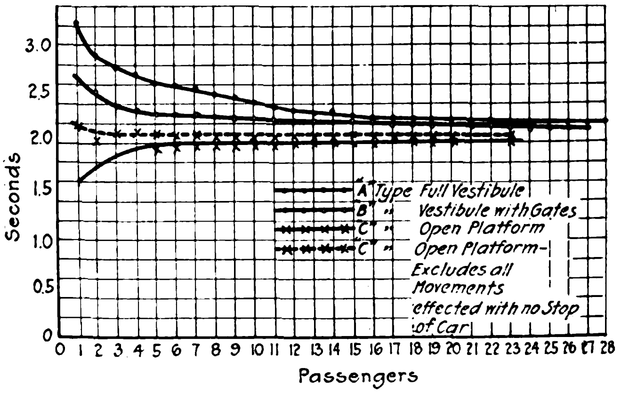
Type A	3.23 seconds per passenger
Type B	2.68 seconds per passenger
Type C	1.59 seconds per passenger

When movements that take place without a full stop of the car are excluded, these values compare as follows:

Type A	3.23 seconds per passenger
Type B	2.68 seconds per passenger
Type C	2.19 seconds per passenger

The average time per passenger when the loads of all sizes are considered is approximately the same in all cases, varying less than 10 per cent between type A and type C. Of course, as the number of passengers per movement increases, the advantage of the open platform diminishes and the loading time approaches closely the values obtained with inclosed platforms.

The committee also submitted data covering fully-vestibuled cars and prepayment cars, these being based on replies to a letter sent to 148 railways. They showed that 80 per cent of the companies used fully-vestibuled cars and that 12 per cent did not use them, 8 per cent failing to reply. Fifty-seven per cent of the companies operated prepayment cars and 31 per cent did not, 12 per cent failing to reply. Sixteen per cent of the companies reported a decrease in schedule speed from the use of fully-vestibuled cars and 13 per cent reported an increase in schedule speed, 71 per cent reporting no change. These companies commented as follows on the effect of fully-vestibuled cars on accidents: Eighty-eight per cent reported a decrease; 1 per cent reported an increase; 11 per cent reported no change. Of these companies 84 per cent used doors and 16 per cent gates. In this connection 59 per cent of the companies allowed platform riding at any time and 14 per cent allowed it when the cars were full.

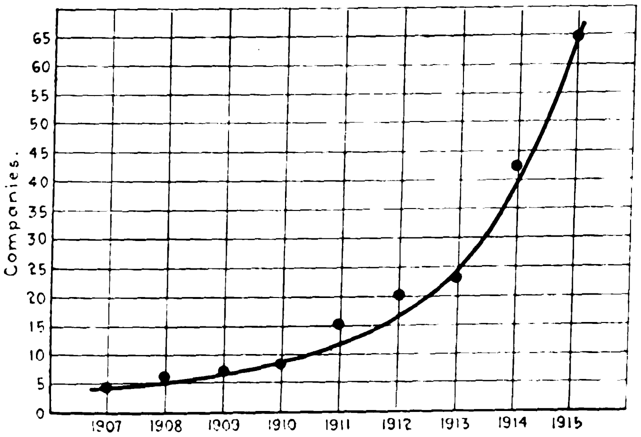


AVERAGE BOARDING TIME PER PASSENGER ON OPEN AND CLOSED-PLATFORM CARS

Another interesting part of the report was that dealing with near-side stops, in which it was said that eighty-seven companies are now using that method of operation. The reasons given for its adoption varied some being voluntary action of the company, some because of ordinance, some because of commission orders, others on account of agreements with civic organizations. A few companies have used near-side stops but have discontinued the practice. The graph on the next page shows the growth of the use of the near-side stop from 1907 to 1915.

The type of car used by the companies operating with near-side stops varies materially. Only 16 per cent of those reporting use the near-side car, which has exit and entrance on the front platform. The majority of companies are operating end-entrance cars and they are of the opinion that this type is satisfactory, since with the entrance at the rear and the exit at the front there is the greatest facility for loading and unloading passengers. It is worthy of notice that some companies using the end-entrance cars with the near-side stop report that this tends to increase the proportion of passengers leaving by the front end. With regard to the effect of the near-side stop on operation opinion was about equally divided as to whether the number of stops was decreased or showed no change. The majority reported no change in speed but a material number reported an increase. No change in power consumption was reported by the majority. Most railways reported a decrease in accidents although some stated that there was no change.

The majority of those using the near-side stop favored it, but seven companies were opposed. Only two of the seven gave reasons against it, one being because the end-entrance cars tended to reduce the speed on account of the passengers having to walk to the rear of the car to board it. The second reason was the trouble resulting from motormen fouling crossings because of the unusually slippery rail with which this company has to contend. However, the consensus of opinion was that neither of the above-mentioned objections is borne out.



GROWTH OF THE NEAR-SIDE STOP

The most common reason given in favor of the near-side stop is that it tends to reduce the number of accidents. Other reasons are that it reduces the number of stops, increases the speed, saves power and reduces congestion. Two companies state that it is so general that transients naturally wait for a car on the near side of the street. Of the companies reported as not using the near-side stops only a few gave reasons for or against its use, about half of them being in favor of the near-side stop and half of the remainder opposing it on account of paving conditions.

The committee stated that valuable information on the subject of near-side stops would be found in the replies of the companies regarding the matter, and that these data, while too voluminous to be included in the report, are on file in the office of the American Electric Railway Association.

With regard to interurban time-tables the committee stated that the data that it had been able to obtain were rather unsatisfactory. However, the present standard form was not considered suitable for several reasons and the preparation of a suitable standard form was one of the most important things that could come before the time-table committee. Because of the large number of subjects referred to it, the committee had not been able to give the matter the attention it required and recommended its reference to the next year's committee.

The report was signed by Alexander Jackson, chairman; J. J. Dempsey, vice-chairman; J. C. Nelson, H. F. Fritch, G. A. Richardson and C. B. Wells.

In the discussion which followed Joseph V. Sullivan, Chicago Surface Lines, pointed out that his company had obtained data in the study of skip-stop operation that differed somewhat from that printed in the report. About twelve stops per mile was the average in Chicago and the loss in time ranged from eleven seconds to fifteen seconds at each stop. President Brush described the detailed study of schedules and service and how it had affected the Boston Elevated Railway. After a thorough study more seats were furnished economically for people when they wanted to ride. N. W. Bolen, Public Service Railway, described briefly that company's service bureau, which included twenty-two men who were engaged in making studies and plotting charts.

Mr. Bradley said that until two years ago the properties in Texas, when complaints were made, had to reply, "We will investigate." This was not right. They are now keeping accurate records of each and every car and can make quick and definite answers to criticisms of service. Complete knowledge of service conditions was most essential in determining how speed could be increased to meet the jitney competition. Messrs. Bolen and Sullivan expressed the thought that the association should take steps to have a thorough study made of the skip-stop plan.

A. B. Merrihew, Los Angeles Railway Corporation. described experiences with the omission of time points on three complete lines in Los Angeles. Cars are started on schedule time and the men are instructed to make the trip as fast as they can without exceeding the schedule speed of the midnight schedule. It is probable that time points will shortly be dispensed with on all lines. The service, as a result of this new practice, has received many compliments from the passengers, headways have been checked and found, in many cases to have been improved. The old men do not run away from the new men because of the supervision given by the instructors, five of which are riding the cars at all times.

W. E. Harrington, Metropolitan Street Railway, Kansas City, said that the jitneys had reduced that company's earnings $3,000 a day. This had been counteracted in part by increasing the schedule speed 2 m.p.h., notwithstanding which increase the accidents had been reduced. The severity of jitney competition had diminished.

W. G. Murrin, British Columbia Electric Railway, stated that the jitneys had caused a loss of 40 per cent in the receipts at Vancouver. In order to meet this loss the schedule speed had been increased approximately 12 per cent. However, he felt that unless time points were maintained car loading would be very uneven due to irregularity in headway.

Thomas Fitzgerald, Cincinnati Traction Company, spoke of the good results obtained by omitting time points on a depot line and thus meeting jitney competition to better advantage. Mr. Fitzgerald also discussed the near-side stop, which, at first, had been put in operation all over the Cincinnati property and later had been changed to the far-side stop in the suburbs because of the condition of the streets. The near-side stop had saved considerable power. Mr. Harrington said that the near-side stop in Kansas City had increased the speed and decreased the accidents. This was also the general opinion of several delegates who discussed the value of near-side stops and set forth their local conditions.

UNIFORM DEFINITIONS

The report of the committee appointed to develop new definitions was read by Joseph V. Sullivan, Chicago Surface Lines, and after discussion the association accepted the report, referring it to the incoming executive committee with the expectation that the work hereafter would be considered as a duty of the American Association so that any definitions formulated would take into account all branches of the industry. The report appears in part below:

The committee of the Transportation & Traffic Association appointed to develop uniform definitions has endeavored this year to make definite progress toward the completion of a code of definitions which might be adopted by the association and put into practical use by its member companies. However, a detailed study has shown that this subject cannot be viewed from the transportation standpoint alone, as a word which has one meaning in one part of the company's organization is often given a different interpretation by one of its other departments. It is therefore thought that no definite recommendation as to definitions should be submitted to this convention but rather, that the association should urge the appointment of a general committee with several representatives from the American and each of the affiliated associations to take up this whole question.

The report was signed by H. C. Donecker, chairman; Frederic Nicholas and William C. Greenough.

Joseph K. Choate, chairman, then stated that the committee on transportation accounting had no report to make and no action to suggest. Hence the joint session was omitted.

Tuesday Afternoon Session

On Tuesday afternoon the joint meeting of the Engineering Association and Transportation & Traffic Association was held, and the joint report on block signals for electric railways was read in part by W. H. Collins, Fonda, Johnstown & Gloversville Railroad, this report being abstracted in the following paragraphs.

BLOCK SIGNALS

The committee submitted designs for a semaphore signal exclusive of the operating mechanism. These were approved as recommended designs for the association by the standards committee. A standard clearance diagram for semaphore signals, in which the undesirable features of the design presented before last year's convention had been eliminated, was also submitted. This diagram was, however, referred back to the committee by the standards committee for conference with the committee on heavy electric traction.

A complete code of signal rules was included in the report, this revision of the existing code being submitted as a progress report only for the guidance of the member companies. In connection with this the committee recommended that provision should be made for representation on the A. R. A. committee that is at present working on a new code for signal procedure. With regard to the point brought up at last year's convention about Rule No. 10 in the code for contactor signals, which covered procedure in case passage under the contactor failed to set the signal, the committee decided that the rule should be restricted to non-registering signals, thus leaving the procedure in the case of registering signals to be determined by special rules suitable to each particular installation.

A review of the subject of light signals followed in which was cited the use of two lenses, the inner one being colored and the outer one of larger size and of clear glass. The lenses are set about 1½ in. apart and a 25-watt concentrated filament lamp is used, giving an increase of some 33 per cent in range while maintaining the same spread of light found with previous arrangements. Another development is the use of a special compound toric lens using a reflector back of a concentrated filament lamp, the reflector being so placed that phantom indications are impossible. With this arrangement lenses 8⅜ in. and 10½ in. in diameter have been tried, the lens being designed in some cases to throw a narrow beam of light which can easily be seen in the day-time at a distance of from 3500 ft. to 4000 ft. The beam-light signals recently installed in the electrified zone of the Pennsylvania Railroad near Philadelphia were also mentioned, it being said that the absence of color to intercept the light from this type of signal makes it possible for the indication to be seen at distances ranging between 3000 ft. to 4000 ft. during the daylight hours.

The committee had been instructed to make a study of signal systems on roads that were signaled from end to end, such study covering maintenance cost, efficiency of operation and effect on traffic. There was found to be a lack of uniformity among different companies in the way in which signal operation data were reported, and this led to the development of a standard signal report form upon which all companies could keep their signal data, with the result that little or no confusion would be found when requests for information were made by succeeding committees. This standard form was submitted with the committee's report, together with a recommendation that it be given a trial. A review of existing standards and recommendations by the committee resulted in a recommendation for but one change, namely, to change the expressions "car counting" and "non-car counting," as applied to contactor signals, to the terms "car registering" and "non-car registering," respectively. The sub-committee having the matter of definition of signal failure under consideration reported progress only as it was found that there was a wide divergence of opinion among operating companies. It was recommended, therefore, that more time be given to the committee for a comprehensive study. The report included also an extensive statement on the subject of highway crossing protection, which has been published in abstract in the ELECTRIC RAILWAY JOURNAL for Jan. 23, 1915.

With regard to the operation of single-track lines by signal indication only, the report stated that for high-speed heavy interurban single-track operation with the track protected by automatic block signals having continuous track circuits, the preponderance of evidence obtained from a large number of representative electric and steam railways, indicates that use of dispatchers and time-card rights, augmented by standard train rules, is the most approved practice. However, development of the art may considerably change the present opinion, as in some instances short stretches of lines are now operated by signal indication only and under the partial direction of a train dispatcher. It is the feeling of the committee that experience may prove it feasible to operate trains by signal indication only, under the partial direction of a train dispatcher or other officer used in a supervisory capacity where proper protective train rules are used, provided the railway is equipped with moden automatic signals whose electrical circuits are free from outside interference.

As appendices to the report there were a bibliography on block signals and several brief descriptions of signal installations made during the past year, these including an extension of the signaling on the Scranton & Binghamton Railroad which has been operating for more than a year by signal indication only and has found this method of operation highly satisfactory. The replies to the data sheet on signal operation, sent out in January, 1915, are also included in an appendix in tabular form, as are also the replies to the data sheet on highway crossing signal installations. Another appendix contains a blank form for a signal estimate data sheet for a.c. track-circuit signals, this being designed for submission by a railway company to a signal company when it is planning to make a signal installation.

The report was signed by J. M. Waldron, chairman; J. W. Brown, vice-chairman; A. E. Roome, H. A. Nicholl, C. D. Emmons, G. N. Brown, John Leisenring and C. H. Morrison.

After discussion the associations approved the recommendations on standard designs for a semaphore signal. The recommendation for a standard clearance diagram for semaphore signals was, however, referred back to the committee for consideration with the committee on heavy electric traction. Charles Rufus Harte, The Connecticut Company, then spoke of the need for closer co-operation between the steam and electric railways associations so that, wherever conditions permitted, uniform rules might obtain, and in connection with this H. A. Nicholl pointed out that the suggestion contained in the report with regard to co-operation with the A. R. A. had been proposed by Charles H. Morrison of the New Haven Railroad, who was primarily a steam railroad man. The sense of various members who discussed the subject was that continued effort should be made toward joint action with the steam railroad associations for the purpose of further unification of rules and practice. The complete report was then accepted as a progress report, and the wish was voiced by the convention that the recommendations contained in it be brought to the attention of the incoming executive committee.

PAUL SHOUP'S ADDRESS

Following the joint session the Transportation & Traffic Association listened to an address by Paul Shoup, president Pacific Electric Railway Company, Los Angeles, on the relation of electric railways to agriculture. Mr. Shoup said, in part, that it is idealism, as much as desire for financial profit, that has created the communities along the electric lines. Ideals which create agricultural and horticultural development can be gratified in a large degree by the modest many only where the electric railroads operate. He mentioned the great tonnage of agricultural products carried by the Pacific Electric lines, and set forth a typical farmer's day, showing the intimate connection of his life with electric railway service. Speaking of the mutual interdependence of the electric railways and agriculture Mr. Shoup suggested that if the people in general had the correct idea of it the electric railways might get under the same wing of the government with agriculture, and he contrasted the governmental policies toward the railroads and toward agriculture. When the farmer needs help the government supplies it without expense, and the government initiates constructive work to help him. Has the public looked upon transportation as equally essential to its welfare and treated it in the same fashion? The public must learn that the electric railways are business institutions traveling upon the most narrow of business margins. Without the government's active support and sympathy they may in large measure disappear. If the electric railways are impoverished, so will be the communities along their lines.

In conclusion Mr. Shoup suggested that troubles should not be too deeply considered as troubles, but as serious problems to be solved by constructive activity. Such activity should include fair and earnest education of commissions and the public so that the people will hold the same viewpoint as to the value of agriculture and of transportation.

STANDARDS

The new committee on standards of the Transportation & Traffic Association then made its report, submitting a code of procedure for the future work of the committee, this following as closely as possible the practice already in use by the Engineering Association. Progress was reported in the compilation of a syllabus of the Transportation & Traffic Association's proceedings during the current year. The committee approved the inclusion of the city and interurban codes in the Transportation & Traffic Manual as standards of the association. It was impossible at this time to submit any other matters for adoption as standards or recommended methods or practices, but the incoming committee was advised to take up as a part of its work the revision of all recommendations made to date in accordance with the standard routine. The report was signed by L. H. Palmer, chairman; J. N. Shannahan, vice-chairman; C. V. Wood, G. L. Radcliffe, N. W. Bolen, J. E. Gibson, F. D. Norviel, Alexander Jackson, P. P. Crafts, W. H. Collins and C. S. Ching.

The report was read in abstract by J. N. Shannahan, vice-president Newport News & Hampton Railway. After its adoption by the association Mr. Shannahan presented an additional report prepared by the same committee, but dealing with proposed changes in the constitution and by-laws of the Transportation & Traffic Association. In making these suggestions it was pointed out that the committee desired to define more clearly the duties and responsibilities of the officers and committees of the association. No formal recommendations were made because the constitutions and by-laws of the four affiliated associations are modeled upon the by-laws of the parent association, so that the question should be taken up by all of the associations jointly.

The committee recommended, however, that steps be taken to consider the following suggestions: First, that the president have charge of the finances; second, that there be but one vice-president for each of the four affiliated associations; third, that six other members be elected to form the executive committee, which would then consist of nine members; fourth, that the various committees be appointed by the presidents; fifth, that the duties of the vice-president be extended so as to require him to familiarize himself with the personnel of the transportation and traffic department of member companies, to prepare for the last executive committee meeting at the convention a tentative list of recommended committee appointments for the ensuing year and to keep in touch with committee work and follow the general progress made; sixth, that the first meeting of the new executive committee be held within thirty days after the convention.

Concerning the work of the committees of the Transportation & Traffic Association, it was recommended that there be included in the association by-laws provision for standing committees on standard rules, passenger traffic, express and freight traffic, training of transportation employees, and schedules and timetables. Certain other committees should be appointed from time to time to confer with similar bodies from the other associations. The recommendations also included provision for the procedure of the various committees with the purpose of facilitating their work.

In conclusion the committee on standards recommended that its work be continued.

After some discussion on these recommendations a motion was carried authorizing the incoming president to appoint a committee of three whose duties would be to arrange for the revision of the constitution in accordance with these suggestions, the revisions to go into effect at the next convention.

Wednesday Afternoon Session

At the joint meeting of the Transportation & Traffic and Claims Associations on Wednesday afternoon President Brush of the Transportation & Traffic Association presided, and the report of the joint committee on claims-transportation was read by President Tichenor of the Claims Association.

CLAIMS-TRANSPORTATION

The committee on claims-transportation, formed jointly from the Transportation & Traffic Association and the Claims Association, outlined in its report the result of an investigation of the applicability of motion pictures to safety-first work in its three phases, namely: the training of employees, the education of school children and the education of the general public. From the information thus obtained the following facts were evident: No one who had ever used moving pictures for educational purposes had ever abandoned them; every company that had ever used moving pictures to any extent was extremely enthusiastic as to the results and the desirability of their use; at least twenty-seven films are on the market and these can be readily obtained.

The committee recommends that all companies should use moving pictures in their safety work and that the American Electric Railway Association should establish a central bureau through which moving picture films can be obtained by member companies. The committee also recommends that the executive committee of the American Association should consider the advisability of the association owning a machine and reels which could be rented to members of the association if assurances can be obtained from a sufficient number of companies that the reels will be used. By providing the smaller companies, which cannot afford to make their own reels, with a method by which these can be obtained, a great deal will be accomplished.

The report was signed by R. P. Stevens, chairman; W. F. Weh, J. P. Barnes, A. D. B. Van Zandt, E. E. Slick and B. B. Davis.

In the discussion N. W. Bolen, Public Service Railway of New Jersey, said that that company had presented five reels of motion pictures to its employees with good results and that the local schools had applied for them. Previous to their use the company had used stereopticon slides. Byron Nixon, chief train-service instructor Pacific Electric Railway, Los Angeles, was thoroughly convinced that motion pictures were a most efficient means for instruction and he would like to see the association own a circuit. The great trouble now was that there were not enough reels. It was a mistake to consider the safety feature only. His company uses them in ordinary instruction work and finds them very helpful in teaching the men to be more courteous. Another use is to instruct them in the methods of signal operation, picking up broken trolley wires and the like. He cited examples of how the reels were used for instructing conductors in regard to their duties in different emergencies.

George Carson, Puget Sound Traction, Light & Power Company, spoke about the good results in public schools. B. F. Boynton, claim agent Portland Railway, Light & Power Company, Portland, Ore., also had good results to report. The safety work in Portland is conducted by a public commission appointed by the mayor and representing the different municipal departments and different classes of citizens. J. H. Handlon, claim agent United Railroads of San Francisco, expressed a need for more films. J. V. Sullivan, Chicago Surface Lines, stated his company had been using reels for some years. J. A. Gibson, Metropolitan Street Railway of Kansas City, approved the idea and said that his company has been using the stereopticon in public schools.

Upon motion the association voted to continue the committee and President Brush said that the incoming presidents of the Claims and Transportation & Traffic Associations would consider whether the subject of motion pictures should be taken up only from a safety standpoint by the committee or from other viewpoints as well.

At the close of the joint session the Transportation & Traffic Association took up the subject of the proposed changes in constitution and by-laws which were read and explained by Secretary Burritt and then passed.

F. D. Norviel, chairman of the committee on express and freight traffic, then presented the report of that committee, which is abstracted below:

FREIGHT AND EXPRESS TRAFFIC

The committee on freight and express traffic of the Transportation & Traffic Association discussed at length a number of subjects, its conclusions being based largely upon returns from data sheets. Answers were received from 178 railways—about double the number of replies which were reecived in previous years. Most of the companies that replied do not handle express, and nine do only a small amount of such business, but fifty lines operate regular express service either on their own part or through old-line express companies, and in many cases both. It was found that practically all of the interurbans in Indiana, Ohio, Michigan and a large portion of Illinois and Pennsylvania, are doing both an interurban and an old-line express business. The larger systems, representing the most mileage, have gone further into the matter of express traffic and have given it greater attention than the smaller lines.

Of the fifty companies doing express business, twenty-one do not have contracts with the old-line express companies. Of the remaining twenty-nine, eight have contracts on a tonnage basis, two on a mileage division, and nineteen on a pro-rate of the through rate. An analysis of the tonnage and revenue taken as a whole from the scattering information received showed very little change in the amount of business in 1914 as compared with 1913. Lines in the Middle West generally show increases, while in other sections they fluctuate with no apparent reason. Only seven of the lines doing an interurban express business have a pick-up and delivery service, and one provides a pick-up service only. Aside from the minimum charge, which in nearly all cases is 25 cents, interurban non-delivery rates follow closely 70 per cent of the old-line express company rates.

Apparently the motor truck has not had an appreciable effect on express traffic. The parcels past, however, has been a prominent factor either in hindering a normal increase, or in causing an actual reduction in the revenues. Estimates as to the effect of the parcel post range all the way from a reported loss of 50 per cent down to a belief that no injury has been done. The committee, however, believes that the parcel post is a real menace to interurban express, and can suggest only good service as a counteracting influence.

In general the committee considered that contracts with old-line express companies would be beneficial to the traction lines, provided, of course, that contracts are made under favorable conditions. Such service should be augmented by traffic arrangements for an interurban express, or expedited freight, carried on passenger cars, this service being elastic and susceptible of handling with few cumbersome details. Rates for such service should be placed about midway between the highest class freight rates and the merchandise rate of the old-line express companies, with the customary minimum charge.

With regard to handling freight the report gives in detail the information contained in replies from fifty companies which operate a strictly freight traffic. A table showing gross passenger and freight revenues for the railways in a number of different States indicated a decrease from 1913 to 1914 of 0.7 per cent in passenger business, while on freight the earnings were 4.8 per cent greater in 1914. It is a reasonable inference from the figures that there are opportunities in freight traffic for a large increase in the earning capacity of interurban railways, although passenger traffic for the past three years has practically been at a standstill. The committee considered that no such efforts were made to increase freight revenue as to maintain passenger revenues, and that if the same relative expenditure had been made for freight equipment and facilities, and for freight advertising as for passenger traffic, the freight business would show a much larger increase.

The report discussed briefly the subject of interline business, stating that little progress is being made. The committee felt that the interest of the traction lines will be better preserved if affiliations are made in all cases with connecting traction lines rather than with steam railroads. The report also discussed briefly the question of weights, rates and inspection service, reiterating its belief in the advantages of a simple form of weight and class inspection by some organization independent of the railway.

The subject of class rates was then taken up, the committee recommending that no further attempt be made by the electric railroads to secure a uniform rate on a mileage scale until the steam railroads had progressed further along these lines. The matter of franchises was also briefly touched upon, and an outline organization for the freight department was submitted. The report concluded with recommendations for future work of the committee, and included as an appendix the form of data sheet which had been used in securing information by the 1915 committee.

The report was signed by F. D. Norviel, chairman; F. W. Coen, G. H. Harris, H. E. Reynolds, E. T. Chapman and C. F. Handshy.

In the discussion J. K. Choate of the J. G. White Management Association, New York, gave arguments in favor of working through the old line express companies but said that, owing to their average short haul, electric railway companies must be much more careful in looking out for a fair minimum payment than was necessary with steam railroad companies. Mr. Norviel explained that the basis used by his company was a prorate of the regular rate and he thought that this was the best plan. Mr. Choate then brought up the importance of the electric railway companies making arrangements to interchange cars if they expected to do much freight business. H. A. Nicholl, general manager Indiana Union Traction Company, explained that this was done to a large extent already in the central electric railway territory. His company, for instance, sends through trains over four lines from Indianapolis to St. Joseph, Mich. Through trains are also run from Indianapolis to Dayton, Ohio, and to Fort Wayne, Ind. The Central Electric Railway Association has rules in regard to the interchange of cars not only for freight but also for passenger business.

Mr. Norviel pointed out that, on the fifty roads doing a strictly freight business which replied to the committee, the gain in freight earnings during the past year was 4.8 per cent, while on the passenger business there was a slight decrease. E. H. Hyman, general manager Electrical Package Agency, Cleveland, said that all of his contracts were on the basis of the merchandise rate. Packages weighing less than 100 lb. are the most profitable part of the business. The rates of his company prior to 1914 were the same as the express company's, but since that date the Interstate Commerce Commission reduced the rate charged by the express companies for shipments weighing less than 100 lb. and his company promptly made its rates slightly less than the express company's. His company still has a minimum differential of 3 cents on packages weighing less than 100 lb., but charges the same rate on packages weighing more than 100 lb. He considered the essentials of success as good service, intelligent solicitation, courtesy and prompt payment of claims. Last year the company handled out of Akron $60,000,000 worth of rubber tires.

Mr. Brush then described the new freight terminal property of the Boston Elevated Railway in which there is an investment of about $750,000. His company handles the freight cars of the suburban properties on a wheelage basis, the rate being determined by the average number of cars per day per month in accordance with a sliding scale. The privilege of freight car operation over the streets of Boston and some of the suburbs was obtained by application to the Public Service Commission, which over-ruled the refusal of the city authorities to grant that privilege. About thirty cars a day are now operated in and out of the terminal and business is still confined only to the lines extending south from Boston. Mr. Brush did not believe in pickup and delivery service. F. W. Coen, general manager Lake Shore Electric Railway, described the service of the Cleveland package agency which now operates thirty-eight wagons and handles the pickup and delivery business as well as the transportation part of an extensive service over the lines of practically all of the roads centering at Cleveland.

Several members discussed the effect of motor trucks and parcel post service on interurban freight and express service. Mr. Hyman said that at first the parcel post had caused a loss of considerable business but because it had been impossible to obtain settlement of shipment losses and other claims the shippers had instructed their traffic men again to use the express company service. Also a number of motor truck lines which had been started in Cleveland to serve the city and the suburbs had been abandoned.

Charles L. Henry, Indianapolis & Cincinnati Traction Company, thought the receipts of the old line express companies had been decreased by the parcel post, but this had not affected the interurban station delivery business. Years ago, when the old line express service was put on, interurban men feared that it would rob the station delivery business but that has not been the case.

The report of the committee on passenger traffic was then read by J. J. Dempsey, Brooklyn Rapid Transit System, who pointed out that its most important subject was that of one-man car operation. An abstract is given in the following paragraphs:

PASSENGER TRAFFIC

In its report to the Transportation & Traffic Association the committee on passenger traffic gave the results obtained from replies to a letter requesting information on one-man car operation, to which 171 companies replied. Fifty-four of these companies operate one-man cars, twenty-six using them exclusively and twenty-eight having them in zones of light traffic. One hundred and eight companies are permitted by charter or franchise to operate one-man cars but are not doing so; nine are not permitted to operate one-man cars, one because of a contract with its trainmen, and eight on account of charter or franchise restrictions, extracts of which appear in an appendix to the report.

The exclusive operation of one-man cars appears to be confined to cities averaging 16,000 population, with a maximum of 25,000. Schedule speeds compare favorably with two-man cars operated in similar territory. This comparison, however, does not hold good for zones of heavy traffic. Nearly all companies use the near-side stop. The average passenger revenue per car-mile reported by thirty-five companies is 14.47 cents and the operating expenses per car-mile reported by twenty-eight companies are 12.72 cents. Trainmen's wages per car-mile average 3.22 cents, twenty-five companies reporting them.

Of the fifty-two companies reporting wages paid to trainmen, forty-two have not increased the wages over those paid on two-man cars and ten companies have increased wages as follows: seven companies from 1 cent to 5 cents per hour, one company 10 per cent and one company 20 per cent.

The prepayment method of fare collections is practically universal, most of the companies using fare boxes. About half of the companies issue transfers to passengers when they leave the cars, the other half issue them as they board. Thirty-one companies report fewer accidents and seven report no difference as compared with two-man operation. The general reduction in step accidents, however, is very marked. Twenty-one companies report that one-man car operation does not adversely affect the settlement of accident claims and twenty-eight report that they find nothing to indicate an adverse effect by such operation. No serious difficulty appears in the matter of flagging at railroad crossings, although sufficient time must be allowed in the schedules for the proper performance of that duty.

Of forty companies reporting on the prejudices of the public, twenty-five mention a favorable attitude, seven report no objections, and one reports the public as indifferent. Seven mention opposition by organized labor and other bodies.

Several companies employ additional trainmen during the hours of heavy traffic and on holidays, etc. A few employ additional trainmen in zones of heavy traffic. Of forty-one companies reporting upon structural changes in cars to adapt them to one-man operation, twenty have remodeled cars already in service, six have built new cars and fifteen have made no changes. In an appendix to the report a description was given of the one-man car developed by the Illinois Traction System, and extracts were made from a paper on one-man car operation that was read before the 1915 meeting of the Wisconsin Electrical Association, matters which have been covered in various issues of the ELECTRIC RAILWAY JOURNAL.

With regard to its investigation of the motor bus and the trackless trolley the committee found only one system of the latter type operating in this country, and that there was no foundation for any recommendations to the electric railways that this means of transportation has yet passed the experimental stage. The present status of such motor-bus companies as were in operation in 1914 has changed very little. With regard to the effect of privately-owned automobiles the committee found it impossible to obtain any specific results as determined by studies made by any of the companies that responded to requests for information.

The report was signed by P. P. Crafts, chairman; E. M. Walker, J. K. Punderford, J. A. Greenland, F. W. Hild and E. E. Soules.

Following the presentation of the report several members described the one-man car service operated on their properties. Mr. Nicholl pointed out that particular care must be taken for protection at railway crossings. L. E. Gould, ELECTRIC RAILWAY JOURNAL, described the new one-man service recently inaugurated in Spokane with re-built cars under the jurisdiction of R. A. Willson, general superintendent Washington Water Power Company.

W. C. Callaghan, general manager Helena Light & Railway Company, also described successful service with one-man cars. Each trainman was carefully examined before being put in complete charge of a car, and physical examinations were made regularly. Instead of introducing the service quickly the cars were first operated with two men at the front end, and the conductors were gradually removed. The public likes the improved service and it has been in successful operation for two years.

Mr. Coen stated that a law has recently been passed in Ohio relieving the electric railways from the necessity of flagging unused industrial track crossings. J. E. Gibson, general superintendent, Metropolitan Street Railway, Kansas City, had just inaugurated one-man car service on certain owl cars. As soon as this service has been thoroughly tried out it will probably be extended to other schedules. Mr. Callaghan did not favor one-man cars for owl-car service, while other members pointed out that this was a question of the character of traffic.

Thursday Afternoon Session

The report of the committee on fares and transfers which was presented before the association on Thursday afternoon is abstracted in the following paragraphs:

FARES AND TRANSFERS

The investigation, during the past year, of the committee on fares and transfers of the Transportation & Traffic Association indicates that transfer issuing and collecting devices have not been sufficiently tested to warrant conclusions as to their practicability. The report states that no great amount of interest has been displayed by the electric railways in demanding mechanical methods of issuing transfers, but that there is a need for such a machine. The report also gives an outline of fare-collection methods on center-entrance cars, these being generally similar to other prepayment systems.

The committee reported that the fare box has not fulfilled all that was expected from it. To insure the full return of all fares paid an improvement seems necessary in its construction in order to secure the immediate registration of each fare deposited in a way that is beyond the control of the conductor to regulate. This feature has been accepted by some manufacturers by the installation of motors in fare boxes in order to accomplish immediate registration. There is no question but that the fare-box system of receipt and accounting for fares has come to stay, and every encouragement should be made to induce manufacturers to meet conditions that fulfill every expectation which was originally thought the fare box, as constructed, would accomplish. A motor-driven fare box (with the elimination of the penny counting mechanism) that will immediately register the fare deposited gives little or no opportunity for conductors to defraud the company, inasmuch as the deposit of a penny would not give him an opportunity to deceive the observer.

The report presented also an outline of the practice of several companies using the prepayment method on lines that had more than one fare zone. One of these makes use of an exchange ticket which is issued to each passenger boarding the cars and which is dropped into a fare box when he leaves. On another a check similar to a transfer is issued to passengers when they pay a 5-cent fare, this being collected from the passenger by the conductor when the car passes the city limits. On two lines the fares outside of the city limits are collected by the conductor as if the car was not of the prepayment type, and on one line the fares outside of the first-fare limits are collected by an inspector who boards the car. Another line makes use of colored exchange tickets that are purchased when the passenger boards the car and which are deposited in a fare box when the passenger leaves.

The report included an explanation of the method of using extra front-end collectors which has been introduced in Toronto, Kansas City and San Francisco, this system being explained in brief as follows: At one or more busy loading centers the street railway company places additional uniformed conductors with portable neck registers. As soon as a prepayment car stops they collect fares and allow passengers to enter at the front as well as at the rear end. This is supposed to facilitate loading and to help the distribution of the passengers throughout the car.

The committee found that there was some difference of opinion as to the time saved by the system and quoted from a letter received from one railway company which said in part: "Checks taken at the outlet of our congested district on days when collectors were engaged, compared with days on which they were withdrawn, revealed to us the fact that the number of cars passing through this zone were identical on the days of the two checks. They also disclosed the fact that the traffic policemen stationed at the intersecting streets had been working up to their limit in moving cars previous to the installation of the front-door loading system, and that the movement of cars was entirely dependent upon them. The object we thought to attain not having been accomplished, we are now contemplating the removal of the extra conductors and a return to the old system."

The Metropolitan Street Railway Company of Kansas City, Mo., has used this method of fare collection since 1911. There are six collectors in the morning and thirty-six in the afternoon rush hours, who are placed at busy transfer points and at some large department stores. They are also used extensively on special occasions, such as ball games during the summer and at theaters in the winter. They handle cash and transfers in the same manner as regular conductors and they also keep trip sheets. One test made by this company at a busy transfer point, with the front-end collectors working, showed that 282 passengers were loaded through both the rear and front doors in 304 seconds, or one passenger every 1.07 seconds. Of the 282 persons handled 109 were loaded through the front door and 173 by the rear. At another busy transfer point under similar conditions, with only the rear door in use and the front-end collectors eliminated, 105 passengers were loaded in 235 seconds, an average of one passenger every 2.23 seconds.

The United Railroads of San Francisco also has used a similar plan of auxiliary collections for the past two years and reports that this has been successful thus far in enabling the cars to perform a greater service and to handle more people. About twelve collectors are employed at the heavy loading points in various parts of the city.

The committee made no recommendation on the subject and gave the experiences of the companies in the belief that some managers will find the system to facilitate loading, while others would not care to try it because of a difference in traffic conditions.

With regard to the question of zone collection versus through collection on suburban and interurban lines the majority of replies to the committee's questions favored the through method. No suburban roads with fast service collected fares by zones, and the committee recommended the through collection system because it is of less annoyance to passengers and because, with the use of hat checks, there is no reason why conductors should not be able to follow the destination of their passengers. The report was signed by J. E. Duffy, chairman; J. V. Sullivan, vice-chairman; H. T. Jones, B. C. Edgar, C. E. Learned and G. K. Jeffries.

In the discussion of this report, which was read, in the absence of Chairman J. E. Duffy, by J. V. Sullivan of Chicago, H. T. Jones, San Francisco, said that front-end collection is very satisfactory in that city as it helps to get people to the front of the car and evens up the load in the rush hours. J. H. Harvey, Kansas City, also expressed satisfaction with the results of stationing collectors at the front end of cars at congested points in the evening rush.

J. N. Shannahan, Hampton, Va., asked President Brush to describe the work with motor-driven coin boxes in Boston, and calling Mr. Shannahan to the chair, Mr. Brush described in considerable detail the development of the Boston system. This eliminates the use of paper in collecting revenue and has been the subject of several articles in the ELECTRIC RAILWAY JOURNAL. The company has, with a very few exceptions, eliminated tickets and, in the collection of 1,016,000 fares from motor-driven boxes, has had a loss of only 35 cents. By Dec. 1 of this year no paper whatsoever will be sold to passengers and deposited in boxes, ticket sellers being replaced by change girls. From 85 per cent to 90 per cent of the passengers have the correct change for their fares. The change girl is given $50 when she goes to work and all her money transactions with the company are exchanging bills for small coin, so that she always has just $50. There are never any disputes. Mr. Brush mentioned a method of dumping coin into coal hods and thence into a counting machine, which wraps packages ready to turn over to the bank. The company's establishment of prepayment areas for surface cars with motor-driven coin boxes also has successfully provided for baseball rush traffic. In reply to queries Mr. Brush said the company had had no trouble from small coins and jumping registers. John F. Ohmer, Dayton, Ohio, spoke briefly on the importance of the human element, and T. Fitzgerald, Cincinnati, raised the point that the elimination of the human element in the form of men whom the railways pay and control might well give increased play to the human element in the public.

Upon motion the report was then accepted and the committee was continued.

Following this J. E. Gibson, Kansas City, in the absence of C. S. Ching, chairman, read the report of the committee on training of transportation employees which is abstracted below.

TRAINING TRANSPORTATION EMPLOYEES

The report of the Transportation & Traffic Association committee on training transportation employees stated that, because so many labor laws were in effect at the present time, a compilation of them was impossible but that the bureau of labor statistics at Washington had published a summary of labor laws of the United States with court decisions, under date of Jan. 1, 1914, this being supplemented by a statement dated Jan. 1, 1915.

With regard to the investigation of a systematic program for improving courtesy on the part of trainmen, replies to a data sheet which had been sent to all member companies showed the following conditions as applying to the 155 companies that answered: 55 per cent issue letters or bulletins when an employee is commended for courtesy; 6 per cent issue a company magazine and one railway is contemplating starting a company publication in the near future; 33 per cent issue instructions with regard to courtesy, the majority posting instructions on bulletin boards; 57 per cent hold meetings where the subject of courtesy is discussed, several of these having regular semi-monthly or monthly meetings.

Although the replies indicate that no systematic scheme for improving courtesy had been adopted the committee considered that it was a most important matter and advocated personal contact between the officials and employees with that end in view. It is always advantageous to have employees properly informed regarding issues between the company and its patrons and especially so when such matters are given publicity in the newspapers. It should not be necessary also to wait until a letter of commendation is received or some meritorious act is performed before speaking to an employee in regard to the good service he has rendered. Much good can be accomplished by informing those who have made exceptionally good records that they are performing their work in a satisfactory manner and that this service is appreciated by the company.

With regard to the discipline of new men the replies to the data sheet show that 24 per cent of the 155 companies have a probation period ranging from ten days to six months. In seven cases the instruction of new men is solely in the hands of the instruction department, and where such practice is followed it is reported to have produced good results. On large properties, especially on compact city systems having a centrally located instruction department, there is no doubt but that the instruction department can materially assist in keeping the discipline of new men uniform. Frequently, better results can be obtained by returning men to the instruction school for further instructions rather than by administering discipline, as in the case of older men in the service. There should be a period during which discipline should be of an instructive and corrective nature, and the follow-up system for new men should be systematic. There should be a man whose duty it is to ride with new employees and he should be held responsible for their proper instruction. On large systems this can be best accomplished through an instruction department, segregated from the regular departments of the division.

With regard to watch inspection methods the committee found that ten member companies required a standard watch having from seven to seventeen jewels, seven of the roads requiring seventeen jewels. Sixteen other roads have a watch inspection. The committee felt that it was necessary that some system of checking watches should be maintained, but it did not seem feasible for all roads to require a high standard of watch with a periodical inspection system. The minimum requirement should be the provision of standard clocks installed at every rating station where men report and that the trainmen be required to have reliable watches and to compare time with the rating station clock before taking out runs. The report was signed by C. S. Ching, chairman; W. J. Harvie, Bruce Cameron, E. E. Strong and F. I. Hardy.

This report was discussed by Mr. Gibson, Oscar Keesee, Manila; H. A. Nicholl, Anderson, Ind.; A. B. Merrihew, Los Angeles, and J. J. Dempsey, Brooklyn. Mr. Nicholl found that instruction through the safety committee and particularly by semi-annual banquets was very helpful. Mr. Merrihew described his company's work in replacing punitive by educational discipline, this having been referred to in a special article in the ELECTRIC RAILWAY JOURNAL. Mr. Dempsey thought that 90 per cent of the instruction is wasted unless followed by examination. His company examines its employees every three months, and if a man is deficient he is sent back to school.

MISCELLANEOUS BUSINESS AND ELECTION OF OFFICERS

Under the head of general business, L. C. Bradley, Houston, Tex., introduced a resolution similar to the one passed by the Claims Association which was, in effect, an expression of opinion of the Transportation & Traffic Association to the American Association that, in view of the congestion, delay and economic loss resulting from the immense increase of automobile traffic in city streets, the various States of the Union should, by uniform legislation as far as possible, define the rights and duties governing motor vehicles in the use of the streets in cities and towns, and that those vehicles travelling on the larger streets, and streets upon which street railway tracks are laid, should have a right superior to those vehicles proceeding from smaller or less-travelled streets.

J. N. Shannahan then read the report of the nominating committee by the adoption of which the association elected the following officers: President, H. A. Nicholl, general manager Union Traction Company of Indiana, Anderson, Ind.; first vice-president, L. C. Bradley, assistant district manager Stone & Webster, Houston, Tex.; second vice-president, R. E. Danforth, general manager Public Service Railway Company, Newark, N. J.; third vice-president, W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.; secretary, E. B. Burritt, New York.

The new executive committee is composed of the officers and J. J. Dempsey, superintendent of transportation Brooklyn Rapid Transit Company, Brooklyn, N. Y.; L. H. Palmer, United Railways & Electric Company, Baltimore, Md.; W. G. Murrin, general superintendent British Columbia Electric Railway Company, Vancouver, B. C.; R. P. Stevens, president Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

After installation of the newly elected officers, J. K. Choate, New York, read the report of the committee on resolutions conveying thanks to the San Francisco residents for the welcome and the entertainment extended the association on the Pacific Coast, to those who made the preliminary convention arrangements, to President Brush, the officers and committee members of the past year, and to the manufacturers association.

Other Features of the Convention

Preliminary Report of Claims Association Meetings—Outline of Convention Entertainment—Account of Exercises at Exposition Grounds—List of New Officers and Executive Committee Members of Manufacturers' Association — Addresses at Spokane and Portland.

BELOW are published a brief résumé of the American Electric Railway Claims Association meetings and accounts of events of general interest, including addresses delivered at important cities en route to the convention.

CLAIMS ASSOCIATION

The first meeting of the Claims Association was called on the afternoon of Monday, Oct. 4, by President William Tichenor, claim agent Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind. His presidential address will, in accordance with the customary practice of this paper, be published in the issue of Oct. 16, together with abstracts of the papers presented before this and the following meetings. After the annual reports of the executive committee and the secretary-treasurer, reports were presented by the committee on an accident prevention board, the committee on employment and the committee on ways and means. The scheduled paper on "The Prevention of Motor Vehicle Accidents" by S. B. Hare, claim agent Altoona & Logan Valley Electric Railway, Altoona, Pa., was read by H. D. Briggs, assistant general claim agent Public Service Railway, Newark, N. J. In the general discussion following the reading of this paper, Russell A. Sears, general attorney Boston (Mass.) Elevated Railway, spoke about a law recently passed in Massachusetts on the subject of automobiles. He promised to send a copy thereof to Secretary Burritt.

At the meeting of the association on Tuesday afternoon the paper on "Standardization of Claims Statistics" by E. E. Slick, claim adjuster Union Traction Company of Indiana, Anderson, Ind., caused a discussion in which many participated. The scheduled joint meeting with the Accountants' Association was not held, as President Tichenor announced that the joint committee on claims-accounting had been instructed to continue its work and to present a complete report at the next annual convention.

The work of the Claims Association on Wednesday afternoon began with a joint session with the Transportation & Traffic Association, at which the joint report on claims-transportation was submitted. This report is covered in the proceedings of the latter association. After this joint session the Claims Association delegates listened to a paper on "A Card Index and What It Means" by J. J. Reynolds, claims attorney Boston (Mass.) Elevated Railway.

At the final session on Thursday afternoon a paper on "Safety and Its Relation to Conservation" was presented by B. F. Boynton, claim agent Portland Railway, Light & Power Company, Portland, Ore., after which written discussion was read as follows: "Financial Benefits Resulting from the Safety First Movement" by J. S. Harrison, claim agent Jacksonville (Fla.) Traction Company; "Justification of the Safety First Movement from a Humanitarian Standpoint" by Alves Dixon, claim agent El Paso (Tex.) Electric Railway; "Uses and Benefits of Illustrated Lectures" by H. K. Bennett, claim agent Fitchburg & Leominster Street Railway, Fitchburg, Mass.; "Should a Moving Picture Film Exchange Be Established by the A. E. R. A.?" by F. J. Warnock, chief claim agent Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

At the conclusion of the discussion the committee on resolutions submitted its resolutions of thanks to the various individuals and organizations, and the following officers were then elected: President, George Carson, claim agent Puget Sound Traction, Light & Power Company, Seattle, Wash.; first vice-president, R. E. McDougall, claim agent New York State Railways, Rochester, N. Y.; second vice-president, S. B. Hare, claim agent Altoona & Logan Valley Electric Railway, Altoona, Pa.; third vice-president, B. F. Boynton, claim agent Portland Railway, Light & Power Company, Portland, Ore.; secretary-treasurer, B. B. Davis, claim adjuster The Columbus Railway, Power & Light Company, Columbus, Ohio. Executive committee members were chosen as follows: J. J. Reynolds, claims attorney Boston (Mass.) Elevated Railway; P. C. Nickel, claim agent New York (N. Y.) Railways; J. H. Handlon, claim agent United Railroads of San Francisco, San Francisco, Cal., and Alves Dixon, claim agent El Paso (Tex.) Electric Railway.

According to precedent, an engraved and dated gold badge was presented to the retiring president, Mr. Tichenor.

COMMEMORATIVE MEDAL PRESENTATION

On Friday morning the delegates met at Native Sons' Hall and were taken to the exposition in special buses. After a photograph had been taken they marched to the Court of Abundance, where Charles N. Black, as master of ceremonies, introduced Thornwell Mulally of the exposition board of directors. In presenting commemorative medals to the American and Manufacturers' Associations Mr. Mulally stated that little is said nowadays in praise of street railway companies, but in reality transportation is the business upon which all other businesses depend. It takes civilization into the far corners of the earth, and without it the development of new territory is impossible. San Francisco, he said, was literally paralyzed after the fire during the period when the street car system was wholly out of commission, and it came to life again promptly when the service was resumed.

President C. L. Henry received the medal for the American Association. In expressing appreciation of such a token he said that San Francisco and the exposition had made such a deep and favorable impression on all that he was sure each individual who came West to the convention would carry away pleasant memories that would never be forgotten. The Manufacturers' Association medal was received and acknowledged by Charles C. Peirce. In expressing the thanks of the Manufacturers' Association Mr. Pierce pointed out that that body was making every effort to support the operating end of the industry. He outlined the natural divisions of the electric railway field, and indicated how well the executive, operating and manufacturing phases of the industry could work together for the benefit of all.

Mr. McGraw then presented his address on the original development and progress of the electric railway, abstracted elsewhere in this issue. After the commemorative exercises the entire party boarded a special boat for luncheon and an afternoon's excursion across the bay. At Oakland automobiles were in waiting to take the visitors on a sight-seeing trip, ending in time for an early evening return to San Francisco.

SOCIAL SIDE OF THE CONVENTION

The great attraction at San Francisco outside of the convention was, of course, the Panama-Pacific International Exposition and, as the illumination of the buildings at night was an important feature of the exposition, the entertainment committee arranged for only one evening function downtown. This was the annual reception and ball, which was held in the Colonial ballroom of the St. Francis Hotel on Monday evening. It was very largely attended and the dancing continued until after midnight.

The other evening entertainment was a highly enjoyable trip to the exposition grounds on Wednesday evening. This was personally conducted by W. D'A. Ryan, who had charge of the arrangement and installation of the illumination system. Many of the delegates dined first at Old Faithful Inn. The party was then taken by Fadgl auto-trains to the "Marina," where they viewed a special display of fire-works and a scintillator drill. Then after a tour of the grounds by train they were taken through the various courts by Mr. Ryan.

The golf tournament took place at the grounds of the Clarement Country Club in Oakland on Thursday. There was no special entertainment on Tuesday or Thursday evenings except the dinner mentioned below.

On Thursday evening retiring President Allen of the American Association and retiring President Baker of the Manufacturers' Association gave a dinner in honor of the new officers of all the associations. W. D'A. Ryan was also present, and about twenty-two retiring and newly-elected officers and others attended.

MANUFACTURERS' ASSOCIATION

About 100 representatives and delegates attended the annual meeting of the American Electric Railway Manufacturers' Association, held on Wednesday, Oct. 6, 1915, with President E. H. Baker in the chair. Secretary-Treasurer H. G. McConnaughy presented his reports, and the following members were elected to the executive committee to serve three years, the first three to succeed themselves: Charles C. Peirce, General Electric Company, Boston, Mass.; Henry C. Evans, Lorain Steel Company, New York, N. Y.; Daniel W. Smith, Peter Smith Heater Company, Detroit, Mich.; Miles B. Lambert, Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., and A. H. Woodward, International Register Company, Chicago, Ill.

At the meeting of the executive committee of the Manufacturers' Association, held on Oct. 7, the following were elected to take office on the retirement of the present officers in December: President, Thomas Finigan, vice-president, Pierson Roeding & Company, San Francisco, Cal.; vice-president in charge of relations, Charles C. Peirce, manager railway department General Electric Company, Boston, Mass.; vice-president in charge of finance, L. E. Gould, western manager ELECTRIC RAILWAY JOURNAL, Chicago, Ill.; vice-president in charge of exhibits, Daniel W. Smith, president Peter Smith Heater Company, Detroit, Mich.; vice-president in charge of entertainment, E. F. Wickwire, general sales agent Ohio Brass Company, Mansfield, Ohio., and secretary-treasurer, H. G. McConnaughy, manager Dearborn Chemical Company, New York, N. Y.

ADDRESSES AT SPOKANE

As was mentioned briefly in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 2, page 674, the officers of the American Electric Railway Association and the American Electric Railway Manufacturers' Association, during the visit to Spokane on Tuesday, Sept. 28, received an invitation to meet the members of the Chamber of Commerce of Spokane. The occasion was the regular Tuesday noon luncheon of the Chamber, the rooms of which occupy two floors in the Chamber of Commerce Building. Several members of the "Red Special" party accompanied the officers to this luncheon. After the luncheon five of the members of the party were asked by the president of the Chamber to address the members on the current problems of the electric railway industry.

C. Loomis Allen, president of the association, made the first address. He said that the American Electric Railway Association stood for the idea of getting together with the kind of men represented by bodies of the kind he was addressing. He then said that he was going to talk from the corporation standpoint. The electric railway industry is practically at a standstill. There has been little development in it recently except that which was enforced. The reason is that there is no complete understanding of the situation between men interested in the electric railway industry and men of the type represented by chambers of commerce. The men in the electric railway industry are engaged in a business undertaking. As he looked at the matter there were four parties in interest. The first of these was the consumer, that is, the man who pays fares to ride on the cars; the second was the employee; the third was the municipality, and the fourth was the investor. These four interests must get along together. If any one or any two try to get an undue share out of the industry, the others can do nothing. He was of the firm belief that if the country was to grow and if the cities in the country were to prosper, they could do so only if the transportation interests of the country develop with them. He believed that it was the duty of the members of every chamber of commerce in the country to inform themselves in regard to the electric railway situation in the city in which they live and to see that each of the four parties mentioned is receiving proper recognition.

The next speaker was William J. Clark of the railway department of the General Electric Company at New York. Mr. Clark stated that all of those present had common interests. Electric railway men have as great a concern in the future development of America as anyone else. He then referred to the important development of the electrical interests in the Pacific states, brought about, in large part, by the invention of the Pelton wheel. He referred to a government report issued in 1880, which said that west of the Mississippi River there was no hydraulic development of more than 1000 hp. and contrasted that condition with the one at present. He also spoke of the alleged claim that the electric railways were over-capitalized and said that in Great Britain $30,000,000 had been allowed in the accounts for the acquisition by the electric tramways of the earlier horse-car systems, whereas, in this country, $963,000,000 has been expended for that purpose. In reference to the development charges since the adoption of electricity he said that the electrical manufacturing companies had been the cause of the erection of the most costly scrap piles which had ever been formed. Nevertheless, the development of public utilities has cost less in this country than in any other, and the cost of service is less. The people did not realize the effect of the rising prices on the cost of public utility operations. Labor has gone up 20 per cent and more than 60 per cent of the operating expenses of electric railways was for labor. In spite of this fact and other increases in the cost of operation the operating ratio in 1902 in the country was 57.5 per cent and in 1912 only 59.7 per cent. In the State of Washington there had even been a decrease, in spite of the fact that in 1902 only 2.3 per cent of the passengers rode on transfers, while in 1912 the percentage was 21.

Charles L. Henry of Indianapolis, first vice-president of the association, was the next speaker. He said that the electric railway industry had as much to do with the prosperity of the country as any other industry. Railways had constantly been giving more service for the fare charged. In the horse-car days 5 cents paid for a ride of 3 miles or 4 miles. Now, it pays in some cities for a ride of 15 miles or 19 miles, although a nickel has less purchasing power to-day. The authorities should foster, not crush the industry. He remembered the day when the builder of an interurban line would have offered to him the deeds for his right-of-way if he would build the line.

William F. Ham, vice-president and comptroller Washington Railway & Electric Company, Washington, D. C., talked about the jitney. He described briefly its origin on the Pacific Coast and its spread through the country and called it the "itch" among electric railway diseases. It was not a good business proposition and he thought that it ought not to receive a cordial reception from business men. In Washington, for example, the railway companies were working hand in hand with the business men to make a beautiful city, but this could not be done if the jitneys took away the profitable short-haul business and neither the jitneys nor the roads could be prosperous. He described the motor-bus situation in Washington, D. C., where a line of motor buses under favorable circumstances had not been able to make any money. Jitneys could conduct only irresponsible service and they made good service on the local railways impossible. At first, owing to the newness of the business, it was difficult to know what to do about the jitneys. Now, however, they are being recognized as common carriers.

The final speaker was Charles C. Peirce, vice-president of the American Electric Railway Manufacturers' Association. After telling several stories Mr. Peirce said that there was no mystery about the electric railway business. It should be judged on the same basis as any other business. The railway in any city reflects the character of the culture or enterprise of that city. Its cars are the most conspicuous objects on the streets and visitors often judge the enterprise of the city by the character of its railway service and the appearance of the cars on its streets. What is needed more than anything else in the treatment of public utilities is sanity and common sense.

ADDRESSES AT PORTLAND

By way of amplification of the account of the farewell luncheon to F. W. Hild before his departure for Denver, given in last week's issue, the following paragraphs will be of interest. During the visit of the members of the "Red Special" party in Portland on Sept. 30, this farewell luncheon had been arranged by the Portland Chamber of Commerce. Several representatives of the American Electric Railway Association were invited to the luncheon, which took place in the rooms of the Chamber of Commerce. The occasion was called "Electric Railway Day." The meeting was also combined with one which had been scheduled by the Jovians at the same hour.

At the close of the luncheon, which was attended by some 200 business men of Portland, the president of the Chamber introduced Franklin T. Griffith, president Portland Railway, Light & Power Company, as the toastmaster, and he in turn introduced C. Loomis Allen as the first speaker.

Mr. Allen spoke of the great influence which transportation lines had had on the development of Portland and said that the association which he represented was composed of business men. The industry, however, was confronted by problems which were the same in all parts of the land. These problems must be dealt with in a fair spirit if the industry and the investment in it are to be carried on successfully, and this solution should be undertaken in a business way. The speaker dwelt upon the absence of new construction during the past five years and urged business men to study the causes very carefully.

W. F. Ham of Washington, D. C., spoke on the subject of "Unjust Competition in Transportation," although he said that he knew more about the jitneys which did not exist than of those which did. He explained that the Public Service Commission of the District of Columbia had early ruled that the jitney was a common carrier, and that the same action had been taken by the Public Service Commission of Maryland in regard to jitneys in the neighboring city of Baltimore. Any other action was illogical. If the public exercises regulation over the gas, electric and other public utility companies with their irremovable property and consequent responsibility, why should it not do the same with the jitneys which are here today and gone to-morrow. The jitneys could not exist with equal regulation, but assuming that they could, the real question is, could they replace the street railways? This would be impossible in any large city. The electric railways must remain. The question then is, does jitney competition help the transportation situation in any city as a whole? Mr. Ham recommended that equal regulation be provided and that then the problem be allowed to work itself out. He also pointed out that the best asset of the business man is his reputation for good faith and fair dealing and that the same principle applies to municipalities. Capitalists will decline to invest money in any place where invested capital is known to be treated unfairly.

Charles C. Peirce of Boston attributed a large part of the present industrial depression to the unwillingness of business men to engage in politics. What is most needed, he said, is sanity in political affairs. If a new town was being established the first requisite would be a good water supply and the second good transportation facilities, but many cities send out "boosters" and then turn around and use the axes on their local railways. Massachusetts was rapidly going to the 6-cent fare because it was recognized there as a fundamental principle in railway as in other affairs that no one could continue to do business at a loss. In attacking its utilities a town was attacking itself. He enumerated as the trinity of successful railway operation, good service, wages and dividends.

Mr. Griffith then introduced the retiring manager of the Portland Railway, Light & Power Company, F. W. Hild, who had recently resigned to go to Denver as vice-president and general manager of the Denver Tramway, and expressed the regret of his associates at Mr. Hild's departure. Mr. Hild referred to the pleasant business associations formed during his five years in Portland and to his regret at leaving.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

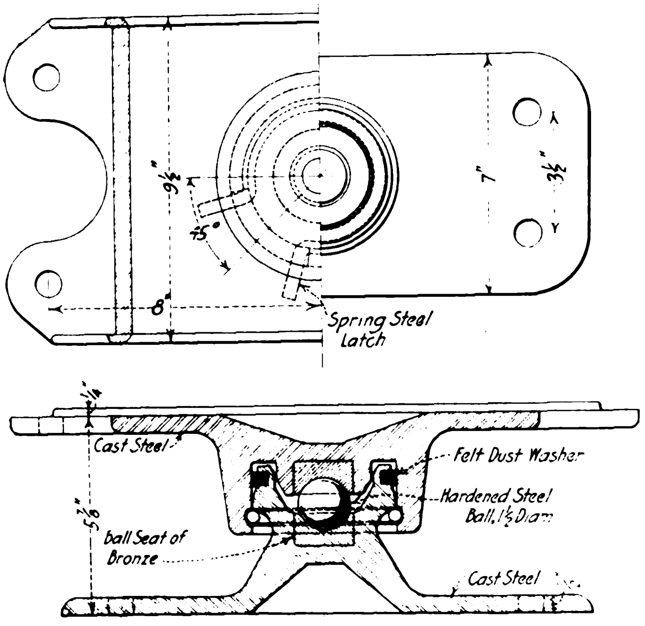
A One-Ball Center Bearing

BY S. J. WITT, DIVISION MASTER MECHANIC WEST PENN RAILWAYS, CONNELLSVILLE, PA.

The mechanical readers of the ELECTRIC RAILWAY JOURNAL will no doubt be interested in the results which we are obtaining from an improvement in center bearings.

We found that many of the old center bearings were so stiff that on short wheelbase trucks, mostly 4 ft. 8 in., it was impracticable to use a steel wheel on account of its tendency to mount short-radius curves, the steel wheel having a greater coefficient of friction and a more pronounced climbing tendency than the chilled-iron wheel. We also found that on the long 6-ft. wheelbase trucks the steel wheels wore out quite rapidly and also caused excessive screeching, guard wear and curve-rail wear, even though the curves were occasionally greased.

We then began to install anti-friction bearings, some of the ball raceway type and some of the rocker type.



PLAN AND SECTION OF ONE-BALL CENTER BEARING

The results, with these, were improved, but the bearings themselves gave a great deal of trouble from excessive wear, not being protected from grit and no provision being made to properly lubricate them.

The accompanying drawing shows a center bearing which we have developed and which has now been in use some five years with very satisfactory results. Those which have been longest in use show no perceptible wear and will operate exactly as well to-day as they did originally. We use a 1½-in., high-grade hardened steel ball, set in two cups of especially hard bronze metal, all submerged in oil and thoroughly protected against grit.

We have found in actual practice that the frictional resistance of these one-ball center bearings is less than the frictional resistance of the average ball raceway pattern of anti-friction center bearing in actual use, and since there is no wear it remains as good for years as when originally installed. One greasing will easily run these bearings two years.

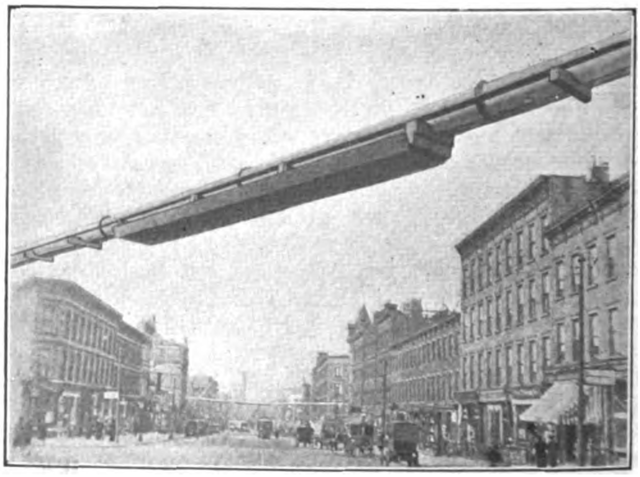
Since installing them we have found that the average mileage on steel wheels, which was about 30,000 with the former bearings, has been increased to 130,000 to 150,000. We lose no more wheels from sharp flanges, as we did formerly.

The locking device is quite secure and strong enough, in case of a wreck, to pull out the bolster from the cars or trucks. It is also quite easily detached and requires no hole through the bolster at its weakest point.

Crossing Water Pipes Over Trolley Wires

BY G. H. MCKELWAY, LINE ENGINEER BROOKLYN RAPID TRANSIT SYSTEM

During the present subway construction in Brooklyn, N. Y., it has been found necessary in some places to remove the water pipes crossing the street in which the subway is to be built from under the surface of the street and to install them temporarily overhead. The accompanying illustration shows how the pipes are installed and how they are protected from wild trolley poles that might leave the wire and fly up and ground upon them.



CROSSING WATER PIPES OVER TROLLEY WIRES

At the sides of the street wooden towers about 10 ft. square are built and filled with heavy stones to a height of approximately 4 ft. to prevent their being overturned. Then suspension wires are carried across the street between the towers and securely anchored to them. As a continuation of these wires, guys are run from the tops of the towers and embedded in heavy blocks of concrete in the street behind them. Spiral-riveted steel pipe is used to carry the water across the street and the pipe rises from the mains vertically at the towers and crosses the street on wooden cradles hung from the suspension wires by means of suspenders, each with a turnbuckle in it so that the height of the cradle can be properly adjusted. Boards are nailed to the cradles on each side of the pipe to form walkways for the use of workmen installing or removing the pipe.

Where the pipe crosses the trolley wire, boards are nailed to the footwalks and to the cradles, completely boxing in the pipe beneath and far enough up on the sides to prevent a pole from striking the pipe or the wires supporting it, all of which are, of course, grounded. On the bottom of the boxing boards are placed lengthwise with the direction of the tracks, short pieces being used, while on the sides where the poles are most liable to strike long boards are used at right angles to the direction of the tracks.

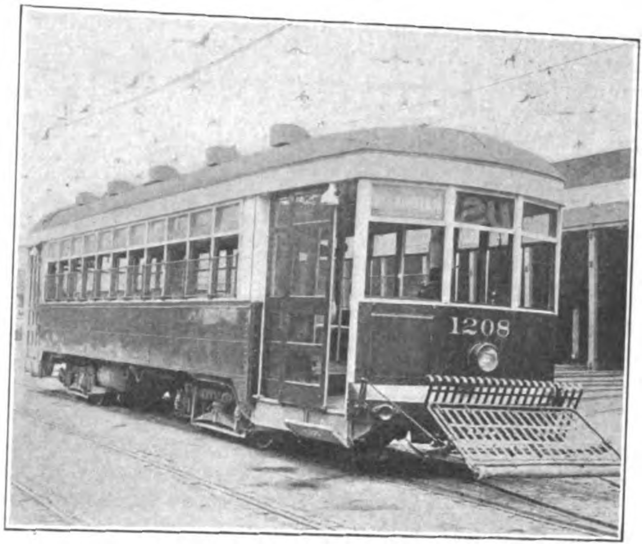
Kansas City's New Cars

BY R. L. WEBER, CAR ENGINEER, BOARD OF CONTROL, KANSAS CITY (MO.) RAILWAYS

Fifty single-end, steel side-girder cars, 44 ft. 10 in. long, have recently been put in operation by the Metropolitan Street Railway Company, Kansas City, Mo. A description of the design details of these cars appeared on page 850 of the ELECTRIC RAILWAY JOURNAL for May 1, 1915, and while it was stated in that article that the estimated weight would be approximately 40,000 lb., it has been found that the actual weight of the finished car is only 37,700 lb., equivalent to 781 lb. per seat. This weight is distributed as follows:

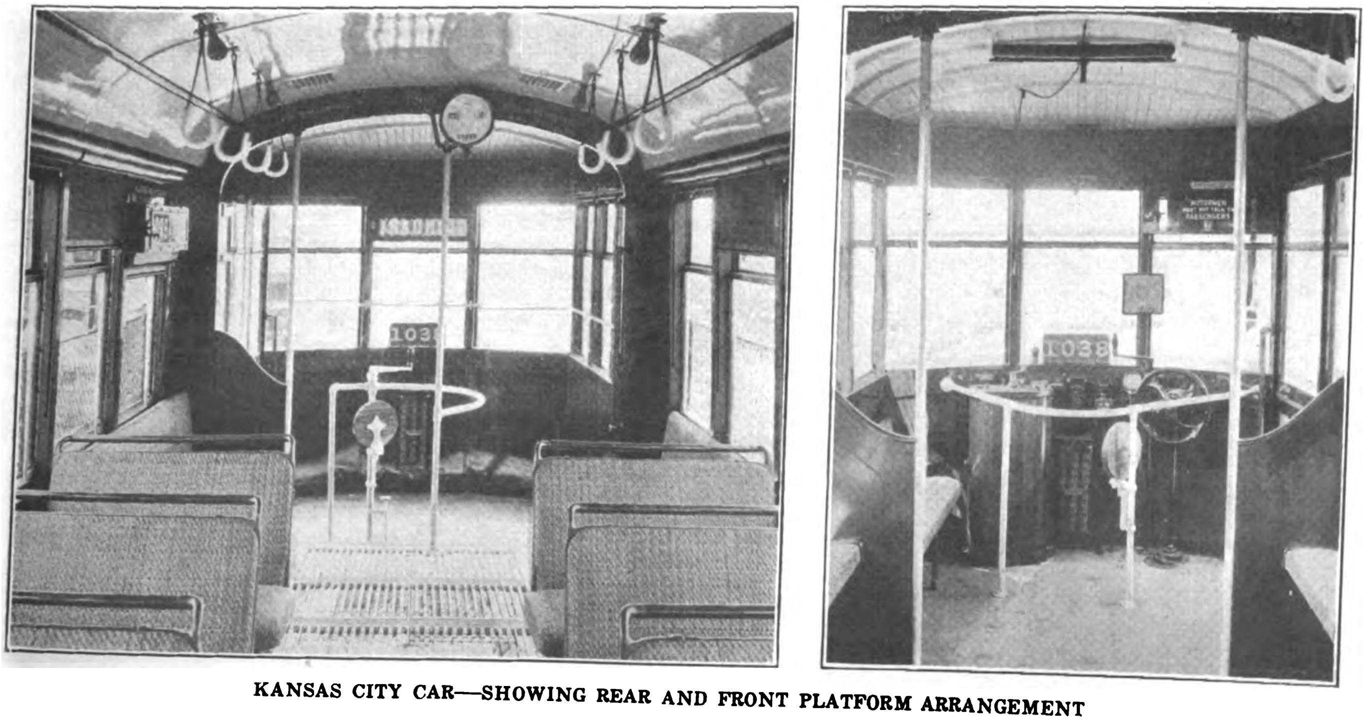
Body, fully equipped	17,850 lb.
Trucks	11,400 lb.
Electrical equipment	8,450 lb.
Total weight	37,700 lb.

A very pleasing exterior appearance has been obtained by the continuous letterboard and the color scheme recently adopted as a substitute for the solid green with which the Kansas City cars were painted. Above the belt rail the car is painted with cream-colored enamel and the lower part of the body is a golden yellow. The roof and the trucks are painted gray, simulating the color of Kansas City dust, and the car trimmings are Tuscan red.


KANSAS CITY CAR—SHOWING STEP LIGHT OVER FRONT DOOR

Among the features of the car are step-light reflectors which thoroughly light the step and the zone of alighting when the doors are open. Sockets on the bumper are provided for a pole to push stalled vehicles off the tracks in the absence of an emergency wagon, and the platform knees, which are straight from the bumper to the bolster, were attached directly to the bolsters instead of to the side plates, to minimize damage to the vestibule from collisions. This design also effectively prevents overturning or loosening of the bolsters.

A somewhat unusual method of signaling was adopted for these cars and it has been found to work out very satisfactorily. The motorman, when approaching a prospective passenger, gives the conductor one bell by means of the bell-cord handle. This indicates to the conductor that someone wishes to board the car and that he should be ready with the door without delay and also relieves him of any unnecessary operation of the doors at safety stops. In case of emergency the conductor may signal the motorman by the same bell cord. The starting signal, however, is automatic, giving the motorman a white light on closure of the rear doors. Push buttons in the body of the car operate a buzzer on the rear platform, and owing to the strong


KANSAS CITY CAR—SHOWING REAR AND FRONT PLATFORM ARRANGEMENT

dislike of motormen for the ordinary signal bell, a push button is also provided on the railing near the rear-door operating handle so that the conductor can give a buzzer signal to the motorman to stop. The tap-bell cord, it may be said, is concealed by running it through light conduit installed above the headlining, where it is out of reach of rowdies.

Other features of these cars are the safety treads set crossways in the ramps at the rear end of the car-body floor, and, as an emergency safety appliance, a plunger is provided beside the conductor's seat by which he may produce an emergency application of the air brakes. Comfortable cross-seat cushions were obtained by making them 35 in. long, which is sufficient to prevent seated passengers from overhanging into the aisle, and the cross-rail at the top of the seat back is offset 1½ in. to the rear of the seat, so that a passenger, when arising, does not disturb the seated passenger in the seat in front. The smooth lines of the one-piece pressed-steel seat pedestals improve sanitary conditions in that the collection of dust at these points is eliminated.

To keep the side plates in the proper plane at the bolsters and also to increase the section modulus at that point, the side sheathing is bent around the corner post and supported by a gusset plate riveted to the end sill, a pocket into which the corner post fits being left between the gusset plate and the bent-around portion of side plates. Steel panels between the belt rail and the letterboard at the corner posts are provided to resist racking of the roof. Pressed steel carlines are used, and they are supported by wooden sideposts. Holes have been punched through the horizontal legs of the angles which are installed along the middle of the side plates, and spaces have been left between the side posts and the side plates, these openings constituting provision for ventilation of the dead air space between the side plates and the inside finish. This space is also ventilated at the top and bottom so that the circulation of air will remove any sweat or moisture that many accumulate.

These cars were designed under the direction of William P. Woods and P. J. Kealy, representing respectively the city and the railway company, and they were built by the American Car Company, St. Louis, Mo.

Cement-Sack-Cleaning Machine Pays Big Dividends

A $900 machine for cleaning cement sacks displaced three men and effected an annual saving of $2,172 for the maintenance of way department of the Cleveland (Ohio) Railway. This machine is another of the ingenious inventions of Charles H. Clark, engineer maintenance of way, and comprises four essential parts —a motor, a drum, an exhaust fan and a dust collector. The motor drives both the cleaning drum through a set of reduction gears and the exhaust fan. The octagonal drum is 12 ft. in diameter by 5 ft. wide, and is constructed with wooden sides and a ½-in. mesh screen on the periphery. This drum is mounted on a shaft in a room which is made as nearly air-tight as possible, and the motor revolves the drum at the rate of about 10 r.p.m. At one of the upper corners of the room an air intake is installed and at the diagonally opposite corner an outlet leads through the exhaust fan to the dust collector. As the drum revolves the exhaust fan draws the air through, removing the cement dust which is deposited on the floor of the room. A small amount of cement is finally taken out by the dust collector. One thousand sacks are placed in the drum at one time and after revolving it for thirty minutes and allowing five minutes for the dust to settle, the clean sacks are removed.

Heretofore the way department of the Cleveland Railway found it necessary to detail three men to clean cement sacks. These men beat the sacks against a post, no attempt being made to save any considerable quantity of the cement by this method, however. These three men received 20 cents per hour, and they cleaned approximately 1000 sacks a day. As the way department uses an average of 250,000 sacks of cement a year, the time consumed by the men in cleaning the sacks was considerable. It was found that 1000 empty cement sacks weighed 1313 lb., but after being machine cleaned they weighed 606 lb., thus a reduction in weight of 707 lb. was effected. The freight rate on sacks returned from Cleveland to the cement mill was 8 cents per hundred, hence a saving of 56 cents per thousand sacks in the freight charges was obtained. This represented a total annual saving of $120 in freight alone. In addition to the freight saving, the 707 lb. reduction in weight represented cement salvaged from the empty bags. In other words, 1¾ barrels of cement were salvaged per thousand sacks, and 442 barrels of cement represented the annual saving from 250,000 sacks. The value of this cement at $1.25 per barrel was $552.50. Besides these two items the labor of the three men employed in cleaning the sacks was rendered unnecessary, hence an additional saving of $6 per thousand sacks, or $1,500 a year, was made.

In a room adjoining the building occupied by the cement-sack-cleaning outfit storage space for empty sacks was provided. This storage room was equipped with a stove and a special sewing machine for mending torn bags. During the winter months one of the men in the concrete gang who had become an expert at mending was detailed to the work of patching bags. As a rule this man will mend between 200 and 250 bags a day, for which he receives $2. Hence the expense of mending the sacks is very small, and when in good condition they may be returned to the cement company and a rebate of 10 cents per bag obtained. A cement-sack-bundling machine also forms part of the equipment of this storage room.

Automatic Railway Substations

In the current issue of the *General Electric Review* appears an article on this subject by Cassius M. Davis. In this he refers to the Elgin & Belvidere Electric Railway substations which were described in an abstract published in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 18, 1915, page 583. He states that the automatic type of substation was chosen by this railway to reduce operating expense by eliminating light-load and no-load losses and by rendering the presence of attendants unnecessary. He credits Alex Dow, president Edison Illuminating Company of Detroit, Mich., with important pioneer work in this field.

Mr. Davis gives the results of calculations based upon conservative estimates of the requirements of a road operating cars on an infrequent schedule. The results are shown in the accompanying table. He claims that even when cars run under such short headway as to require the continuous operation of some of the substation equipment an appreciable saving can be secured by automatic operation of other machinery in the substation. As a definite example of this condition he takes the case of a substation containing two 300-kw. converters, one of which is in continuous operation from 6 a. m. until 2.30 the next morning, and the other machine from 6 to 7.45 a. m. and again from 3.45 to 9.30 p. m. The service assumed on the road calls for trains

COMPARISON OF HAND-OPERATED AND AUTOMATICALLY OPERATED SUBSTATIONS

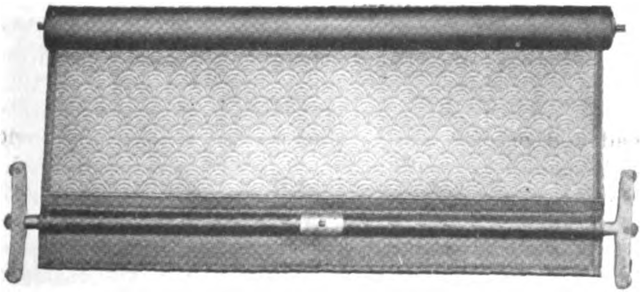
	Hand Operation	Automatic Operation
Headway between trains......	120 minutes	120 minutes
Number of substations........	Four	Four
Capacity of each substation....	300 kw.	300 kw.
Actual time machines operate operate per day............	18 hours	7 hours
No-load losses per substation...	12 kw.	—
No-load energy losses per day per substation..............	132 kw-hr.	—
Cost of energy at substation..	1 cent per kw-hr.	1 cent per kw-hr.
Value of energy saved per day per substation..............	—	$1.32
Value of energy saved per year per substation..............	—	$482.00
Number of operators or inspectors......................	Eight	Two
Wages of each operator or inspector per month..	$65.00	$65.00
Total wages per year..........	$6,240.00	$1,560.00
Value of wages saved per year..	—	$4,680.00
Value of energy saved per year.	—	$1,928.00
Total saving per year.........	—	$6,608.00

each way every half hour with extra cars during the morning and evening rush hours.

Under this condition it is estimated that the first machine when running alone operates at no load for a period of 3.4 hours. The no-load loss of the converter and transformers is approximately 12 kw. Therefore, the energy loss per day is approximately 41 kw.-hr. or a total of 14,965 kw.-hr. per year, which at 1 cent per kilowatt-hour means approximately $150 per year. During the time the two machines are operating it is estimated that there is no load on either machine for a period of eighteen minutes per day, which represents a no-load loss of approximately $15 per year. Furthermore, during the time the two machines are operating, it is estimated from a typical load curve that the second machine could be shut down a total of at least two hours when it is not required to carry load peaks. The no-load losses during this time would amount to 24 kw.-hr. per day, which represents approximately $88 a year at 1 cent per kilowatt-hour. This station could, therefore, save at least $253 per year in power alone. There would also be a slight additional saving during the time when the two machines are running, due to the fact that under automatic operation when two machines were necessary, both would be operating at a high efficiency.

A Handless Curtain Fixture

The Railway Supply & Curtain Company, Chicago, Ill., has just brought out a new type of curtain fixture, named the "Handless" because it has no pinch handles. The curtain may be operated from any point along the bottom. It is made for a wide range of adjustment to suit the variations in the width of window frames. The double-acting friction device, which holds the curtain at any desired height, may be pushed up or pulled down without friction or resistance of any kind.

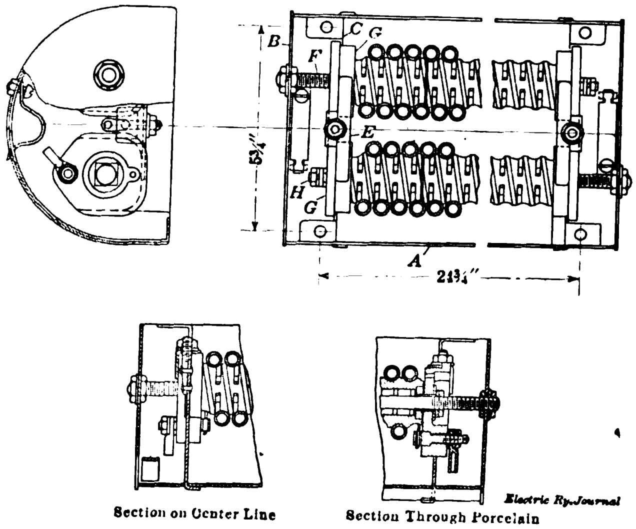


CURTAIN WITH FRICTION DEVICE ON ROLLER TIPS

This fixture is of standard dimensions so that it will fit the usual window grooves, and it cannot be removed from these grooves in the ordinary manipulation of the curtain. Another feature is that the tip has a special connection whereby it is permitted a certain amount of lateral action. At the same time a locking device prevents it from being displaced beyond the limits of play except when adjustments are desired, or when the fixture is to be taken apart. This fixture is made up with any of the customary curtain fabrics.

Light-Weight All-Steel Panel Heater

A new type of heater is being installed by the Interborough Rapid Transit Company on the 478 new cars that are being placed in service on the New York subway. This is a new design that has been brought out by the Gold Car Heating & Lighting Company, New York, for general service on electric railway cars. In it all of the metal parts have been made of pressed steel, and the weight has thus been reduced to a material degree. A feature is the use of resistance-coil supports made of Gold's ventilated porcelain cores, which are perforated so that air is allowed to pass through the coils as well as around them, providing an efficiency which is not found when solid porcelain supports are used. This feature, in fact, increases the effectiveness of the heater to such an extent that it is found in practice that cars equipped with them can run longer with the heater switch in the first position than cars equipped with the ordinary types of heater.



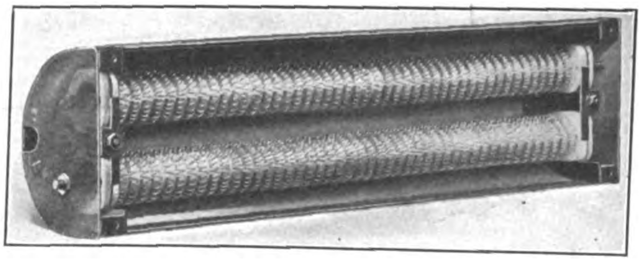
Section on Center Line

Section Through Porcelain

Electric Ry. Journal

TWO-COIL PANEL HEATER

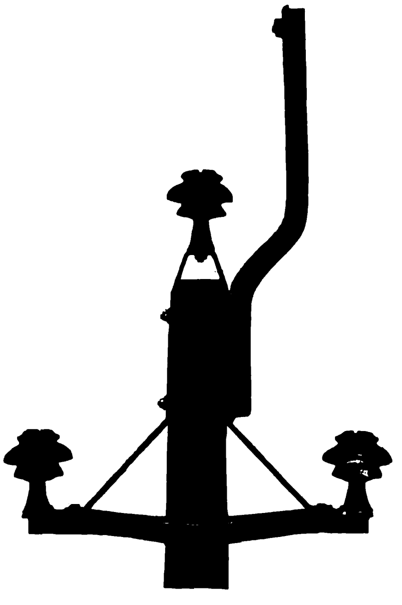
Among the other features are resistance coils made of special non-corrosive wire which will not rust or otherwise corrode, thus reducing maintenance to a minimum. The heater is quickly detachable for repairs or renewals, as the removal of two nuts releases both heating elements through the front of the heater case. The heater also is fitted with special binding posts or spring-clip terminals as desired, the former, which are shown in the accompanying cut, providing an especially simple and rugged construction.



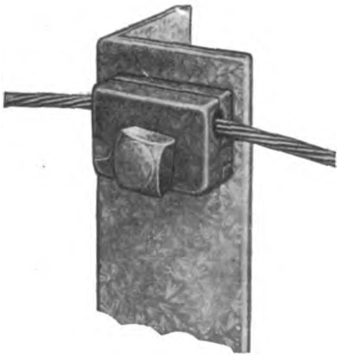
ALL-STEEL PANEL HEATER

Single-Circuit Metal-Arm Construction

Among the various features of equipment for single-circuit metal-arm transmission line construction that are manufactured by the Electric Service Supplies Company, Philadelphia, Pa., is the self-contained cross-arm construction known as the Keystone triangle. This consists of one horizontal lower member made of steel angle sections and one upper member of flat steel formed to go over the pole top, thus serving as a support for the top insulator of a three-phase line and as a brace for the horizontal arm. The device is as strong as an ordinary arm of the same weight when the pull is applied at any transverse angle and is decidedly stronger on pulls that are applied at angles below the horizontal. Its ease of installation is obvious.


TRIANGLE CROSS-ARM WITH BAYONET FOR GROUND WIRE ATTACHED

One of its advantages is the fact that the bottom bolts, or those in the cross-arm, are at right angles with the two upper bolts which attach the flat steel member to the pole. This serves to increase the strength and rigidity of the installation, particularly against strains applied horizontally with the wire. Naturally, the construction allows the wires to be spaced in a true triangle, each one being located in a different vertical plane. Therefore, if one wire breaks it is not likely to short-circuit one of the other phases, an advantage of inestimable value. As the construction actually comprises an extension of the pole top its use means an economy in pole length, and for a given clearance between line wires and the ground a shorter pole may be used than would otherwise be the case.

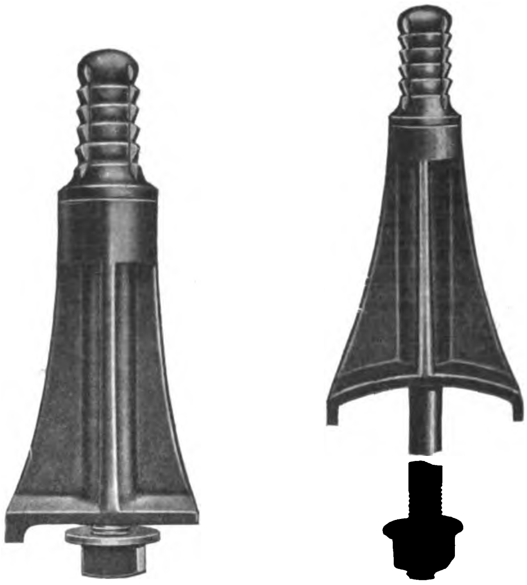

GROUND WIRE CLAMP

These triangles may be used either with or without a bayonet, or ground-wire support, the latter, when used, being attached to the pole through the medium of the same bolts that are used for attaching the triangle. The bayonets are made from angle steel formed to the shape shown in the illustration.

For holding the ground wire to the top of the bayonet either a Keystone ground-wire clamp or a U-bolt clamp may be used. The action of the latter is obvious, but with the former there are several unique features, one of these being the fact that the clamp is made of two malleable-iron castings held in position by a single bolt with lock nut and washer. The castings are identical in form and they are furnished either galvanized or sherardized. Their design is such that they hold the cable away from the sharp edges of the angle-iron support and thus prevent cutting or chafing. The groove is designed with flared ends with a similar purpose in view, the grooves being furnished either corrugated or plain.

While the Keystone clamps are designed especially for use with bayonet construction, such as applies with Keystone triangles, they are also eminently suited for attaching ground wires direct to a wood pole through the use of one through bolt and they have been very largely adopted for this purpose. In any case they afford a simple, cheap and very efficient device.

In addition to the foregoing items of transmission line equipment there should be mentioned the Keystone truss pin, of which more than 500,000 are in service. These are of the separable thimble type and their use is not limited to the Keystone triangle arm, as they may be installed wherever insulators with cemented thimbles are to be applied. They are made in many styles to meet all modern service conditions, the accompanying illustrations showing types for angle-iron cross-arms such as used on Keystone triangles and also for curved-base wooden cross-arms. Great flexibility among standardized insulators or standardized pins is secured by their use, because all Keystone thimbles cemented in any insulator are perfectly interchangeable with any type of Keystone truss pin.


TRUSS PINS FOR ANGLE-IRON ARMS AND ROUNDED WOOD ARMS

Special rigidity and strength are secured by the design of the trussed base and by the use of solid drop-forged steel and bolts. These bolts are non-rotatable, making the installation of the insulator an easy matter, and as they are made so as to be subject to tensile strains only, the combination will behave perfectly under heavy pulls in any direction. The pins or insulators can never come loose in service. They are very easy and cheap to install in the first place, and damaged insulators are very easy to replace. The groove of the insulator may be perfectly aligned with the wire, and at the same time the insulator and pin are kept perfectly tight.

To complete this line of transmission system material the company furnishes the well-known Locke insulator, a name that has been synonymous with good insulation for years. Superior facilities for manufacturing insulators, the most up-to-date facilities for testing, and a record of millions in service in all parts of the world amply demonstrate the ability of the Locke insulator to meet successfully the most adverse conditions.

News of Electric Railways

COMMISSION FIXES SERVICE STANDARDS

Salient Features of Comprehensive Chicago Service Order, the First in that City Ever Fixing a Standard for Rush Hours

Seats for all passengers outside the rush hours and a minimum of eighty-five seats for each 100 passengers during the peak of the rush hours, trailers and switchbacks outside of the loop district, are the salient features of a comprehensive service order issued by the State Public Utilities Commission of Illinois to the Chicago Surface Lines. This order grew out of complaints filed by the Cook County Real Estate Board and was based upon evidence collected from the officials of the railways, the city and the public. The rush-hour service standard is considered to be very severe. This is the first time any regulating body has attempted to fix a standard for Chicago's rush hours. Trail car operation is prohibited by city ordinance. This question of conflict, together with that of the jurisdiction of the commission and the City Council, has already been raised.

Rush-hour and non-rush-hour service standards fixed by the commission provide that between the hours of 6 a. m. and 12 o'clock midnight, except during the morning and evening rush hours of all week days, all cars passing any given point during any fifteen-minute period shall have an aggregate seating capacity equal to the total number of passengers carried. On lines where less than three cars pass a given point during the fifteen-minute period, the time of the check is extended to include three consecutive cars going in one direction. On all lines and routes the maximum headway is not to exceed twenty minutes for the entire day, excepting the six hours between 12 o'clock midnight and 6 a. m.

During the morning and evening rush hours, which were tentatively fixed as the period between 6.30 a. m. and 9 a. m., and 4.15 p. m. and 6.45 p. m. on all days except Sundays and holidays, two standards of service are provided, one for the transition periods and the other for the peak of the rush. During the maximum rush period of one and one-half hours, an average of eighty-five seats for every 100 passengers carried is fixed as the standard. During the transition periods, immediately preceding and following the maximum rush hour, ninety seats for each 100 passengers is fixed as the standard. The exact time of the rush-hour periods was not fixed for all parts of the city, other than that it was considered to extend over a two and one-half-hour period. For different locations throughout the city, particularly outside the loop district, the railway company will be authorized to fix the rush period upon filing a written notice with the commission. During the period from midnight to 6 a. m., the commission ordered that the service should be such as to meet the demands of the public and the conditions of travel, but that the schedules covering this period should be filed with the commission for approval.

The standard of loading for each of the rush-hour periods was specified as applying to any half-hour period consisting of any two consecutive fifteen-minute periods. The standard for non-rush-hour periods was fixed for fifteen-minute periods. The demand for service was separated into Sundays and week days, and the average count of passengers for three consecutive normal week days was considered sufficient to give a fair average. The average count of passengers for two consecutive Sundays was considered a fair average of Sunday service demands. Traffic surveys must be made from time to time, subject to the order of the commission, both as regards time and place of checking points.

Tracks were deemed by the commission to be operated to their full capacity when the combined headway of cars passing any checking point in the same direction was twenty seconds or less. Exception was made, however, for lines operated through tunnels, where an average headway of thirty seconds or less was deemed to be the full capacity of the tracks. To comply with the order of the commission as regards a service standard, the surface lines were ordered to proceed at once to make service checks, and within sixty days or by Dec. 1, to file a statement showing the location of the maximum traffic points outside the loop district for all lines and routes and for both the morning and evening rush periods. With this information the railway company was ordered to state what it deemed the morning and evening rush-hour periods for the various lines and routes checked.

Turn-back service in the territory immediately outside of the Chicago loop district sufficient to comply with the service standards was also ordered by the commission. Plans showing this service installed, as well as the scheme for rerouting cars in the downtown district to secure maximum track capacity, were ordered to be filed with the commission by Dec. 1. In case the railway found its present equipment insufficient to comply with the provisions of the order, it was ordered to proceed immediately to acquire the necessary equipment. The commission believed trailers would materially increase the track capacity and ordered the company to install within sixty days such trailer service during the rush hours as was necessary to comply with the service standards.

To clear up the question of jurisdiction, the commission ordered the railway to apply within thirty days of the date of the order to the proper municipal authorities for all necessary permits and authority. Other questions of service included in the commission's order provide that separate route and destination signs must be displayed on the front ends and route signs on the sides of all cars. All plans for new passenger cars as well as those for remodeling old passenger cars must be submitted to the commission for its approval of the width of passageways, height and location of seats, platform arrangements and such other details as might affect the adequacy of the service.

In a digest of the order given out to the local newspapers, the commission directed the attention of the municipal authorities to the serious delay to cars caused by vehicles in the congested districts during the rush hours. It was recommended that the city prohibit the use of the tracks by vehicles during the rush hours. The commission also suggested that the companies employ additional traffic supervisors with authority over trainmen, these supervisors to be stationed at important transfer and loading points to hasten the loading and movement of cars, and thereby increase the number of seats. The commission also called attention to the extraordinary congestion on Jackson Boulevard, the only east and west artery through the loop district devoted exclusively to vehicular traffic. It was suggested that Washington Street also be given over entirely to vehicular traffic.

Unification of the surface and elevated railroad lines in the near future was also considered important to provide adequate transportation facilities. The commission expressed the opinion that considering all the traffic difficulties existing in Chicago and the increased traffic demands which would come with the natural growth of the city, steps should be taken immediately to make use of all transportation facilities by the construction of subways.

FORT WAYNE CARS IN FULL OPERATION

No further violence or serious disorder has occurred in Fort Wayne, Ind., since Sept. 29. All regular cars have been in full operation, although up to Oct. 4 service was suspended about 6 p. m. On Oct. 4 cars were operated until 10 p. m. without interference. Assistance for the striking street car men has been voted by the various labor organizations in Fort Wayne, and members of unions are forbidden to ride on the street cars under penalty of fine. The hearing for an injunction, which was to have been held in the Federal Court at Indianapolis on Oct. 5, was postponed until Oct. 27, in accordance with agreement between the opposing counsel. The case of the United States Mortgage & Trust Company, trustee under the mortgage of the Fort Wayne & Northern Indiana Traction Company, against Joseph C. Colgan, executive officer of the Amalgamated Association, for contempt of court, filed after the trainmen at Fort Wayne went on strike after a temporary restraining order had been granted by the United States Court against Colgan and others, will also be heard. In connection with the postponement the attorneys for the defendant allege that the United States District Court for the District of Indiana has no jurisdiction in the case, as Colgan says he is a resident of Chicago, while the plaintiff trust company is a New York company.

Cars in Fort Wayne continue operating until about 10 p. m., but several cases of the stoning of cars have been reported. President J. M. Barrett of the company addressed an appeal to the citizens of Fort Wayne to assist the company in the exercise of its lawful rights and to patronize the cars. On Oct. 8 all cars were reported as being operated on schedule and with increased traffic.

Superintendent of Transportation J. J. Brennan of the company stated that on Oct. 9 the company would assign regular runs to the men working on the cars and that the assignments would be permanent, with the seniority rule in force. Several old men have reported to the officers of the company and asked to be assigned to work.

J. C. Colgan, the organizer for the Amalgamated Association, has stated that the men would be willing to meet the officials of the company for a conference leading to arbitration, but that they would not accept the members of the Public Service Commission as a board of arbitration.

Mayor Hosey on Oct. 7 proposed to the company that Governor Ralston should decide whether a local arbitration board or the Public Service Commission should arbitrate the strike. This proposal was refused by the company.

SAN FRANCISCO CONSIDERS AN ELEVATED LINE

At a session of the International Engineering Congress, held recently in San Francisco, there was some discussion of the possibility of an elevated railway in San Francisco, in which M. M. O'Shaughnessy, engineer of that city, took part. In response to a request for comment on the means now being considered for improving transportation facilities in San Francisco, Mr. O'Shaughnessy has supplied the following statement to the Electric Railway Journal:

In the near future something will have to be done to reduce the time required to travel from the business section to the western residence districts of the city and to relieve the congestion on lower Market Street, the main traffic artery of San Francisco. The time required to travel from Third and Market Streets to the western residence districts could be reduced by twenty minutes if an express train service were provided. The economic advantage of the saving of forty minutes of time lost in two daily trips of each of 50,000 passengers daily would justify an expenditure of $50,000,000 by the community. In addition a rapid transit system would at once infuse stability and confidence into the outlying and Peninsula sections and help to increase the population of the city.

The possibilities of subway and of elevated lines have both been considered. Objections to subways were found to be greater than the objections to elevated lines because of the greater first cost, ventilation difficulties and time required for the construction of the subways. The cost of a subway system was estimated to be $3,500,000 per mile of double track as against $800,000 per mile for an elevated system. The cost of surface lines with 106-lb. rails in San Francisco has been found to be about $218,000 per mile. The greatest problem in undertaking to provide a rapid transit system in San Francisco is that of educating the public to a point where the prejudices to the elevated system will be overcome.

NATIONAL ELECTRICAL CODE CONFERENCE ON OCT. 27 AND 28

The deferred conference in Washington on the proposed national electrical safety code will be held at the bureau of standards on Oct. 27 and 28, in accordance with the announcement made several months ago. Official delegates have already been appointed from the American Institute of Electrical Engineers, National Electric Light Association, American Electric Railway Association, American Railway Association and many other organizations. The bureau of standards will report to the conference concerning the work which has been done in the preparation of the proposed code and present the latest revised copy of the text of the code. It will also present some recommendations with regard to the method of revising the code in future and of its administration by the various States and municipalities. The bureau will recommend, however, that the code shall not be made mandatory until after its tentative use for one year, in order to give the commissions and municipal authorities, as well as the utility companies, an opportunity to become thoroughly familiar with it and to permit the experience of one year to be utilized in its further revision before being made mandatory. About 100 delegates are expected to attend the conference.

ULTIMATUM IN SEATTLE PAVING CASE

Mayor H. C. Gill of Seattle, Wash., in a recent communication to the Puget Sound Traction, Light & Power Company, issued an edict stating that unless the company paved between its tracks in accordance with franchise requirements on the streets where the city of Seattle is laying paving, he would immediately recommend to the Council the revocation of the corporation's street railway franchises. A. L. Valentine, superintendent of public utilities of the city, has notified the company that improvements must be made at once on five separate street paving jobs.

In reply, the company stated that it had an application before the Public Service Commission for relief from this paving exaction, as well as from other franchise obligations, and that until this was disposed of, the company could not see its way clear to comply with the request which the city has made.

In discussing the matter Mayor Gill was quoted recently in part as follows:

"I will not submit to the company setting aside its franchise at this time and failing to pay 2 per cent of its gross revenues to the city when they come due simply because it has a matter pending before the Public Service Commission. Fifty-five thousand dollars has been included among revenues in the city budget for this amount, and I propose that the company shall pay it, unless the city is restrained by court order. Charles A. Reynolds, chairman of the Public Service Commission, has been quoted as saying that he will not consider the application of the company until a valuation of the company's properties has been completed. This valuation will not be completed, according to present estimates, until the last of next year. Should the company agree to pave its right-of-way under agreement to accept a refund in case the city should lose in litigation with the company, then I will not send my recommendations to the Council. The city cannot wait on its paving until the commission has valued the company's properties, and held a hearing on the company's application."

OPINION IN OHIO REGARDING LOCATION OF INTERURBAN TRACKS

Attorney-General Turner of Ohio rendered an opinion on Sept. 22 to the effect that interurban railways with tracks along the side of the public highways may be compelled to move those tracks to the center of the highway when it is necessary for the proper paving and improving of the space and that the owning corporations must pay the entire expense of relocating the tracks. Not only this, but they must pave the space between the tracks and to the distance of 1 ft. on either side. This opinion was rendered to State Highway Commissioner Clinton Cowan, who is preparing to build a 40-ft. pavement for a distance of 3810 ft. on the extension of North High Street north of the corporation limits of Columbus. The tracks of the Columbus, Delaware & Marion Railway extend along the east side of this highway. The franchise granted the company by the County Commissioners gives it the right to occupy that particular location, but Attorney-General Turner asserts that it is not within the power of the commissioners to make a grant that will impinge on the higher power—the police power—of the State. This is the power that insures the people their rights, and no authority or power is above the rights of the people to the best service and the highest degree of safety commensurate with the conditions. One of the rules of traffic, he says, is that all travelers shall use and keep to the right-hand side of the road or street. It is necessary to change the tracks to the center of the street in order to do this. Any other method of travel would result in great confusion and danger. The commissioners had a right to grant a franchise, but not to limit the location so that these rules cannot be carried out by the public. He says that as there is no provision in the laws whereby the cost of relocating electric railway tracks shall be paid from the public highway funds, the company must stand this expense.

ROCK SLIDES GREATEST MENACE TO NEW YORK SUBWAY WORK

That New York City's subway work is being carried on in general in accordance with the best practice, that rock slides such as occurred Sept. 25 on Broadway, at Thirty-eighth Street, constitute the "greatest and only serious menace" to be guarded against, that cross-bracing should be used wherever there is any doubt as to the strength of the rock foundation, that the permanent construction should be kept as near as possible to the headings, and that constant inspection of the temporary street supports is necessary, are the conclusions set forth in the report to the Public Service Commission by Edmund S. Davis, chief engineer of the Boston Transit Commission, and Henry H. Quimby, chief engineer of the Philadelphia Department of City Transit, made public on Oct. 6. These men were retained by the Public Service Commission tq make a report on the construction methods in use, and to recommend, in view of the recent failures of subway decking, changes to insure against a repetition of either accident. In the light of experience gained as a result of these accidents the engineers made the following recommendations:

(1) That throughout the present construction, at every point where the trench is in a rock with inclined strata, showing open seams or other evidence of actual or threatened disintegration, the sides be shored across the trench so as to form a continuous strut from side to side of the trench, with additional supports in the shape of raker braces if projecting portions of rock afford the necessary hold.

(2) That an effort be made to systematize the work so that the sequence of operations will carry the work of excavation and the erection and concreting of the permanent subway structure close together, so as to require as little falsework and temporary decking of the street as possible.

(3) That in future work preference be given to a type of timbering that will provide continuous needlebeams or struts from side to side of the trench, with the joints of the uprights firmly spliced to prevent buckling.

(4) That a periodic inspection be made of every point of contact of shoring with the banks, as well as of all connections of members to insure continuous tightness and prevent deterioration of the timber work from vibration.

Among other things the engineers said:

"In our tour of inspection we have found that, with the few exceptions noted, the work of subway construction is being prosecuted throughout in the most thorough and systematic manner. Considering the magnitude of the work and the great extent and variety of the operations, the instances of failure of any sort resulting from carelessness, or otherwise, in the conduct of it are remarkably few."

ADDITIONAL INDORSEMENT OF TOLEDO GRANT

The Toledo Retail Merchants' Board, at its annual meeting on Oct. 5 approved the street railway franchise ordinance which has been initiated at Toledo, Ohio.

On Oct. 1 a temporary restraining order was issued in the Court of Common Pleas to prevent the enforcement of the order of the city that the railway tracks on Huron Street between Orange Street and Stickney Avenue and on Stickney Avenue between Huron and Erie Streets be removed at once. This action was taken at the instance of City Solicitor Thurstin and former City Solicitor Cornell Schreiber, and was intended to give Council and opportunity to push the matter through or rescind the order for the present. It was found that the approval of the Dotson franchise by the people at the fall election would give the company the right to tear up the new pavement that is to be built on the streets mentioned in order to relay its tracks, and the property owners objected to this. Council decided on Oct. 4 to notify the company that the removal order will not be enforced until after the election on Nov. 2, whether or not the restraining order is made permanent.

HYDRO-ELECTRIC PLANS MATURING

T. J. Hannigan, Guelph, Ont., secretary of the Hydro-Radial Association of Ontario, has notified Mayor Church of Toronto that preliminary surveys have been made and plans and estimates of the cost prepared for the proposed hydro-radial lines in the Toronto district. He asked that the city appoint three delegates to join representatives of other municipalities interested to inspect the plans. It is rumored that the Hydro-Electric Power Commission of Ontario has arranged to acquire the Toronto Suburban Railway from Toronto to Guelph. While confirmation of the story could not be obtained, it is regarded as likely that some tentative arrangement will be made whereby the commission may incorporate the suburban line in the proposed network of radials. Chief Engineer Gaby of the commission said that nothing in regard to the matter and the route of the proposed radial lines could be divulged until after the representatives of the municipalities had been consulted.

Alabama Utilities Bill Passes House.—The Denson public utility bill, transferring control of public utility corporations from municipalities to the State, has been passed by a vote of forty-nine to thirty-two. Only a few minor amendments were considered.

Planning for the Minneapolis Appraisal.—The sale or $15,000 of bonds to provide funds for conducting the franchise negotiations with the Minneapolis (Minn.) Street Railway was expected to be taken up by the City Council on Oct. 8. F. W. Cappelen, city engineer, who will have charge of the work, has stated that the appraisal will be started within two weeks after the bonds have been sold.

Albany Arbitration Adjourned.—The first meeting of the arbitrators named to inquire into and settle the differences between the United Traction Company, Albany, N. Y., and its employees which led to the strike of Sept. 6, was held on Oct. 1 The arbitrators organized by choosing Judge Lynn J. Arnold chairman and adjourned to Nov. 4. The principal difference between the company and its employees is over the methods of discipline.

Yonge Street Order Issued.—The Ontario Railway & Municipal Board on Sept. 21 issued an order directing that the Yonge Street tracks of the Toronto (Ont.) Railway must be extended from the present terminus to Farnham Avenue, and that the cars must be in operation over this section of line by Dec. 1 of this year. The order backs up the opinion of the board, rendered some days ago, that the company had a right to extend its Yonge Street tracks to occupy the space lately vacated by the Toronto & York Radial Railway. The city of Toronto will have to lay the necessary roadbed for the company's rails, as is the case with all lines in the city.

Springfield Trolley Pole Removals.—Agreements have been prepared by the Springfield, Mass., City Planning Commission for submission before Oct. 16 to property owners in the downtown district relative to the removal of trolley poles on Main Street between State Street and the Union Station. The agreements have been prepared in blank and approved by City Solicitor C. H. Beckwith. When signed by the property owners and the Springfield Street Railway the agreements authorize the removal of the poles and the attachment of span wires to the buildings at the expense of the company, which has agreed to meet the cost of the change, made desirable by increasing traffic congestion.

New Orleans Street Railway Resumes Service After Hurricane.—Practially all street car service was resumed on Oct. 7 on the lines of the New Orleans Railway & Light Company, New Orleans, La., following the terrific hurricane which swept the Gulf Coast last week. The delay to service has been entirely due to the cutting off of power because of fallen wires. Relief work was badly handicapped by continuous heavy rains following the storm. The roofs of the Poland, Prytania and Claiborne carhouses were badly injured, resulting in slight damage also to about thirty cars which were in these carhouses at the time. The main power house suffered damage to its roof and through broken windows, amounting to about $1,000.

Rhode Island Arbitration Testimony Concluded.—Presentation of testimony in the Rhode Island Company's arbitration case was concluded on Sept. 29 at Providence, when an adjournment was taken to Oct. 25, when final arguments are to be submitted by counsel on each side. It is expected that two days will be required for arguments, and a finding is anticipated by the board by Nov. 26. The hearings have covered forty-three days and have resulted in the presentation of 192 exhibits, 105 witnesses and 3431 pages of typewritten testimony aggregating about 837,750 words. The final hearing was devoted to clearing up various loose ends of testimony which had been carried over from previous sessions. An analysis of the company's financial status tending to show ground for confidence in the future of the road was submitted by Arthur Sturgis, Boston, on behalf of the employees.

Electrolysis Report at Providence, R. I.—R. B. Brunet, public service engineer of the city of Providence, R. I., has submitted a report on electrolysis within the municipality to Commissioner of Public Works Slade. The report sets forth a number of cases of corrosion of water pipes and cables, gas pipes and other structures, and states that 2191 open and defective rail joints have been found in the local street railway system. This is about 15 per cent of all the joints in service. The report recommends that temporary bonding be required of the Rhode Island Company at points where new tracks are being installed, repairs being made or special work under construction; that the company be requested to hasten the rebonding of track at points known to be defective; that broken or imperfect rails be repaired or removed as soon as discovered, and that the company be formally requested to bond all joints and track networks electrically.

Completing Connecting Railroad Bridge.—Samuel Rea, president of the New York Connecting Railroad, on Oct. 1 sent a message to Gustav Lindenthal, chief engineer of the East River Bridge Division of the New York Connecting Railroad, congratulating him as designer and chief engineer of the East River arch bridge upon the closing of that great arch that day. Mr. Rea said in part: "Within eighteen months I hope we will see the completion of the New York Connecting Railroad and of the Seventh Avenue subway in Manhattan, which will conclude the Pennsylvania Railroad's comprehensive program for terminal development in and through New York City, adopted thirteen years ago under the presidency of A. J. Cassatt. With these projects completed full opportunity will be afforded to measure the benefit of the New York terminal improvements to the public, the country at large and to the company." The new bridge will afford a connecting link between the New England railroads and the trunk lines serving the West and South and make unnecessary the ferriage of cars around New York.

Chicago Mayor Urges Subway Construction.—Immediate construction of four-track subways in the downtown district and the unification of the surface and elevated lines formed an important part of the annual message of Mayor William Hale Thompson to the Chicago City Council. The Mayor supported the initial subway scheme, but suggested that it contain four tracks and be used by the cars of both the surface and elevated lines. He proposed that the subways be constructed by the city in and through the downtown district, extending out as far as the present needs of the traffic situation warranted, and that they be operated as a unified system of transportation on a rental basis. The message stated that to accomplish this a tri-party agreement between the city, the elevated railways and the surface lines would be necessary. In order to formulate a concrete scheme as promptly as possible, the Mayor suggested that experts familiar with the engineering and financial problems involved be appointed by the city and companies. The plan worked out by these experts should later be submitted to the City Council and finally in referendum to the people of Chicago. If the elevated and surface lines agreed to become parties to such an arrangement, the Mayor believed it would be necessary to give Chicago the right to purchase the elevated properties at any time, and that the price be fixed either before the negotiations are consummated, or at some future time when it has been decided to consider the purchase.

Financial and Corporate

STATUS OF MICHIGAN COMPANIES EXPLAINED

Organization and Extent of Michigan United Traction Company and Michigan Railway Described to Avoid Confusion

On account of a possible confusion of the Michigan United Traction Company, the Michigan United Railways and the Michigan Railway, it is deemed wise to print the following facts:

The Michigan United Traction Company leases from the Michigan United Railways (simply a consolidated nonoperating company) and operates the city lines in Kalamazoo, Battle Creek, Jackson, Lansing and Owosso, Mich. It also leases and operates two 600-volt third-rail interurban divisions. The northern division includes the trackage from Jackson to Owosso and Corunna and from Lansing to St. Johns. The southern division includes the trackage between Jackson and Kalamazoo, passing through Battle Creek, and from Jackson and Grass Lake to Wolf Lake. This is also a short spur from Gull Lake Junction to Gull Lake. The Michigan United Traction Company also operates between Kalamazoo and South Haven a steam road called the "Fruit Belt Line" connecting with Chicago boats at South Haven.

The Michigan Railway owns and operates as its northeastern division an interurban line running between Bay City and Flint and a spur line from Saginaw to Frankenmuth. This is a 1200-volt line, and the portion between Bay City and Saginaw is operated with a third-rail. Arrangements have recently been made with the Detroit United Railway for the operation of through limited-passenger trains between Bay City and Detroit, the Michigan Railway furnishing new all-steel cars for this service.

The western division of the Michigan Railway includes the 2400-volt third-rail lines between Kalamazoo and Grand Rapids, Battle Creek and Grand Rapids, and Monteith Junction and Allegan. Aside from these this company is building a 2½-mile detour between Yorkville and Gull Lake Junction on the line between Battle Creek and Monteith Junction, which will put Gull Lake on the main line. The existing spur track from Gull Lake Junction, as well as that section of the main line cut off by the new route, will be abandoned. This company is surveying for a 35-mile extension between Owosso and Saginaw. When this is completed limited service will be given between Jackson and Bay City.

Tickets are being sold from all points on the Michigan United Traction Company and the Michigan Railway, as well as from points on the Detroit United Railway, to Chicago by way of Detroit, through Jackson, Battle Creek, Monteith Junction and Grand Rapids. At Grand Rapids connection is made with the Grand Rapids, Holland & Chicago Railway, which in turn connects with the Chicago boats at Holland and with the Grand Rapids, Grand Haven & Muskegon Railway at Muskegon. The western division of the Michigan Railway carries mail and express and handles steam-road mixed-freight cars, having a steam railroad connection with the Père Marquette Railroad at Allegan, the Grand Rapids & Indiana Railroad at Monteith, the Chicago, Kalamazoo & Saginaw Railway at Richland Junction and the Michigan Central Railroad at Battle Creek.

The lines of both the Michigan United Traction Company and the Michigan Railway are operated by the same management. The organization of the Michigan United Traction Company is as follows: President, B. C. Cobb; vice-president, Frank Silliman, Jr.; vice-president and general manager, J. F. Collins; secretary, G. B. Dobbin; treasurer, J. W. Glendenning; general superintendent, C. E. Morgan; superintendent of equipment, R. C. Taylor, and general superintendent of the steam road, H. D. Swayze. The organization of the Michigan Railway is as follows: President, H. H. Crowell; vice-president, B. C. Cobb; vice-president and general manager, J. F. Collins; vice-president, Frank Silliman, Jr.; vice-president, George W. Mechem; secretary, G. B. Dobbin; treasurer, J. W. Glendenning; manager of the northeastern division, A. D. Furlong; superintendent northeastern division, Charles Arnold; traffic manager of the western division, F. W. Brown, and superintendent of equipment, R. C. Taylor.

ANNUAL REPORT

American Light & Traction Company

The comparative statement of income, profit and loss of the American Light & Traction Company, New York, N. Y., for the years ended June 30, 1914 and 1915, follows:

	1915	1914
Earnings on stocks of subsidiary companies owned	$3,980,302	$3,697,743
Miscellaneous earnings	754,962	717,867
Gross earnings	$4,735,264	$4,415,610
Expenses	157,599	139,465
Net earnings	$4,577,665	$4,276,145
Surplus and reserve June 30, previous year	9,577,664	8,973,146
Total surplus earnings	$14,155,329	$13,249,291
Cash dividends on preferred stock	$854,172	$854,172
Cash dividends on common stock	1,553,332	1,408,727
Stock dividends on common stock	1,553,333	1,408,728
Total dividends	$3,960,837	$3,671,627
Surplus balance June 30	$10,194,492	$9,577,664

During the last fiscal year the gross earnings of the company increased $282,559 or 7.6 per cent, most of which was made up of increased earnings on the stocks of subsidiary companies owned. The expenses increased $18,134 or 13 per cent. The net earnings showed an increase of $301,521 or 7 per cent. Dividends increased $289,210 or 7.9 per cent, and the surplus balance (previous surplus included) $616,828 or 6.4 per cent.

FARES COLLECTED IN CLEVELAND

The traffic returns of the Cleveland (Ohio) Railway thus far this year indicate in general very favorable results of operation. The following table shows the number of fares collected in each of the first eight months of 1914 and 1915, with the totals:

	1915	1914
January	18,431,753	18,816,541
February	17,052,978	17,046,893
March	19,527,042	19,100,804
April	19,391,440	19,296,216
May	20,359,602	20,434,647
June	20,455,054	19,647,477
July	20,829,989	20,216,303
August	20,669,652	19,796,084
Total	156,717,510	154,354,965

It will be noticed from the foregoing table that the total of fares collected for the first eight months of 1915 was 156,717,510, ac compared to 154,354,965 for the corresponding period of 1914, an increase of 2,362,545. Six of the months showed increases (the lightest being in February and the heaviest in August) as follows: February, 6085; March, 426,238; April, 95,224; June, 807,577; July, 613,686, and August, 873,568. In January and May decreases of 384,788 and 75,045 respectively were shown.

BROOKLYN COMPANY WINS $829,578 SUIT

Brooklyn, Queens County & Suburban Railroad Is Not Compelled to Pay City Percentage of Revenue Under Railroad Law

In a decision handed down in the Supreme Court on Oct. 2 Justice Erlanger held that New York City is not entitled to collect $829,578 from the Brooklyn, Queens County & Suburban Railroad, Brooklyn, N. Y. This company is now one of the operating controlled companies of the Brooklyn Rapid Transit Company.

The suit, which has been going on since 1907, was brought under the railroad law to collect a percentage of the revenue received by the company from Oct. 1, 1901, to Sept. 30, 1907. The city's share of the earnings of $7,029,105 for that period, according to the corporation counsel, was $361,753. In addition, the city maintained that the company should have been penalized $467,825 for failure to pay the amount due.

The present decision shows that by various consolidations the defendant company in 1893 came into possession of important lines in Brooklyn. These consolidations completed, the company effected an entrance into Manhattan by way of the Williamsburg and Brooklyn bridges. The city contended that this brought the company within the statutory requirement for lines operating within a city of 1,200,000 or more inhabitants, although the population of Brooklyn at that time was less than the required figure.

Justice Erlanger holds, however, that the city is entitled only to franchise revenues and bridge tolls. If the railway were to be charged with the percentages on revenues under the railroad law the facts must indicate that it brought itself within the definition of the statute. To become chargeable because of an operation of cars within the Borough of Manhattan the defendant must be found to have operated a branch or extension of its line under the provisions of this statute. The company's cars, however, were run across the bridges by virtue of permits granted by the city, but there was no franchise given to the company by the city, because the State Legislature alone had that power. When thus operating its cars, under contracts with the city for payment of tolls, the railroad sought and obtained nothing under the provisions of the railroad law. It had a "privilege" or "license upon consideration," and it paid for what it received.

WINONA INTERURBAN PLANS READJUSTMENT

In Explanation of Recent Non-Payment of Interest on Bonds, Details Are Published of Financial Proposition Now Being Considered by Creditors

The report recently circulated in daily newspapers regarding the failure of the Winona Interurban Railway, Warsaw, Ind., to pay interest due on its first mortgage bonds was misleading. The company has under consideration a plan for reorganization, and pending the negotiations caused thereby it will not pay the coupons which matured Oct. 1, since a large amount of the bonds have already been deposited with the trustee.

According to an official statement recently issued, the Goshen division of the company, extending from Warsaw to Goshen and covering 25 miles of track, was opened for business in 1906. The Peru division, from Warsaw to Peru, 45 miles long, was put into operation in May, 1910. The company also leased from the Winona & Warsaw Railway in 1910 the line from Winona Lake to Warsaw, about 2½ miles.

Since the company began operations the gross receipts increased each year, except the last, about 10 per cent per year, but the increased cost of materials, supplies, maintenance and operation was so great that the net earnings did not increase accordingly. Consequently the company has not been able to earn its operating expenses and fixed charges. There is now an accumulated deficit of $323,295, which has been covered by loans or the deferring of the collection of interest due.

In a desire to work out a plan whereby all creditors would ultimately receive full payment, the executive committee has been considering readjustment. The first plan, proposed more than two years ago, involved the organization of a holding company to which the claims of creditors would be sold for stock in the holding company to the amount of the claim. Such a company was organized under the name of the Securities Investment Company, and claims against the railway have been assigned to it and certificates of stock issued to the amount of $851,455. While other creditors to the amount of more than $100,000 have signified their willingness to transfer their holdings to the Securities Investment Company, it is not likely that the holders of claims to the amount of more than $1,000,000 will consent to assign their claims on the plan proposed.

The executive committee has therefore prepared another plan, which, if adopted, will probably be accepted by the Securities Investment Company on the same terms as other creditors. The plan now submitted is that the company issue $1,087,480 of consolidated first mortgage bonds and $1,256,220 of second mortgage bonds, both being 5 per cent twenty-year issues. The first mortgage bonds would be secured by one mortgage on all the property of the company, instead of two mortgages, one on each division, as at present. The second bonds would be a junior issue, with the right of foreclosure for non-payment of interest restricted until a default occurs in first mortgage bond interest.

The issued $750,000 of bonds on the Goshen division would be taken up on a basis of 60 per cent of par with the new first mortgage bonds and 40 per cent with the new second mortgage bonds at par, while the $1,593,700 of bonds on the Peru division would be taken up by 40 per cent of first mortgage bonds and 60 per cent of second mortgage bonds. This discrimination is based on the better earning capacity and better bond worth of the former division. The present net revenues are said now to assure the payment of first mortgage bond interest.

The company has submitted this plan to its creditors with the statement that unless the holders of the bonds now outstanding consent to some plan which will insure the payment of bond interest on the present income, the company will be compelled to default on its interest payment, which will undoubtedly mean the ultimate disposal of the property at judicial sale.

Alton, Granite & St. Louis Traction Company, East St. Louis, Ill.—It is reported that the Illinois Public Utilities Commission has authorized the Alton, Granite & St. Louis Traction Company and the Alton Gas & Electric Company each to extend the date of $250,000 bonds of the Alton Railway & Illuminating Company from Oct. 1, 1915, to Oct. 1, 1939. These bonds are underlying issues of the Alton, Granite & St. Louis Traction Company, the section for the Alton Gas & Electric Company representing bonds assumed by this latter company, which was once owned by the former.

Brooklyn (N. Y.) Rapid Transit Company.—The Central Trust Company, Kuhn, Loeb & Company and Kidder, Peabody & Company, New York, who financed the Brooklyn Rapid Transit Company subway requirements three years ago by the purchase of $40,000,000 of six-year 5 per cent secured gold notes, have exercised the option then given to them by the company and have purchased the remaining $20,000,000 of the notes under the $60,000,000 issue. The proceeds are to be used in completing the construction and equipment required by the contracts between the city and the New York Municipal Railway Corporation, a subsidiary of the Brooklyn Rapid Transit Company. The notes are secured by the deposit with the Central Trust Company as trustee of the New York Municipal Railway Corporation first mortgage 5 per cent guaranteed bonds, equal in face value to the notes issued and outstanding from time to time, and $10,000,000 of Brooklyn Rapid Transit Company refunding gold mortgage 4 per cent bonds. All the notes under this $60,000,000 issue are convertible prior to Jan. 1 next into the New York Municipal Railway Corporation first mortgage 5 per cent bonds. Notes not converted will mature on July 1, 1918.

Choctaw Railway & Lighting Company, McAlester, Okla.—The Guaranty Trust Company, New York, N. Y., as trustee, has filed suit in the Federal Court at Muskogee to foreclose the mortgage of $925,000 on the property of the Choctaw Railway & Lighting Company. A receiver is asked to take charge of the property.

Cleveland (Ohio) Railway.—Horace E. Andrews has resigned as a director of the Cleveland Railway.

Kansas City Railway & Light Company, Kansas City, Mo.—Chairman Dunham of the reorganization committee of the Kansas City Railway & Light Company has been advised by Federal Judge Hook that the time for deposit of the company's stock under the reorganization plan has been extended to Nov. 1; and of the various underlying bond issues, except Kansas City Elevated Railway and Kansas City & Westport Belt Railway issues, to Oct. 9. More than 90 per cent of the principal issues, and about 85 per cent of all interest-bearing securities, have been deposited.

Louisville (Ky.) Railway.—According to the report of the Louisville Railway for the first eight months of the year, the decrease in business was represented by a falling off in receipts of $180,258. This loss, however, was nearly offset by careful management and curtailment of expenses, so that a reduction of only $2,088 in surplus resulted. The decreased revenue for August was $22,801, but operating expenses were cut down so that there was a small increase in net earnings. Figures for the first eight months of the year show the following: Gross revenue, $1,940,703 (decrease, $180,938); operating expenses, $1,024,437 (decrease, $198,903); operating revenue, $916,266 (increase, $12,965); charges and taxes, $596,396 (increase, $16,729); net revenue, $325,870 (decrease, $3,764); other revenue, $121,670 (increase, $1,676), and net income, $447,540 (decrease, $2,088).

Memphis (Tenn.) Street Railway.—Out of the proceeds of the sale of $1,500,000 of two-year 6 per cent collateral gold notes and $600,000 of one-year 6 per cent guaranteed gold notes on a when-issued basis to bankers, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 2, 1915, there will be met maturities of $1,000,000 of debenture notes on Nov. 1, 1915, and of $906,000 of Citizens' Street Railway first mortgage bonds on Jan. 1, 1916, the balance going to working capital. The retirement of the Citizens' Street Railway first mortgage bonds will make the consolidated bonds of the Memphis Street Railway a first mortgage. The aforementioned two-year collateral notes are now being offered by Bertron, Griscom & Company, New York and Philadelphia; Reilly, Brock & Company, Philadelphia, and Counselman & Company, Chicago, at 99½ and interest to yield 6¼ per cent, while the one-year guaranteed notes have all been sold. These issues are to be dated Nov. 1, 1915.

New York (N. Y.) Railways.—A call for proxies to be voted at the annual meeting of the New York Railways on Dec. 6 has been sent out by a proxy committee representing holders of the company's adjustment income 5 per cent bonds. This is believed to indicate dissension among the five minority directors, the proxy campaign being leveled against the insurance company representatives because these companies had assented to adjusting the interest on the bonds by arbitration. The last arbitration award for the bond interest was noted in the ELECTRIC RAILWAY JOURNAL of Oct. 2.

Pekin (Ill.) Municipal Railway—The Mayor of Pekin and the city clerk have been authorized by the City Commission to execute the $4,000 of bonds previously unissued of the total of $48,000 originally authorized by the city to provide funds to complete the reconstruction and electrification of the short local railway as a municipal enterprise. The Pekin Street Railway, which was organized in 1914 to rebuild the short existing line in Pekin but which on May 4, 1915, formally transferred the line to the city for municipal operation, has filed a dissolution notice with the Illinois Secretary of State.

San Diego (Cal.) Electric Railway.—The San Diego Electric Railway has filed with the California Railroad Commission an application for extending until Oct. 1, 1916, the time within which the company may issue $577,000 of 5 per cent forty-year general first lien sinking fund gold bonds at not less than 85 per cent net. The commission authorized the company on Oct. 6, 1914, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 24, 1914, to execute a mortgage to the Union Trust Company, San Francisco, securing a possible maximum issue of $10,000,000 of these bonds, and to put out thereunder $4,497,000 of the issue. Up to now the company has issued $3,920,000. The company's earnings decreased so materially during the last year, and the prospect of improvement is so doubtful, that it is deemed inexpedient to proceed with further extensions and improvements. As the time for the issue of the bonds was limited to Oct. 1, 1915, the company therefore asks another year's time for disposing of the bonds.

San Joaquin Light & Power Corporation, Bakersfield, Cal.—The California Railroad Commission has authorized the San Joaquin Light & Power Corporation to renew promissory notes for a total of $91,481 for not more than one year from Dec. 31, 1915, with interest from 6 per cent to 7 per cent.

Wilmington Southern Traction Company, New Castle, Del.—Announcement has been made that the Wilmington & Philadelphia Traction Company, Wilmington, Del., has secured control of the Wilmington Southern Traction Company through the purchase of all the stock from the banking house of E. Clarence Jones & Company, New York. The transfer of control to these bankers was described in the ELECTRIC RAILWAY JOURNAL of Sept. 18. The company has a line about 6 miles long, running from Wilmington to New Castle. The purchasing company recently acquired the People's Railway in Wilmington, as noted in the issues of June

5 and June 12, and now has control of all the railway lines in the State with the exception of one running from New Castle to Delaware City. Negotiations are now on for this line. It is announced that a number of improvements will be made on the purchased line running to New Castle which will be one of the most important parts of the local system.

DIVIDENDS DECLARED

Boston (Mass.) Suburban Electric Companies, quarterly, 50 cents, preferred.

Cincinnati, Newport & Covington Light & Traction Company, Newport, Ky., quarterly, 1⅛ per cent, preferred; quarterly, 1½ per cent, common.

Citizens' Traction Company, Oil City, Pa., quarterly, 1½ per cent, preferred.

City Railway, Dayton, Ohio, quarterly 1½ per cent, preferred; quarterly, 1½ per cent, common.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Dallas (Tex.) Electric Company, 3 per cent, first preferred; 2½ per cent, second preferred.

Lincoln (Neb.) Traction Company, quarterly, 1 per cent, common.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Ottumwa Railway & Light Company, Ottumwa, Iowa, quarterly, 1¾ per cent, preferred.

Rome Railway & Electric Company, Rome, Ga., quarterly, 1 per cent.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred; quarterly, 1¼ per cent, preferred.

Springfield & Xenia Railway, Springfield, Ohio, quarterly, 2 per cent, preferred.

Stark Electric Railroad, Alliance, Ohio, quarterly, three-quarters of 1 per cent.

United Railways & Electric Company, Baltimore, Md., quarterly, 50 cents, common.

Virginia Railway & Power Company, Richmond, Va., quarterly, 1½ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
AMERICAN RAILWAYS, PHILADELPHIA, PA.						
1m., Aug.,	'15	$472,614	......	......	......	......
1 " "	'14	504,253	......	......	......	......
8 " "	'15	3,536,524	......	......	......	......
8 " "	'14	3,700,227	......	......	......	......
BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.						
1m., Aug.,	'15	$73,221	*$36,822	$36,399	$17,610	$18,789
1 " "	'14	72,661	*34,761	37,900	17,402	20,498
12 " "	'15	781,405	*380,869	400,536	211,839	188,697
12 " "	'14	777,080	*371,629	405,451	208,897	196,554
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.						
1m., Aug.,	'15	$91,213	*$63,039	$28,174	$30,289	†$2,115
1 " "	'14	91,032	*58,960	32,072	28,544	3,528
12 " "	'15	1,039,701	*713,423	326,278	353,565	†27,287
12 " "	'14	1,150,490	*712,375	438,115	327,206	110,909
EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.						
1m., July,	'15	$65,068	*$34,015	$31,053	$8,715	$22,338
1 " "	'14	61,066	*35,832	25,234	8,580	16,654
12 " "	'15	676,520	*383,473	293,047	104,702	188,345
12 " "	'14	619,771	*390,016	229,775	99,428	‡148,529
EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.						
1m., Aug.,	'15	$205,259	*$121,539	$83,720	$62,421	$21,299
1 " "	'14	219,250	*124,388	94,862	59,519	35,343
12 " "	'15	2,434,872	*1,449,601	985,271	761,017	224,254
12 " "	'14	2,740,793	*1,710,759	1,030,034	641,522	388,512
EL PASO (TEX.) ELECTRIC COMPANY						
1m., July,	'15	$77,426	*$44,006	$33,420	$4,203	$29,217
1 " "	'14	83,640	*48,672	34,968	4,196	30,772
12 " "	'15	991,199	*536,154	455,045	50,336	404,709
12 " "	'14	981,560	*545,470	436,090	51,325	‡386,444
GRAND RAPIDS (MICH.) RAILWAY.						
1m., Aug.,	'15	$101,207	*$73,136	$28,071	$13,966	$14,105
1 " "	'14	114,380	*75,374	39,006	13,520	25,486
12 " "	'15	1,202,935	*831,178	371,757	163,970	207,787
12 " "	'14	1,292,726	*832,618	460,108	154,718	305,390
TAMPA (FLA.) ELECTRIC COMPANY						
1m., July,	'15	$78,979	*$41,455	$37,524	$3,617	$33,907
1 " "	'14	83,683	*44,639	39,044	3,702	35,342
12 " "	'15	982,096	*504,183	477,913	43,779	434,134
12 " "	'14	945,836	*519,540	426,296	46,572	379,724

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*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

JITNEY JOTTINGS

Letter from New York Commission to Mayors and District Attorneys on Jitney Status

In view of the many complaints which have been lodged with the Public Service Commission for the Second District of New York against alleged illegal jitney bus lines the commission on Oct. 3 transmitted to the Mayors and District Attorneys of the State a notice calling their attention to the fact that the decisions of Justices Brown and Hasbrouck, sustaining and defining the jitney law passed by the last Legislature, bring practically all bus lines, wholly or partly in any city, within the scope of this statute. The commission says:

"In the light of these decisions and the drastic nature of the statute, it is the hope of this commission that, with the aid of the local authorities and the district attorneys, all persons operating in contravention of the statute shall upon this notice at once cease such operations and not resume the same until properly authorized by the local authorities and by this commission."

Information has reached the commission that bus lines are operating in practically all the cities of the State without the proper authorizations under the court interpretation of the law. Complaints, formal and informal, reach the commission almost daily, necessitating in each case an individual show cause proceeding, and a possible resort to the courts for an injunction. It was pointed out at the office of the commission on Oct. 3 that an application for a certificate of convenience and necessity can be handled far more readily than the proceedings for violations of the law, and it was said that the notice was to induce jitney operators to take this course or to cease operation rather than lay themselves open to proceedings for violation.

The letter of the commission to the Mayors and District Attorneys was as follows:

"By direction of the commission, your attention is herewith respectfully directed to these circumstances with regard to the enforcement of Chapter 667 of the laws of 1915, the so-called jitney bus statute:

"Mr. Justice Brown, of the Supreme Court in Niagara County, has decided in the case of Public Service Commission, Second District, vs. Burt G. Hurtgam, that all of the following classes of vehicles come within the scope of this statute and must secure consents from the local authorities and certificates of public convenience and necessity from this commission for operation wholly or partly within any city of the State: (a) a bus line; (b) a stage route; (c) a motor vehicle line or route; (d) a vehicle in connection with a bus line, a stage route, a motor vehicle line or route; (e) a vehicle carrying passengers at a rate of fare of 15 cents or less for each passenger within the limits of a city; (f) a vehicle carrying passengers in competition with another common carrier which is required by law to obtain the consent of the local authorities of said city to operate over the streets thereof.

"Mr. Justice Hasbrouck of the Supreme Court in Albany County in the case of Public Service Commission, Second District, vs. Elmer G. Booth, has held that the possession of a city license, granted previous to the taking effect of Chapter 667 of the laws of 1915, does not exempt the holder of such license from compliance with the chapter to which reference is made. You will thus observe that practically all of the so-called jitney lines which have not secured local consents and the certificate of this commission under the provisions of Chapter 667 are operating in violation of law. In view of these decisions and of the drastic nature of the statute, it is the hope of this commission that, with the aid of the local authorities and the District Attorneys, all persons operating in contravention of the statute will, upon this notice, at once cease such operation and not resume the same until properly authorized by the local authorities and by this commission."

The most lengthy hearing thus far allowed in any of the jitney suits for an injunction to restrain the Philadelphia police from enforcing the ordinance of Councils passed in July was presided over by Judge Patterson in Common Pleas Court a few days ago. Statistics, distances and averages were entered upon the record to prove the jitney operators' contention that it is impossible to engage in the business at a profit while complying with the provisions of the recent ordinance. One operator now running a car under the ordinance testified that after paying for gasoline, tires, oil, garage charges, repairs to his car, etc., he was losing about $5 a day. Before the ordinance went into effect, he said, his profits were always more than $5 a day. Two other men who ran higher priced cars before the enforcement of the ordinance also submitted some figures showing that by traversing the routes designated in the ordinance for a 5-cent fare, they would run their cars at a loss. Assistant City Solicitor Wolff frequently interposed objections to the testimony of the complainants' witnesses on the ground that the only allegations to fact which the bill in equity raised were whether or not the ordinance was confiscatory. Mr. Wolff declared that all the other allegations were based on questions of law and were matters for argument and cannot be decided by means of testimony. Judge Patterson, however, allowed the complainants' attorney every latitude in the presentation of his case. The case will likely be decided in a written opinion.

The Philadelphia police will begin an active crusade against the automobiles run on Broad Street under the direction of the Peoples' Motor Club. Director of Public Safety Dripps issued an order calling upon the police department to enforce the jitney ordinance as passed by Councils and arrest all drivers save those who have complied with that ordinance by depositing a license fee of $5 and a liability bond of $2,500. According to the president, Paul Randolph, the People's Motor Club was acting under advice of counsel, who told the company it could operate as a private club and not be amenable to the ordinance which Councils passed last July. By issuing a membership card and selling with it for 25 cents a strip ticket good for five rides, the club contended it was operating within the law as a private agency, and, therefore, not liable to prosecution under the provisions of the ordinance. City Solicitor Ryan advised the Director of Public Safety that the People's Motor Club plan is an evasion of the law, and he pointed out that the police should proceed against the drivers of the "club." The officers of the People's Motor Club said that their 115 or more cars would operate to test the law and that a plan of action to meet such an emergency had been decided upon some time ago.

On Oct. 15 the Ferry Line Auto Bus Company will begin the operation of auto buses throughout West Seattle, the buses to connect with the ferry owned by the Seattle Port Commission. Passengers will receive transfers to and from the buses and the ferry, and the transportation company and Port Commission will share the proceeds on a 60 per cent and 40 per cent basis. The Ferry Line Auto Bus Company has provided five motor buses, capable of carrying a total of 250 to 300 people. Some of the buses will operate west on Alki Avenue, while the remainder will traverse California Avenue. The present service is to be maintained over the most practical route. As other streets are improved, the auto bus company will provide connecting service within a reasonable distance from the ferry landing. The Port Commission has agreed to charge a straight 5-cent fare on the ferry, and to give the passenger an option of transfer to the auto bus if he calls for it. In case such transfer is called for and used the auto bus company will receive 3 cents of the 5-cent fare, and the Port Commission the remaining 2 cents. The auto bus company has provided itself with a $50,000 indemnity bond, $10,000 on each bus, and will forfeit $5,000 to the Port Commission if the service is not maintained as agreed.

The jitney regulation by-law as returned by the City Council of New Westminster, B. C., to the city solicitor for re-drafting, provides for a bond of $2,000, to be put up by jitney drivers, to cover their liability in case of accident. This will apply also to drivers of autos for hire in the city other than jitneys. It does not apply to cars on the interurban run between Vancouver and New Westminster, which are covered by a $5,000 bond in Vancouver. The license fee was fixed at $10 a year for each vehicle.

RESTRAINT OF JITNEYS IN TERRE HAUTE—HEARING IN U. S. DISTRICT COURT

The hearing in the case of the Fidelity Trust Company, Philadelphia, Pa., trustee under the mortgage of the Terre Haute, Indianapolis & Eastern Traction Company, against jitney-bus drivers of Terre Haute, Ind., was held before Judge Arthur B. Anderson in the United States District Court at Indianapolis, Oct. 4. The complaint was made in the bill that the jitney-bus drivers were operating without any license, permit or other form of regulation, unlawfully competing with the street railway lines in Terre Haute and depriving them of revenues to which they were entitled under franchise rights.

Attorneys for the jitney drivers sought to have the bill dismissed on the grounds of insufficiency and because it was multifarious, but this was refused by the court. In their opening argument they contended that while the jitney bus was a common carrier, and, as a common carrier, subject to regulation, they denied that a franchise was necessary to operate over the highways. They contended that the State had the necessary police powers of regulation over all common carriers, and that the operation of any common carrier, whether under franchise or not, was subject to such regulative authority.

Judge Anderson stated that he believed the question to be decided by the court was whether the jitneys had the right to operate over the streets of Terre Haute, and if they had this right, whether in the present case they were operating unlawfully. If they were operating in an unlawful manner as charged in the bill, even if they were operating under a franchise ordinance granted by the city, he could restrain them.

Counsel for the plaintiff read affidavits to the effect that the jitneys stood in an unbroken line along Wabash Avenue, Terre Haute, preventing ingress or egress from the sidewalk to the cars in the center of the street; that the jitneys ran in front of the cars which had stopped for passengers waiting for the cars; that the lives of citizens were endangered by the reckless running of jitneys. James M. Gossom, Mayor of Terre Haute, also made affidavit that the merchants along Wabash Avenue had complained that the jitneys were interfering with their business by blocking the street along the curb. The Mayor's affidavit stated that orders had been given that a space of 20 ft. should be left between jitney buses, and that he thought some regulation was necessary. Newspaper editorials and articles were introduced by the plaintiff to show that the central labor union and other bodies had agreed to combine and by concerted action divert travel from the street cars to the jitneys.

Ferdinand Winter, attorney for the plaintiff, sought to show that the right to take tolls and use the public highways for private gain was a franchise, and that the State could not grant a franchise unless some consideration was given, either in the way of an obligation to perform service under specified conditions or in some other form. He stated that the appeal of the company to the Public Service Commission of Indiana some months ago had been denied because the commission did not consider that under the utility act it had jurisdiction over the jitneys, but suggested the company might seek remedy in the courts.

Attorneys for the defence argued that the fare charged by the jitney was an agreed fare for a service rendered by the owner of the automobile and was not a toll for the use of the highway, and was no more subject to franchise conditions than the transfer of a person's household goods over a highway.

Judge Anderson, in summing up the case, stated that the plaintiff had not conclusively shown that there was a physical interference with the operation of its cars. He did not believe that the evidence introduced showed what would be termed a boycott of the street railway lines. The court could not shut its eyes to the fact that there were differences between the company and organizers of labor. There was a combination to "not help the company," but as the court understood the case, that combination had not been shown to be unlawful. The judge stated that the matter devolved upon whether the court had the right to enjoin the defendants because they were operating without a franchise, while the company has built tracks, operates cars, etc., under a franchise and the payment of interest on its mortgage to the plaintiff was dependent upon its ability to collect fares on its cars. The court thought that the jitney-bus drivers should operate under a franchise or grant, but that was a matter which concerned the State, and if the State did not choose to impose such regulation it was not within the province of the court to do so. The judge stated, however, that he would take the matter under advisement, and asked the attorneys to leave their briefs pending the decision of the court.

LOCKPORT SWITCHING CASE DECIDED

New York Central and International Railway Ordered to Provide Switching Facilities at Lockport—Case Before Commission Since 1908

In an opinion by Commissioner Devoe P. Hodson, the Public Service Commission of the Second District of New York has decided the long-pending Lockport interchange case, and has ordered the New York Central Railroad and the International Railway to provide facilities for the switching of freight between the two roads in Lockport. This service must be put into effect on or before Oct. 15. The two railroads are permitted to prepare their own plans and enter into their own agreements, which must be submitted to the commission for approval, including a reasonable switching tariff for such service involved. If these agreements are not made and the service not put into effect before the date set, the commission will enter a final order compelling the performance of the work in detail.

This is the oldest case before the commission, having been filed in December, 1908, and it is the first time that the commission has ordered an interchange of freight between two railroads in the State. Commissioner Hodson ascribes the long delay in disposing of the case to the fact that a number of similar cases were pending in the courts and commissions of other States, and that a case parallel to this has only recently been decided by the United States Supreme Court.

Commissioner Hodson bases his opinion on three points: that the present service is unreasonably inadequate, inconvenient and expensive, as well as possibly discriminatory; that carriers are compelled under Sec. 35 of the public service commissions law to interchange freight and passengers, and that the commission has power, through Sec. 19 of the law, to enforce this requirement; and that neither the law nor an order to enforce it will be confiscatory following the just rendered decision of the United States Supreme Court in a similar case which came to it from the Michigan Railroad Commission.

The New York Central Railroad objected to the installation of interchange facilities at Lockport because it maintained that the interchange facilities between its lines and those of the Erie Railroad and the International Railway at Suspension Bridge, North Tonawanda, East Buffalo, Batavia, Attica and other points afforded proper facilities. The Erie Railroad and the International Railway, which leases the line of the Erie into Lockport, alleged that it was a condition of the lease between the two that no road other than the Erie should participate in freight originating on its line leased to the International Railway. Of this Commissioner Hodson says:

"A remarkable feature of this case appears to be that the city of Lockport, which is a municipality of considerable size and commercial importance, and contains more extensive manufacturing plants than are usually found in cities of its class, should be discriminated against by the railroad companies by denying to the industries of that city the same privileges for promptly shipping and receiving freight which other communities are afforded. * * * So far as the decision of the New York Central Railroad is concerned, Lockport cannot have any interchange of freight between that company and the Erie Railroad unless it avails itself of the privilege of going to North Tonawanda, Suspension Bridge, East Buffalo or Batavia for that purpose. While the International Railway, operating the Erie Railroad, denies the right of Lockport for interchange of freight from its line because, forsooth, it has an agreement with the Erie Railroad that no other road shall participate in business originating upon such leased line."

The opinion shows that when a car of freight arrives in Lockport on one road, consigned to a plant on the other road, the consignee must either unload and haul the contents privately across the city, or must allow the car to be hauled 14 miles back to North Tonawanda, there switched to the other road and hauled 14 miles again to his plant, subjecting him not only to this delay, but to a switching charge of upward of $30. The opinion says:

"The argument of the carriers that this practice is even reasonably good service is entirely without merit, especially in view of the fact that every opportunity for such interchange—just the same as is afforded at North Tonawanda at large expense of time and money—is at hand in Lockport. It has been shown in this case by an abundance of proof, and it stands uncontradicted, that there are several places in both the upper and lower parts of the city of Lockport where these two railroads could be joined by a switch, and where there are ample and sufficient opportunities to have sufficient storage tracks to hold all the cars which might be placed there at any one time for delivery from one road to the other, either of outgoing or incoming freight, and at an expense for construction and maintenance which would be insignificant in comparison to the advantages which would be gained by everybody concerned; and in procuring any one of these sites the city officials of Lockport and the commercial bodies of the city stand pledged to assist the railroads in the acquirement of necessary private property as well as the right to cross or use the streets.

Commissioner Hodson points out that there are at the present time plants in Lockport which enjoy practical interchange because they are located contiguous to both roads. Not only this, but in some cases the tracks of the two roads are physically connected at these plants and the steam locomotives of the New York Central Railroad and the electric locomotives of the International Railway haul cars over the same tracks to and from these plants. In this connection Commissioner Hodson said:

"It is difficult to find justification for a practice which guarantees every desirable facility of a public utility to a few shippers in a community and denies the same privileges to all others; besides, such course is in contravention of Sec. 32 of the public service commissions law, which prohibits unreasonable preference on the part of carriers."

Speaking of the unwillingness of the railroads to grant this interchange through fear that one or the other may gain an advantage not now existent in the handling of the Lockport business, Commissioner Hodson says:

"The underlying theory of the respondents as to their freight service in Lockport seems to be the maintenance of competition, while the complainants seek to invoke the more modern theory of regulation. * * * However this may be, it now becomes the duty of the commission, regardless of what has gone before, to make a declaration of the rights and obligations of both shippers and railroads with reference to these matters, and in such declaration to show, if possible, that the interests of the parties are mutual and not antagonistic; and if we can do that we have gone a long way toward proving the efficacy of regulation in the interest of the public and the carriers themselves.

"Both carriers seem to forget that they have no prescriptive right to the freight business at Lockport, but are only common carriers who may or may not be employed to transport such freight and that the shippers have something to say as to which railroad the business belongs."

Commenting on the fact that the clause in the International-Erie lease confining the International Railway switching to Erie business qualified by the phrase "unless required by law to do so," Mr. Hodson says:

"Apparently these contracting parties recognized the probability that necessity would some day arise for the switching freight cars from other lines than the Erie Railroad, and that the International Railway would be required to perform such additional service, when the clause above quoted was made a part of the contract. * * * The time has arrived when the law should require such special switching service to be extended and made general in accordance with the demands of the complainants. There cannot be any element of justice in a rule which permits the carriers to continue their present plan of freight interchange for the industries of Lockport."

NEW RULE ON GROUP FARES IN LOUISVILLE

Ever since the pay-as-you-enter system of collecting fares has been in vogue, the management of the Louisville (Ky.) Railway has been considering means by which it might be possible to eliminate chances of losses easily resulting through the practice of one person paying the fares for all members of a group that boards a car at the same time. In an effort to reduce the chances of loss the company has posted the following notice in its cars and elsewhere:

"IMPORTANT—To save time and prevent mistakes, persons paying fare for others will board car first and deposit fare, indicating to conductor those following for whom fares have been paid."

The newspapers took the matter up, and Samuel Riddle, superintendent of transportation, was quoted as follows:

"We have sixteen lines in Louisville, and we make 18,000 half trips daily. Now suppose we lose an average of one fare on each trip. That is 18,000 nickels, or a total of $400. Three hundred and sixty-five times $400 equals $146,000 a year. Now the corporation which protects its revenue makes the investments of its stockholders safe. Hence the rule."

In response to queries as to whether the man should climb aboard first, leaving his wife to get on as best she could Mr. Riddle suggested that this was not necessary; that she might wait on the platform for him or he could follow close behind and so not cause any delay or crowding. In this connection he was reported to have said:

"We are not aiming at the time-honored custom of men helping women aboard, but we are simply requesting the co-operation of our patrons in eliminating disputes between conductors and passengers and delays resulting therefrom and in keeping the company on a sound business basis in order to give everybody his money's worth."

"Near Side" Stop in Albany.—The United Traction Company, Albany, N. Y., has announced that it will put the "near side" stop in effect on its lines in Albany on Nov. 1.

Accidents Reduced in Dallas.—Accidents on the Dallas (Tex.) Consolidated Electric Street Railway for the last twelve months have decreased 41.2 per cent over the preceding year. This gratifying result is attributed directly to the carefully planned safety-first campaign. Among the more radical changes incident to this campaign is the adoption of platform doors and folding steps.

Louisville Public Thanked.—Cards are being displayed in all of the cars of the Louisville (Ky.) Railway expressing the appreciation of the company for the co-operation given by the public during the year just passed in the way of preventing accidents. During the first year the safety-first movement was in effect not a death resulted from injuries in which the company's cars were involved, while accidents were reduced by one-half or better..

One-Man Car Service Upheld by Court.—Justice L. E. Wagelin at Belleville, Ill., has decided that the City Council of that city had no right to compel the company to place two men on all city cars operated by the East St. Louis & Suburban Railroad. The justice held that all such matters of the operation should be settled by the Public Utility Commission rather than be passed upon by the Councils of the various cities of the State. The city has announced an appeal.

"Near Side" Stop and One-Man Cars in Spokane.—C. S. MacCalla, general manager of the Washington Water Power Company, Spokane, Wash., states that when the new cars of the company designed for front entrance are placed in general use the "near side" stop will be adopted exclusively. Where traffic conditions permit, the new cars will be operated as one-man cars. On the Cannon and the North Division Street routes, two stub lines, which connect with through lines, the company has already installed the one-man system.

Schedule of Increased Fares Filed.—Schedules providing for the establishment of a 6-cent fare unit on the entire system have been filed by David A. Belden, president of the Massachusetts Northeastern Street Railway, Haverhill, Mass., at the offices of the Massachusetts and New Hampshire Public Service Commissions and the Interstate Commerce Commission. Minor changes in fare zones are also contemplated. The company operates in the Merrimac Valley cities and towns of Massachusetts, in southern New Hampshire and along the coast of Massachusetts and New Hampshire, and is closely affiliated with the central station interests of Portsmouth, N. H., where the main generating plant of the system is located.

Trenton Fare Case Before Court.—The United States District Court heard argument on Oct. 4, on the application made to it for an injunction to restrain the Board of Public Utility Commissioners of New Jersey and the city of Trenton from interfering with the elimination by the Trenton & Mercer County Traction Corporation of its six-for-a-quarter tickets. The decision of the court has not been announced. The hearing under the order adopted by the Board of Public Utility Commissioners suspending the increased rates, which had been continued until Oct. 5, was continued on Oct. 5 until Oct. 19, without the submission of testimony. This continuance was ordered because of the proceedings pending before the United States Court.

At-Your-Service Car in Seattle.—The Puget Sound Traction, Light & Power Company, Seattle, Wash., at the suggestion of A. L. Valentine, superintendent of public utilities of the city, has installed a short car line, which will be continued in operation until the completion of the Fremont Avenue Bridge. Patrons who require the service of the car press a button at either terminus of the line, and the car hurries to the waiting passenger. Signs "Push the Button if You Want a Street Car" are posted at the Stone Way Bridge and the Fremont Avenue Bridge. The car that furnishes this personal service operates on Westlake Avenue North, between Stone Way and Fremont Avenue, a distance of about ten blocks. The car seats about thirty-two passengers. The motorman collects the fares, issues transfers and dispenses information regarding the schedules of the connecting cars.

Toronto Car Order Entered.—The Toronto (Ont.) Railway must proceed with the construction of twenty-five cars upon the plan recently tried out on College Street of cross-seats on one side and a longitudinal seat on the other. The company got its orders on Oct. 1 from the Ontario Railway & Municipal Board following a conference between the board and the city and company representatives. The decision of the board was opposed by R. J. Fleming, manager of the company, who declared that the company was being asked to spend a large sum of money for converting its cars at a time when traffic was falling off and many cars were idle in the carhouses. Commissioner of Works Harris thought that the present was the most suitable time for putting on the new type cars, since traffic would be heavier during the winter time. The order requires the company to have the twenty-five cars in service by Dec. 1.

What the Public Leaves Behind It.—The Glasgow (Scotland) Corporation Tramway has tabulated in its recent pamphlet report the articles left behind in the cars for the years ended May 31, 1914, and May 31, 1915, by thoughtless passengers. The articles are classified under twenty heads, namely, umbrellas, parcels, bags, purses, baskets, gloves, books, parcels of clothing, sums of money, keys, walking sticks, boxes, tools, jewelry, spectacles, furs, coats and waterproofs, music, watches and miscellaneous. The total number of articles found in the cars for the year ended May 31, 1915, was 31,287 as compared with 32,766 for the previous year. Of these totals 16,813 articles were claimed in 1915 against 16,599 claimed in 1914, while 14,474 remained unclaimed in 1915 as compared with 16,167 unclaimed in 1914. Naturally the umbrella leads. In 1915 4776 umbrellas were left behind as compared with 4665 in 1914. It seems almost incredible but 605 sums of money were left behind in 1915 as compared with 743 in 1914. In 1915 thirty-eight people were so careless as to leave watches behind while in 1914 forty-eight people left their watches on the cars. The figures are faily consistent for the several months of the year except for the seasonable articles such as furs and coats and waterproofs, which naturally predominate in the winter months.

NEW PRESIDENTS OF THE ASSOCIATIONS

Brief biographical sketches and portraits are appended of Mr. Charles L. Henry, the newly elected president of the American Electric Railway Association; Mr. H. A. Nicholl of the Traffic & Transportation Association; Mr. George Carson, of the Claims Association; Mr. John Lindall, of the Engineering Association; Mr. Thomas Finigan, of the Manufacturers' Association, and a biography of Mr. T. P. Kilfoyle, of the Accountants' Association.

C. L. HENRY

Mr. Charles L. Henry, the newly elected president of the American Electric Railway Association, has been for twenty-five years a leading figure in the development of the extensive system of interurban lines radiating in all directions from Indianapolis, the success of which exercised a tremendous influence in encouraging the construction of long electric interurban lines elsewhere. Mr. Henry is credited with having originated the term "interurban railway," which was coined and applied to the new lines at Indianapolis soon after their operation began. This venture, it may be said, was the beginning of the now famous Union Traction Company of Indiana, which was formed in 1899 to combine the several electric railways that had sprung into being following the success of Mr. Henry's pioneer line from Anderson to Alexandria Subsequently, as general manager of this company, Mr. Henry constructed the lines from Muncie to Indianapolis, forming the backbone of the system as it exists to-day. Several years ago, however, he disposed of his interest in the company to form the Indianapolis & Cincinnati Traction Company, notable as one of the earliest successful single-phase systems in the country, as well as for a number of innovations along technical lines that have been brought to perfection through their adoption by the railway of which Mr. Henry is president and general manager. In spite of receiving an education for the legal profession Mr. Henry has shown keen judgment in engineering matters. He was graduated from the law school of Indiana University in 1872, when he was twenty-three years of age, and he practised law in Pendleton, Ind., and Anderson, Ind., until he began his connection with the street railway industry nineteen years later. During this period he served for four years in the Indiana State Senate, subsequently being elected for two terms as a Representative in Congress. It was not until 1891 that he became actively interested in railway matters, his first venture being the purchase of the horse car line in Anderson which he electrified soon afterward. Ever since his entry into the industry Mr. Henry has taken a prominent part in electric railway association work, being president of the Central Electric Railway Association at the present time and having served as vice-president of the American Association since 1911. All of Mr. Henry's activities during his long and successful career have centered in or about Indiana, his native State, but his every instinct is that of the pioneer who avoids the beaten trails. Of his personality perhaps its best characterization, in the opinion of his many friends, is that contained in a testimonial presented to him at the last convention by his fellow members of the National Joint Committee on the Joint Use of Poles. It said: "Charles Lewis Henry, loved by us all for his unfailing delightful personality, consummate tact, nice discernment and ready power of appreciating and doing that which is required, is hereby elected to the degree of engineer of good will."

Mr. H. A. Nicholl, who was elected president of the American Electric Railway Transportation & Traffic Association, is general manager of the Union Traction Company of Indiana, Anderson, Ind., which embraces more than 400 miles of line. Mr. Nicholl has been engaged in electric railway work for a number of years, but derived his earlier railroad experience with steam roads. After completing schooling he became connected with the construction engineering corps of the Chicago & Northwestern Railway and later served with the operating department as baggageman. Subsequently he became successively assistant secretary and treasurer of the Natchez, Jackson & Columbus Railway and station agent of the Louisville, New Orleans & Texas Railway, both of which now form part of the Illinois Central Railroad; and finally, served in the Illinois Central Railroad's general freight department at Chicago. Mr. Nicholl began electric railway work as superintendent of the North Chattanooga Street Railway and Chattanooga & North Side Railway, Chattanooga, Tenn., and was later made vice-president and general manager. He subsequently became associated with the Rochester (N. Y.) Railway as superintendent of power and purchasing agent, and at the same time was superintendent of construction of the Rochester & Sodus Bay Railway. After this time he served successively in the following positions: general manager of the Taunton (Mass.) Street Railway; general manager and treasurer of the Ithaca Street Railway and Brush-Swan Electric Light Company, Ithaca, N. Y.; general manager Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio. Since April 15, 1905, Mr. Nicholl has been general manager of the Union Traction Company of Indiana.

Mr. George Carson, the new president of the American Electric Railway Claims Association, is claim agent of the Puget Sound Traction, Light & Power Company, Seattle, Wash. Mr. Carson was born in Ireland. He arrived in New York City when seventeen years old and secured employment as a horse-car conductor. In 1883 he became a conductor with the old Chicago West Division Railway and was advanced rapidly, filling in succession the positions of conductor, receiving clerk, carhouse foreman, division superintendent and claims adjuster of the company. While attached to the claims department of the Chicago West Division Railway he studied law and was graduated in 1891 from the Chicago College of Law, the Law Department of Lake Forest University. He was admitted to the Bar and practised law in Chicago from 1891 to 1893. Mr. Carson went to the Pacific Coast in the latter year and from that date until 1900 was employed almost continuously in the law and claims department of the Southern Pacific Company and the old Market Street Railway, San Francisco. The latter company controlled nearly all the street railway lines in San Francisco at that time. For a year and a half prior to 1900 he had supervision of all the damage suit litigation for both companies. In 1900 Mr. Carson went to Nome, Alaska, and took an active part in the mining litigation going on there at that time. In October, 1901, he entered the service of the Seattle (Wash.) Electric Company as a conductor. He was promoted the following March to the position of inspector of the old Pine Street carhouse in charge of operation of all of what was known as the downtown lines, comprising about three-fourths of the system at that time. He continued in

H. A. NICHOLL

GEORGE CARSON

charge of operation of different divisions of the company until May, 1908. He was then promoted to his present position as claim agent of the company. In 1908 Mr. Carson was admitted to practice as an attorney in Washington. He was one of the organizers of the Pacific Claim Agents' Association, formed in Portland, Ore., in 1909, and served as president of that association 1912-1913. Mr. Carson is the originator of safety committee organizations as applied to electric roads, organizing the first safety committees in 1911. He has been chairman of the central safety committee of the Puget Sound Traction, Light & Power Company since the organization of the safety committees. In 1912 he was one of the organizers of the Pacific Claim Agents' Index Bureau, in Los Angeles, and has been president of the bureau since 1913.

Mr. John Lindall, the newly elected president of the American Electric Railway Engineering Association, is superintendent of rolling stock and shops of the Boston (Mass.) Elevated Railway. Mr. Lindall entered the railway field as a conductor in June, 1889, with the West End Street Railway, Boston. He served one year as conductor and two years as starter, during which time the horse cars were replaced by electric cars. In 1892 he was transferred to the mechanical department of the same company as a car repair man, serving on the different classes of such work until 1895, when he was appointed as carhouse foreman, which position he held in various carhouses of the company until January, 1901, when, upon completion of the elevated lines by the Boston Elevated Railway, successor to the West End Street Railway, he was appointed general foreman of elevated shops, and given charge of the work of equipping cars for the elevated service and their mantenance after they had been put into service. In May, 1905, he was promoted to the position of assistant superintendent of motive power and machinery and given charge of both surface and elevated car equipment. In October of the same year he was again promoted to the position of superintendent of motive power and machinery, in which position he was in charge of the company's power stations as well as rolling stock. Owing to the increase and extension of the work in this department, the power station work was separated from that of the rolling stock, and in December, 1907, Mr. Lindall received the title and position of superintendent of rolling stock and shops. During the installation and early development of the equipment for elevated and tunnel lines in Boston, many new and untried conditions were met in the then new branch of railway industry. In working out these problems, Mr. Lindall developed a genius for invention that has resulted in many improvements in car equipment. Mr. Lindall is a member of the American Electric Railway Association, New England Railroad Club, New England Street Railway Club, and American Institute of Electrical Engineers.

JOHN LINDALL

THOMAS FINIGAN

Mr. Thomas Finigan, who has been elected president of the American Electric Railway Manufacturers' Association, is vice-president of Pierson, Roeding & Company, San Francisco, representatives for manufacturers of street railway supplies, with branches in Los Angeles, Cal., Portland, Ore., and Seattle, Wash. Mr. Finigan entered the employ of the Consolidated Traction Company, Newark, N. J., now the Public Service Corporation, in 1898, and was advanced rapidly to the position of assistant master mechanic. He resigned from the company to become associated with the mechanical department of the United Railroads, San Francisco, in 1903. He took entire charge of the commissary department created by the United Railroads to meet the unusual conditions arising from the earthquake and fire of 1906 and the strike in 1907 when the company fed and cared for more than 2000 employees. In the latter part of 1907 he was appointed purchasing agent of the company and continued in that capacity until June, 1913, when he was elected an officer of Pierson, Roeding & Company. Mr. Finigan has served on various committees of the American Electric Railway Association and acted for a time as secretary for the Pacific Coast Electric Railway Association following its organization.

Mr. T. P. Kilfoyle, auditor of the Cleveland (Ohio) Railway, was elected president of the American Electric Railway Accountants' Association on Oct. 6. Mr. Kilfoyle has been first vice-president of the accountants' association for two terms, and has served in other years on the executive committee of the association. He has been auditor of the Cleveland Railway since March 1, 1910, and previous to that time was connected with the auditing department of the company for a number of years except during the short interval while the Cleveland Electric Railway was being operated by the Municipal Traction Company during the administration of former Mayor Tom L. Johnson. Prior to the time when he became connected with the Cleveland Railway, Mr. Kilfoyle was general auditor for the Warren Bicknell Company, Cleveland, Ohio, which operated the Cleveland, Lake Shore & South Bend Railway, the Youngstown & Ohio River Railway and the Springfield & Xenia Railway. Mr. Kilfoyle has been connected with the street and electric railway business for the last eighteen years. He was born in Cleveland on June 28, 1868.

Personal Mention

Mr. R. C. De Frees, formerly assistant engineer on the forces of the Interurban Railway, Des Moines, Iowa, has been appointed computer for the Interstate Commerce Commission, Division of Valuation, Karpen Building, in the city of Chicago.

Mr. Byron T. Burt, vice-president of the Rutland Railway, Light & Power Company, Rutland, Vt., has assumed the duties of general manager of that company in addition to the office of vice-president. Mr. Burt was formerly general manager of the Chattanooga River & Power Company, with headquarters at Chattanooga, Tenn.

Mr. Horace E. Andrews has withdrawn as a director of the Cleveland (Ohio) Railway. His resignation was accepted at the monthly meeting of the directors on Sept. 25. It is said that the resignation has been in the hands of Mr. J. J. Stanley, president of the company, for several weeks. He retired because he is now a permanent resident of New York and therefore is unable to take an active part in the company's affairs. Mr. Andrews first became interested in street railway affairs in Cleveland when he was made a director of the Broadway & Newburg Railway in 1886. He served in this capacity until the organization of the Cleveland Electric Railway in 1893. For many years he was president of that company. His part in the franchise negotiations with the city of Cleveland during the Johnson administrations forms an interetsing chapter in street railway history.

OBITUARY

Gustave C. Kuhlman, founder of the G. C. Kuhlman Car Company, Cleveland, Ohio, died at his home in that city on Sept. 4, after an illness of several months. The car manufacturing business of the Kuhlman Company was started in a small shop on St. Clair Avenue, Cleveland, in 1881. When electric power was introduced the business was expanded and the factory was moved to the old carhouse at Broadway and Aetna Road. Later on the shops at Collinwood were built. In 1503 Mr. Kuhlman sold his interests to The J. G. Brill Company. Since his retirement from the company Mr. Kuhlman has been the northern representative of the Martindale Mercantile Agency.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***North Arkansas Utilities Company, Corning, Ark.**—Incorporated in Arkansas to construct and operate a power plant, railways, etc. Capital stock, $75,000. It is not contemplated to build a railway for possibly eighteen months. Incorporators: George A. Booser, C. L. Daniel, Elizabeth Morrison, H. B. Hays and Thomas Neely.

Torrington (Conn.) Traction Company.—Incorporated in Connecticut to construct a line between Torrington and Thomaston. Capital stock, $300,000. Officers: Hosea Mann, Torrington, president; Howard M. Guernsey, Thomaston, vice-president; E. M. Canfield, Hartford, secretary, and George B. Goodwin, Torrington, treasurer. [Jan. 2, '15.]

***Kinston (N. C.) Belt Line.**—Incorporated in North Carolina to construct a belt line of steam railroad around Kinston and an electric line through the city streets to carry both passengers and freight. Capital stock, $25,000. Incorporators: J. T. Deal, M. L. German, W. S. Spottswood and G. V. Cowper.

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has received a franchise from the Council to construct and operate a single-track line on certain portions of Figueroa Street, Denver Avenue, Hoover Street, Menlo Avenue and Vermont Avenue.

Belvidere, Ill.—A new franchise for the Elgin & Belvidere Electric Company has been passed by the Council of Belvidere. The city service in Belvidere is to be abandoned, and the tracks on West Lincoln Avenue and South State Street to Logan Avenue are to be taken up within thirteen months. The tracks on North State Street from the interurban line to Harrison Street and along the latter street are to remain if so desired by the company. Within two years the company must decide whether it will obtain property consents and a franchise from the city to extend the operation of the interurban line over North State Street and Harrison Avenue with the view of a possible interurban extension to Rockford.

Transcona, Man.—The Council has granted a twenty-five-year exclusive franchise to H. W. Adcock, Winnipeg, renewable for five years and at the end of every five years thereafter, reserving to itself the right to take over the line on terms to be fixed by the Public Utilities Commission. The franchise requires that work be started immediately, the line to the Winnipeg city boundary to be completed first and the lines set out in the schedule to be completed within two years.

Malden, Mass.—The Bay State Street Railway and the Boston Elevated Railway have asked the Council for a franchise to relocate their tracks on Salem Street from City Hall Square to Bryant Street. As each company owns one rail. two petitions were necessary.

Columbus, Ohio.—The East Linden Electric Railway has asked the Council for a franchise to construct two lines in Columbus. One line begins at Champion Avenue and Long Street and extends on Champion Avenue to the corporation line of Columbus. The other begins at Water Street and Spring Street and extends on Randolph Street, Front Street, Naghten Street and Grant Avenue to Grove Street.

Walkerville, Ont.—It is reported that a franchise proposed to be granted to the Sandwich, Windsor & Amherstburg Railway or its subsidiary, the Windsor & Tecumseh Electric Railway, for the construction of a belt line in Walkerville will be voted on at an early date.

Medford, Ore.—The Southern Oregon Traction Company has received permission from the Council to abandon its Siskiyou Heights extension and use the rails and wires on a line to be built down the Hillcrest Road, tapping the Highcroft, Laurelhurst and Queen Anne Additions. A franchise was also granted for the construction of a line down West Main Street. Work upon both projects will begin at once.

TRACK AND ROADWAY

Fort Smith Light & Traction Company, Fort Smith, Ark.—To end the differences which resulted in the Fort Smith Light & Traction Company abandoning the use of the Fort Smith-Van Buren bridge more than a year ago, the Fort Smith-Van Buren Bridge Commission has made the company three propositions. One calls for an intercity fare of 5 cents a passenger with ½ cent of each fare for the bridge district as bridge rental. Another purposes that the maximum fare be 10 cents, with one-half of each fare to go to the bridge district. The third proposition is for the company to pay $250,000 in cash for the use of the bridge.

***Melbourne, Ark.**—Surveys will soon be made for a proposed electric railway from Guion to Melbourne. A. C. Veach, Gravette, is interested.

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway, as a result of a conference which was held in the city hall, has agreed to discontinue its use of the Southern Pacific Company's tracks on Broadway at Alamitos Avenue. The company also agreed to install a new track before May 30, 1916.

Pacific Gas & Electric Company, Sacramento, Cal.—The Washington Improvement Club has appointed a committee to urge the Pacific Gas & Electric Company to construct a line between Washington and Sacramento. The proposed route extends over the M Street bridge through Washington to Riverbank.

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—Plans are being made by this company to construct a line from Pueblo to the State line through the Arkansas Valley in the near future.

Washington Railway & Electric Company, Washington, D. C.—Extension of the lines of the Washington Railway & Electric Company on New Hampshire Avenue to a point near the Eastern Star Home and thence by loop to the city through Takoma Park or Brookland, is urged by the Chillum Castle Heights Citizens' Association in a list of recommendations for public improvements filed with the Public Utilities Commission for consideration in connection with the preparation of the annual estimates.

Lewiston-Clarkson Transit Company, Lewiston, Idaho.—Plans are being made by this company to extend its line from Sixth and Sycamore Streets to Thirteenth Street and Hyland Avenue, Clarkston. $10,000 has been raised to pay for this extension.

Aurora, Mendota & Western Traction Company, Aurora, Ill.—Officials of this company have asked the Public Utilities Commission of Illinois for permission to increase its capital stock from $10,000 to $100,000 and also have applied for a certificate of convenience and necessity. At a hearing held before the commission in Chicago opposition to the issuance of the certificate was made by officials of the Aurora, Elgin & Chicago Railway, who told the commission that it would cost $1,000,000 to build to Mendota and that it would take all of the increased capital stock of $100,000 of the new line to build between Montgomery and Aurora. The company offered to grant the Aurora, Mendota & Western Traction Company all of its transportation facilities between Montgomery and Aurora upon terms to be made by the commission. [Aug. 21, '15.]

Jacksonville Railway & Light Company, Jacksonville, Ill.—In connection with paving being done, this company will relay its tracks on South Main Street from Morton Avenue to Michigan Avenue.

Lincoln Railway & Heating Company, Lincoln, Ill.—This company has just purchased ties and other material to repair its tracks on Eighth, Union and Seventeenth Streets, Lincoln.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company has just completed the construction of new track on State Boulevard from the St. Joe River to Anthony Boulevard.

***Goshen, Fort Wayne & Northern Interurban Railroad, Goshen, Ind.**—Plans are being made by this company to build a line through Albion if the proper franchises, rights-of-way and depot sites can be secured. The proposed main line of the road will extend from Goshen via Benton, Ligonier, Albion and Churubusco to Fort Wayne, with a branch from Warsaw via Winona Lake, North Webster, Wolf Lake, Albion and Kendallville to Ashley-Hudson, another branch from Ligonier via Topeka to Lagrange and a branch from Columbia City via Collis, Churubusco, Huntertown and Leo to Grabill. Clarence E. Tasher, Goshen, is interested.

Tipton-Frankfort Traction Company, Tipton, Ind.—The interurban project from Tipton through Kempton to Frankfort has been revived and the holdings of franchises and right-of-way of Eugene Purtelle, who projected the line, have been acquired by a Chicago company. This company now wishes to dispose of them to parties actively interested in the building of the road. [March 22, '13.]

Tri-City Railway, Davenport, Iowa.—Operation was begun on Oct. 1 on this company's new Fourth Street Line, Moline, Ill. The route extends from the business district of Moline to Fourth Avenue and Fourth Street.

Keokuk-Jefferson City Electric Railway, Keokuk, Iowa.—A meeting was recently held in Shelbina to discuss the construction of this company's line from Keokuk to Jefferson City. A committee was appointed to solicit funds to defray the expense of having the line surveyed through Shelbina. H. W. Knight, Chicago, is interested. [Sept. 18, '15.]

Iowa City-Muscatine Interurban Railway, Muscatine, Iowa.—This company has removed its offices to larger and more commodious quarters in the Hershey Bank Building. Although it has been rumored that the negotiations which look forward to the company taking over the operation of the Montezuma branch of the Rock Island line have been concluded, A. D. Bowen, who is promoting the project, declared that no agreement has been signed up as yet. [May 29, '15.]

Salina (Kan.) Street Railway.—The differences between the city and this company have been settled and the material hauled away is being replaced. The company made application for a permit to build the track which was granted by the Mayor. No mention is made in either the permit or application of the new city ordinance to which objection was made. At the same time practically all provisions of the ordinance are to be complied with. There are to be double tracks from Ninth Street west to Thirteenth Street and then north to the Union Station. The only tracks on Bishop Street will be a double track from Thirteenth Street east for 150 ft.

Salina-Northern Railroad, Salina, Kan.—Plans are being considered for the extension of this company's line northwest from Osborne. It is reported that plans are under consideration for the connection of the Salina-Northern Railroad with the Arkansas Valley Interurban Railway, which is being extended to Salina. E. A. Tennis, Salina, is interested. [Sept. 18, '15.]

Brandon (Man.) Municipal Railway.—It is reported that this company's extension on Percy Street has been placed in operation and work will soon be begun on the extension along College Avenue and Eighteenth Street.

Detroit, Pontiac & Owosso Railway, Owosso, Mich.—The Michigan Railroad Commission has authorized a bond issue of $3,300,000 for the construction of this company's proposed line between Detroit and Owosso. It is asserted that the promoters have complied with all requirements of the commission. Plans are now being prepared by engineers for two routes into Pontiac, one of which will be chosen soon. Dr. Oliver H. Lau, Detroit, is interested. [July 24, '15.]

Hattiesburg (Miss.) Traction Company.—Citizens of Hattiesburg have filed a petition with the Mississippi Railroad Commission asking that the Hattiesburg Traction Company be forced to build an extension of its lines to the Women's College at Hattiesburg.

***McComb, Miss.**—It is reported that plans are being considered to construct an interurban railway from McComb to Summit, Fernwood and Magnolia, with a street railway in McComb. Guy M. Walker, New York, is interested.

United Railways, St. Louis, Mo.—When the grading of Taylor Avenue is completed this company will extend its Taylor Avenue line from its present terminus on Pope Avenue to Broadway, thus giving a connecting line between the extreme northern part of the city and Baden.

Moncton Tramways, Electricity & Gas Company, Moncton, N. B.—This company is laying 300 ft. of double track through the new subway on Main Street under the Intercolonial Railway. The special work for this double track has been ordered from the Canadian Steel Foundries, Ltd.

Morris County Traction Company, Morristown, N. J.—Hereafter, under an order of the Board of Public Utility Commissioners, this company will be required to operate its east-bound cars on the east-bound track and west-bound cars on the west-bound track on the Morris turnpike between Elizabeth and Springfield Junction. To facilitate this operation the board has ordered the company to construct a cross-over in Morris Avenue east of Main Street, in Springfield Township. There are two tracks, one on either side of the road in Morris turnpike, but the company has been operating most of its cars on the south-side tracks, thereby making it a single-track operation.

Monmouth County Electric Company, Red Bank, N. J.—The Board of Public Utility Commissioners has ordered this company to repair its tracks in Long Branch.

Buffalo, N. Y.—A contract has been awarded by the Tonawanda Board of Public Works to Louis P. Gipp, Buffalo, to remove the tracks of the defunct Tonawanda, North Main Street & Depew Railway in Young Street between Main and Delaware Streets at his bid of $1,346. The track paralleling it is owned by the International Railway and will be taken up by that company.

Long Island Railroad, New York, N. Y.—The Long Island Railroad has applied to the Public Service Commission for the First District of New York for permission to construct and operate a two-track extension from Flushing to Creedmoor, in the Borough of Queens, 5.4 miles. At present Creedmoor is reached by a branch extending from the main line of the Long Island Railroad diverging therefrom at Floral Park. By providing the proposed new line a more direct route from Manhattan to Creedmoor will be obtained, and in addition a rapidly growing section of Queens between Flushing and Creedmoor will be provided with railroad facilities. The commission will hold a hearing upon the application.

Hiawassee Valley Railway, Andrews, N. C.—The directors of this company have authorized the sale of $125,000 of bonds to complete the construction of its line from Andrews to Hayesville, 25 miles. S. E. Cover, Andrews, president. [April 24, '15.]

Alamance, Durham & Orange Railway & Electric Company, Burlington, N. C.—Chapel Hill and Bingham townships of Orange County have voted almost unanimously to issue bonds to aid in the construction of this company's line from Ossippee to Durham. Junius Harden, Burlington, president. [Aug. 21, '15.]

Piedmont & Northern Railway, Charlotte, N. C.—This company plans to construct an extension from its Gastonia line to Belmont.

Beaver, Meade & Englewood Railway, Beaver, Okla.—The Beaver Construction Company has received the contract for the completion of this company's proposed line from Forgan to Beaver. Grading has already been completed. The construction will include two small 14-ft. frame bridges on mud sills and one 350-ft. bridge on piling. L. A. Walten, engineer. [May 16, '14.]

Henryetta, Okla.—In addition to the proposed line from Henryetta to Dewar and Kusa it is planned to connect Henryetta with Rich Hill, Blackstone, Pleasant Valley and Coalton. James Liggett, Henryetta, may be able to give information; also the Board of Trade. [July 24, '15.]

Peterborough (Ont.) Radial Railway.—This company is reconstructing its track on Charlotte, Park and George Streets, rendered necessary by the city paving.

Trans-St. Mary's Traction Company, Sault Ste. Marie, Ont.—This company reports that it has rebuilt 4700 ft. of track. A concrete base with brick surface was used.

Northwestern Pennsylvania Railway, Meadville, Pa.—The State Water Supply Commission has approved the application of the Northwestern Pennsylvania Railway to construct a bridge across the Rhulings Branch, 1 mile south of McKean and to construct a bridge across Walnut Creek near Kearsarge.

Montreal (Que.) Tramways.—This company has laid 2 miles of new track and has reconstructed about 15 miles of single track on various streets in Montreal. It is contemplating the reconstruction of 3 miles of track. The company has placed an order in the United States for 1500 tons of 115-462 girder rail.

Dallas (Tex.) Southwestern Traction Company.—A survey has been begun of the right-of-way of this company's line from Glen Rose to Stephenville, which is the terminus of the line. E. P. Turner, Gaston Building, Dallas, president. [Aug. 21, '15.]

Three Rivers (Que.) Traction Company.—It is reported that this company has constructed 3.5 miles of track in Three Rivers and overhead work is now being put up. It is expected that this line will be placed in operation before the end of the year. Very little progress has been made in the construction of the suburban line, owing to the terms which the municipality asks for a franchise. [June 5, '15.]

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—Street car service between Aberdeen and Cosmopolis has been resumed. The cars will not cross the West Bridge, but will stop on both sides. While officials of the company say that such service is operated at a loss, continual requests that it be established has led to the service being resumed.

SHOPS AND BUILDINGS

Humboldt Transit Company, Eureka, Cal.—The Humboldt Transit Company has filed with the California Railroad Commission an application for authority to issue and pledge eight first mortgage 5 per cent sinking fund thirty-year gold bonds to William Butterworth as collateral security for a loan of $4,000 at 5 per cent for a year or less, the money to be used to purchase a site of a carhouse in Eureka.

Ottumwa Railway & Light Company, Ottumwa, Iowa.—Construction has been begun on the three-story Leighton & McNett Building, the greater part of which will contain the new offices of the Ottumwa Railway & Light Company. The building formerly occupied was destroyed by fire.

Southwestern Light, Power & Railway, Oklahoma City, Okla.—The Arbuckle Construction & Improvement Company has received a contract from this company to construct repair shops at Arbuckle and a power station at Davis.

Toronto (Ont.) Suburban Street Railway.—Work will soon be begun on the construction of a carhouse and substation for the use of the new Toronto-Guelph extension of this company. The estimated cost is $10,000.

POWER HOUSES AND SUBSTATIONS

Ottumwa Railway & Light Company, Ottumwa, Iowa.—This company, under the supervision of the engineering department of H. M. Byllesby & Company, is increasing its power station capacity by the installation of a 200-kw., engine-driven generator. Improvements are also being made in the boiler room.

Public Service Electric Company, Newark, N. J.—This company has ordered from the Westinghouse Electric & Manufacturing Company one 1083-kva. 60-cycle, high-tension, 11,000-volt three-phase; low-tension, 2600-volt two-phase, air blast type duplex transformers; four 48-kva., single-phase, 60-cycle, 2400-volt, 10 per cent regulation induction regulators; and two 24-kva. 60-cycle, 2400-volt, single-phase, 10 per cent regulation O. I. S. C. induction regulators.

Interborough Rapid Transit Company, New York, N. Y.—This company has ordered from the General Electric Company six 4000-kw. rotary converters with three-phase transformers. This apparatus is for two new substations. Three of the converters will be installed in substation No. 45, White Plains Road, and three in substation No. 26, Jackson Avenue.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—The Interurban Construction Company has placed an order with the Westinghouse Electric & Manufacturing Company for the Salt Lake & Utah Railroad for three 250-kw., 750-volt, d.c. rotary converters for series operation on 1500-volt circuit, three-phase, 60-cycle, 1200-r.p.m. compound-wound a.c. self-starting, together with three 150-kva., 44,000-volt, single-phase, 60-cycle, O. I. S. C. transformers with triple secondaries, and complete switching equipment for same.

Manufactures and Supplies

ROLLING STOCK

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has issued specifications for ten new double-truck cars.

Washington Water Power Company, Spokane, Wash., has placed in service a new double-truck, one-man car, equipped with smoking compartment.

Wilmington & Philadelphia Traction Company, Wilmington, Del., noted in the ELECTRIC RAILWAY JOURNAL as expecting to purchase twenty-five new cars, has ordered this equipment from The J. G. Brill Company.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., ordered from the Cincinnati Car Company last week three 50-ft., center-entrance, all-steel interurban cars, fitted with Westinghouse motors and equipment and air brakes.

Toronto (Ont.) Railway has been ordered by the Ontario Railway & Municipal Board to proceed with the construction of twenty-five cars with cross-seats on one side and longitudinal seats on the other, as noted elsewhere in this issue.

TRADE NOTES

Midvale Steel Company, Philadelphia, Pa., at a meeting of its board of directors on Oct. 4 elected A. C. Dinkey president to succeed William E. Corey, who acted as president temporarily for a week. Mr. Dinkey for several years has been president of the Carnegie Steel Company, a subsidiary of the United States Steel Corporation.

H. W. Johns-Manville Company, New York, N. Y., is exhibiting at the Electrical Show in New York City the latest designs of three lighting systems for which this company is sole agent: the I. P. Frink system of scientifically diffused reflective illumination; the Mitchell Vance artistic lighting fixtures and bronzes, and Gill Brothers "Parian Ware," the beautifully molded translucent ware used in semi-indirect lighting.

E. I. du Pont de Nemours & Company of Delaware, Wilmington, Del., has taken over the property and business of the E. I. du Pont de Nemours Powder Company of New Jersey. The new company assumes all liabilities of the old company, except capital stock and funded debt, and will carry out all contracts of the old company, there being no change in the personnel of the management, operations or methods of handling the business. It will issue capital stock to the amount of $120,000,000.

Northern Equipment Company, Erie, Pa., has issued catalogs describing and illustrating the Copes boiler-feed regulators. One catalog quotes the 1913 report of the committee on power generation, which shows the desirability of this method of feed control because it "enables peak loads of short duration to be carried with a more uniform working of the furnace, as sudden demands for steam will cause a fall in the water level without a corresponding increase in the rate of feed." One of the catalogs among other things contains charts descriptive of successful regulator tests in the power plant of the Boston (Mass.) Elevated Railway.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received the following awards at the Panama-Pacific International Exposition: Grand Prize for its exhibit of the Pennsylvania Railroad electric locomotive; Medal of Honor for a.c. and d.c. industrial motors and control apparatus, precision instruments, Le Blanc condensers, and on high voltage oil switches; Gold Medal for a number of different classes of apparatus, among which are steam turbines, a.c and d.c. generators and railway motors, transformers, rectifiers, starting, lighting and ignition systems, switchboards and accessories, and mining locomotives; Gold Medal for the most complete and attractive installation in the Palace of Transportation.

McDonald-Gibson Automatic Train Control, Inc., New York, N. Y., has secured patents on an automatic train-stop and speed-control system, the operation of which will not permit a train to approach within two sections of another train, wreck or any obstruction that will form a circuit by touching both rails. An important feature claimed for the system is that it is not affected by weather conditions because the only operating mechanism is a relay switch of the standard railroad type. The general principle of the system is that sections of the d.c. third-rail, or trolley-contact wire, are fed with alternating current which is sectionalized by impedance loads placed at the end of the conductor sections. If the track ahead is occupied or obstructed the a.c. circuit in the section to be protected is de-energized through the operation of a system of relays, thus de-energizing a coil which controls an air-brake valve on the train and applying the brakes. If speed control is desired each relay switch governing the a.c. circuit may be equipped with an ordinary time-element device. William Gibson is president of the company, D. M. McDonald is secretary and treasurer, and J. C. McDonald is vice-president. The offices of the company are located at 391 East 149th Street, Bronx, N. Y.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" railway headlights, delivered headlight equipment to the following railways during the month of September: Eastern Pennsylvania Railways; Argenta Inter-City Terminal Railway; Cincinnati Car Company for new cars of the Charleston Consolidated Railway & Light Company; Hot Springs (Ark.) Street Railway; Metropolitan Street Railway, Kansas City, Mo.; West Helena Consolidated Company, Helena, Ark.; Washington Water Power Company; Chicago & Joliet Electric Railway; Scranton (Pa.) Railway; Chicago, Lake Shore & South Bend Railway; Granite City Railway; East St. Louis & Suburban Railway; Ogdensburg (N. Y.) Street Railway; Tarentum, Brackenridge & Butler Street Railway; United Railroads of San Francisco; Seattle, Renton & Southern Railway; Windsor, Essex & Lake Shore Rapid Railway; Charleston-Isle of Palms Railway; Detroit United Railway; Roanoke Railway & Electric Company; Des Moines (Iowa) City Railway; Sioux City Service Company; Denver (Col.) Tramways; Mahoning & Shenango Railway & Light Company; East St. Louis, Columbia & Waterloo Railway; United Railways of St. Louis; New Bedford & Onset Street Railway; Bryan & College Interurban Railway; Lehigh Valley Transit Company; Iowa Railway & Light Company; Springfield (Mo.) Traction Company; Toledo, Bowling Green & Southern Traction Company; Virginia Railway & Power Company.

Midvale Steel & Ordinance Company, organized in Delaware with an authorized capital stock of $100,000,000, divided into 2,000,000 shares of only one class of the par value of $50 each, has contracted for the purchase of all of the capital stock of Worth Brothers Company, a Pennsylvania corporation, and for all the property and business of the Pennsylvania copartnership trading as the Coatesville Rolling Mill Company; also for somewhat more than 89 per cent of the capital stock of the Midvale Steel Company of Pennsylvania and for all the capital stock of the Remington Arms Company of Delaware. The directors of the Midvale Steel & Ordinance Company are: William E. Corey, Albert H. Wiggin, Samuel F. Pryor, Ambrose Monell, Frank A. Vanderlip, Alva C. Dinkey, Samuel M. Vauclain, William P. Barba, Percy A. Rockefeller, Charles H. Sabin, M. H. Dodge and F. W. Allen. Officers are: president, W. E. Corey; vice-president, A. C. Dinkey; secretary and treasurer, W. B. Dickson.

ADVERTISING LITERATURE

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued folder No. 180 on its second-hand railway equipment.

Hauck Manufacturing Company, Brooklyn, N. Y., has issued a folder which illustrates various effective applications of the Hauck burners in machine shops and for bending rails and making steel car repairs.

Ohio Brass Company, Mansfield, Ohio, has issued a sheet describing its Type J milling machine for bonding. It is stated that on one road recently an average was obtained by this machine of 149 joints per day for eighteen consecutive days.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued, as an appropriate guide or souvenir book for visitors to the International Exposition at San Francisco, an illustrated booklet containing large and stunning views of all the well-known natural wonders of the West, such as the Grand Canyon of Arizona, Yosemite Valley, Canadian Rockies, Mounts Hood, Ranier and Shasta and other beautiful scenes. The booklet also contains photographs of buildings and other architectural details of the Exposition.

S. K. F. Ball Bearing Company, New York, N. Y., has issued a catalog describing and illustrating the uses of its self-aligning ball-bearing hangers for belt and chain drive shafting. The catalog reproduces a chart which demonstrates, from laboratory tests, the saving of power effected by these self-aligning ball bearings over ring oiled babbitted bearings. The booklet also discusses the advantages claimed for the self-aligning ball bearing hangers, in enabling the use of a smaller motor, as regards lubricant saving, cleanliness and reduced fire hazard, and as compared with roller bearings.

Trussed Concrete Steel Company, Youngstown, Ohio, has issued a catalog illustrating the uses of the Kahn building products for railroad structures. In the field of reinforced concrete these products include all types of reinforcement suitable for all structures, from the smaller culvert to the largest viaduct or building. They also include Hy-rib, metal lath and steed stud construction, United States steel sash, and Kahn pressed steel construction. As shown by a large number of illustrations in the catalog, these products are used by the New York & Boston Railway, Philadelphia (Pa.) Rapid Transit Company, Los Angeles (Cal.) Railway, Omaha & Council Bluffs Street Railway, Louisville Railway, Chicago Railways, Portland Railway, Light & Power Company, Portland, Ore., and Richmond & Chesapeake Bay Railway. Another catalog issued by this company describes the Kahn expanded metal mesh for reinforcing concrete when applied to floors and roofs, roads and pavements, sewers and conduits, tanks and walls, and culverts and bridges.

NEW PUBLICATIONS

Department of Commerce, Bureau of Standards, has issued technologic paper No. 48, entitled "An Air Analyzer for Determining the Fineness of Cement," prepared by J. C. Pearson, assistant physicist, and W. H. Sligh, aid in the Bureau of Standards. This paper discusses the various methods employed in the mechanical analysis of cement and describes the development of a new form of air analyzer for this purpose.

The Law of Electricity. By Arthur F. Curtis. Matthew Bender & Company, 26 John Street, New York, N. Y. 1119 pages. Buckram, $7.50.

This is a complete modern work upon a subject of law that has shown enormous expansion during the last decade. Where formerly few decisions existed, now there are hundreds of reported cases that disclose well-defined rules of electrical law covering the powers, duties and liabilities of electric companies. Mr. Curtis' book is especially valuable because one-half of the decisions relating to electrical law have been reported since the publication of the last preceding textbook. The present work covers such topics as electrolysis, electrical injuries, electrical contracts, interference with currents, injuries to appliances, street railways, municipal ownership, master and servant doctrine, etc. Decisions of courts in the United States, England and Canada are cited.

Financial Developments in South American Countries. By William H. Lough. Bureau of Foreign and Domestic Commerce, Department of Commerce. 40 pages. 5 cents.

This reviews in about forty pages the situation as regards the currency, the money market, the principal banks and the general condition of business in Argentina, Bolivia, Brazil, Chile, Peru and Uruguay, during the last two or three years. Especial emphasis is placed on the results of the European war and the measures taken by the various governments, financial institutions and commercial communities to meet the situation thus created. There is also much up-to-date information with regard to the present state of affairs in South America as to credit extension, government finances, currency conversion, emergency measures and prospective changes and reforms.

The author is William H. Lough, vice-president of the Alexander Hamilton Institute, New York, N. Y., who has recently made a trip through the countries treated. The publication is to be had from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Electric Railway Journal

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Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

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GROWTH OF THE NEAR-SIDE STOP The graph showing the growth of the near-side stop in American electric railway practice that was submitted at the San Francisco convention constitutes a most impressive argument in favor of this method of operation. In a thoroughly conservative industry like that of electric railroading a consistent rate of expansion for any practice is bound to be an excellent measure of its utility. Thus the regular increase in the number of companies using the near-side stop, which was only four in 1907, but was sixty-five in 1915, shows a normal and thoroughly satisfactory popularity. The reasons advanced in the past for clinging to the far-side stop have, of course, been numerous and varied, but back of all of these has been the prejudice of a public which still shows the influence of an early training in the horse-car days. Clearly enough the near-side stop would have been a practical impossibility for the horse car, which was handicapped first by the impossibility of making a near-side stop with either platform at a cross-walk, and second by a slow and generally uncertain rate of acceleration, and in consequence the new practice has, until recently, been the subject of much opposition. That it has survived this is, we believe, fortunate for the industry, since an increase, during the past year, of 50 per cent in the number of companies using it is a very definite testimonial as to its merit, as well as an indication that the custom will soon become well-nigh universal.

BALLASTED AND SUB-BALLASTED TRACK Supplementing the comments on the annual report of the Engineering Association way matters committee made in a general editorial last week we wish to direct attention to another important result of its work. Realizing the chaotic condition existing as regards the types of track foundations used to carry the same kind of traffic in different parts of the country, this committee recommended for adoption two types, of which most all others are nothing more nor less than modifications. Until more satisfactory results can be obtained from solid concrete construction, which contains many meritorious characteristics, the committee's action will doubtless meet with general approval. By every measure of the data collected throughout the country, the ballasted type of construction was the most popular and gave the best satisfaction. The committee believed, however, that this type of foundation would not meet all classes of traffic and soil conditions, hence recommended the concrete slab sub-ballasted construction. This is more expensive, but is certain to bridge over most unfavorable soil conditions and will provide a uniform load distribution. The concrete slab, sub-ballasted construction also overcomes some of the undesirable qualities of the solid concrete foundation, namely, that it facilitates installation and makes possible tie and rail renewals without destroying the concrete substructure. Variations in the track surface after the concrete slab has set, may be corrected when the ballast is tamped beneath the ties. If the track becomes out of surface under traffic, the ballasted slab lends itself as readily to resurfacing as a plain ballasted foundation.

MORE TIME ON THE SAFETY CODE Electric railway managers will approve the action of the United States bureau of standards in postponing for an indefinite period the conference which had been called for Oct. 27. In spite of the industry of the representatives of the bureau, and of the utilities which will be affected by the rules, in holding conferences in different parts of the country, it is still too soon to attempt to cast the rules into anything like final form. As the details are studied more and more closely it becomes increasingly evident that it is a stupendous task to frame rules which will conserve life and health and at the same time impose no unreasonable burdens upon the utilities. That the utilities are already alive to the importance of the safety movement is evident on every hand. A glance through the pages of the last few volumes of the ELECTRIC RAILWAY JOURNAL will serve to convince the most skeptical on this point as far as the electric railway industry is concerned. It should, therefore, be possible to codify the best practice in safety work in a way that will commend itself to all concerned. But such a consummation requires time, effort and co-operation. The bureau has been most reasonable in granting a request for more time so that additional effort in the direction of co-operation may be expended.

BROAD-MINDED COMMISSION POLICY The decision of the Public Service Commission for the First District of New York in the Bronx Gas & Electric Company case, abstracted elsewhere in this issue, is not excessively liberal in its allowances of 20 per cent for contractor's profits, engineering supervision, contingencies and incidentals, and 12 per cent for preliminary and development expenses, for, as Commissioner Wood himself points out, these figures represent simply a conservative average of allowances made in analogous cases by this and other commissions. The allowances are essentially fair, however, and the commission deserves credit therefor. Yet it deserves more credit for outlining at this time a broad and far-sighted policy in regard to such overhead charges. It is, of course, widely recognized now that overhead percentages, dependent upon the character and the continuity of construction work and methods, and upon the completeness of the appraisal and the construction records, should be included in physical value, but few commissions seem to be inclined to lift their gaze beyond the perusal of the facts presented in any particular case. Hence, it is encouraging to find the New York commission clearly enunciating such sagacious principles as the following: "If corporations do not receive fair and liberal treatment and are denied the right to include such items [as the above] in their expenditures to be reimbursed by the sale of securities, there will be no inducement or encouragement to attract capital, extension work will come to a stop and new enterprise will be discouraged," and "the investment of funds in public utility developments should be encouraged by those in authority as far as it is consistent and proper." Such prescience in valuation work is a thing to be cultivated by every commission.

RAIL-WEAR VALUE REPLACES GIRDER STRENGTH

Coincident with the more general adoption of permanent types of track foundations has been the tendency to substitute 7-in. rail sections for the 9-in. sections. This has been a logical evolution, since the 9-in. section has not proved to be a panacea for all track ills, although it aided greatly in prolonging the life of the track structure when more or less meager attention was directed toward improving foundations. Permanent types of foundations also, in a measure, account for the success attending the more general use of the plain girder rail sections, and improved pavement construction has done much to overcome municipal objections to this type of rail. From an economy standpoint the increased wearing area available in 7-in. plain girder and in the more recent grooved girder sections has tended to make them more popular than the earlier 9-in. rail sections. Full advantage has not been taken of the reduction in weight made possible by shallower sections to reduce the weight of the rail, but the metal removed from the web has been added to the head or other portions subject to wear and corrosion.

If an engineer designs the track structure in proper proportion, the additional cost of a more permanent type of track foundation may, to a certain extent, be offset by a reduction in the weight of the rail. This is especially true where the tendency was toward the heavier 9-in. grooved girder sections. Great girder strength is not as necessary with the properly designed permanent track foundations as it was with the older types, where attention was not directed to drainage problems and load distribution on the subsoil. Where the generally accepted permanent types of track foundations have been in service for periods of twelve to fifteen years, the substitution of the 7-in. for the 9-in. sections has been vindicated from an engineering standpoint. This applies particularly where the area of the rail head available for wear has been increased, or, in other words, head wear area has been substituted for great girder strength. Manifestly there are some cities where this change cannot be effected owing to franchise limitations. On the other hand, there are plenty of examples of unusually long life and particularly satisfactory pavement conditions which could be cited as a most compelling argument for the 7-in. rail sections. Of course, there are localities where the traffic consists of unusually heavy interurban or steam road equipment, and a 9-in. rail may be necessary. On the whole, however, for average street railway and interurban traffice the substitution of the 7-in. for the 9-in. rail is a step in a direction which most companies would do well to follow.

PROBLEMS OF THE CLAIMS ASSOCIATION

Probably three of the most important points that came up before the Claims Association at the San Francisco convention were those concerning the prevention of motor-vehicle accidents, the standardization of claims statistics and the installation of a moving-picture exchange by the parent association.

Mr. Hare's careful and critical discussion of the first topic adequately summarizes all that has been said concerning motor-vehicle accident prevention, and his suggestion that uniform state laws be passed to cover motor-vehicle operation is commendable. Electric railways have done everything possible to cut down motor-vehicle accidents, but the persistent recklessness and disregard of the rights of others that characterize automobile collisions make it necessary for the drivers to be forced by restraining regulations to protect themselves and others. When, as the Long Island Railroad found out, it is necessary to install solid, heavy pole gates so that foolhardy drivers cannot disregard the warning of the closed roadway and break through, it is evident that the proper solution of the problem requires more than mere physical safety-devices and the like that have consistently been utilized by the transportation companies. We see no reason why the requirements for motor-vehicle drivers and the penalties for violations of operating regulations should not be as strict as in the case of electric railways and similar carriers, if not more so. Fully detailed and uniform state laws, inexorably enforced by state, county and municipal officers, would certainly aid transportation companies in their often unappreciated efforts to conserve public safety, and such a program merits indorsement by the association.

The standardization of claims statistics, together with the adoption of a standard claims-accounting classification, offers a fertile field for extended study by the Claims Association, and we confidently expect that by the next convention the association will be ready to take definite action along this line. The act just now of the joint committee on claims-accounting in deferring its report for a year is more praiseworthy than otherwise, for too much time can hardly be taken in endeavoring to unify, if possible, the multitude of diverse ideas held by claim agents on this topic. The difficulties of standardization may seem insurmountable, but they are actually by no means so, as the accountants with their co-operative and compromising spirit have proved in their solution of the much broader problem of standardizing all their accounting theory and procedure. Mr. Slick's paper on standardizing claims statistics is valuable in outlining some of the questions that must be solved and in describing one system of statistical forms that has been found fairly satisfactory. As a contribution from experience it should receive due consideration by the joint committee in the final analysis.

The efficacy of moving pictures in safety work has in general been amply attested by those who have made use of this method of instructing employees and the public, but, as Mr. Warnock points out, many companies have not yet awakened to the possibilities of such a campaign or have not become sufficiently enthusiastic to put it into operation. The point here at issue is: "Should the American Electric Railway Association establish a film exchange?" Looking at this question from all points of view, we are inclined toward the belief that such an institution would have more favorable than unfavorable features. In preserving safety films of various manufacturers, in carrying only a specialized line, in saving money through mutual interchange of pictures, in making films readily available at a minimum cost to the small companies—in these and other ways the suggested film exchange would render accident prevention by moving pictures more convenient, economical and generally powerful. Some doubt the usefulness of such means as a deterrent or preventive of accidents, and not the least desirable result of a film exchange would be this—that no company would then have a really legitimate excuse for not proving to itself at first hand the possible results of this method.

LOOKING BACKWARD

In these days of the jitney and of the motor bus, it may be difficult to realize the enthusiasm which greeted the advent of the street car and its introduction as a substitute for bus transportation in cities. At present, certain advantages of the omnibus and jitney, such as their freedom of movement and fewer stops because of fewer passengers, appeal to many people, and claims are even made that the independent car is suitable as a transportation agent for at least a considerable part of the traffic in any city. In Denver, for instance, automobiles are carrying about one-fourth as many passengers in and out of the business district as the electric railway system. To understand what complete dependence upon the omnibus and private car would mean, however, and what a great boon the car on rails really was, one must go back to the time when the street car was introduced.

We had occasion in a recent issue of this paper to quote some passages from a book on "Street Railways," by Alexander Easton, published in 1857, when horse cars first began to supplant the omnibus, and said that we might again quote from that book in connection with views held of omnibus traffic at that time. We cannot give space here to all of the points brought out by the author, but some of them are well worthy of attention.

In the first place, the author shows that both the time of the passenger and space on the street is economized by the car as compared with the bus. Space is economized, of course, because the car easily carries three times the number of passengers carried by a bus, but time is economized by the regularity of the service, as when buses were used exclusively it was found impossible to keep them on a regular schedule. If these conditions obtained sixty years ago with the low buildings of that time and the comparatively small amount of traffic on the streets, the advantages must be even greater now with the larger traffic and the streets lined with tall office buildings holding ten or more times the number of occupants. Again, Mr. Easton says "a street car can be taken and vacated without trouble or danger to the occupants of the car, whether invalid or infirm.

"There is marked reduction in the noise, the danger to other users of the street and to those wishing to cross at a corner are greatly lessened by the street car. The omnibus travels from one side of the street to the other, like 'an old rudderless monster,' picking up passengers or seeking a loophole to gain space, whereas the cars are confined to the middle of the street, where drivers of other vehicles and pedestrians can easily avoid them, because they know exactly the direction in which they are going."

The author sketches this picture. A rainy day. Every corner of the sidewalk crowded with impatient pedestrians, each anxiously peering up or down the street in search of the particular omnibus among the fifteen or twenty approaching to carry him home, which, with as many more coming in the opposite direction, so effectually choke up the street that the drays and carts, unable to cross at the intersections, render the highway impossible to private vehicles. The omnibus is crowded to excess, cannot accommodate those waiting to board, and the sudden halt, with imminent risk of collision, and the driver's "plenty of room, sir," with twenty passengers inside, by no means softens the temper either of those waiting or those who have taken passage, as they look upon each moment of unnecessary delay as an infringement on their right. This scene is compared with another where not an omnibus is seen in the entire length of the street. There is no noise, no blockade. Passengers are comfortably seated, and they converse and read newspapers in comfort. No rain drops in from the roof; ladies' dresses are not splashed with dirty water from the gutters. Private conveyances can use the streets with safety, and everyone is pleased with the change.

The author may be somewhat biased, but those who remember the days when buses furnished the only means of transportation in an important section of a city, as on lower Broadway in New York during the seventies, will hardly consider the situation overdrawn. In any event, the great increase in congestion that has come with the advent of the skyscraper to the average business district in late years makes for conditions that demand something more than haphazard transportation.

Progress on C. M. & St. P. Electrification

The First Division Electrification of 113 Miles Is Nearing Completion and Construction Work on Three Other Engine Divisions Is Actively Under Way, Making a Total of 440 Miles of Main Line Equipped with Forty-Two 280-Ton Locomotives

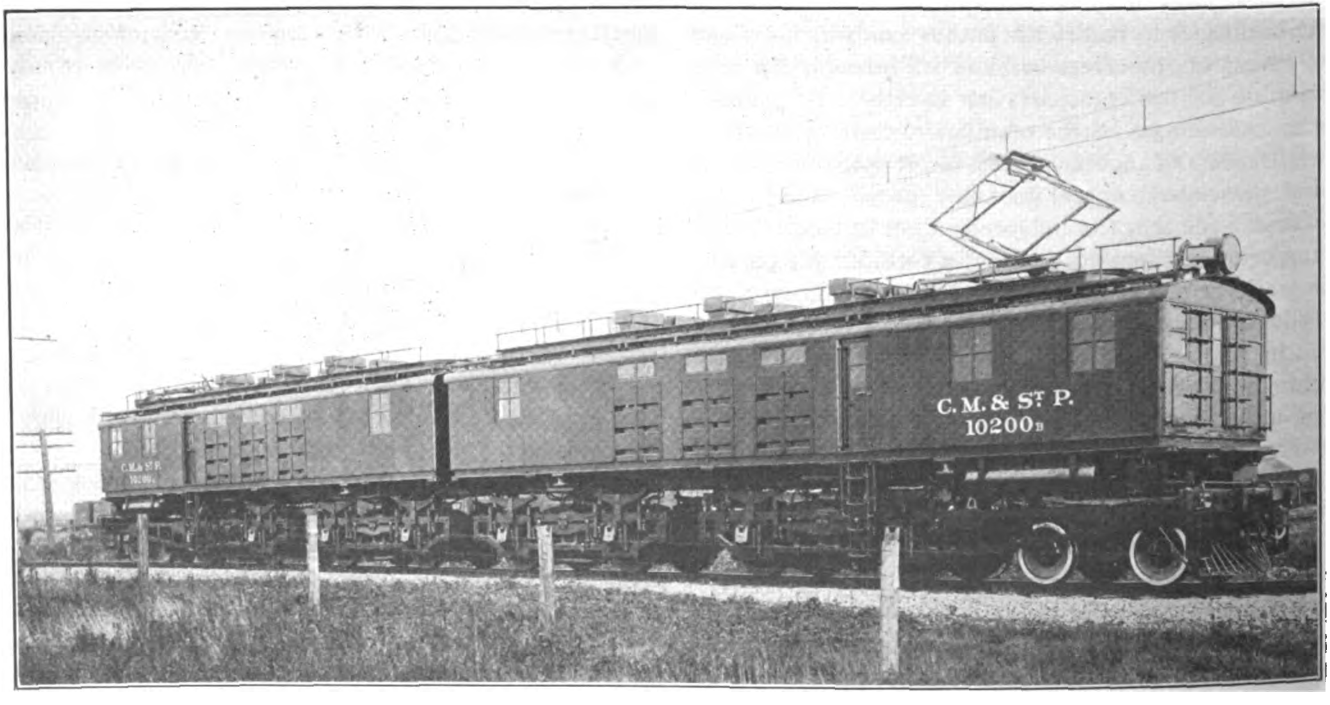
REPORTS from Montana show that the work of equipping the first division of the Chicago, Milwaukee & St. Paul Railway's electrified zone is nearing completion, and it is estimated that by the middle of November the first electric train will be tried out between Three Forks, Mont., and Deer Lodge, Mont., a distance of 113 miles. At present construction crews are working from Harlowton, Mont., which is nearly 100 miles east of Three Forks, as far to the west as Drummond, Mont., the latter station being some 30 miles west of Deer Lodge, the western terminus of the electric division that is about to be placed in service.

The electrification, which includes 440 route miles and 650 miles of single track for the four divisions that extend across the Rocky Mountains is thus practically finished for a distance of more than 200 miles, the trackage that is being made ready for immediate train operation including extensive yards and sidings at Three Forks, Deer Lodge and Piedmont, as well as passing tracks at other points. The 100,000-volt transmission line that is being erected by the railway company to parallel the electrified tracks has been installed for an equal distance, and tie-in lines from the 100,000-volt system of the Montana Power Company are ready for service.

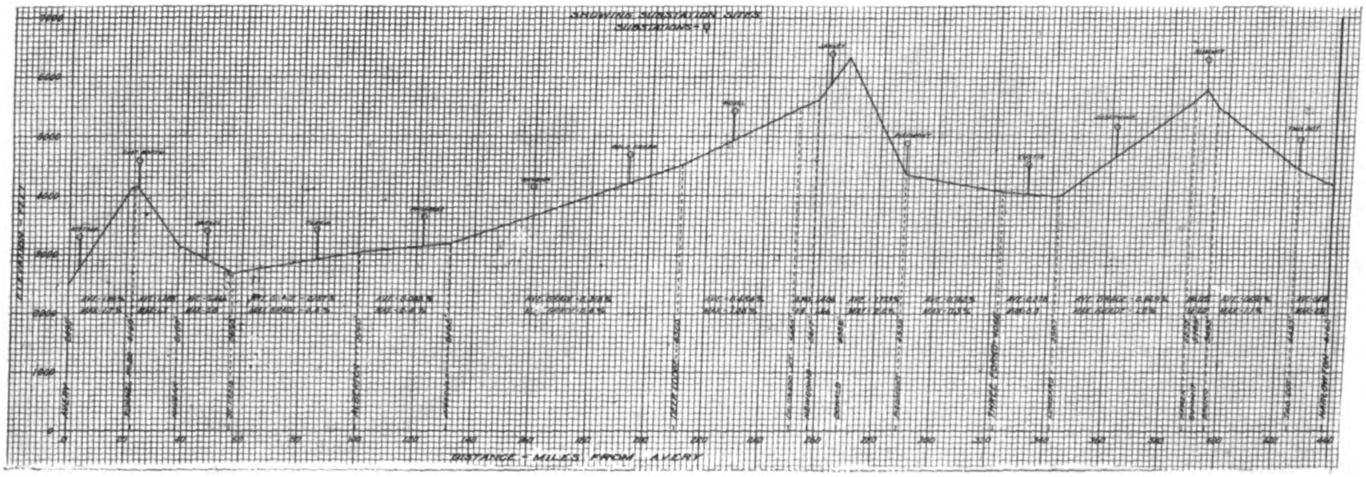
Overhead trolley construction and feeder lines are practically completed from Eustis, Mont., to Janney, Mont., making a total of more than 70 miles of overhead work, the former town being east of Three Forks and the latter near the city of Butte at the middle of the Three Forks-Deer Lodge division. The remainder of the overhead work westward from Janney is stated to be more than 50 per cent complete so that, in general, approximately 75 per cent of the overhead construction is in place. Three track-bonding crews are at work east of Three Forks, the bonding having been completed from Deer Lodge east to Canyon, a few miles east of Three Forks. The transmission line, which is of the wooden-pole suspension-insulator type with double cross-arms, has been completed from a point within 17 miles of Deer Lodge eastward to a point approximately 30 miles beyond Three Forks.

From the foregoing it is evident that the electrified division that extends between Three Forks and Deer Lodge is completely equipped, with the exception of the overhead construction between Butte and Deer Lodge. In addition, a considerable amount of work has been done east of Three Forks on the adjoining division, and in view of the magnitude of the undertaking, which is in charge of C. A. Goodnow, assistant to the president Chicago, Milwaukee & St. Paul Railway, the progress has been remarkable.

The accompanying illustrations show the general appearance of the new type of trolley construction that has been installed. It will be noted that wood-pole construction is used throughout both for cross span and bracket construction. The twin No. 0000 trolley wires are suspended individually and separately from the same steel catenary and the hangers of one trolley wire are located at points opposite the mid-span on the other trolley wire. In the switching yards, however, only one trolley wire is used, because the train movements at these points will take place at low speed, mak-



CHICAGO, MILWAUKEE & ST. PAUL ELECTRIFICATION—282-TON, 3000-VOLT DIRECT-CURRENT LOCOMOTIVE IN EXPERIMENTAL OPERATION ON TEST TRACK

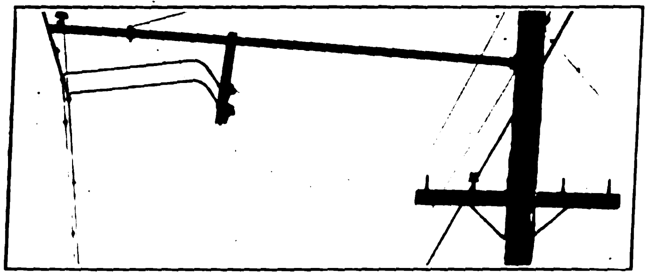


CHICAGO, MILWAUKEE & ST. PAUL ELECTRIFICATION—PROFILE OF ELECTRIC ZONE AND SUBSTATION LOCATIONS

ing the collection of the large drafts of current an easy matter.

SUBSTATIONS AND EQUIPMENT

Seven substations designed to supply power to the eastern half of the 440 miles of route have been completed and electrical equipment is being rapidly installed. Complete shipments of transformers, motor-generator sets, switchboards and other accessories have been made by the General Electric Company from Schenectady, N. Y., for the stations first erected, and the equipment of the four substations on the Three Forks-Deer Lodge division is practically ready for operation. Construction crews are proceeding with the erection of the remaining seven substations located between Deer Lodge, Mont., and Avery, Idaho, at the western end of the electrified zone.

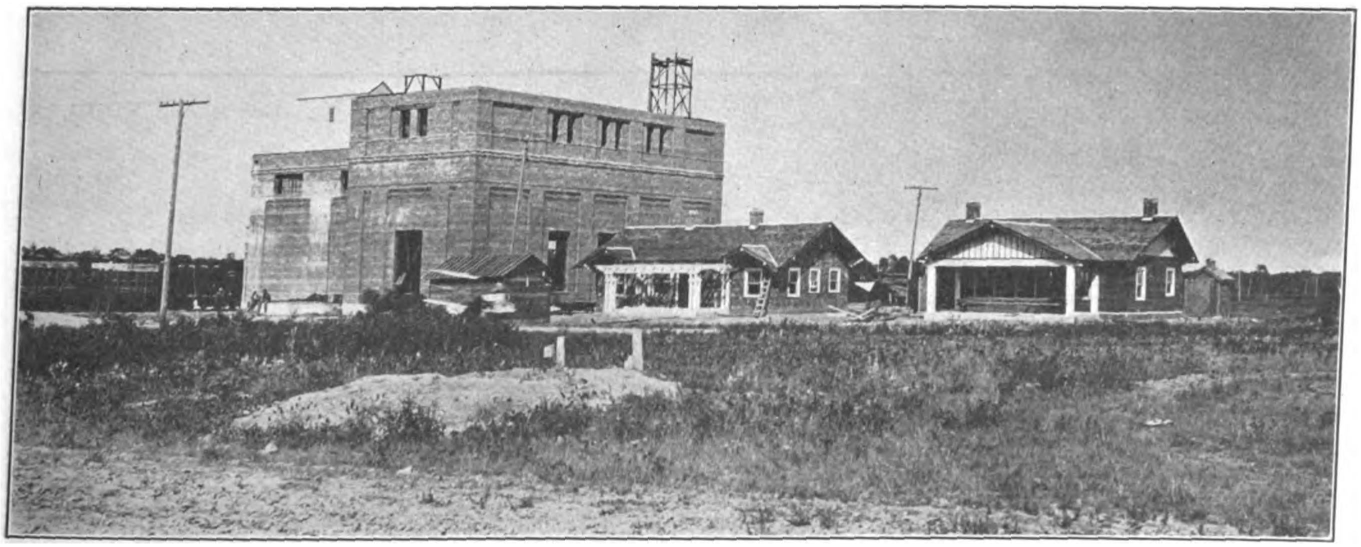


CHICAGO. MILWAUKEE & ST. PAUL ELECTRIFICATION—DOUBLE PULL-OFF ON CURVE FOR TWIN TROLLEY WIRE

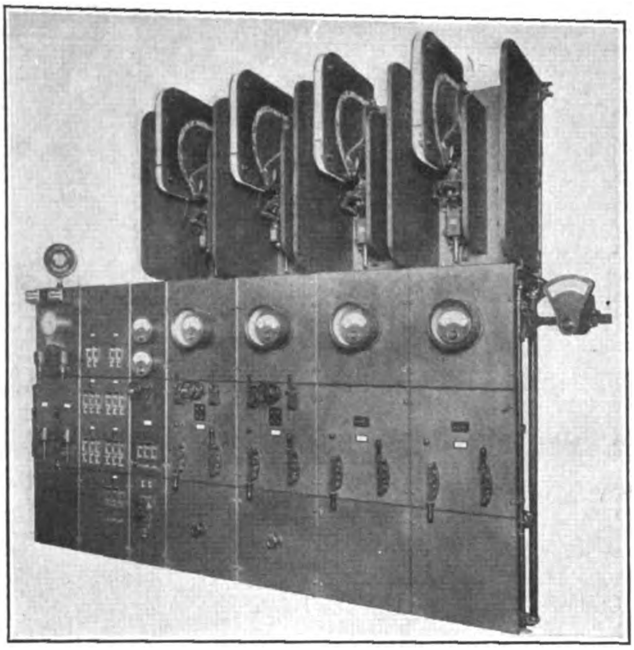
Each of the motor-generator sets in the substations consists of a 60-cycle, three-phase, 2300-volt, synchronous motor direct-connected to two 1500-volt direct current generators. The generators are connected permanently in series to supply 3000 volts to the trolley. Each set is also provided with an exciter at each end, one providing excitation for the revolving field of the motor and the other supplying the separately excited fields of the d.c. machines.

SUBSTATION EQUIPMENT, CHICAGO, MILWAUKEE & ST. PAUL RAILWAY

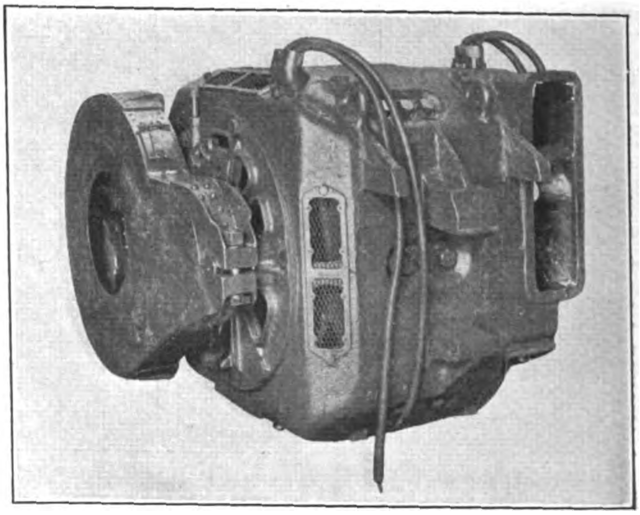
Station	Miles from Avery	Number Units	Size Motor-Generator Sets	Substation Capacity	Size Trans'f'rs	Total Trans'f'rs
Two Dot ...	425.6	2	2,000 kw.	4,000 kw.	2,500 kva.	5,000 kva.
Summit	392	2	2,000 kw.	4,000 kw.	2,500 kva.	5,000 kva.
Josephine ..	361.8	2	2,000 kw.	4,000 kw.	2,500 kva.	5,000 kva.
Eustis	331.8	2	2,000 kw.	4,000 kw.	2,500 kva.	5,000 kva.
Piedmont ...	289.1	3	1,500 kw.	4,500 kw.	1,900 kva.	5,700 kva.
Janney	261.7	3	1,500 kw.	4,500 kw.	1,900 kva.	5,700 kva.
Morel	228.3	2	2,000 kw.	4,000 kw.	2,500 kva.	5,000 kva.
Gold Creek..	192.7	2	2,000 kw.	4,000 kw.	2,500 kva.	5,000 kva.
Ravens	160	2	2,000 kw.	4,000 kw.	2,500 kva.	5,000 kva.
Primrose ...	122.2	2	2,000 kw.	4,000 kw.	2,500 kva.	5,000 kva.
Tarkio	85.6	2	2,000 kw.	4,000 kw.	2,500 kva.	5,000 kva.
Drexel	47.5	2	2,000 kw.	4,000 kw.	2,500 kva.	5,000 kva.
East Portal.	23.7	3	2,000 kw.	6,000 kw.	2,500 kva.	7,500 kva.
Stetson	3.6	3	1,500 kw.	4,500 kw.	1,900 kva.	5,700 kva.
		32		59,500 kw.		74,600 kva.



CHICAGO, MILWAUKEE & ST. PAUL ELECTRIFICATION—SUBSTATION AND OPERATORS' HOUSES AT TWO DOT, NEAR THE EASTERN END OF THE ELECTRIFIED DIVISION



CHICAGO, MILWAUKEE & ST. PAUL ELECTRIFICATION—HIGH-VOLTAGE, DIRECT-CURRENT SWITCHBOARD FOR SUBSTATIONS



CHICAGO, MILWAUKEE & ST. PAUL ELECTRIFICATION—430-HP., 1500-VOLT MOTOR USED ON LOCOMOTIVE

These sets are, in general, similar, except as regards voltage and capacity, to the five 1000-kw., 2400-volt units that have been in operation on the Butte, Anaconda & Pacific Railway for the past three years. However, there has been added one new feature which deserves mention. This consists of a longitudinal ventilation of the core and field coils similar to that employed in the well-known GE ventilated railway motor. The use of this method of cooling has effected a considerable reduction in the floor space required per kilowatt.

The d.c. generators are equipped with commutating poles and compensated pole-face windings to insure sparkless commutation under heavy overloads. The overload capacity is 150 per cent of the normal load for two hours, and 300 per cent of the normal load for periods of five minutes. This will provide ample margin for starting a train of maximum tonnage on the most difficult grades.

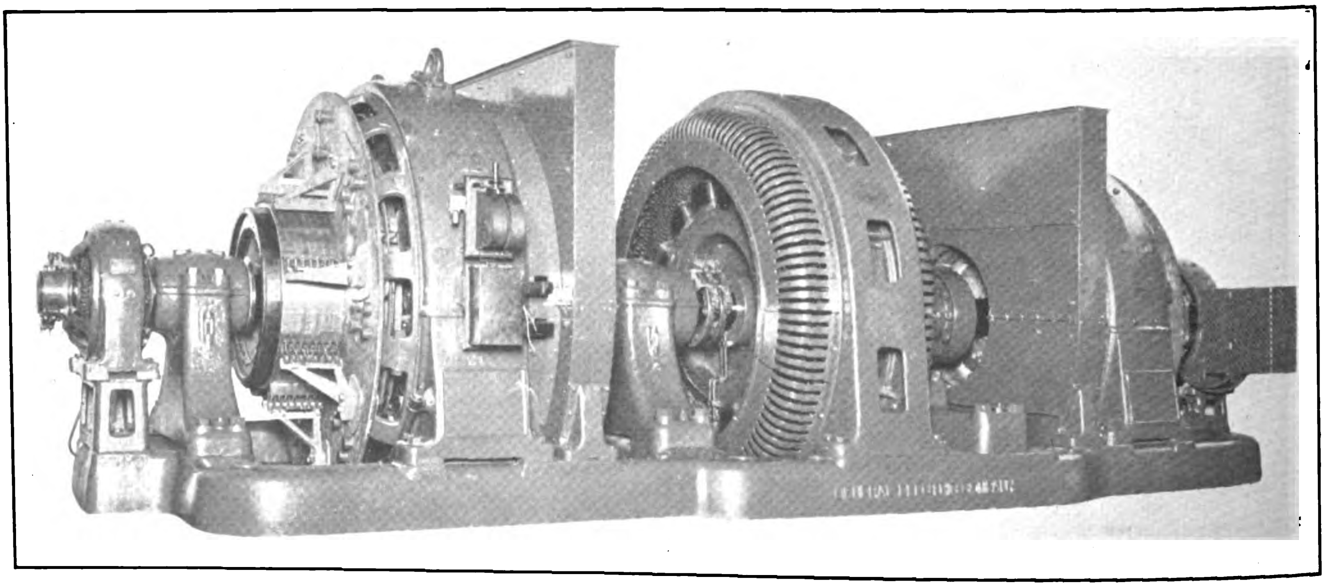
It is interesting to note in connection with these substations that the motor-generator sets are designed to operate inverted in case the power that is regenerated by the locomotives on the down grades exceeds that required by other trains operating nearby. For this reason there is no necessity for water boxes or other energy-consuming devices, since the excess energy is returned direct to the 100,000-volt transmission system.

SWITCHBOARDS AND TRANSFORMERS

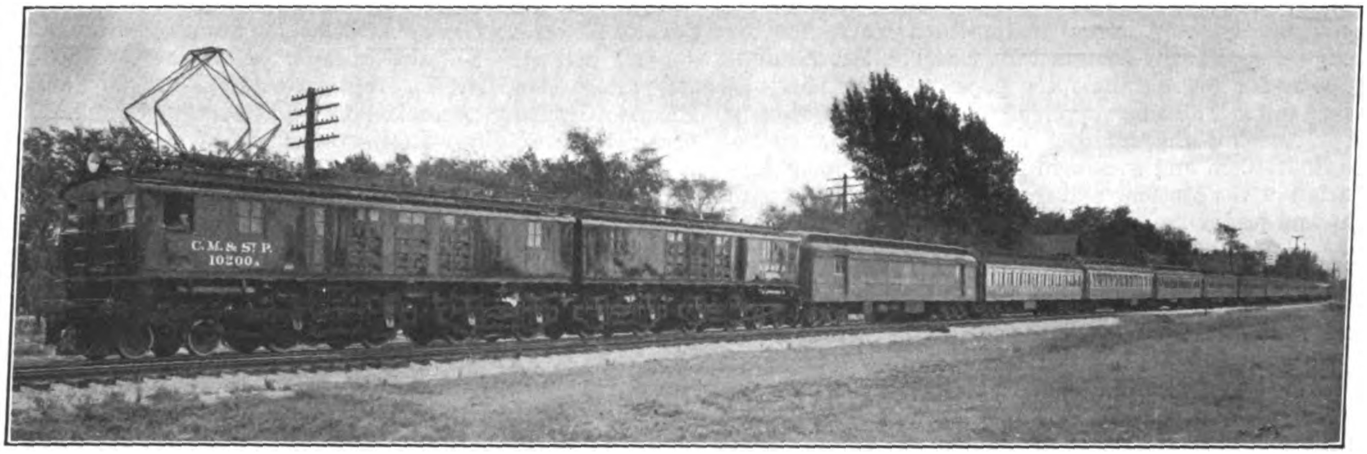
The main direct-current switchboard in each station is of special interest, since it represents the latest practice in high-voltage direct-current switch apparatus. A panel is provided for each set and two panels are provided for feeders in each direction.

The circuit breakers and switches are mounted on separate panels located above and a short distance back of the main panels, similar in general to those now operating in the Butte. Anaconda & Pacific substations. The control handles for operating the breakers and switches are located on the main panels and are connected to the circuit breaker panels through insulated wooden rods.

In addition to the special high-voltage d.c. panels, switchboards are also being furnished for the synchronous motors and auxiliary circuits. Oil switches and



CHICAGO, MILWAUKEE & ST. PAUL ELECTRIFICATION—VENTILATED 2000-KW. MOTOR-GENERATOR SET FOR 3000-VOLT DIRECT CURRENT



CHICAGO, MILWAUKEE & ST. PAUL ELECTRIFICATION—LOCOMOTIVE COUPLED TO THE "OLYMPIAN," THE FAMOUS TRANSCONTINENTAL TRAIN BETWEEN CHICAGO AND TACOMA

other standard 100,000-volt equipment are also being installed for the high-tension circuits.

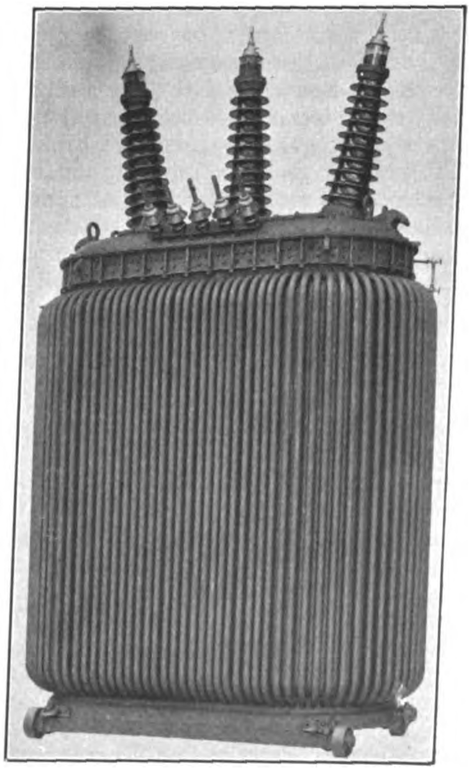
The transformers are an excellent example of the most recent design and construction. There is a total of thirty-two of these units which are to be used for stepping down the power supply from the 100,000-volt transmission line to the 2300 volts required for the synchronous motor-generator sets. All are of the three-phase core type with a ratio of voltages of 102,000: 2300. For regulating purposes taps are provided for 97,200 volts and 94,200 volts. Taps are also brought out on the secondary windings to give 1150 volts for starting the motor-generator sets.

The transformers are oil cooled and the tanks are of the tubular type, the main body consisting of steel plate with tubes welded to the sides of the tank at top and bottom, giving absolutely oil-tight joints. An air dryer and breather is attached to the tank so that all interchange of air between the interior of the tank and the outside must take place through this channel. This drier is provided with chambers containing a moisture extracting medium thereby preventing the entrance of moisture to the tank.

The bushings furnished with these transformers are weatherproof and as all joints are tight, they are suitable for outdoor as well as indoor operation. At the top of the high tension oil-filled leads is a glass cup which shows the height of oil in the leads. Accessories consisting of thermometer, oil gage and drain valve are also provided. Each transformer is mounted on flat wheels to facilitate movement for making repairs and a lifting device is furnished for removing the transformer core.

In addition to the main transformer equipment, each substation is furnished with a standard 10-kw., three-phase transformer stepping down from 2300 volts to 110 volts for lighting and auxiliary power circuits. For operating the railway signal circuits, a standard, 25-kw., single-phase transformer is being installed in each substation, this stepping up the voltage from 2300 to 4400.

A portable oil drying outfit will be used for remov-



CHICAGO, MILWAUKEE & ST. PAUL ELECTRIFICATION—BONDING CREWS AT WORK—RADIATOR TYPE, 100,000-VOLT TRANSFORMER ing moisture from the transformer oil. This outfit consists of a motor-driven pump which forces the oil through a specifically-designed filter and an electric drying oven for drying the filter paper. A portable oil-testing set will also be supplied.

For housing the families of the substation operators, four-room and five-room bungalows are being constructed at the stations and these will be furnished with light and power from the low-voltage auxiliary circuits.

LOCOMOTIVES

Work on the construction of the forty-two 282-ton locomotives for this electrification is progressing rapidly at the Erie Works of the General Electric Company and in the Schenectady plant of the American Locomotive Company. The first complete locomotive was placed on the test tracks early in September and shipment was made as scheduled on Sept. 25.

This locomotive has been taken in charge by the railway company at Chicago and it is now being towed over the lines of the Chicago, Milwaukee & St. Paul for purposes of exhibition at Chicago, Minneapolis, St. Paul, Spokane, Seattle and Tacoma, Wash. At each of these cities the time and place at which the locomotive is to be on exhibit is announced in the local newspapers. The engine is in the charge of two men familiar with its construction so that any questions which may be asked by the public will be correctly answered. Aside from the exhibition of the locomotive, moving pictures of it are to be exhibited at all points along the lines of the Chicago, Milwaukee & St. Paul Railway. An illustration on page 797 shows the locomotive coupled to the crack train of the St. Paul system, the "Olympian."

A complete set of tests on the Schenectady testing tracks indicate that the locomotive will easily exceed the expectations of the designers which were outlined in the ELECTRIC RAILWAY JOURNAL for June 5, 1915. The actual weights of the complete unit equipped for freight service are as follows:

Total weight	564,000 lb.
Weight on drivers	448,000 lb.
Weight per driving axle	56,000 lb.
Weight per guiding axle	29,000 lb.

Twelve of the locomotives on order are geared for passenger service and the remaining thirty are geared for freight service. Both freight and passenger types are equipped for regenerative braking, this apparatus being under control of the engineer. All of the passenger locomotives and several of the freight locomotives will be equipped with oil-fired steam boilers for heating the passenger trains, this equipment, of course, including ample storage tanks for oil and water.

Recent Conferences on the Safety Code

The American Electric Railway Association committee to confer with the bureau of standards on the proposed "National Electrical Safety Code of Rules," met in Rochester, N. Y., on Sept. 28, 29 and 30 in pursuance of its study of the code. At this meeting there were present representatives of similar committees appointed by the Central Electric Railway Association, the New York Electric Railway Association, and the Pennsylvania Street Railway Association. Those present were: C. L. Cadle, electrical engineer New York State Railways, Rochester, N. Y., and W. J. Harvie, Allen & Peck, Inc., Syracuse, N. Y., representing the American Electric Railway Association; Adolph Schlesinger, superintendent of distribution Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., and G. H. Kelsay, superintendent of power Union Traction Company of Indiana, Anderson, Ind., representing the Central Electric Railway Association; James P. Barnes, general manager Buffalo, Lockport & Rochester Railway, Rochester, N. Y., representing the New York Electric Railway Association, and Gordon Campbell, president York (Pa.) Railways, representing the Pennsylvania Street Railway Association.

It was not possible to complete the work at this session and the meeting was adjourned to Oct. 5 at New York, at the rooms of the American Institute of Electrical Engineers, and the same procedure was followed in Rochester. In New York the American Association was represented by Messrs. Harvie and Cadle and by Prof. A. S. Richey, Worcester (Mass.) Polytechnic Institute. The other associations were represented as before excepting that Mr. Kelsay was absent. This meeting produced very beneficial results in co-ordinating details of electric railway practice.

On Oct. 6, by invitation of the bureau of standards, the committee and representatives of the bureau met and discussed in detail the suggestions which had been developed by the American Association's committee, with the co-operation of the state committees above referred to, and it was found possible to eliminate a considerable number of points of difference, thereby enabling the bureau and the committee to come much closer to agreement in perfecting the proposed code. It was not possible during the day to consider completely all of the suggestions made, and the committee expects to co-operate in further conference with the bureau and with the other associations.

Report on Taxation Matters

Owing to typographical errors the totals in the last two columns of Table III in the report of the committee on taxation matters of the American Electric Railway Association, abstracted in the ELECTRIC RAILWAY JOURNAL of Oct. 9, page 734, were erroneous. The percentage of total federal taxes to electric railway operating revenue for 1914 should have been 0.237 per cent instead of 6.717 per cent, and a similar percentage for the total of all taxes should have been 6.717 per cent instead of 5.702 per cent. The detailed total for Hawaii in the last column also should have been 5.176 per cent instead of 1.763 per cent. The following table compiled from the data in this committee's report shows the total comparative taxation figures as they should appear:

TABLE SHOWING RAILWAY OPERATING REVENUE, TAXES AND PERCENTAGES OF TAXES TO REVENUE FOR EIGHTY-THREE ELECTRIC RAILWAYS FOR YEARS ENDED IN 1904 AND 1914

	1904		1914	
	Amount	Per Cent of Railway Operating Revenue*	Amount	Per Cent of Railway Operating Revenue*
Railway operating revenue	$140,183,165	....	$237,968,085	....
Municipal taxes	4,378,048	3.125	8,108,476	3.410
State and county taxes	3,997,172	2.850	7,307,440	3.070
Federal tax	——	——	565,792	0.237
Total taxes	8,375,220	5.975	15,981,708	6.717

*United States percentage.

In a recent editorial the *Engineer* of London expressed the belief that field for the split-phase system of electrification such as has been installed on the Norfolk & Western Railway was limited in Great Britain, owing to the complications on the locomotives notwithstanding its great advantages in the use of the rugged induction motor with an overhead system having but one wire. The direct-current system was considered best suited to conditions on the British Isles.

Some Neglected Phases of Accounting*

Fundamental Valuation Principle Is Not Equity But Attraction of Capital, With Assumption of Risk by Investor Involved—Author Differentiates Between Capital Expenditures and Revenue Charges, and Analyzes Depreciation Accounting, Capitalization of Deficits and Franchise Payments

BY HENRY RAND HATFIELD
Professor of Accounting, University of California, Berkeley, Cal.

THERE are five matters that call for careful consideration—namely, the fundamental principle of valuation; the differentiation between capital expenditures and charges against revenue; the treatment of depreciation; the capitalization of deficits, and the effect of payments for franchises.

Paramount among these questions is that relating to the valuation to be taken as the basis for rate regulation. In the torrent of discussion it seems strange that any aspect of the question should have been neglected. Nevertheless in most discussions there is a startling lack of any fundamental principle, of what Allison calls an "over-theory," by which the varying methods can be judged. One proposes a cost basis, another a reproduction basis, another a present-value basis, but comparatively little attention has been given to the principle by which these are to be tested.

EQUITY AS FUNDAMENTAL PRINCIPLE OF VALUATION IS NOT ADEQUATELY CONSIDERED

To be sure, it is generally implied that there must be some equity, but the question of what constitutes equity as between the public and the corporation is not adequately considered. Two writers of prominence, Allison and Whitten, have come to closer grips with the subject, but even these fall short of a satisfactory solution. Whitten's idea is that equity consists in an adequate reward for the sacrifice of the investor. Yet this statement is not followed to its logical conclusion and is made to rest on a forced analogy altogether begging the question at issue. In his argument supporting the cost basis, Whitten states: "[The corporation] devoted a certain amount of money to a public use and is equitably as much entitled to a fair return on that investment, provided the business can be made to earn it, as though it had actually loaned that amount to the public. * * * It is the actual investment or sacrifice on the part of the company that is entitled to consideration."

There are several points for criticism in this statement. In the first place, sacrifice is in itself not a basis for remuneration. In the second place, it altogether begs the question to compare the investment to a loan. Conceivably the transaction may resemble rather a lease with revaluations at stated intervals. In such a lease no one questions its equity, even though the rental paid in the later years is altogether out of proportion to the original value contributed by the landlord. Doubtless, if the investment in a public utility were like a loan the return should be like interest; but the bald assumption that it resembles a loan rather than a lease is purely gratuitous. Finally, in the statement that a fair return is to be paid "provided the business can be made to earn it," the proviso is altogether out of place. No one asserts that San Francisco's obligation to pay interest on the municipal railway bonds is dependent on the road's making a profit.

Many other writers advocate original cost as the proper basis for rates, but all balk at standing consistently by it. The statement is emasculated by saying that the investment must have been a wise one—as if a loan were less valid because unwise. It must be recognized, says one, that competition may arise and destroy the value of the investment; hence it must be a proper investment as well as a wise one. Thus the statement that equity demands a return on the original cost because of the sacrifice involved has been so explained and modified as to lose any consistent character.

Furthermore, in discussing equity, consideration has generally been had to past investments rather than to present-day investments reaching onward into the future. The treatment of an early investment, made without any expectation that it would be subject to valuation, is a more difficult but much less interesting and much less important problem than the formulation of rules by which all future investors are to be guided.

OTHER CONSIDERATIONS ARE MORE FUNDAMENTAL THAN EQUITY

Attempts to formulate a principle resting on equity have led to hopeless confusion. It is time to recognize that, as far as the establishment of a settled policy for the future is concerned, equity is not the guiding principle at all. Any contract entered into freely and intelligently is equitable. In regard to public utilities there are other considerations more fundamental than equity.

This has, to some extent, been recognized, as when Bemis says: "The problem now is not so much an ethical problem of what a company ought to receive as it is what return, as a matter of fact, will tempt the investor to furnish the money needed for the growth of the business." Bemis here rejects equity and substitutes the incentive to investment of capital. Yet capital can be attracted either by increasing the prize or by guaranteeing against risk, two methods quite distinct in their effect on the public. More fundamental by far is the problem of how the risks and the profits of new enterprises are to be borne, and particularly whether the public is to profit by new discoveries and improvements.

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*Abstract of paper read before San Francisco convention of American Electric Railway Accountants' Association on Oct. 6, 1915.

Allison has expressed a vain fantasy in saying: "The true aim of regulation is to bring about eventually a condition where, as far as possible, all risk and all speculation will be removed from the enterprise." Risks never can be eliminated from new enterprises—the question is, who shall bear them? In undertaking a public enterprise there are two distinct kinds of risks. The first is that of miscalculation as to the value of the service rendered, or the cost of its production. Error here may lead to an investment which cannot be profitable. Such a risk cannot be removed by rate regulation. If charging all that the traffic will bear still leaves a deficit, it is evident that no regulation of rates will prevent loss. Such risks may be borne by the investor. Yet to induce him to do so, he must be tempted by the prospect of rates high enough to cover the risk. They may be borne by the public, but only by public ownership or subsidies.

The second class of risks is more important to the discussion. It is, in the words of Chairman Stevens, "the competition of a new and superior service produced at a less cost which will secure all custom." In ordinary competitive industries such competition means inevitably a loss to the investor and a gain to the public. In public utilities direct competition is subordinate to regulation. Yet if a new discovery is made the public must adopt one of two courses—either it must maintain rates so as to yield adequate returns on the more costly plant, or it must adjust rates to correspond with the lower cost of the substitute process. The whole question turns on the advisability of allowing the investor to take this risk, or, on the other hand, of protecting him against this risk, as is implied in the original cost-loan theory. There seems no escape. Either the investor takes the risk, or the public foregoes the advantages to be derived from inventions, at least of inventions which would substitute a cheaper plant.

It is true that the public may itself be the investor, by public ownership or by granting subsidies, but the alternative remains. Either the investor, whether private or public, must bear the risk of competitive improvements, or the public must forego the advantages of radical improvements in the arts and sciences. A compromise may be made, but compromises, while allaying disputes, never settle principles.

It is perhaps not difficult to persuade the investor to undertake the risk. The risk of loss by supersession may be offset by the allowance of high returns during the period before the supersession takes place. Capitalists as a class will profit by some of the undertakings, but lose by others. It is, however, manifestly inconsistent to allow high returns as an offset for possible losses and then to demand that the high rates be reduced in the cases where the enterprise proves successful. It is difficult to determine the point at which a rate of return, only sufficient to induce the original investment, becomes exorbitant. There is need of considerable caution in applying the following statement laid down in the Commonwealth Edison Company report: "Capital is doubtless entitled to returns commensurate with the risks incident to the business. * * * But it should not be supposed that the early large returns should be continued when the development of the business, the elimination of competition, and the necessities of the community have largely reduced the risk of the investment." It much resembles refusing to pay a lottery prize, because the gain seems exorbitant as compared with the price of a single ticket, although the purchaser may have squandered a fortune in the purchase of unsuccessful numbers.

WHAT THE REAL FUNDAMENTAL IS

The neglected phase of railway accounting first to be mentioned then is: In the discussion of a basis for valuation the problem of finding an underlying principle has been neglected. Even those who have attempted it have generally erred in regarding it as having to do with equity. Nor is it merely a problem of how to allure the investor into putting his money into an enterprise. He can be induced to take any risk if the stakes are made high enough. Fundamental to all, however, is the question as to whether the investor is to take risks, or whether the public is to go at a dead level, foregoing the economies coming from new inventions. It suffices to state the problem thus in general terms, although its many ramifications, such as the incentive to initiative in one or the other system, furnish room for much thought.

DIFFERENCE BETWEEN CAPITAL EXPENDITURES AND REVENUE CHARGES

The second point to be discussed is the real nature of the difference between capital expenditures and charges against revenue, when these terms are used in reference to the operations of public utilities. In some aspects capital charges and revenue charges are distinct, almost contradictory. These differences are strongly emphasized by the United States Supreme Court in the Kansas City case. Yet even in ordinary commercial undertakings the difference between the two is not diametrical. The machine, the tool, the raw material are all alike expenses of producing commodities. All are operating expenses, provided a long enough field of operation is taken into view. In public utilities the similarity is even greater than in ordinary business. Where rates are regulated so as to yield a fair return, there is little difference between a capital expenditure and a charge against revenue. The consumer must provide for both. For what is called an operating expense the consumer pays promptly. Where the expenditure is capitalized, he returns the payment more slowly but pays interest during the time of delay. There is but little difference whether principal is repaid or not, provided interest is paid indefinitely. In a few instances, as where the capital is invested in land, it resembles a perpetual annuity. Yet what is ordinarily called fixed capital is rather like a sinking-fund bond, in that the consumer pays interest on the investment, and through the charge for depreciation provides for the ultimate extinction of the principal. As far, then, as the relation between the corporation and the public as a whole is concerned, it is relatively immaterial whether an expenditure is called an expense or an investment of capital. In either case the public must provide for the reimbursement of the amount expended, together with a fair return on the investment while it remains unpaid.

In only one point is the difference significant. The public, while a permanent body, is made up of changing individuals. In so far as the body of consumers changes, injustice may be done to the consumers of one or another period, if an expense, which should properly be paid by the consumers of one period, is so treated that the consumers of another period are burdened by it. An expense, capitalized wrongfully, burdens later consumers to the advantage of present-day consumers. The position is reversed when what is properly a capital expenditure is treated as a current expense. The whole question then reduces to equity, not as between the public and the corporation, but as between individuals composing the public at two different dates.

DEPRECIATION REPRESENTS INTERMEDIATE POSITION

Somewhat analogous is the third point of depreciation. In the discussion of this subject there has been even greater confusion of thought. Depreciation represents a position intermediate between a capital expenditure and a charge against revenue. An absolutely permanent investment of capital demands perpetual interest but no repayment of principal. A pure expense demands immediate return of the amount expended, payment to be made so promptly as to render calculation of interest unnecessary. Depreciation indicates that so-called fixed capital is, as a matter of fact, being repaid through rates, and presumably interest on the unconsumed capital should also be allowed.

TOO MUCH CONTROVERSY ABOUT EQUITY OF DEPRECIATION METHODS

In this matter there has been far too much polemical discussion as to the equity of one or another method of treating the problem. This discussion has become most acute in the conflict as to whether the straight-line or the curved-line method of calculating depreciation is correct. The advocates of either method almost invariably assume that the other method is unfair either to the public or the corporation. Here again there is, in reality, no question of equity as between the corporation and the public. Advocates of the straight-line method generally base the argument on some statement similar to the following, which is taken from the paper of a distinguished engineer: If one buys ten firecrackers and uses one, he has nine-tenths of his purchase still left to him. Similarly a plant costing $100,000, with a life of ten years, is worth just $90,000 at the end of one year. The curved-line method, calling for a smaller annual charge than the straight-line, is therefore only a partial payment of the property destroyed and consequently inequitable. The one thing which is certain, however, is that an investment of $100,000 in a plant with a life of ten years does not represent the purchase of ten annual units each worth $10,000. The sum of $100,000 represents the present value of an annuity of $12,950, interest being at 5 per cent. The decline in the value of such an annuity during the first year is not $10,000 or $12,950, but only $7,949.

This principle can be perfectly illustrated with few figures by assuming a life of only two years and an interest rate of 10 per cent. A payment of $100,000 for a utility lasting two years represents the present value of an annuity of $57,619. This is made up of: Present value of first installment, $52,381; present value of second installment, $47,619; total, $100,000. At the end of the first year there remains a value of $52,381. The reduction in value then has not been $50,000 or $57,619, but only $47,619.

It is apparent that it is incorrect to say that only the straight-line method is equitable. Yet the real error in most of the discussion is not that either side is wrong in claiming its method is correct, but that it fails to see that, where a public utility is concerned, there is no difference between the two methods. This may again be illustrated by taking a utility having an initial cost of $100,000 and a life of two years, with interest reckoned at 10 per cent. An ordinary two-year investment at 10 per cent should bring in a total return, with interest compounded, of $121,000. Yet exactly the same returns come in with a depreciating property, whether the depreciation is figured on a straight-line or on a curved-line basis. This is clearly shown by the following schedules:

STRAIGHT INVESTMENT

Interest on $100,000 for first year	$10,000
Interest on above sum during second year	1,000
Interest on $100,000 for second year	10,000
Principal returned	100,000
Total	$121,000

INVESTMENT IN DEPRECIATING PROPERTY—STRAIGHT-LINE METHOD

Interest on amount invested for first year	$10,000
First installment of depreciation	50,000
Interest on above items during second year	6,000
Interest on depreciated value	5,000
Second installment of depreciation	50,000
Total	$121,000

INVESTMENT IN DEPRECIATING PROPERTY—CURVED-LINE METHOD

(Amount of sinking fund, $47,619, + interest, $10,000.)

Amount paid at end of first year	$57,619
Interest on above amount during second year	5,762
Amount paid at end of second year	57,619
Total	$121,000

One may go further. In a public utility a "fair return" is considered necessary. A fair return is an impossible conception unless return of capital in some form is implied. The return of capital may be made at any time, in any sums, without in anyway affecting the equity between the company and the public. If the capital is excessively reduced at one time, the amount on which the public pays a return is correspondingly reduced. Yet just to the extent that interest paid by the public is reduced, the company is compensated by an early return of capital. Actuarially it is immaterial when and how a debt is returned, provided interest is allowed on the unreturned balance.

EXCESSIVE DEPRECIATION ALLOWANCE, HOWEVER, MAY PROVE INEQUITABLE

There is an element of equity, however, that is frequently lost to sight. An excessive allowance of depreciation, being a premature repayment of capital, does work a hardship in so far as there is a shifting of the persons purchasing the output of the corporation. One group can easily be benefited at the expense of another group. Thus in the instance given above the consumers of the first and second years would each pay $57,619 under a curved-line system, while under a straight-line system the consumers of the first year would pay $5,000 more than the consumers of the second year. As far as the corporation is concerned there is no difference, and as far as the consumers as a whole are concerned there is no difference between the two methods. Yet as far as there is a difference between the two groups of consumers, the curved-line method is equitable to both bodies, while the straight-line method burdens the earlier users to the advantage of their successors.

IMPORTANCE OF SPECIFIC DEPRECIATION RESERVE

The point just made carries with it some corollaries often neglected. Much discussion has been raised as to the importance of having a specific depreciation reserve set aside. Thus it is claimed by Hayes that the investors are entitled to a return on the full value of their investment only in case they can show that there is property in hand equivalent to the amount of the depreciation reserve. The real question is not whether the original value has been maintained, but whether the consumers have paid enough to cover ordinary operating expenses and depreciation. If $100,000 is invested for public use and the consumers pay only enough to cover ordinary operating expenses (not including depreciation), evidently there is a decline in the value of the investment. Obviously, if investors are entitled to a fair return on the full cost of the plant they are none the less so entitled because rates have been made so low as not to cover the annual depreciation. The company is entitled to this return even though it does not comply with the requirement made by Hayes.

The question as to whether there is a depreciation reserve fund so placed as to be yielding interest also becomes meaningless, as far as the public and the company are concerned. The annual appropriation to reserve is less where it is calculated on the sinking-fund plan. But that is neither an advantage nor a disadvantage, for just to the extent that the sinking-fund interest lessens the amount annually set aside, to the same extent are the profits kept down by crediting to the sinking-fund reserve the receipts which otherwise would have gone to the general income account.

The problem of depreciation may be summed up by comparing the investment of the company to a loan which the debtor has the privilege of repaying in installments. If it is a loan of $10,000, it might be repaid in ten annual installments of $1,000. Yet neither creditor nor debtor would be harmed if more or less than a proportional amount were paid in each year. It might be repaid by any system, or with a lack of system. As long as interest is allowed on the outstanding balance, perfect equity is secured. The debtor might either pay in installments or merely keep up interest and himself accumulate a sinking fund with which to pay the principal. On the other hand, the creditor might, or might not, retain the installments as received and invest them in a sinking fund, so that he should have his principal intact at the end of the ten years. Any of these schemes would not affect the equities as between debtor and creditor.

DEFICITS SHOULD BE BORNE BY ALL BENEFICIARIES AS PERMANENT CAPITAL CHARGE

Another difficult problem is the fourth, relating to deficits. Where a deficit occurs in the early operations of a public utility, it is generally admitted that rates in subsequent years should make some adjustment. It is said that such deficits may be treated under either of two distinct theories—the first called "capitalization as an investment" and the second "recoupment as a loss." The New York commission says there is a real and substantial distinction between considering a loss as an investment and as an expense to be reimbursed. Despite such high authority, it seems to some that a loss which must be reimbursed is an investment until it is repaid. If an ordinary business concern were in question, the distinction would indeed be valid. Yet in a public utility both investments and losses must be covered in order to secure a fair return. When the commission admits that the loss "must be reimbursed" all differences vanish.

Whether losses are actually repaid or are to be permanently capitalized is relatively unimportant, just as the nature of a government loan is not particularly changed when it is a perpetual annuity. Equity as between different consumers, however, may enter into the problem. If the loss is regarded as an essential to the establishment of the enterprise, it should be borne by all its beneficiaries, and the only way to spread the expense is to make it a permanent capital charge. If paid off by consumers of the next five years, for instance, they are inequitably burdened with an expense which appertains to them no more than it does to the consumers of any other years. From an actuarial viewpoint the granting of a fair annual return on a given sum is neither more nor less advantageous than the actual repayment of the sum, just as it is neither more nor less advantageous to repay in five than in fifty years. This actuarial truth is not affected by other questions of public policy which may seem to make it more desirable to have debts promptly paid, but the equity of the case is not affected by policy.

The United States Supreme Court is doubtless sound in stating that "instrumentalities which are to be used for years should not be paid for by the revenues of a day or year." (206 U. S. 463.) In so far as the deficit was merely a loss in furnishing service to consumers of one year, there is no shadow of equity in claiming that the consumers of any other year should pay the bills of the earlier consumers. The only justification of carrying the loss forward is that it is considered not as a loss of the first year, but as something pertaining to the entire operating life of the company. If this premise is correct, it follows that all subsequent consumers should pay their share of the burden, and that can most effectively be done by treating the deficit as a capital investment.

FRANCHISE FEE NEITHER BENEFITS NOR HARMS EITHER PARTY

Finally, for the fifth point, reference may be made to the effect of charging the corporation a fee for its franchise. Where such a fee is obtained, it is generally assumed by the city that a most successful bargain has been struck, and that the public has been benefited just to the extent that the corporation has been mulcted of the fee. Yet in the midst of the rejoicing over the shrewd bargain, some facts are apparently forgotten. In the subsequent regulation of prices a "fair return" is to be allowed on the entire investment. Hence the public must reimburse the company for the franchise fee paid, and must pay interest at a comparatively high rate while it remains unpaid. The situation is not different if instead of a direct repayment by the public, the fee is capitalized and counted as part of the investment taken over by a successor company. As long as the rule of a fair return is admitted, the entire cost of the franchise is borne by the consumers, whether it is amortized during the life of the franchise or treated as a permanent annuity. Hence the franchise fee neither benefits nor harms either party. All that it amounts to is that the city receives a considerable sum of income in advance, which is subsequently collected, not from taxpayers but from consumers. This indirect and unconscious collection of revenue may be advantageous or may not. Yet the transaction is certainly different from what it is popularly assumed to be.

Professor Hatfield's Fundamental Principle of Valuation

"*IN the discussion of a basis for valuation the problem of finding an underlying principle has been neglected. Even those who have attempted it have generally erred in regarding it as having to do with equity. Nor is it merely a problem of how to allure the investor into putting his money into an enterprise. He can be induced to take any risk if the stakes are made high enough. Fundamental to all, however, is the question as to whether the investor is to take risks, or whether the public is to go at a dead level, foregoing the economies coming from new inventions.*"—HENRY RAND HATFIELD.

Foundation Principles of Valuation[*]

Appendix to Address Abstracted in Last Week's Issue—Fair Treatment to Public and Investors Demands Considerations of Value in Addition to Cost New—Amortization of Intangible Values and Typical Electric Railway Resettlements Are Described

By BION J. ARNOLD

Chairman Board of Supervising Engineers, Chicago Traction, Chicago, Ill.

THE convention report number of the ELECTRIC RAILWAY JOURNAL, dated Oct. 9, 1915, contained an extended abstract of the address of Bion J. Arnold on "Foundation Principles of Valuation," based on electric railway resettlement cases. As an appendix to this address Mr. Arnold also submitted some notes on valuation and the amortization of intangible values, and a description of the three typical resettlement cases in Kansas City, Chicago and San Francisco. An abstract of this appendix follows:

NOTES ON VALUATION

In the Kansas City (Mo.) Railways proceedings the receivers requested "a disinterested valuation of the property and the necessary work to establish the property in first-class physical condition and enable it to fulfill its moral obligations to the community in every sense, under the conditions peculiar to Kansas City," and the finding of "a fair and reasonable sum to represent the capital value * * * for adoption in a contract for new franchises in the municipalities wherein the properties are operated, various elements of such value and how it should be apportioned between the municipalities."

It is of interest here to recite the considerations attached to this local problem as outlined by the receivers:

1. The use of the properties, present and prospective.
2. Original cost of construction.
3. Cost of duplicating to-day.
4. Present conditions.
5. Advantages and economy in operation as a whole.
6. Earning power at reasonable rates.
7. Territory reached, or allocation of property.
8. Past and prospective growth of tributary communities.
9. Transit facilities afforded between the cities.
10. Density of settlement and character of improvements.
11. Bonded debt in relation to physical property values.
12. Market value of bonds and other securities.
13. New money for present and future extensions.
14. Contractual relations between company and public for making possible the raising of new money.
15. The values fixed by assessing bodies.

Four methods were finally developed to verify the values recommended:

1. Actual cash investment and return thereon in the past.
2. Cost to reproduce new, less depreciation, plus intangible values, based upon reasonable future earnings.
3. Basis of deferred earnings upon actual investment.
4. Fair market value of properties: *i.e.*, "that sum at which a fair buyer would buy and a fair owner would sell, both being willing to deal at a fair price."

In this case, with an assumption of a protected investment and superseded property left in capital, the accrued deficit amounted to 6.5 per cent of the cost new (including overhead) based upon as low a rate of return as 6 per cent. At a 7 per cent return the accrued deficit similarly amounted to 36 per cent. When the superseded property was charged to operation year by year, the deficits were 40 per cent and 60 per cent respectively. The total valuation of tangibles and intangibles in the two cases, however, differed but slightly for a given interest rate.

It will be seen from the above citations that if valuations are to be predicated upon the assumption of fair treatment as between the public and the investor, there undoubtedly exist considerations of value in addition to cost new. It is also patent that these values can only be developed after searching inquiry and experienced judgment in the use of factors for future predictions. It will be quite clear, too, that the necessity of preserving complete and accurate records of past operations is paramount if utility operators expect to receive the treatment to which they are entitled in the final settlement.[**]

AMORTIZATION OF INTANGIBLE VALUES[†]

Views vary as to how far decapitalization should apply and continue, some contending that not only the intangible but also all the tangible property should eventually be amortized, so that the property would in time become possessed by the city without expenditure of money therefor on its part. Others contend that, in addition to amortizing the intangible values, there should be amortized only that portion of the value of the physical property which represents depreciation, and that such value as then remains in the property should be carried as a continuing investment by the company, in the case of a privately-owned company, or by the municipality, in the case of a municipally-owned property. This investment with present properties (owing to their comparatively recent construction and rapid development into new territory) is usually about 75 per cent of their cost to reproduce new value, although in properties restricted to certain districts and requiring no extensions, reconstruction or betterments but only maintenance and renewals, this would be about 60 per cent of their cost to reproduce new value. Therefore, if it is the policy of the city to retain the right ultimately to acquire the property of the company, the terms for so doing should be agreed upon and stipulated in the ordinance and the character and expense and method of amortization therein provided for.

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[*] Abstract of appendix to address delivered before the San Francisco convention of the American Electric Railway Association on Oct. 7, 1915.

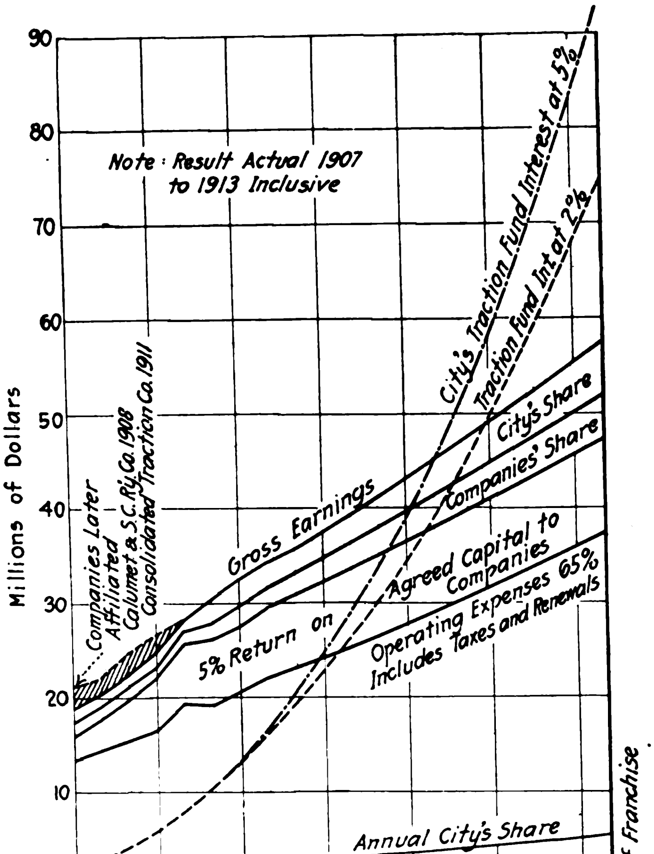
[**] In the case of another Western road, which has been subjected to much manipulation and consequent attack, this accrued deficit, on an 8 per cent basis, amounted to 43.7 per cent of the total cost new. This company earned a profit from 1884 to 1887, when a considerable portion of the electric line was abandoned. This caused heavy deficits. Profits ensued after 1902 but only sufficient to reduce the former cumulative deficit by about one-eighth. In the case of a Western telephone plant, where the company had paid dividends of 8.3 per cent on actual cash invested and had maintained a considerable reserve fund for depreciation and other contingencies, the accrued deficit on a 7 per cent basis was comparatively small, amounting to a little more than 4 per cent of the cost new value. Here the reserve funds, while larger than usual, were still inadequate to care for the depreciation.

[†] Metropolitan Street Railway, Kansas City, Mo., report.

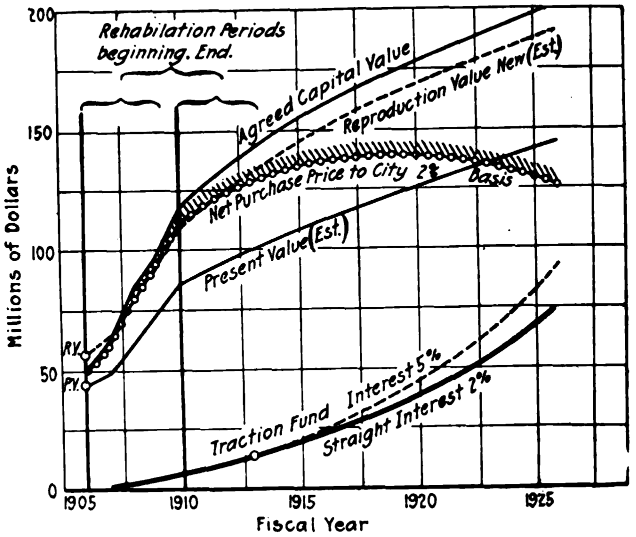
With the continued growth of the territory and the resulting enlargement of the business of the company, the net return from operation will increase and should in time provide sufficient net profit not only to meet the requirements of the agreed fair return on the investment, but also to amortize that portion of the investment, to be agreed upon, which is not now represented by physical property. This procedure will be fair to the operating company, in that the company will be allowed to receive the fair return on all capital actually expended until such time as it is able to retire out of earnings the amount agreed upon in the ordinance as representing intangible values and superseded property.

The result of this procedure will be to decrease gradually the capital investment of the company in its property on a fair and sound basis, and will in the end tend to reduce the cost of the service. This reduction in the cost of the service can be applied either to the reduction of fare or to the increasing of the amount and quality of the service furnished by the company, or to any purpose of value to the public.

The decapitalization of intangible values cannot generally be accomplished economically by gradually retiring outstanding securities that have been issued for a fixed time. It can be accomplished, however, by increasing the physical property without correspondingly increasing the capitalization. The agreed portion of the net revenue from operation appropriated to the amortization fund should be used in the purchase of additional physical property, and the value of the physical property actually furnishing the service will then ultimately equal the capitalization. The rate at which such intangible value can be eliminated from the investment is determined entirely by the rate of increase of the gross revenue and by the disposition of the net revenue agreed upon in the ordinance.



RESETTLEMENT PLANS—FIG. 1—SHOWING DISTRIBUTION OF INCOME UNDER 1907 CHICAGO TRACTION PLAN, WITH NO SUBWAYS

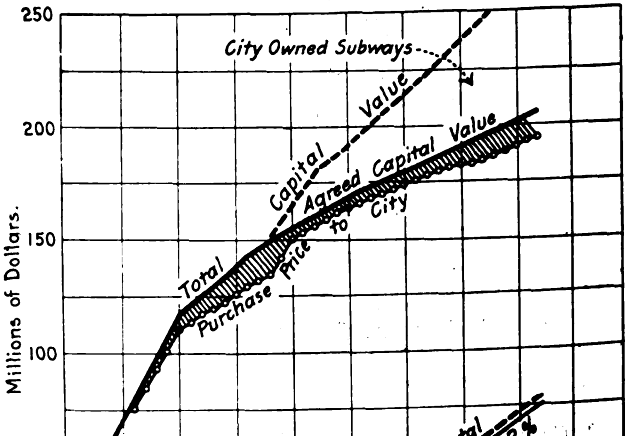


RESETTLEMENT PLANS—FIG. 2—SHOWING INCREASE IN CAPITAL VALUE UNDER 1907 CHICAGO TRACTION PLAN, WITH NO SUBWAYS

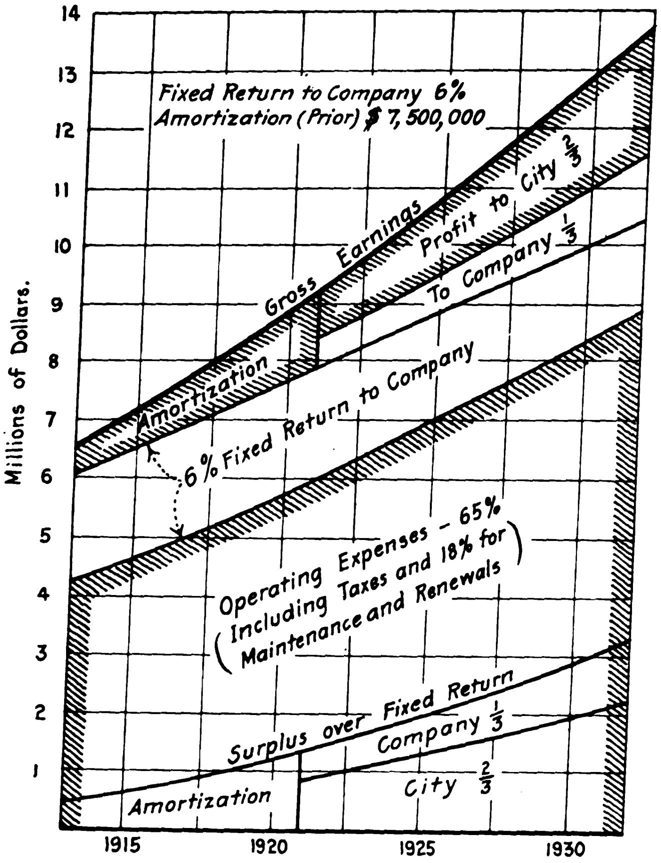
RESETTLEMENT PLANS

As stated in the preceding article, the central idea of the Chicago, Kansas City and San Francisco resettlement cases, although these were based upon somewhat different franchise conditions, was to put tangible property behind intangible values. The following paragraphs and accompanying diagrams show the essential details of these three plans.

Chicago: Fig. 1, Fig. 2 and Fig. 3 indicate graphically the results of the 1907 Chicago traction ordinances up to the present time, with predictions for the future. Two plans are worked out, one assuming the perpetual extensions of the surface system as the only transportation facility, and the other assuming downtown subways for the accommodation of the through-routed surface lines, such subways to be built out of the proceeds of the traction fund without the assistance of outside



RESETTLEMENT PLANS—FIG. 3—SHOWING INCREASE IN CAPITAL VALUE UNDER 1907 CHICAGO TRACTION PLAN, WITH CITY-OWNED SUBWAYS INCLUDED



RESETTLEMENT PLANS—FIG. 4—SHOWING DISTRIBUTION OF GROSS EARNINGS UNDER KANSAS CITY RESETTLEMENT PLAN (PROPOSED 1913)

capital. These subways, on this assumption, would be city-owned and rented to the traction companies.

Fig. 1 shows the probable distribution of income under this plan, based upon a 65 per cent operating ratio (including taxes and renewals). At the end of the franchise, the city's annual share will amount to more than $5,000,000.

In Fig. 2 the capital value is shown to increase by extension, purchase and rehabilitation from the original agreed value of $50,000,000 to approximately $135,000,000 at the end of the rehabilitation period of the last property brought into the system (the Consolidated Traction Company). By the expiration of the ordinances it is estimated that extensions and betterments will have increased this capital value to about $200,000,000, of which about $11,000,000 represents the original intangible value of franchise rights and superseded property agreed to at the time of the resettlement. There is no direct amortization provided for in this plan under the ordinances. The city traction fund, however, representing 55 per cent of the divisible net receipts after bond interest on purchase price or agreed value, will gradually accumulate to a total of from $75,000,000 to $95,000,000, according to the rate of interest used. On the old basis of 2 per cent interest, the net purchase price to the city will then reduce progressively from a maximum of about $140,000,000 after 1918-1919, and at the end of the franchise will actually be less than the present value of the property then existing.

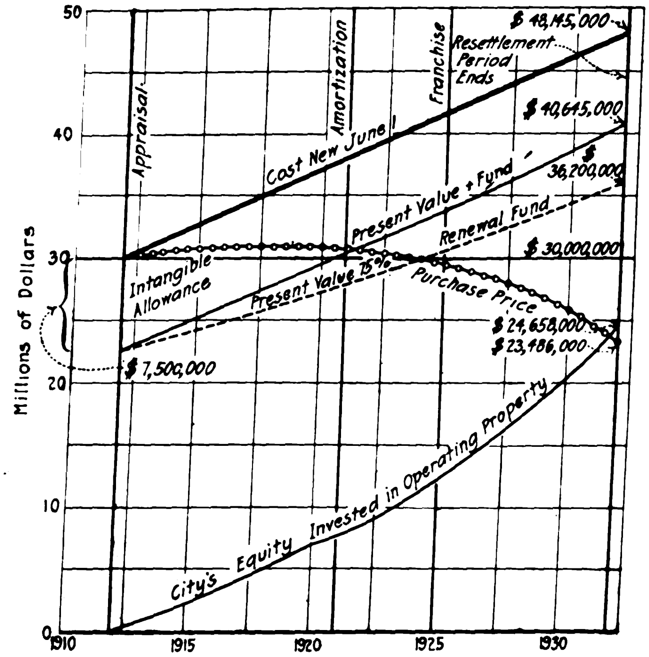
In Fig. 3, which includes subways built out of the traction fund, the total capital investment rises to about $275,000,000 by the end of the franchise. The purchase price to the city for the remaining surface line properties, however, will amount to $195,000,000, which is less than the purchase price "agreed capital value," as predicted in Fig. 2. By that time, about $70,000,000 will have been invested in city-owned subways and uncapitalized, with approximately $11,000,000 still remaining in the traction fund, over and above this subway investment.

In all of these studies the predictions for the future earning capacity have been scaled down to the minimum reasonable limit, far below what the property is now doing and what other larger cities of the size Chicago will probably be in 1927 are now doing. This shows the possibilities of the automatic amortization that can be legally carried out under the Chicago ordinances.

Kansas City: The Kansas City plan was similar to the Chicago traction plan except with the improvement embodying the amortization principle. One-third over and above the appraised present value, or $7,500,000, was allowed in the original agreed value for intangibles. Yet these intangible values must be first amortized before either city or company can share in the divisible net revenues, which would take place about 1920. The operating ratio (taxes included) is fixed at 65 per cent, and 18 per cent of the gross earnings goes for maintenance and renewals. The city's equity is to be invested back into the operating property. Fig. 4 and Fig. 5 show the distribution of gross earnings and values.

In this plan, the purchase price to the city would from about the present time be gradually reduced to the level of the present value of the then operating property by 1924, or about the original "agreed value" assumed. And at the end of the franchise period the cost to the city would be less than half of the agreed value at that time and about equal to the original present value of the property appraised in 1912, or $23,500,000 in round numbers.

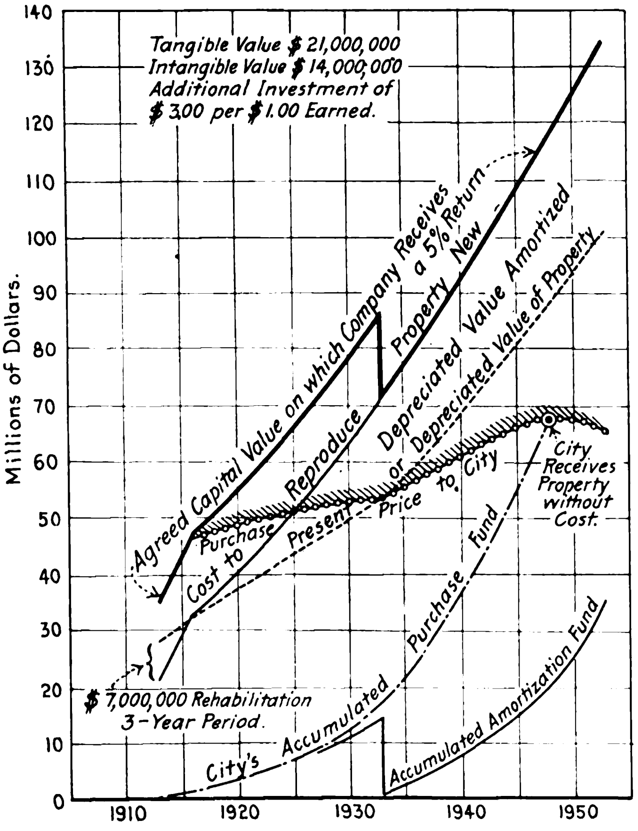
San Francisco: The plans illustrated in Fig. 6 and Fig. 7 were developed in order to interpret the provisions of charter amendment No. 34, submitted to referendum in 1913. These are described in detail in the "Report on San Francisco Transportation Facilities," pages 82 to 91. At the time the report was prepared there existed a strong sentiment favoring acquisition of all street railway lines as a part of the municipal system. These plans, therefore, were formulated to show fair and practicable means whereby such results



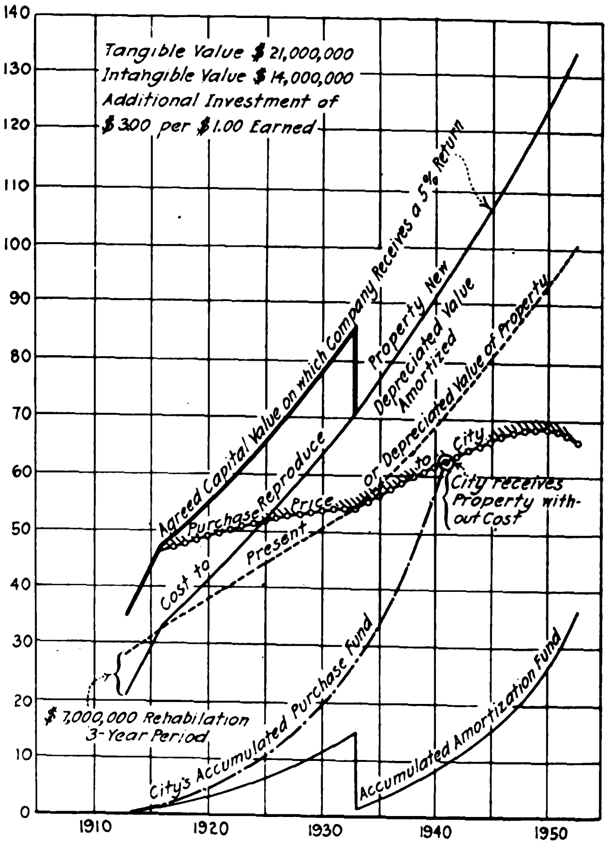
RESETTLEMENT PLANS—FIG. 5—SHOWING DISTRIBUTION OF VALUES UNDER KANSAS CITY RESETTLEMENT PLAN (PROPOSED 1913) could be ultimately brought about without jeopardizing either service or actually invested values.

The theory of the plans is still applicable to the situation, although the charter amendment was unfortunately lost at this referendum by a narrow margin. In the absence of a definite valuation, an estimated value was assumed for purposes of illustration, and a continuing underlying investment based upon real property. That is, it was intended only to amortize out of earnings original intangible values agreed upon in the resettlement and the shrinkage due to depreciation. This would be accomplished within the franchise extension period of twenty years. The net income used provided for upkeep of the physical property in a perpetual condition of 75 per cent new—i.e., 25 per cent depreciation after the end of the rehabilitation period.

Fig. 6 (resettlement plan No. 2) was based upon a definite apportionment of net income—35 per cent to city, 30 per cent to labor and to company, and 35 per cent in addition to 5 per cent prior return on agreed capital value (shown by full line). The assumed present value of property was $21,000,000. The initial intangible value was $14,000,000, all to be amortized at the end of twenty years. There was included $7,000,000 of rehabilitation work, to be completed and capitalized within three years. The future investment was to increase at the rate of $3 for each additional $1 earned. The purchase price to the city at any date is shown by the dotted line, and intangible values to be amortized are indicated by the distance (shaded) between "purchase price" and "investment" (full black) curves, which values include depreciation accrued both prior to the resettlement and after the completion of rehabilitation. The city's share, if allowed to accumulate at 5 per cent, should suffice to equal the purchase price by 1947, and thus automatically recapture the entire property to the city without cost by acquiring the underlying securities covering these depreciated values; i.e., the actual value of physical property producing the service. This plan "pools" the shares of the two parties, to give the city the option of increased service, decapitalization, extensions, etc.



RESETTLEMENT PLANS—FIG. 6—SHOWING PLAN NO. 2 FOR SAN FRANCISCO CASE



RESETTLEMENT PLANS—FIG. 7—SHOWING PLAN NO. 5 FOR SAN FRANCISCO CASE

In Fig. 7 (resettlement plan No. 5, which was recommended as the most practical one under the conditions) the Chicago traction plan was adopted together with amortization features. This plan differs from that shown in Fig. 6 in that profit sharing in the net income exists only between the city and the company, the former receiving 55 per cent and the latter 45 per cent. This increase in the city's share over that of plan No. 2 enables the city, if it allows its share to accumulate at 5 per cent interest, to take over the property without cost by 1941, six years earlier. In both cases, an annual reserve of 3 per cent of the gross receipts (at 5 per cent interest) will suffice to amortize all initial intangible values allowed (except depreciation). After the first twenty years initial intangible value is retired and this fund starts anew for amortizing part of the physical value. A further fund is necessary for amortizing accrued depreciation (except expenditures for rehabilitation), requiring 4 per cent of the gross receipts for twenty years and thereafter a sufficient amount to cover permanent shrinkage in value through depreciation. It will be noted in plan No. 5 that all initial intangible value is retired by 1933, at which time the cost to the city is equal to the then present value of the property. Amortization fund and purchase fund increase so rapidly during the later years that the actual amount of initial intangible value has relatively little effect on the date of acquisition. This fact is usually lost to view.

The estimated returns indicate that the extended property would be able to earn a rate of return on the probable tangible value approximating 10 per cent in 1930, or 8 per cent on the agreed capital value; that the company would receive more than 7 per cent on tangible values, and the city, exclusive of taxes, as high as 2 per cent in cash on tangible values.

Relation of Railways to Agriculture*

The Author Outlines the Practice of the Pacific Electric Railway in Its Development of Traffic Which Originates With the Farms Along the Company's Route and Advocates Co-operation Between the Railways and the General Public

BY PAUL SHOUP
President Pacific Electric Railway

WHEN we speak of the relations of the electric railways to agriculture, I want to emphasize the fact that ideal agriculture, home-making agriculture, in large part leans upon, and is created by, the electric railways and the associated utilities. An analysis of all the relations would take too much time, but here are two facts that stand clearly forth, and you may make your own deductions: The county of all counties in the United States served in largest degree by an electric interurban railway system is Los Angeles County, Cal. The county of all counties that stood first, according to the United States census of 1910, in the annual value of products of the soil, and which still maintains that position, is Los Angeles County, Cal. Associate these facts and then, better than all the words at my command, you will interpret from them the mutual benefits and mutual independence of electric railways and agriculture.

We illustrate our own conclusions with our own experience, and because it illustrates the relationship between the electric railways and agriculture, I will give the possible experience of a farmer living along our electric railway lines.

He gets up in the morning and looks to the forwarding of his milk by a Pacific Electric fast freight. At breakfast he reads the morning paper brought by a Pacific Electric paper train. After breakfast his wife may telephone to a department store in the city and have the desired article at the house by express operating over the Pacific Electric not later than noon. At 8 o'clock in the morning the children leave for the Union High School on Pacific Electric cars, using school tickets sold at special rates. His place in order, the farmer may leave at 10 for the city, attend to his business at the bank, and if in a hurry get back home for lunch upon our cars. In the late afternoon he may send his berries and vegetables to market for sale the next morning. During the day he can get as many of the morning and afternoon editions of the evening papers as he may desire. In illness he is not isolated, but can get anything promptly, either nurses, drugs or doctors. In the evening, the family may take the electric car to the city and return comfortably after the "movies" are over. His friends may visit him from 40 miles away, spend the evening and get home before the lights go out. Wherever there is any population of consequence, there are electric railway stations not more than 2000 ft. apart, and these are artistic, lighted, resting places for passengers who may be waiting for trains. On holidays the farmer can go to any of the dozen beach resorts or to the crest of the wooded mountains at Mount Lowe, or to the Mission Play in the afternoon at San Gabriel, or to the hot springs at Arrowhead, or to the famous inn at Riverside, or to any of the score of other pleasure places, and get back in time for dinner at home, no matter on what part of our line he lives. What is true in our county is no doubt true elsewhere, and in degree as conditions make possible.

The Pacific Electric Railway has encouraged intensive cultivation and the creation of small ranch homes whenever and wherever it can. It co-operates with communities in creating and distributing advertising matter. The most effective advertising for electric railways in getting people to settle along their lines is through co-operation with the communities already in existence. That is team work. Railway publications are apt to be discounted, though this is not so true as formerly. But where there is co-operation, where the railways back up what the communities state and the communities back up what the railways state, the most effective work is done.

Thus, if a pamphlet is issued by an agricultural community, indorsed by the Board of Supervisors and the Chamber of Commerce, giving individual experiences of satisfactory results from people already there, quoting government analyses as to soils, giving official statistics as to the annual products and the creation of wealth, picturing with photographs the homes achieved, making proper mention of the railway service as a factor in the life of the community, then the circulation of such pamphlets is valuable.

Advertising should request that replies be sent not to the railway company, but to representatives of the communities upon the ground, these in turn to follow up these inquiries and learn the specific desires of the inquirer. Finally they should meet him when he comes, and help him truthfully, directly and with no thought of reward except the good of the community in general. Thus is accomplished a great work. The ends of the electric railway are served for there is an addition to the patrons on its lines, and once resident there, the newcomer can thereafter hardly lift his spoon to his mouth without helping the electric railway.

This requires co-operative organization in high degree, but without it success is much diminished. For railways to get out glowing advertising matter about any section and then leave it to the man interested to grope his way in an effort to reach home is not only waste and misdirected effort but is apt to lead to discouragement, disappointment and the bad advertising that follows in its train.

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*Abstract of paper read before the American Electric Railway Association Convention at San Francisco, Oct. 5, 1915.

In advertising the sections along its lines the Pacific Electric spends thousands of dollars every year. It believes in co-operation and believes in publicity. The hope of the electric roads lies in the increase in population upon their lines. The work of creating traffic through excursions, conventions, picnics and the like leaves no such permanent results as that which brings population to the line.

The Pacific Electric operates sight-seeing trips every day in the year. These are the Mission trolley trip, the Balloon Route trolley trip, the Triangle trolley trip and the Orange Empire trolley trip. While established for direct profit, they serve a greater purpose in that they give opportunity to see southern California comprehensively to thousands of strangers who otherwise would see very little of it. They are, in my judgment, the best advertisement that southern California has had. No one can travel a few hundred miles upon the Pacific Electric and not be impressed from the very appearance of the homes themselves with the pride and satisfaction therein expressed.

Diverging perhaps slightly from the subject, I wish the people of this country had a real view of the mutual interdependence of the electric railways and agriculture. Putting it a little differently, we would like to get under the same wing of the government with agriculture. When I speak of government, I mean national, state and local. Nothing perhaps more strongly contrasts the views that the public has had than its widely different methods of treatment. The farmer raises something; we distribute it. One is as necessary as the other to give the article value, but the people have not fully found that out yet. The agricultural people have been looked upon as the sheep to be guarded, directed, encouraged; the transportation folks—well, perhaps we have been the goats.

Many of these modern governmental regulatory provisions are all right. Many are necessary from the public's viewpoint. Many of the burdens put upon us are unfair and will disappear in the course of evolution. The commissions learn this, but the public does not. The work of the commissions is thus hampered unless the public knows the facts. One cannot establish a department to deal with these problems because they can only be dealt with by the officers who are familiar in a practical way with the problems presented. This means that much time must be given to problems quite often in themselves not important. From the government the railways receive no such help as is given our agricultural associates.

Contrast these two conditions. Is there any wonder we would all like to be farmers? Farmers, I know, have their troubles. But so far as the relations of agriculture and the electric railways to the government are concerned, I am very sure that we would all be glad to have the association of agriculture and the electric railways so close that in government policy we might be considered as one.

I have no fault to find with the public when it knows it is just and when it is appreciative of our difficulties. But the things we do right are not apt to be uppermost in its mind. The good service we give is accepted unconsciously as a matter of routine. It is up to us to tell effectively and truthfully our trials to the public. We must win its confidence and its interest, and to do so must go further than fair dealing. We must tell the people of our weakness, as well as of our strength. The public must learn that the electric railways are business institutions traveling upon the most narrow of business margins. Without the government's active support and sympathy they may in large measure disappear.

This is no alarmist statement. The time has passed to gloss over the facts. The electric railways of California have created hundreds of millions in property values, not only in the agricultural communities served but in cities and towns that they have helped to build. No community leans upon jitney service; none desires to lose a single car or train because of that service. They realize unconsciously that all the automobiles in California together transport but a small fraction of the number of people that are carried by the electric lines.

Before me are the earnings of nearly all the electric lines in California for the last three fiscal years. The showing is a bad one. Only one out of twenty-four made as good a showing during the fiscal year ending June 30, 1915, as for either of the two preceding years. Obligations to the public have increased; taxes are higher; paving costs, because of high standards, are greater; labor costs, where there have been changes, have increased; automobile traffic has required additional safety measures. On the other hand, automobile competition has cut revenues. Returns for the year are the worst in the history of the roads in this State, as a whole. No interurban line and but few city lines earned interest on their investments or on their interest-bearing obligations. One only of the twenty-four declared a dividend. Several are in the hands of their creditors. From such a showing, even after making allowance for general depression of business, which is widespread, it is plain that the public view must in some measure change if the electric railroads are to be maintained in their present efficiency.

Taxation must be lessened, not increased. Street paving burdens in many instances must be reduced or the lines abandoned. While adjustments in rates are individual questions, yet fares as a whole must be increased rather than lowered. Jitneys, dividing the traffic of the electric roads, must divide likewise their heavy obligations. Where the electric lines are providing and maintaining a large part of the street and where the community is under moral obligation to protect the investment made because of this and the investment needed to meet franchise requirements as to service and fares, the jitneys must, where practicable, be kept off such streets, and where, in the business centers, they use the streets, they must be required to bear some part of the paving burden. On very few streets or on very few interurban lines is there enough business to support two classes of carriers. Our returns show that. Of course, the jitneys assail our best earning lines, and the natural result of this is, no longer having fat lines to carry the lean ones, the service on the latter must be reduced or the lines given up. Only a small alienation is necessary to reduce income to the level of operating expenses. The public must know these facts, and knowing them must choose between. It is at this point we have arrived.

I have wandered from my subject, but perhaps not far. If the electric railways are impoverished, so will be the communities along their lines, and as the Pacific Electric felt the blow to the citrus fruit industry through the freeze of three years ago, so likewise will these communities feel any blow to the Pacific Electric.

On our side, we should not give too much weight to our troubles as troubles. We are face to face with serious problems, the solutions of which lie in a better understanding with the public. We should meet the situation with constructive courage. We must seize upon methods to decrease our expenses and at the same time, if possible, to increase the efficiency of our service. That is the door through which we get business. If there be a new industry in sight, go after it. If a new stopping place is needed for passenger traffic, establish it. Furnish freight platforms. Furnish team tracks in plenty. If interline freight and passenger tariffs with steam line connections can be obtained, get them. Let us look after our express and package business and help the express in competition with the parcel post.

Public complaints and demands should never be looked upon as aggressions of an enemy but, instead, as sources of our education as to the public's interpretation of its needs. Its expressions should be listened to with intelligent interest. If its wishes warrant changes being made, meet them. If not, explain pleasantly and patiently why they cannot be made. We must take the people into our confidence. If service has to be reduced or rates raised, put forth the reasons plainly, concisely. Let us do all we can to get more people along our lines. Population is our greatest asset. The good-will of the public is likewise a great asset. Work in a co-operative and cheerful spirit with every public agency whose duty it is to concern itself with your affairs. Remember these commissions themselves are between two fires. They are responsible, not to our stockholders and bondholders, but to the public, and very, very often they are the agencies that must be called upon to stand between us and the lack of popular understanding of our needs and difficulties. It is thus up to us to help them where we can with their work and never to hinder them, to show them why a thing is so, and if they suggest real improvements upon our methods, to adopt them.

By scrupulous integrity in dealing with these public agencies by fair, truthful and candid statements to the public in all matters pertaining to and concerning the public, we will find the surest road to that goal which we would reach, where the people of the United States will hold the same viewpoint as to the value of agriculture as expressed in the creation of farms and of farm products and the value of transportation in maintaining these farms through the transportation service rendered.

The Importance of Accrued Accounts*

From Point of View of Certified Public Accountant, Operating Accounts Do Not Always State the Entire Facts—Accounting for Commission and Organization Expenses, Depreciation, Taxes, Premiums and Discounts, and Sinking Funds Should Follow Uniform Practice

By JOHN F. FORBES, C.P.A.
Haskins & Sells, San Francisco, Cal.

UNDER the inspiration of the American Electric Railway Accountants' Association and the various commissions, state and federal, the accounts of transportation companies are maintained with a greater decree of accuracy and a more highly organized standardization than are the accounts of any other class of business concerns. Yet the certified public accountant rarely has occasion to review the accounts of any electric railway without feeling that there is a need for standardization of practice that is quite as important as the standardization of forms and accounts.

The first and most general criticism is that the operating expenses do not invariably state the entire facts. The elemental purpose of detailed accounts is comparison. An operating cost is high or low only by comparison. The operating expenses of a normal period should present a basis for comparison with some other similar period. Yet when a company begins to apply over a series of months of this year credits for old copper wire, old carwheels, or any other scrap or replaced material, which has been garnered last year and sold or taken into stock this year, it has distorted the accounts of both years and the basis of comparison is gone. When it further complicates this by charging one month with enough car paint to last six months, or enough repair parts to last four months, or ties sufficient to last three months, and so on, just because the departmental requisitions upon the storekeeper happen to come in that way, it is not alone destroying comparative value but is also laying the foundation for serious errors in the balance sheets regularly prepared from the books. Many responsible railway officials point with pride to a supply of stores or a heap of scrap as provision against that rainy day when a credit will reduce some extraordinary operating expense. When the accounts must include certain charges or credits, why not accrue them irrespective of their nature into the periods in which they belong, and thus establish facts?

This condition obtains in various forms in most of the operating expenses. Only last month one company was found accruing its insurance from the date of payment of the insurance bills instead of the date of the insurance itself, upon the theory that another payment would not have to be made for twelve months. The current operating expenses were not affected, for the practice had been in vogue for a long time and the amount of insurance premiums, though large, was fairly uniform, but the balance sheet as disclosed by the company certainly did not present the exact financial condition.

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*Abstract of paper presented at San Francisco convention of American Electric Railway Accountants' Association, Oct. 6, 1915.

There is absolutely no uniformity in charging off railroad commission expenses, organization expenses, or any of the host of similar unusual expenses over a long period of time. Indeed, there is a reluctance to charge them off at all. Yet in the commission states where the companies have no option in these matters, would it not be better for comparison's sake, if no other, to establish more uniformity in the handling of such items than now exists?

Nowadays, instead of considering the subject of depreciation as a thing apart—something to be considered more for its effect upon the United States Treasury Department than upon the stockholders, electric railways under the urgings of late Interstate Commerce Commission classifications are endeavoring to look upon depreciation as a mere operating expense, but thus far with poor success. Rarely is depreciation handled twice in the same way. Utility commissions touch lightly upon the subject, being fearful of establishing precedents. It is really not such a serious thing in those utilities where the burden is borne by the consumers, but where depreciation must be borne by stockholders, as it must be in those instances where car fare is fixed by franchise, the question of whether depreciation from obsolescence should not be capitalized looms large. This is especially true where changes follow each other so quickly that the capital cannot be returned out of earnings.

Sometimes reserves are accrued according to formulæ prepared by famous engineering firms after elaborate appraisal. If upon the sinking-fund method, then generally the proper investments are not being made and remade on the dates indicated, if at all. Sometimes the accounting officer reminds his associates that the reserves are not being reinvested semi-annually according to the plan, but generally he is satisfied in setting up the reserve. Sometimes depreciation reserves are accrued upon the straight-line basis, represented by specific funds, though more often they are represented by general assets. Sometimes depreciation is accrued upon the curve-line basis and sometimes on a percentage of gross earnings. Almost invariably the reserves are diminished by charges to it. One hesitates at the thought of passing upon the propriety of these charges. It is such a simple thing innocently to defeat the most conservative financial plan by using up these reserves with what would be operating charges if the reserve did not exist. The present situation, therefore, calls for a standardization of ideas upon depreciation—otherwise another element in the detailed operating figures is absolutely useless and the balance sheet departs from the truth.

Perhaps the one account which above all others gives the public accountant most concern is the tax account. As an accounting proposition, it is clear enough. The accrual approximates the monthly tax cost. If taxes are paid in advance of the accruals there is an asset. If they are not paid in advance of the accruals there is a liability. The trouble lies in the fact that there are so many confusing elements to be reconciled. For instance, in California a corporation tax is paid on gross earnings. A tax on the 1914 gross is paid in 1915. It would seem proper to begin to accrue this tax in January, 1914. But when the tax was first instituted the regular property tax was in vogue and property was assessed and taxed in the year fixed as a basis for the first gross-earnings tax. So the gross-earnings tax had to be paid in the following year. Therefore companies might seem properly to begin accruing the tax to be paid on the 1914 gross in January, 1915, though it is not payable until the middle of the year. And so some corporations handle it. Some, however, contend that the tax is applicable to the State's fiscal year 1915-1916, and insist upon commencing to accrue in July, 1915, while some, bulwarked behind the opinions of eminent counsel, maintain that since taxes become a lien on the first Monday in March, March 1, 1915, is the day upon which to commence accruing the tax. Then comes a corporation which began to operate in April, 1914, and one is almost back at the starting point. Yet the outlook is different, since not to charge up taxes for an entire half year is unthinkable. And in any event the State officials say they most assuredly tax that company in 1914, although they collect the tax in 1915. Then, just to make it hard, the municipal franchise and vehicle licenses join hands, so to speak, with the city, county and State tax on non-operative properties, the State corporation franchise tax and the federal income tax. And out of all this the public expects public accountants to establish an asset or liability, while the company accounting officers grieve if the former do not agree with their figures and say differences reflect discredit upon them.

Much might be said of "accruals, not due" on notes and accounts. Accruals on payables are always handled conservatively. Where the interest is fixed, as in notes, the calculations usually square with experience. Where the interest is neither fixed nor certain, as in accounts payable, accruals are usually based upon the hope of their never having to be paid. Quite the reverse is true of the receivables. Here a spirit of optimism is in constant evidence. "Accruals, not due" are so easily subject to adjustment that they worry no one save the accountant who is trying to establish their cash values as assets or liabilities. Interest on bonds is the one accruing account almost invariably properly handled. It departs from the narrow way occasionally when the bonds happen to have been bought up by the trustees or by the company for investment. Generally, however, this charge is fixed and unvarying and no complications ensue. On the contrary, discount and premium accounts are apportioned off with a marked hesitancy by nearly all utilities. Every old railroader feels that discount is part of the cost of property and that it should be capitalized.

The one account which, above all others, possesses an individuality is the reserve for sinking funds. Regularly it emerges from its closet to disturb the public accountant. A tremendous confusion of ideas, created in great part by the legal phraseology of trust deeds, exists with reference to sinking funds, and many methods of handling them are in force. By far the greatest amount of trouble occurs in not letting these sinking funds completely alone so far as the accounts are concerned.

The impression seems to have gone abroad that, because a company dedicates certain resources to the payment of a debt, surplus is in some way affected. This is absurd. Of course, if a company desires to make specific appropriations of its surplus, there is nothing to do but set up a reserve. Such companies may exist, but the writer has never seen one. Yet company after company ties up its surplus most unnecessarily. It is a most conservative thing to do, however, and public accountants can afford to look upon the practice with complacency. All they ask for is a little uniformity in the practice.

Papers Before the Claims Association

Address of President Tichenor—Among Topics Considered Were Prevention of Motor-Vehicle Accidents, Standardization of Claims Statistics, Card Index, and Safety and Its Relation to Conservation, with Written Discussion Accompanying the Last Subject

Program for Monday

Annual Address of the President.
Annual Report of Executive Committee.
Annual Report of Secretary-Treasurer.
Reports of Committees:
  Accident Prevention Board—W. F. Weh, chairman.
  Employment—B. B. Davis, chairman.
  Ways and Means—J. S. Harrison, chairman.
Paper—"The Prevention of Motor-Vehicle Accidents," S. B. Hare.

Program for Tuesday

Paper—"Standardization of Claims Statistics," E. E. Slick.
Report of Committee:
  Claims-Accounting—co-chairmen: H. K. Bennett and H. J. Davies.

Program for Wednesday

Report of Committee:
  Claims-Transportation—co-chairmen: B. B. Davis and R. P. Stevens.

WM. TICHENOR
President

Wednesday—Continued

Changes in Constitution and By-Laws.
Paper—"A Card Index and What It Means," J. J. Reynolds.

Program for Thursday

Paper—"Safety and Its Relation to Conservation," B. F. Boynton.
  Written Discussion:
    "Financial Benefits Resulting from the Safety First Movement," J. S. Harrison.
    "Justification of the Safety First Movement from a Humanitarian Standpoint," Alves Dixon.
    "Uses and Benefits of Illustrated Lectures," H. K. Bennett.
    "Should a Moving Picture Film Exchange be Established by the A. E. R. A.?" F. J. Warnock.
General Business.
Reports of Convention Committees:
  (a) Resolutions.
  (b) Nominations.
Election and Installation of Officers.

THE ELECTRIC RAILWAY JOURNAL of Oct. 9, page 767, presented an abstract of the proceedings of the Claims Association at the San Francisco convention on Oct. 4-8. In accordance with the usual custom, abstracts of the papers read at the various meetings of this association are published this week, as follows:

PRESIDENT'S ADDRESS

BY WILLIAM TICHENOR, CLAIM AGENT TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY, INDIANAPOLIS, IND.

From the beginning of this year's work it has been the endeavor of the officers of the association and the executive committee to dispose of unfinished topics rather than to originate new subjects for discussion. Particularly was it desired to place special stress upon three things: The Hooper-Holmes Index Bureau, the safety-first movement, and the standardization and classification of accidents.

The Hooper-Holmes Index Bureau from the beginning has not met with as much approval from claim agents and general officers as many thought it justified. This bureau is not of itself essential to the existence or well-being of electric railway claim departments, for they might build up a similar organization among themselves that would be extremely valuable. Because of its necessarily local existence, however, such a bureau would be of much less value because claim agents would know nothing of what was going on in the index bureau world outside of their own association community. Wonderful benefits are being derived from the Pacific Coast Claim Agents' Index Bureau, and great good is coming from some of the organizations local to the East, but if all companies should join and report freely to one bureau, as in the case of the Hooper-Holmes Index Bureau, each would get the benefit of all engaged in claim work, not only with electric railways but also with steam railroads, manufacturing establishments and insurance companies.

It seems strange that some of the most important electric railway men are utterly opposed to the use of an index bureau, either national or local, because in their view it requires a great deal of time and expense to the companies and is of no value to them. Yet since the first contract was made with the Hooper-Holmes people, this thought seemed to be so prevalent that at the convention last year the committee on an index bureau recommended that the contract cease. The committee did not consider that the bureau would not be valuable if properly used, but it felt that the contract was practically valueless because nearly all companies then reporting to the bureau were individual subscribers to it and gained no additional right through the contract. On final vote, however, it was unanimously recommended that the contract be extended for at least one more year.

At a meeting of the executive committee of the parent body immediately after the adjournment of the 1914 convention, the question again came up for discussion, and the same point was raised. Finally, however, a renewed contract ending Dec. 31, 1914, was approved, and the secretary was instructed to communicate with the member companies to ascertain their desires as to the continued life of the contract. A sufficient number expressed a wish to continue the arrangement and promised to report in the future, to justify continuing the contract for 1915. It may fairly be said, however, that 1915 is to be treated only as a test, the results of which will control future action on this point.

The safety-first movement since its origin has been as much in doubt as the Hooper-Holmes Index Bureau, if indeed it has not been more of a vexed question than that. Some of the most enthusiastic safety-first advocates put the greatest stress upon the education of children and their mothers. Others insist that a better result is to be obtained through the enactment and rigid enforcement of stringent laws to control the public, especially automobile drivers. Still another class believes that the public cannot in general be educated to a realization of its dangers, and that the better method is to educate company officers and employees until they come fully to an appreciation of the fact that they must expect the public to be careless and to be depending upon them for safety. Not long ago an experienced claim agent said that 75 per cent of the serious and costly accidents on interurban railways were preventable, and that 50 per cent ought not to happen and would not happen if the car-service men thought straight and right. This claim agent is under the impression that the greatest benefit possible to be derived from the safety-first movement must come from a hounding process causing the motormen and conductors to think safety instead of speed. In short, there are as many different plans as there are different minds dealing with the subject, but it is to be hoped that at this meeting harmonious action may be suggested.

At the 1914 convention the Claims Association had a joint committee with the Accountants' Association on the subject of the standardization of accidents and accident reports, as well as accident accounts. When this joint committee met, it seemed to have concluded that the first division of the subject was completely a claim agents' affair and that the latter division was completely the work of the accountants. The accountants had no trouble in agreeing upon the recommended standards of their side of the committee and the report was unanimously adopted. When the report was presented by the claims side of the committee, however, complete chaos prevailed on account of the many ideas suggested in discussion. The whole subject was therefore referred to the committee for another year's study. This committee held several meetings during the year and I trust that eventually the whole subject will be understood and agreed upon.

PREVENTION OF MOTOR-VEHICLE ACCIDENTS

BY SAMUEL B. HARE, CLAIM AGENT ALTOONA & LOGAN VALLEY ELECTRIC RAILWAY, ALTOONA, PA.

No other class of accidents contains the elements of carelessness, recklessness and utter disregard of the rights of others that are found in automobile and motor-vehicle collisions. Transportation companies, realizing their responsibilities, have done everything possible to protect the public from harm, yet there is a tendency on the part of the public to demand protection without making an effort to protect itself. To relieve this condition, we must seek measures to protect ourselves from the expenditure of large sums of money in damages, by throwing around others a safeguard which they are unwilling to provide for themselves, or which they carelessly and negligently refuse to exercise. The time has come when we must prohibit the automobile and motor-vehicle driver from using his own judgment (or misjudgment, as is frequently the case), and surround him with restraining regulations for the protection of himself and others.

It may reasonably be presumed that railway companies have done that which is necessary to prevent accidents. Their constant change from old to new appliances and equipment, the introduction of every practical safety device, the most careful supervision of track conditions, the rigid preliminary examination and patient, early training of car operators, the rigorous discipline that punishes any infraction, the constant warnings by signs, and numerous methods of advertisement—all these, accomplished at an enormous expense, are indubitable evidences of the good faith of the railway companies toward the question of conserving the safety of the public.

As compared to this preparation, care and attention, what qualifications as to mechanical knowledge, physical ability or fitness are requisite for the applicant as a driver of a motor vehicle? None! He need only fill out a printed blank form, stating the make and character of his machine, its horsepower, his name and residence, and inclose the fee, proportionate to the horsepower of his machine, whereupon the state grants the license with authority to operate, making no inquiry whether the applicant is mentally, physically, morally or mechanically prepared to assume the implied responsibilities. The conclusion is certain that the great number of motor-vehicle accidents must be attributed to stupid, inadequate and worthless license laws now operative, and the foremost step toward the prevention of this class of accidents should be made in the revision of these laws.

Compulsory legislation by the enactment of uniform state, county and municipal laws is the only solution to the prevention of motor-vehicle accidents. Of what use to an automobile driver is a sign if he cannot see? What effect has a horn or gong upon a deaf driver? What escape for a careful person as against an epileptic? What refuge has a person from the wild wanderings of a drunken, careless or negligent driver? Of what use is an emergency brake to a one-armed or one-legged man? What does the joy-rider care for the safety of the man he meets? Should a high-powered motor vehicle be permitted in the control of a young boy or girl under the age of twenty-one years, or an old man or an old woman over the age of sixty years? Should a dwarf 36 in. in height be permitted to operate an automobile? Should a person adjudged of unsound mind be given authority by the state to operate a machine? Should a driver who had already recklessly killed three persons in his machine be allowed to retain his license? Should an unnaturalized person be granted a license? Should any license be issued without the assurance of physical fitness and mechanical qualification? Not one of these persons could ever hope to obtain employment as a street car operator on any railway line, yet each and every one can obtain the privilege of operating a motor vehicle, of much greater horsepower than a street car, on every highway within the commonwealth.

The first move toward the prevention of motor-vehicle accidents would be the enactment of uniform state laws, a section of which should be devoted to the regulation of the speed of all motor vehicles, fixing a speed limit for rural as well as congested city districts, establishing rights-of-way and providing for the turning at the approach of or in passing another car. The dominant measure of such a statute should be a standard or test of the physical fitness, mechanical knowledge and the moral character of the individual, with the positive requirement of a practical demonstration. The owner of every car should be required to file an approved bond, either for himself or driver, conditioned upon the proper indemnity to persons killed or injured. Penalties for violation of the law should be severe and should include the arrest or impounding of the motor vehicle and its sale for fines, costs and damages. The state department should immediately be informed of the transfer of ownership of each motor vehicle. Lighting regulations should be the subject of legislative enactment.

Rigid ordinances for the operation of motor vehicles, in conformity with state laws, should be enacted by municipalities, and traffic squads and police officers should relentlessly enforce such requirements. Such ordinances should designate the line of travel, the manner of passing standing or moving street cars or other vehicles, the method of crossing at intersecting streets and the establishment of safety zones, and in short should incorporate all the provisions of the state laws. After the enactment of such uniform state and municipal laws, it would be the duty of automobile associations, motor clubs, safety committees, committees of 100 and all interested individuals to exercise a general supervision in relation to the strict and inexorable enforcement of the laws by the officers of the state, county and municipality.

In the past, much has been written and said concerning motor-vehicle accident prevention, and it is now fitting and proper that this association take some concerted action to meet this imminent peril. The subject should be presented to the accident prevention board, appointed two years ago, or possibly a new and separate committee could be specially appointed with directions to draw up immediately a bill for presentation to the legislatures of each state. In view of the ultimate beneficial results of such procedure, there is scarcely a doubt that it will receive the indorsement and financial support of the parent association.

USES AND BENEFITS OF ILLUSTRATED LECTURES

H. K. BENNETT, CLAIM AGENT FITCHBURG & LEOMINSTER STREET RAILWAY, FITCHBURG, MASS.

This kind of publicity, illustrated lectures, is one of the most tactful ways to present the question of public safety in use at the present time. One may theorize and speculate to his heart's content and still be far from the mark, but a truthful representation of what has happened impressed upon the brain of the individual starts a train of thought that will never be entirely dissipated and cannot fail to produce results. It is not enough, however, to show pictures of electric car accidents and the perils of the street. Neither is it enough to confine education by means of pictures to the public alone, for as "charity begins at home," so should education begin with the employee. He should be thoroughly schooled as to the common accidents that occur in the performance of his duties, and be shown how easy it is to prevent just such an occurrence with his advance intelligence of what the public may be expected to do under certain circumstances. When he is shown what thoughtlessness may do in a personal way, he will think of himself and the net gain will be for the welfare of the public and the company that he represents.

Hence the scope of this kind of a campaign should not be limited, and as a matter of fact there is no limit. It can be adapted to the use of the kindergarten or the board of trade, and for every intermediate point that can be imagined. There is not a single society or organization that could not be entertained and instructed. In an eastern city where 300 women, representatives of the best homes, were gathered at one of these lectures and were shown how they invariably got on and off cars, along with other interesting views and the consequent results under certain circumstances, they agreed that they had never given the matter personal thought but that what they had seen was all true. Since that time there has been a marked decrease in this class of accidents, and it therefore cannot be said that there are no results from this kind of work.

At a recent meeting of the "Safety First Association" of an eastern city, the president of the local team drivers' union pledged the support of himself and his society to do everything possible to minimize traffic accidents, and when a representative of a street railway showed views of various vehicle accidents in connection with electric cars, this delegate admitted they were true. Think of it, a labor organization, primarily organized for the sole benefit of its members, standing shoulder to shoulder with a railway corporation for the betterment of humanity through the prevention of needless accidents. Does educative publicity pay? Can one picture a more ideal condition of affairs?

The public schools, from the creeping tots to the senior classes of the high and normal schools, clubs of all kinds, lodges of every description, labor unions of every class are a target for a campaign of this character. Even the churches have been invaded with gratifying results, for those who have experience with accidents and their results can never have a creed for the righteous or unrighteous, the rich, poor, blind or crippled. There is no limit to the use, and the benefits are as many as the human mind is capable of absorbing. Seeing is believing, and the nearer the public can be brought to actually seeing what they are doing every day to fill the hospitals and the streets with cripples, the more they will appreciate their responsibility in avoiding accidents.

A criticism has been made that nine-tenths of the accidents happen to a class of people to whom one might talk by the hour and show pictures all day with as much effect as if they had not been approached. This cannot be so. There is not a single individual who has an ounce of perception and a teaspoonful of brains, that cannot be brought to a realization of conditions through the eye. People will not grasp everything, but they will grasp enough to get an idea, and what more can be asked than to have them absorb enough to keep them out of danger along certain lines. It cannot be expected that one picture and one lecture will be enough to produce miracles, for it is only by repetition and bringing the matter to these minds time and time again that real results are secured. The results are not going to come to-day, to-morrow or next week, but when the public has been reached in all of its classes. To speed the good work there should be no delay in starting this educative campaign, this gospel of "Safety First and First Aid to the Uninjured."

STANDARDIZATION OF CLAIMS STATISTICS

BY E. E. SLICK, CLAIM ADJUSTER UNION TRACTION COMPANY OF INDIANA, ANDERSON, IND.

The difficulties in the way of standardizing claim accounting and statistics appear almost insurmountable, since there are almost as many different ways of transacting claim business as there are different companies. For example, in one class of companies all the accounts of the claim department are kept by that department and its results are audited, while in another class the accounts are kept entirely by the auditing department, to which all claims are referred for payment after an adjustment or agreement has been reached. Under these divisions, it would appear to make little difference in the details of the payment, whether the claim account is kept by the claim department or by the auditing department, but the author recommends the general method of the account being kept at least nominally by the auditing department, in harmony with the standardized accounting rules, regardless of the details or methods by which money is placed in the hands of the claim department for settling claims after an agreement has been reached.

A standardized plan will not show all the valuable data at a glance, because the classification will present condensed facts. These condensed facts will probably answer very few of the questions that may be required by the management, and the classification must be such that any question may be readily answered from the collected data at some stage of the boiling-down process. It is conceivable that the management may ask for data concerning platform accidents at a certain road crossing, or collisions with vehicles at a highway crossing, the number of employees injured at certain shops, the number of accidents of any week or month as compared with any corresponding week or month of another year, the accident record of all or part of the men employed, the number of collisions with automobiles, the number of third persons killed and injured, and numberless similar questions, all of which may or may not be asked in comparison with other weeks, months or years. Hence there must be a uniform system setting out these data, so that the statistical sheets will answer such questions as well as give the final results used for comparative purposes.

Even after selecting a standardized classification, the choice of a physical basis for keeping statistics presents a vital problem, for the physical property of the associated companies consists of interurban systems, city systems, park lines, elevated lines, subways and perhaps many others. The writer's personal view is that the physical unit should be a terminal, or a division of the property generally under the control of a local superintendent, from which point trains are originated and runs are estimated. Sub-terminals should be classed with the terminals. The terminal may be made up of both city and interurban service. In the smallest properties, either of city or interurban service, there would be at least one terminal, while the larger properties must be made up of a number of terminals, since all trains cannot originate at one place, if the physical property is stretched over a large territory.

Whatever classification of accidents is used, the same classification must be carried forward uniformly from the actual events to the financial results or the cost of this same class of accidents, in order to make the statistics valuable for comparison. If platform accidents are a class, the cost of platform accidents must also be given, and likewise with every item of the various classes. In order to do this it is necessary to make the very earliest collection of accident data in harmony with a definite plan. It is inconceivable that the management of any property does not want accident data, and accordingly it is suggested that a report be made at stated intervals, presumably weekly, by collecting the accidents and classifying first as to terminals and second, under the terminals, into accidents on city cars and accidents on interurban cars. Make other divisions as desired, but hold to the above-named divisions.

Probably the cost of cleaning up a wreck will not enter into the claim statistics at any stage of the game, but the matter of car repair on account of particular accidents, such as collisions and derailments, is an important question, and especially so if damage should be done to foreign cars. It would appear the more reasonable that the cost of repairs to foreign cars should be charged to some item in the claim department, and no doubt it would be fair so to charge this expense.

When special data for claim statistics were demanded of the writer by the management, he found a virgin field from which to extract the data, since no statistics had been kept by his predecessor, except a weekly report to the general manager, classified under as many heads as there were different lines. Since the method put in practice has produced reasonable results, it may be well to outline these results. The first act was to collect the accidents for one week under the head of the proper terminal, which was responsible for the men involved in the accident; and, second, to group this division into city and interurban accidents. It is generally assumed up to this point that accidents to employees are as carefully kept as accidents to other persons, but a simpler form under the following heads is used: Roadway, Electrical and Shops, and Trainmen. These divisions are recommended, whether or not the company has a larger or smaller number of departments having control of this line of work, since it is believed that practically all the work on the physical property is done under these classes.

If a number of heads are used for a terminal, the same heads will be applicable to either interurban or city accidents, and no matter how many terminals there may be, the same items are simply repeated under each terminal. Therefore, in presenting such an outline, it is necessary to give it for only one interurban terminal, the same item being repeated for the city terminal, if it be desired to keep them separate.

The first real statistical blank is a monthly blank with items as indicated below:

Day of Month..........	1	2	3		30	31	Total
Platform accidents.......	1	1	1		1	1	5
Collisions with vehicles...	..	..	..	..	..	..	...
Collisions between cars...	..	..	..		..	..	...
Collisions with persons, things and animals frightened............	..	..	..	****	..	..	...
Derailments............	..	..	..		..	..	...

Under general heads, the following items are used: employees slightly injured, employees severely injured and employees killed; passengers slightly injured, passengers severely injured and passengers killed; trespassers injured and trespassers killed; all other persons injured and all other persons killed; baggage claims; ejectments, and stock killed. City and interurban accidents were classified under these heads for a given terminal, and the terminal repeated as often as necessary.

On this monthly sheet there are thirty-one spaces for the days, and the item is indicated with the date of the happening. The items added horizontally indicate the number of accidents in that class for the month, and added vertically indicate the number of accidents for each day, the latter having no special statistical value. The figures obtained from the horizontal addings, of course, indicate the accidents under that head for the month, and are the figures carried to the next condensed sheet, as follows:

ACCIDENT REPORT MONTHLY FOR THE YEAR 19....

Month of Year..........	Jan.	**	Dec.	*****	1910	**	1920
Platform accidents.......	5		6		19		20
Collisions with vehicles...	..		..		..		..
Collisions between cars...	..		..		..		..
Collisions with persons, things and animals frightened............	..		..		..		..
Derailments............	..		..		..		..

The above outline contains the same items reduced from all the terminals, and for both city and interurban, into one class under its appropriate head, i. e., all the platform accidents are collected in one number for this sheet, and twelve spaces are used for the months, followed by any number of spaces for the years, so that this last sheet will show at a glance the items for the different years.

Then a financial sheet is prepared as follows:

FINANCIAL SUMMARY OF ACCIDENTS MONTHLY FOR THE YEAR 19....

Month of Year..........	Jan.	**	Dec.	*****	1910	**	1920
Platform accidents...Cost	$75		$50		$200		$150
Collisions with vehicles...	..		..		..		..
Collisions between cars...	..		..		..		..
Collisions with persons, things and animals frightened............	..		..		..		..
Derailments............	..	**		*****	..	**	..

This contains the same items as the monthly accident report, followed by twelve spaces for the months and totals for any number of years. Thus the last financial report will show at a glance the cost for each year under its appropriate head, as indicated above. This blank should be filled by taking account No. 92 from the auditor's books and collecting the data under the proper head.

The foregoing suggestions are not intended in any way to influence the work of the Claims Association committee on this subject, but only to indicate a method that has been put into practice and found fairly satisfactory.

A CARD INDEX AND WHAT IT MEANS

BY J. J. REYNOLDS, CLAIMS ATTORNEY BOSTON (MASS.) ELEVATED RAILWAY

A card index is nothing more or less than an intelligence department. As the intelligence department is part of the claim organization, it must act in conjunction with other departments, and its highest efficiency can only be reached when all other departments are kept up to the same high standard. Stated briefly, the work of the intelligence department can be brought under the three heads: filing, indexing and summarizing. By filing fixed places are provided for the materials; by indexing there is extracted what is useful, and by summarizing the various extracts are brought into one consistent statement. By indexing the bulk of the original materials is reduced, and by summarizing the bulk of the indexed information is reduced. The most important part of the entire work of the intelligence department is indexing, for through it information is made accessible and ready for use, and is selected for special requirements.

No pains should be spared, therefore, to construct indices on the most systematic plan. A systematic card index of whatever kind or for whatever purpose is not to be regarded as a pretty plaything, or a little odd job to be hurried through in a few minutes, which may be entrusted to one of slender understanding. With the increase of information an index becomes sufficiently intricate to demand the best efforts to run it with anything like economy and efficiency. Those who have in view the construction of a card index and are looking about for methods should have in mind the simple fact that cards are only written once, but they may be consulted or referred to an infinite number of times. From the point of view of both cost and efficiency, therefore, the ease of reference is the best criterion. The work left undone by those who write the cards must be done by those who consult them, and at each consultation. Hence when possible this work should be done once and for all when the cards are being written.

NECESSARY OPERATIONS

The operations necessary to apply the method of systematic indexing may be summarized as follows:

1. Index cards: Writing the result of indexing on cards in accordance with uniform rules which will facilitate filing and consulting.
2. Card index: Arranging or classifying the cards according to the plan provided for.
3. Guides: Dividing the cards into classes to facilitate reference and bringing these various classes into relation. To these must be added the practical test of the card index as a whole.
4. Consulting: Tracing cards or sets of cards for the purpose of using the information.

The various operations connected with the filing of the cards may be selected as follows: (*a*) Verifying and checking the cards to be filed; (*b*) placing each card in its proper position in the index; (c) attending to guides (this work should be in the hands of one reliable man so as to enable him to observe the utmost consistency).

Before the cards are incorporated into the index the filer should examine each card with a view to checking the work, generally, so as to eliminate errors.

IMPORTANT POINTS

The card-index method aims to bring to a focus complete and concise information concerning each claim filed and furnishes a short cut to all the information about the claim that may be required. By use of signals of various colors attached to the top of a card, any case requiring special attention may be kept constantly before the eye of the claim agent. In this way the claim agent may keep track of cases he should review, with the minimum effort.

Cross reference is of the greatest importance and should be made as perfect as possible. A card-index system will not give the very best results for the money expended if the cards are not properly guided and the fullest advantage taken of the opportunity for cross reference. Guides are just as essential to one consulting the index as street signs are to a pedestrian. To file a large number of cards is as a rule not so difficult as to trace cards wanted afterwards. By connecting related cases, or numbers, strings are tied to the cards, thus making it impossible to miss any. Access is also made easier by the systematic disposition of the information on the cards, limiting the related terms to those which are actually in the index and, by referring from one name or number to another, connecting those which are related by making a cross reference on each. The most valuable feature of the card index is the safeguard it provides against repeaters and fakirs. Such an index properly planned and cross referenced serves as a check against dishonest claimants, doctors and witnesses.

EXAMPLE OF INDEX DATA

The following record of the Hogan case, which was tried and is therefore a matter of public record, was furnished from the record of the Boston Index Buerau. It illustrates the method and extent of the record kept:

Honora Hogan, sometimes called Honora A. and sometimes Nora A. Hogan. 60 East Springfield Street. Case 4815-13 against the Boston Elevated. Tried in Third Session, March 15, 16 and 17, 1915. Whipple, Sears & Ogden for plaintiff. Fletcher, Ranney and Thomas Allen, Jr., for defendant. Verdict for defendant.

Claim thrown by starting of car at corner of Washington Street and Cedar Street, June 23, 1913, at 10.30 p. m. Claimed synovitis of left knee, shortening of left leg and injury to left sacroiliac joint. Dr. Eugene Thayer attended plaintiff. Plaintiff also called Dr. H. H. Germain for consultation and Dr. Charles F. Painter and Dr. DeWitt Wilcox of Boston University Medical School.

Previous accidents admitted on cross-examination by plaintiff:

1. Born in Boston about 1865. Name, Honora McCarthy. Injured when seven years old by a piece of steel run into her left shin. Scar still present.
2. In 1898, corner Dover and Washington Streets, thrown from elevated car on back. Name then Honora Hogan. Number of this case is unknown. She claimed injury to back and spine. Received $60 from claim agent day after accident.
3. Case 3351-1 against the Elevated. Claimed she was thrown about in elevated train on July 23, 1901. Hurt back and head. Out of work a year. (She being an expert laundress.) Was paid $700 in settlement. Charles S. French, attorney for the defendant. Feb. 21, 1907.
4. 1908. Name, Honora Hogan. Claim against C. F.

Hovey & Company for a blow on head from fall of electric light globe.

Claimed injury to head and was laid up six months. Charles S. Knowles, attorney for insurance company, and Hardy, Foster & Stone know about this claim. She received $75 in settlement from the insurance company. At the time of accident No. 4 she lived at 24 Village Street. One Thomas Thornley has the care of this house. Address, 24 Village Street. She lived there five years. She has recently moved to 60 East Springfield Street. She had two or three other addresses between Village Street and East Springfield Street, but could not recall just what they were.

In 1901, time of accident No. 3, she lived at 51 Allston Street, Charlestown.

Her husband, Cornelius Hogan, died about six years ago. She has a son 24 years old, who works for McGann (rent autos) and another son, about 20 years old, who is also working. She is a short woman, about 5 ft. 2 in., weighing now 220 lb. A very voluble and persuasive talker.

BOSTON INDEX BUREAU

The Boston Index Bureau was formed in December, 1905, with twelve subscribers. New members have been added every year and it now has a total membership of twenty, representing four railway systems, three railroads, nine casualty insurance companies, one telephone company, one gas company, one law department (city of Boston) and one law firm.

The file for plaintiff's cards, now including more than 403,000, consists of twenty-three cabinets of eight drawers each, each drawer having two compartments. Two cards are made out for each claimant, one of which is filed alphabetically and the other by street and number.

In the first year the members filed 33,529 claims, which included settled cases four or five years old. Since then they have filed 20,698 in 1907, 15,514 in 1908, 16,063 in 1909, 18,175 in 1910, 18,402 in 1911, 20,061 in 1912, 21,261 in 1913, and 22,421 in 1914. In the nine years a total of 186,664 claims was filed, on which the bureau returned 74,138 references, or 39 per cent. In addition to these regular claims, sent in by subscribers, the bureau has the names of 5500 or more persons which were clipped from newspapers and court records or which were reported to the bureau by investigators, attorneys' assistants, etc. These persons are very likely to turn up as plaintiffs sometime.

The references or items of information consist of previous claims by the same person against the same or other companies; previous claims by persons of the same name or similar names in the same town, district of Boston or neighborhood, and previous claims by others in the same family and by claimants at the same address. The bureau is also filing, with the regular claims, all witnesses for plaintiffs. These names are furnished by the attorney's assistants. A surprising number of previous claims of the witnesses themselves or at their residences have been found. These records are sure to become very valuable. In this file also are about 8000 guide cards, lettered by hand and spaced so as to aid the eye and permit the greatest possible speed and efficiency.

A separate file consists of 5700 attorneys' cards and 9000 doctors' cards, on which are written the names of the claimants and such general information as may come to the bureau's notice. These cards are posted daily from the plaintiff's cards. On these cards also are posted all the facts of any case that has been tried in court. This latter information is sent in by the trial attorneys or their assistants on furnished blanks, giving the names of the doctors who testified and the names and addresses of the plaintiffs' witnesses. This information is likewise posted on the claimant's card.

When detailed information regarding any particular doctor's case is required by the trial attorney, the bureau picks out the original claim cards and writes out on prepared blank sheets the full details. It has about 250 of these special lists, the use of which has repeatedly been the means of winning or lessening a verdict.

The local jury lists are checked up as soon as the names are available. It is found that 40 per cent of the jurors have had claims in their families or at their places of residence, or have appeared as hostile witnesses against some of the companies.

The references referred to above vary considerably in the percentage on claims filed. The averages have been about 39 per cent, while the references returned to the Boston Elevated Railway average over 70 per cent. This shows that the claims of subscribers whose operations cover a wide territory show a smaller percentage of returns than those which operate in a more restricted territory.

OTHER INDEX BUREAUS

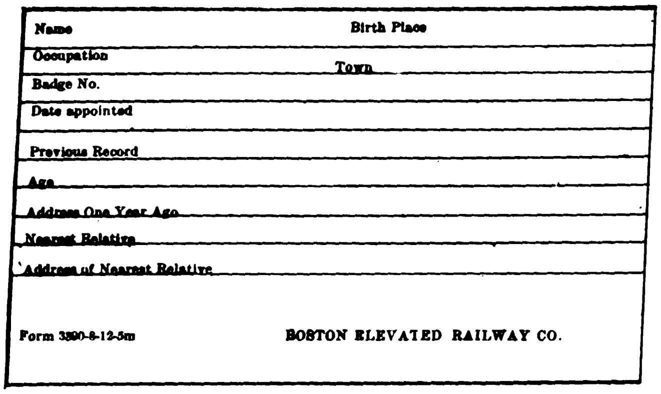
On or about May 1, 1915, the Hooper-Holmes Index Bureau had in its card system nearly 4,000,000 records and each year there is an increase not only in the number of reports received but in the percentage of "duplicates" or references, these accumulations clearly indicating the value of the service to subscribing companies. The Chicago Index Bureau had about 1,000,000 cards on file in April, 1915. The card index of the "Alliance Against Fraud" in New York has more than 250,000 names at present on file. The Philadelphia Index Bureau has a present index of approximately 150,000 names, and the Pacific Coast Claim Agents' Index Bureau has cards as follows: Claims, including suits, 30,560; attorneys, 426; doctors, 638; occupations, 4500; descriptions of injury, 6500. The point to be stressed here, and now, is that the claim departments did not make the index bureaus, but that the card index, as represented by the index bureaus, made the claim departments the formidable organizations to the fakir that they are to-day.

BOSTON ELEVATED EMPLOYEE INDEX

A card index and what it means is further exemplified in the card index record of the Boston Elevated Railway employees. From this record can be found the name, address, age and history of the employee, the nature of the position he holds, the length of time in each class of work, the change to a new position, if any, with the company, together with such information about the employee as may be especially valuable to the claim department when desiring information concerning any past or present employee or claimant.

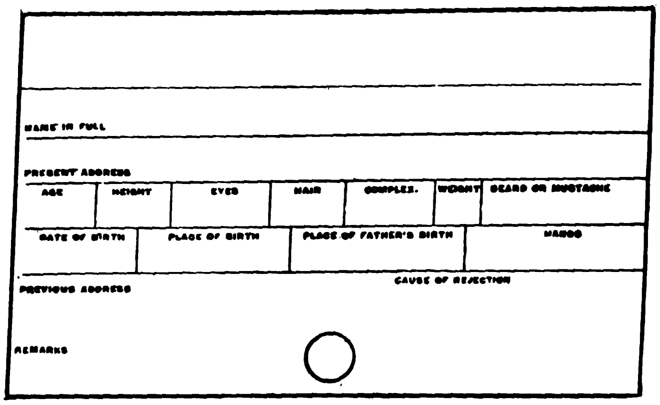
The card index in addition to giving the history of the new employee shows that he has been notified, as required by law, and is therefore possessed of actual personal knowledge that this company is a subscriber to an insurance company under the workmen's compensation act. In the case of injury to the employee any question of his waiver of notice of his common law rights is a matter of record in the claim department.

All cards in this index are kept separate from the general claim index except that the net information accruing may be transferred in any manner desired. This card index originated in and is maintained in the claim department of the company, under the personal supervision of one of the department men. Since its establishment in 1904 it has resulted in the centralization in the claim department of practically all the information



Name Birth Place
Occupation Town
Badge No.
Date appointed
Previous Record
Age
Address One Year Ago
Nearest Relative
Address of Nearest Relative
Form 3390-8-12-5m BOSTON ELEVATED RAILWAY CO.

EMPLOYEES' INDEX—FIG. 1—SHOWING CARD USED TO FURNISH INFORMATION FOR LOCATING EX-EMPLOYEE



NAME IN FULL
PRESENT ADDRESS
AGE | HEIGHT | EYES | HAIR | COMPLEX. | WEIGHT | BEARD OR MUSTACHE
DATE OF BIRTH | PLACE OF BIRTH | PLACE OF FATHER'S BIRTH | HANDS
PREVIOUS ADDRESS CAUSE OF REJECTION
REMARKS

EMPLOYEES' INDEX—FIG. 2—SHOWING DATA CARD FILLED OUT AT TIME OF APPLICATION

in the possession of the company relative to its 8500 employees. It contains at the present time about 60,000 cards. The cards are filed alphabetically, by streets and by all the principal cities and towns in New England and the British Provinces. When an employee leaves the service the record card is removed from the live index and on it is entered the date and reason for going. A past employee file is kept, arranged alphabetically and territorially so that when applications for reference from other employers are requested they may be quickly consulted.

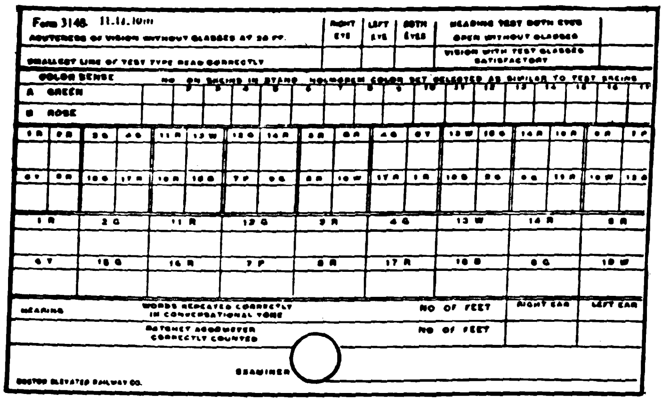
This index gives a street directory of employees, showing whether or not the company has any employee residing in or near a given number in a particular street. It is really surprising to see how often it will be found that one or more employees actually live at or near the address given by a claimant, so that in the event of the claim department desiring specific information of a claimant, his previous history, his conduct since the accident, etc., it is in a position to get available and speedy information almost at first hand. In fact, through this street phase of the record, the Boston Elevated Railway was aided in discovering that a certain claimant, who had given a different place of employment, was actually working for the company. For the benefit of the claim agent or attorney handling the claim in the department a stamp is placed on the lower corner of the case file when it is made. In this may be written the names of from one to three employees living at or near the claimant's residence. This is a great help to one handling large numbers of claims.

The card index is also used in checking up the jury lists (this being in addition to the same use made of the local index bureau before referred to) to ascertain whether jurors or members of their families are present or past employees. Then, too, the various divisions and department heads consult the index for information which they may desire concerning employees. It is used by the treasurer's office to locate men who have assigned their wages or who have had wages trusteed by the bureau of audit, etc. All mail addressed to employees which contains no street or number, but is directed in the care of the company, is delivered at the bureau, where it is properly addressed and forwarded by the man in charge. The same is true of the general public and all outsiders who may wish to communicate with or locate any of the employees. The great care exercised in connection with this phase of the index insures minimum "leakage."

Fig. 1 shows a card (3 in. x 5 in.) which, properly filled out, gives the necessary clue by which an ex-employee may be located. This card is immediately sent to the claim department from the department of employment when a man is hired, and is retained in the index after the man has left the service.

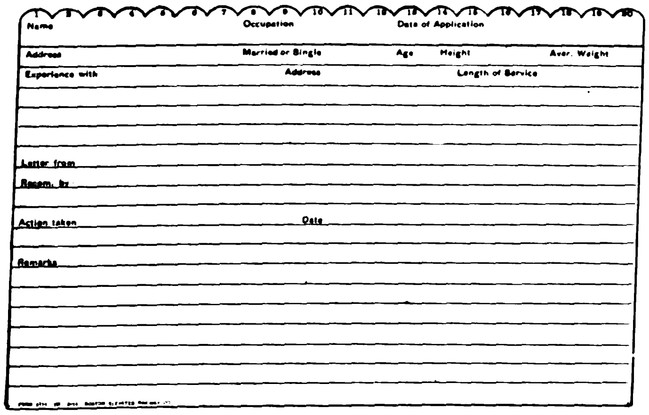
Fig. 2 is a card (3 in. x 5 in.) filled out at the time of application. Signature and address are written in ink by the applicant, all other information required being filled in by clerk. The result of eye examination is recorded on the reverse side of this card (Fig. 3). This card is kept on file with the applicant's papers until his references have answered. If the applicant is rejected, the papers are filed away and the card is filed in the "rejected" list. The bureau uses the Lockhart binding cases, and the date of filing is placed on the first line of the card, which corresponds with the date on the binding case in which the papers are located. By simply locating the card, papers of any applicant can be readily secured, even though the application may have been made ten or fifteen years previously. Cards are filed alphabetically.

Cards are made out for every man appointed and for



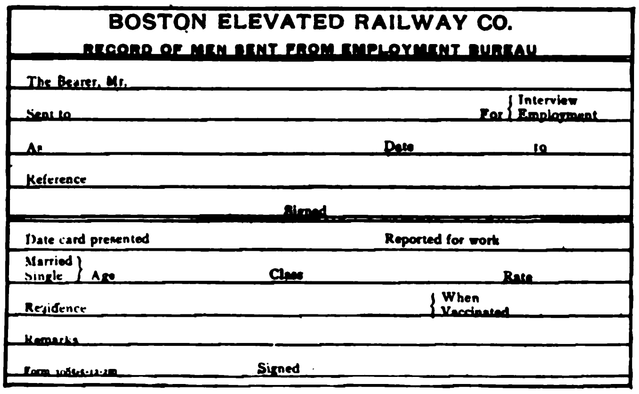
Form 3148. 11-14-10m
ACUTENESS OF VISION WITHOUT GLASSES AT 20 FT. | RIGHT EYE | LEFT EYE | BOTH EYES | READING TEST BOTH EYES OPEN WITHOUT GLASSES
SMALLEST LINE OF TEST TYPE READ CORRECTLY | VISION WITH TEST GLASSES SATISFACTORY
COLOR SENSE NO. ON SKEINS IN STAND HOLMGREN COLOR SET SELECTED AS SIMILAR TO TEST SKEINS
A GREEN
B ROSE
1 R | 2 G | 11 R | 12 G | 3 R | 4 G | 13 W | 14 R | 8 R
6 Y | 15 G | 16 R | 7 P | 5 R | 17 R | 18 B | 9 G | 19 W
HEARING | WORDS REPEATED CORRECTLY IN CONVERSATIONAL TONE | NO. OF FEET | RIGHT EAR | LEFT EAR
[illegible] ACOUMETER CORRECTLY COUNTED | NO. OF FEET
EXAMINER
BOSTON ELEVATED RAILWAY CO.

EMPLOYEES' INDEX—FIG. 3—SHOWING REVERSE SIDE OF DATA CARD (FIG. 2) FOR EYE EXAMINATION RESULTS



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Name Occupation Date of Application
Address Married or Single Age Height Aver. Weight
Experience with Address Length of Service
Letter from
Recom. by
Action taken Date
Remarks

EMPLOYEES' INDEX—FIG. 4—SHOWING APPLICATION CARD FOR EMPLOYEES IN OTHER THAN CAR OR TRAIN SERVICE



BOSTON ELEVATED RAILWAY CO.

RECORD OF MEN SENT FROM EMPLOYMENT BUREAU

The Bearer, Mr.

Sent to For { Interview / Employment

At Date 19

Reference

Signed

Date card presented Reported for work

Married / Single } Age Class Rate

Residence { When Vaccinated

Remarks

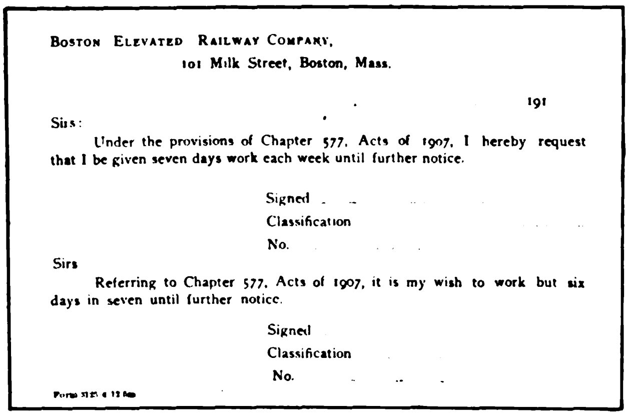
Form [illegible] Signed

EMPLOYEES' INDEX—FIG. 5—SHOWING CARD GIVEN TO APPLICANT FOR PRESENTATION TO SUPERINTENDENT OR DEPARTMENT

every badge issued to employees. One card is for the alphabetical live list; the card shown in Fig. 2 (application card) is filed with the same. The second card is a tab card, the tab denoting the last figure in the badge number. Badge number 1248 would require a No. 8 tab. These cards are filed in numerical lists, and when the employee leaves the service, the tab is cut off, the date and the reason for his leaving are noted on the card, and this is filed again in the numerical list. Thus the bureau is able to tell at a glance just what employees have had certain badge numbers for the last fifteen years, and the other information necessary in such cases. Classes are denoted by different colored cards—namely, motormen, yellow; conductor, white; brakeman and gateman, salmon. Miscellaneous employees, such as inspectors, starters, switchmen, employees, etc., are denoted by a salmon card with the position occupied stated.

The card (5 in. x 7 in.), shown in Fig. 4, is used in receiving applications for positions other than for car or train service, such as shop and power station employees, etc. The tab numbers on this card denote the position applied for. In filing this card, all tabs are cut off except the tab number denoting the special position applied for. If there is occasion to look for applications for machinists one would simply run through the cards, picking out those of the proper number.

Fig. 5 illustrates the card (3 in. x 5 in.) that is filled out and given to an applicant for presentation to some superintendent or department. This is kept on file at the office where presented. The card (4 in. x 6 in.) in Fig. 6 is filled in by each new man appointed, and is forwarded to his division superintendent for file. The bureau also has a card file containing the name of every employee in the blue uniform service, cards of which are arranged by date of appointment into years, months and days of service. A report is made monthly of the number of blue uniformed employees in service by years and classes. This file is also used in sending notices for increases of pay and others for stripes. It is kept accurate by simply taking out the card when a man leaves the service and adding new cards for new appointees.



Boston Elevated Railway Company,
101 Milk Street, Boston, Mass.

191

Sirs:

Under the provisions of Chapter 577, Acts of 1907, I hereby request that I be given seven days work each week until further notice.

Signed
Classification
No.

Sirs

Referring to Chapter 577, Acts of 1907, it is my wish to work but six days in seven until further notice.

Signed
Classification
No.

Form [illegible]

EMPLOYEES' INDEX—FIG. 6—CARD FILLED IN BY EACH NEW MAN APPOINTED AND FORWARDED TO DIVISION SUPERINTENDENT

CONCLUSION

From the very beginning of organized effort in this country for the dissemination of information relative to accident claimants, reckoning from the founding of the Hooper-Holmes Index Bureau and the Alliance Against Fraud organized in New York, and the Index Bureau in Boston, Mass., which was the first local bureau in the country, the leaders in claim department work have been searching for means of co-operation between claim departments and the resultant elimination, as far as possible, of the fakir or repeater. It is universally accepted opinion that a card index is the most efficient method discovered up to this time. The card index may appear insignificant to the uninitiated, but it means that the resources of the combined claim departments of the American Electric Railway Claims Association are being made easily accessible to all member companies who wish information of certain claimants. The field of usefulness of a card index to the association is limited only by the extent of the activities of its members in seeking and exchanging information concerning claimants of whom they have even a bare suspicion. No argument is needed to prove that the hour has struck for intense activity toward perfection of this defense.

JUSTIFICATION OF SAFETY FIRST MOVEMENT

BY ALVES DIXON, CLAIM AGENT EL PASO (TEX.) ELECTRIC RAILWAY

Figures are cold and lack expression, and only the eyes of those familiar with the subject can appreciate the full significance of "Yearly Accident Report of a Great Institution," and farther down: "Reduction in Fatal Accidents this Year over Last, Twelve." The general public reads perhaps the headlines, and hurriedly turns the page until "The Great Ty Steals Home" catches and holds the eye. But you and I, of the inner circle, what do we see? If it is possible to visualize negation we sense a darkened room—a stillness broken only by the moans of a small, tear-eyed woman racked with grief—her hands worn thin and wrinkled through loving service—sobbing children—mourning relatives and a few sympathetic friends. The curtains are drawn, but through the oppressive gloom we see a long, narrow box, covered with flowers, and as the scene changes, we see the little company standing beside an open grave, we hear the hollow sounds of falling clods, the wail of women and the hard dry sobs of men. With outstretched hands, the Man of God is commending another soul into the keeping of its Maker—we multiply this scene by the twelve lives saved, and then, like a glorious flash of light, comes the thrilling thought: To twelve families has this been spared—to twelve wives there are saved husbands who are still full of life and the joy of living—to twelve groups of little children there are still devoted fathers and happy, happy mothers, and instead of the small group, bare-headed beside the new-made grave, and the accompanying sound of a funeral dirge, we see a happy family gathered around an open hearth and hear from a tiny phonograph on the dining-room table the rollicking chorus of "The Five Fifteen."

And this is just the reduction made in one institution. Multiply this by the great reduction made throughout the country; grasp, if you can, what a saving it means—not only in mere life and limb itself but in the sum total of human happiness—and grasping it, you feel that while your work is done without the blare of trumpets and with perhaps little appreciation, it is none the less effective.

RELATION OF SAFETY TO CONSERVATION

BY B. F. BOYNTON, GENERAL CLAIM AGENT PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Safety and its relation to conservation is twofold. It is humanitarian and it is economic. To conserve life, limb and health is the highest ideal of the human race. To conserve efficiency is the basic principle of economic success and an incomparable asset to society. To attempt to achieve that which is humanitarian and at the same time economic, is worthy of the most careful thought and the highest endeavors without stint or selfishness, that can possibly be put forth by society or any unit of society.

In any large organization the first step toward safety and conservation must be with the head of that organization. The president or general manager—whatever title he may use—must be a man of such ability and capabilities that he can gather around him men who will work with him in harmony. They in turn must be men of such a caliber that they can organize their different departments along the same line of harmony—that is, with each and every man working toward the one purpose. When this is done, the greatest step that can be taken along the line of safety from every standpoint is accomplished.

The next step, if the property be a big utility, a street railway, is to establish an employment bureau. The one in charge of such a bureau should be a good level-headed man with exceptional qualifications in regard to reading and judging the character of humanity. The employment of insufficiently trained men is hazardous, and over-confidence in employees breeds bad results. Each and every applicant should be investigated as to his character and habits as well as ability. No matter what position he may be seeking, he should have a thorough medical examination by a competent surgeon, so that if he has or ever had any afflictions, can these be made note of in order to make the record complete. Before the man is allowed to assume his duties in any department, he should be taken through a school of instruction along accident lines by some competent person, preferably a representative of the claim department. After the men are placed in their positions, they should be called together at least once every six months and again be talked to about safety and its relation to conservation, for the purpose of keeping them well informed. Close observation should always be kept of all employees, and wherever a careless or indifferent person is found, he should be relegated to the scrap heap. It should be remembered, too, that earnest investigations of the primary causes of accidents and adequate safeguards all tend toward conservation from a safety standpoint. By making conditions safe, safety and conservation are absolutely brought together.

To show some practical applications of these principles it may be said that in Portland for the last seven years lecturers have covered the public schools once or twice a year, talking to the school children and teachers and distributing safety mementos of different kinds.

Every carman, before he can assume his duties, is sent to the claim department for instruction on accident prevention and the care of accidents. These men are re-instructed twice each year. All of the other various employees are also assembled two or three and sometimes four times a year and talked to along the same lines.

The company has organized safety committees in each and every department from the track greaser to the president's office. It holds safety picnics and safety dances, safety socials and safety gatherings of every name and nature, and tries to make them not only interesting and attractive to the employees and their families but also instructive along safety lines.

Through the safety committees, by the different suggestions that have been sent in from time to time, the company has found and made safe hundreds of dangerous conditions that never would have been reached in any other manner. It never fails to answer and follow up a suggestion, letting the sender know the outcome and, in any case, always thanking him for the interest he has shown.

From time to time prizes are offered to the trainmen on the different divisions for the best articles on some particular line of safety. This has brought forth a great deal of good thought, and some fine papers have been written on safety and conservation.

Once in a while, safety suggestion blanks are placed in the pay envelope of every employee, asking if they know of any condition which could be remedied to make things better and safer, and if they will kindly note any such condition on the blanks and return these. Through this channel a great deal of good has resulted.

Through the various meetings and gatherings and by getting in touch with the employees directly, the company has created a harmonious family touch between the employees and the heads of departments, and that alone has helped greatly toward safety and conservation.

The company had signs painted in various parts of Portland on large billboards (some of them 20 ft. x 30 ft.). These signs, containing different safety slogans, were placed in as conspicuous places as possible and near danger zones. These signs, perhaps, to the layman, look like money ill spent, but the company feels that it obtained wonderful results from the investment. The city has joined in this work by placing between 300 and 400 safety-first signs. They are steel disks 18 in. in diameter, mounted on steel tubing 6 ft. high and painted red with a green center, and are set in concrete just inside the curbing on the right hand side of the street at various distances from danger zones, warning drivers of teams or machines of the conditions ahead. "Sharp Turn," "Steep Grade," "Railroad Crossing," "School, Drive Slow," "Fire Station," "Reverse Curve," "Hospital," and various other things, as required, are painted in clear letters on these little disks.

The company has gone further than the reaching of its employees by inducing the authorities, through the mayor and commission, to appoint a public safety commission. This commission consists of the following bureaus under the following men:

Bureau of Public Safety.—John T. Moore, captain of police.

Bureau of Fire Prevention.—A. M. Churchill, lawyer and chairman of fire prevention bureau of Civic League; E. F. Dowell, chief of fire department; Jay Stevens, fire marshal.

Bureau of Traffic.—H. P. Coffin, chairman public safety committee of Portland Automobile Club; A. S. Kirkpatrick, city traffic engineer.

Bureau of Schools.—L. R. Alderman, superintendent of schools.

Bureau of Transportation.—F. L. Burckhalter, general superintendent Southern Pacific Railway.

Bureau of Electric Transportation.—B. F. Boynton, general claim agent Portland Railway, Light & Power Company.

Bureau of Industrials.—Marshall N. Dana, *The Evening Journal.*

Bureau of Buildings.—Robert L. Withrow, *The Evening Telegram.*

Bureau of Publicity.—Horace E. Thomas, city editor, *The Oregonian.*

Advisory Board.—J. E. Wheeler, McCormack Lumber Company; F. C. Knapp, Peninsular Lumber Company; A. H. Averill, Averill Machinery Company.

Their various walks in the business world show what these men represent. These different safety bureaus have woven a chain of friendship and harmony among the newspapers, the schools, the fire department, the police department, and in fact all of the public utilities. The company has lent and is lending every effort possible to each bureau to accomplish the results which are necessary to be obtained by these various functions, and in this way is breeding a harmonious, good-fellowship feeling between the company and the city and at the same time accomplishing great results along the line of safety and conservation. The children in the schools and the people in the factories, the department stores and various other places are being taught what to do and how to do it in case of fire, and the merchants and the manufacturers are being induced to cover and protect accident hazards. The traffic bureau of the commission, up to May 1, 1915, had 153 automobile drivers arrested for disobeying the traffic ordinance in passing street cars while they were discharging passengers. The bureau of schools has organized safety committees among the school children in each school. All this accomplishes the one great result of setting the people to thinking right along safety lines. Whenever this is done, the battle is more than half won.

FINANCIAL BENEFITS OF SAFETY-FIRST MOVEMENT

BY J. S. HARRISON, CLAIM AGENT JACKSONVILLE (FLA.) TRACTION COMPANY

The subject "safety first," as a means to financial results, divides itself into two sections. The first covers "safety devices," such as rotary gongs, safety gates, life guards and other numerous excellent safety devices which up-to-date street railways have adopted as part of the safety-first plan in order to reduce accident costs. The second section is devoted to "educational methods," subdivided with the operating employees in one class and the public in the other. The educational means employed for these vary materially in point of expense, for the education of the public, embracing the safety education of school children, the use of cuts and catchy epigrams in newspaper advertising, the employment of moving pictures and numerous such devices, does of course necessitate a greater outlay of money than does the education of employees. Just what relation, from a financial saving standpoint, the safety devices installed upon the cars will bear to the educational methods employed would be, of course, hard to compute. It is believed, however, that greater financial results have been accomplished by the use of automatic and semi-automatic safety devices and the giving of more attention and education to employees of the Jacksonville Traction Company than have resulted from the education of the public by the ordinary means and methods, such as cited above.

As regards the joint result of the two methods the following is pertinent. The Jacksonville Traction Company began actively to equip its cars with safety devices about the time it also inaugurated its safety-first educational methods. In 1914 a trained safety-first man was placed in charge of the movement. This man has been devoting all his time and attention to the work by formulating apt and careful advertisements, working up movements in the different clubs, encouraging the safety-first movement among the public schools, and, of course, delivering regular and practical lectures to the trainmen two or three times a week, using as illustrations actual recent accidents with which almost every employee was familiar. These two methods of safety work resulted in a decrease of 42 per cent in accidents in 1914 as compared to 1913. This figure was compiled after a careful classification of the different accidents under different headings. One can reasonably conclude, therefore, that if there is an average annual expense or loss of $25,000 from accidents to any electric railway the institution of the safety-first movement will reasonably result in a financial benefit or a saving, on the basis of the population of Jacksonville, of $10,500.

Aside from the fundamental humanitarian aspect of safety work, the practical business benefits resulting from the institution, in intelligent and systematic manner, of safety first, with every part of the human machinery of the corporation alive and aflame to its importance and thoroughly enthusiastic over the results, cannot but convince the public service corporation itself, as well as the public at large, of the prime importance of such work. Of all the modern ideas and theories advanced in relation to the operation of street railways, safety first has done more to popularize the public service corporations with the public, but more particularly in financial circles, than anything else. Anything which prevents accidents saves money, and anything which saves money necessarily tends to pay dividends. The safety-first movement has ceased to be a theory or an experiment and has become an actual, practical necessity, from the financial as well as the humanitarian point of view. It is the mortal enemy of the ambulance chaser and a real automatic safety device against the worst of all accidents—a receivership.

MOVING PICTURE EXCHANGE FOR A. E. R. A.?

BY F. J. WARNOCK, CLAIM AGENT MAHONING & SHENANGO RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

If one is satisfied, as many companies are, that public instruction is the final solution of the problem of accident prevention, the question arises as to the methods to be used in imparting such instruction. There are several ways in which this can be done—among them being the use of the press, the distribution of literature and the use of car signs bearing illustrations and printed matter on the subject of safety. But the most powerful medium of all, through which to teach safety, is moving pictures, because these pictures make a deeper and more lasting impression on the mind, and especially on the minds of children, than any other means that can be used. The moving picture comes nearer to the reality than anything in existence, and therefore leaves a more profound impression than anything outside the reality. Furthermore, moving pictures are now so popular that it is not necessary to put forth any effort to create interest in them, for anything that comes in this form appeals to the public.

Those who have used moving pictures for safety work can testify as to their efficacy. The Mahoning & Shenango Railway & Light Company has used them some in past years and has been conducting a regular campaign during the present year, particularly directed to educating school children. During this time, many expressions and illustrations have been received showing the effect that has been produced. Some companies can even show figures to prove that accidents have been reduced following a moving picture campaign. We can only say that we have not, since starting out some months ago, had a single car or wire accident reported among school children to whom pictures have been shown.

Thus far, however, there has been no concerted action. Here and there promiscuously companies have become enthusiastic over the moving picture as a means of instructing the public, but others have not awakened to the possibilities which lie in a campaign of this kind, or at least have not warmed up to the point of putting it into operation. Accident prevention will never come into its own until everyone puts his shoulder to the wheel and co-operates with everyone else. No doubt in time the subject of safety will be taught in the schools as physiology is now taught. In fact, already some states have passed legislation requiring that some time be devoted to this important thing. In Ohio, it is required by law to be taught one hour a month. In New Jersey a law has been passed providing that more time be devoted to it than in Ohio and that it be taught from text books prepared for that purpose.

Yet the time has not come when one can rely upon the teaching of safety through the natural channels. No doubt in time it can be so brought about that teachers can train children to take care of themselves as skillfully as they now train them in other things. When such an atmosphere of safety shall prevail, companies can devote their entire time to their own organization and equipment. But before such an atmosphere can be created a great amount of agitation is necessary, and it falls upon the shoulders of corporations to create and sustain it until safety instruction can be placed upon a natural and permanent foundation. There can be no question about the value of moving picture film as a means to the desired end. The great trouble, however, has been the difficulty experienced in procuring films as well as the expense.

The establishment of a film exchange by the American Electric Railway Association is a school that is entirely possible and practicable. In fact, it offers the only true solution to the problem of country-wide accident prevention, because with it in existence it would be comparatively easy for all companies to engage in this work instead of a few. It has already been tried and found to be a success. On various occasions when our company has sought to obtain films from various sources, and failed, we were able to secure them from an exchange conducted by the National Council for Industrial Safety, whose headquarters are in Chicago, Ill. This council conducts a very successful exchange for the benefit of its members who are engaged in safety work. It is too extensive in scope, however, to suit street railway purposes, as it embraces, together with railroads, every form of industry where men are employed and in which safety instruction is needed. Its films are also directed almost entirely toward instructing employees, while the most important task of electric railways is with the public. At any rate, it demonstrates that the proposition is feasible and leads to the conclusion that if the National Safety Council can do a thing of this kind, the American Electric Railway Association should be able to do it and even with greater success, for the reason that it would be specializing instead of carrying safety films of every description.

It should not be difficult to establish a film exchange, where safety films could be collected and kept for the use of members. The association could decide upon its location and care for the appointment of the person or persons to take charge of it. Many companies have already made films, being unable to secure them in any other way. These could be put in the exchange, when they are through with them, instead of being destroyed. The contribution of films could be made to entitle the contributor to membership in the exchange. Those who do not furnish any and who desire to participate, could be charged a fee for use in making new reels, to be kept in stock by the exchange.

In addition to this, the influence of the association could be brought to bear in securing and preserving safety films created by the film manufacturing concerns of the country. In past times these films, after going the rounds of the theaters, have been called in and destroyed. On two or three occasions our company endeavored to rent pictures of which it had heard, but received the answer that they had been called in and disposed of. If the negative were preserved, of course new reels could be made from time to time, but as it is now, the manufacturers usually keep the negative and later destroy it.

Another argument for the exchange is that it would mean a great saving in money to members. Those who have used this means of public instruction in the past have been forced to make their own films or have them made. They cannot use the same material over and over again after it has covered the territory in one campaign. They must, therefore, make new films, if there is no place where they can look for them. The films they have just finished using will be suitable for some one else in another locality and others would have pictures which would fit their requirements. Thus the necessity of always making new films would be avoided. The film exchange would serve as a sort of clearing house for the mutual interchange of pictures. It would take a little time to get such a supply as would take care of all possible demands, but with good co-operation and with many patrons any reasonable request could be promptly met. Moreover, films could probably be made for less money under the management of the association than is now the case.

Perhaps the strongest argument in favor of an exchange is that it would remove the greatest obstruction in the way of engaging in this work, in that it would then be convenient and inexpensive for companies to get material. Thus the only real excuse for not carrying on this most effective form of safety campaign would then be a thing of the past. In this way vigorous safety work would become general instead of promiscuous. Some may argue that pictures taken in one locality are not suitable for use in another where different types of cars are in use and different conditions prevail. The same kinds of accidents, however, happen wherever cars are operated and wires are strung, and the principles of safety that should be instilled into the mind are the same the world over. The important thing after all is to get people to thinking about safety, and pictures made anywhere, even if not covering every form of accident, will do this.

The creation of a film exchange would positively render the work of accident prevention more convenient and economical, more general in its scope and more powerful in its influence and effect. It would aid in the work which, wherever it has been tried, has generally elicited from the public commendation instead of criticism and has brought companies into closer touch and into a better understanding with those they are endeavoring to serve.

Echoes of the National Convention

Total Attendance at Convention was 777—"Red Special" Party Had Pleasant and Profitable Days at Los Angeles and Pasadena, Santa Catalina and Yosemite Valley, Now at San Diego —Consolidated Railway Bands Made Hit at Los Angeles

THE thirty-fourth convention of what is now the American Electric Railway Association closed in San Francisco on Friday, Oct. 8, with the presentation of memorial plaques to the American and Manufacturers' Associations. Most of the proceedings were covered in last week's issue, practically all of the remainder being given this week. There remains now only to mention the registration and the details of the return trip.

CONVENTION REGISTRATION FIGURES

Eighty-eight electric railway companies were represented in the registration at San Francisco. The numbers of individuals in attendance were as follows: Railway representatives, delegates, 395; guests, 34; ladies, 132; total, 561. Manufacturers' representatives, 175; guests, 2; ladies, 39; total, 216. Grand total of attendance, 777.

HOMEWARD BOUND

After spending Saturday, Oct. 9, in visiting the exposition, the convention party left in the evening for the Yosemite Valley, which was reached early Sunday morning. That day and Monday were spent in the Valley. Tuesday was Transportation Day at Universal City where an elaborate program had been arranged. Owing to the late arrival of the "Red Special" at Los Angeles this program had to be somewhat curtailed. However, the train was met at San Fernando by representatives of the local committee and the delegates were taken in a special three-car train to Universal City. Attending the local committee was a band made up by consolidating the regular brass bands of the Pacific Electric Railway and the Los Angeles Railway.

At Universal City other convention attendants and delegates, who had reached Los Angeles by other trains, joined the "Red Special" party and a Spanish barbecue was greatly appreciated by the hungry guests. After lunch President Bulla, of the Los Angeles Chamber of Commerce, introduced President Charles L. Henry, of the American Association, and W. O. Wood, president New York & Queens County Railway, who addressed the gathering on the important railway questions of the day. The delegates then inspected the methods used in manufacturing moving-picture films.

The party returned to Los Angeles and Pasadena by special cars of the Pacific Electric Railway. At the New Maryland Hotel, Pasadena, the local headquarters, there was an informal reception on Tuesday evening, with dancing, tendered by the Southern California committee on entertainment.

On Wednesday the party was divided, many going to Santa Catalina Island, others spending the day at points of interest in the cities. The Santa Catalina party comprised about 400 persons and they were accompanied on the boat by the consolidated band. The band also led the way to the luncheon tables on the island where a Catalina sea-food repast was served. The visit to Santa Catalina proved to be a most delightful incident of the trip. The steamer left Avalon for Los Angeles toward the close of the afternoon.

On Thursday the party left Pasadena at 2.30 p. m. over the Santa Fé, and on arrival in San Diego was taken to the headquarters hotel, Del Coronado, by special cars and ferries, under the guidance of the San Diego local committee. After dinner a formal reception was held and a grand ball given in honor of the guests. At the reception President Charles L. Henry called the guests together and introduced Retiring-President C. Loomis Allen who, on behalf of the "Red Special" tourists, presented a number of testimonials to those who contributed most directly to the success of the tour. A picture was given to Mrs. H. G. McConnaughy, a scarf pin to Mr. McConnaughy, a gold watch to Frank H. Gale and a pocket-book to E. C. Cook, special representative of the New York Central Lines, the presentation being accompanied by expressions of appreciation of the attention which had been shown the tourists.

As this issue of the JOURNAL goes to press the "Red Special" party is enjoying the sights of the Panama-California Exposition. Up to this point the weather on the return trip has been perfect.

Saving Power by Watt-Meter Records

In the ELECTRIC RAILWAY JOURNAL for Aug. 22, 1914, there was given an account of the savings in energy consumption effected by the use of wattmeters on the New York, Westchester & Boston Railway, and the accompanying table shows the record that has been established since that article was published, the figures being given by months since April, 1914, as the previous months were recorded in the article cited. The energy consumptions per car mile, as indicated, include the power that is used for all miscellaneous purposes, as well as for propulsion of the cars. This covers the operation of the auxiliary equipment, the heaters, the lights and the transformer blowers, which are kept running continuously when the atmospheric temperature is above 80 deg. In addition, the power used in switching the cars about the storage yards and in testing them after inspection is reported as part of the overall energy consumption, and it is estimated that the minimum figures obtained in the summer time, when no heaters are used, represent approximately 10 per cent more power than is actually consumed by the propulsion of the cars.

TABLE SHOWING AVERAGE CAR-MILE ENERGY CONSUMPTION BY MONTHS. NEW YORK, WESTCHESTER & BOSTON RAILWAY

Month, 1914	Kw.-hr. per Car Mile	Month, 1915	Kw.-hr. per Car Mile
April	4.61	January	5.53
May	4.35	February	5.46
June	4.38	March	5.22
July	4.34	April	4.41
August	4.33	May	4.24
September	4.33	June	4.26
October	4.42	July	4.24
November	4.91	August	4.20
December	5.63	September	4.15

The low record for the summer of 1912, it may be said, was 8.2 kw.-hr. per car mile, this being made prior to the establishment of the present system of competitive records for individual motormen which are made up from readings of the wattmeters on the cars. During the summer of 1913, after the competitive records had been put into effect, the low figure was 4.5 kw.-hr. per car mile. In 1914, as shown by the accompanying table, the record was reduced to 4.33 kw.-hr., and in 1915 it was brought down still further to 4.15 kw.-hr.

The cars to which these figures apply are 72 ft. long, and with their passenger load weigh about 65 tons. In consequence, the figure for 1915 represents an energy consumption of 64 watt-hours per ton mile, and if 10 per cent is deducted for lights and yard switching the energy consumption becomes only 57.5 watt-hours per ton mile; an astonishingly low figure for the service involved. The average schedule speed for all trains, both express and local, is 26.4 m.p.h. with an average of 0.93 stop per mile.

Under the system that has been established the meter readings are made by the motormen at the end of each round trip and are turned in to the dispatcher on a report form. The inspector, or switchman, who takes the car at the end of the trip also reads the meter before and after the switching operation and turns in a separate report. The two reports serve as the basis for a check whenever that appears to be desirable and as evidence of the accuracy of the reports it is decidedly interesting to note that the total monthly consumption of single-phase power used by the road checks within about 20 kw.-hr. of that obtained by totalling the figures given by the reports of the motormen and inspectors. The monthly totals are of the order of 800,000 kw.-hr.

I. C. C. Holds Valuation Hearing

Steam Railroads Set Forth Their Views of Fundamental Principles in Two-Day Conference at Washington

Depreciation and intangible elements of value were the chief bones of contention at the valuation conference held by the Interstate Commerce Commission in Washington from Sept. 30 to Oct. 2, inclusive. The steam railroads furnished most of the argument, basing their discussion on a 544-page brief previously filed with the commission. The state commissions had not prepared any formal argument. The railroads' case was presented by G. S. Patterson, Pierce Butler, W. G. Brantley and Sanford Robinson. A. E. Helm of the Kansas Public Utilities Commission was the spokesman for the state commissions.

The arguments of the railroads were presented under eight main heads: (1) Reasons for the Valuation Act, (2) cost of reproduction new, (3) unit prices, (4) depreciation, (5) the phrase "owned or used for the purposes of a common carrier", (6) land, (7) property charged to expenses or surplus, and (8) other values and elements of value. One or two other subjects treated in the brief were not reached in the oral presentation.

Mr. Patterson, opening the discussion, said that the recommendations of the commission to Congress for the last twenty-five years indicated that the valuation act was deemed essential: (1) To obtain a trustworthy comparison between present value and original cost, (2) for use in rate questions, (3) in connection with taxation, (4) in determining a proper depreciation reserve, (5) in testing the accuracy of the carriers' balance sheets, (6) in standardizing railway statistics, and (7) in determining whether the railroads are under or over-capitalized. Mr. Butler, discussing reproduction cost new, asserted that this implied original topographic conditions, but construction according to present-day methods and prices and with present facilities other than the railroad itself. It also implied a construction program combining speed and economy. Mr. Robinson held that the unit prices should be arrived at by a consideration of prevailing prices, price tendencies and conditions affecting labor and material markets during a reasonable period of time next preceding and at the date as of which the valuation is made, due consideration being given to the existence of active railroad construction during that period. Weighted averages for prices should be used.

Mr. Brantley insisted that where there was no deferred maintenance there was no depreciation, and that it was impossible for the numerous field men to "guess" how long a car or a bridge would remain useful. Questions put by representatives of the government indicated that they deemed it mandatory to record the "condition per cent" of the individual parts. The meaning of the phrase "owned or used" was discussed briefly by Mr. Patterson, who held that the question of title was immaterial, only the use signifying. In the case of joint facilities all property should be credited to each carrier regardless of the other users. Mr. Butler, discussing land, held that while the Minnesota rate decision did reject the use of speculative multipliers, it did not conflict with the railroads' views that values should be what it would now cost to acquire the land. He asserted that allowance of unearned increments was fully sustained by law. As to property charged to expenses or surplus, Mr. Patterson stated that the doctrine excluding this was highly destructive to railroad practice. Mr. Robinson conceded that it might be very difficult to estimate intangible values separately, and that the railroads would not as yet undertake to say how they should be determined. He thought they should always have a plus sign unless it were conceded that the railroad ought not to have been built and would not be replaced if removed.

This closed the carriers' discussion. Before adjournment Mr. Helm asked that the states be given a later hearing, but the commission was unable to grant the request. The state commissions were allowed sixty days to file a brief, and the carriers twenty additional days to reply to it. Chairman McChord pointed out that the commission would not render any formal order covering the questions raised, but the progress of the valuation work would necessitate orders from time to time on various matters under discussion.

Chicago Surface Lines Advertise

Immediately following the wage arbitration award on July 16, 1915, President L. A. Busby of the Chicago Surface Lines inaugurated an advertising campaign notable for the character of display and the treatment of the topics discussed. These advertisements began with one-half pages in all the Chicago daily newspapers, the advertisement with new text appearing twice each week. As the campaign progressed the size of the advertisements was gradually reduced until they are now at the minimum or standard size, being 4¼ in. x 9½ in. During this change, however, the interval between the advertisements remained the same. Typical examples of these are reproduced on the following page.

In the beginning the company sent its 12,000 employees a letter which was published in the daily newspapers, the trend of which was an appeal for the cooperation of the trainmen in increasing courtesy to the public. Shortly after this appeared, the company received a letter from one of its employees, the contents of which along with comments, were published as a half-page advertisement. This letter contained a suggestion to the company that in addition to requesting its men to be courteous and the public to file written complaints when they were not so treated, that the public write of any courtesies extended by the trainmen and that these be used as a mark of credit. This letter began a campaign, the motive of which was essentially preaching the gospel of courtesy to the em-

HOW YOU CAN HELP THE STREET-CAR SERVICE

The furnishing of street-railway transportation is a complex human problem, always subject to the limitations of human beings.

The great majority of the trainmen on the Surface Lines are doing the best they can, oftentimes under trying conditions, to handle three millions of people daily and to give everybody good service.

We ask you to co-operate with them in every way you can. There still will be a proportion of errors, misunderstandings, and *some* inexcusable faults.

We are even more anxious than our patrons to have every one of these faults eliminated from the service.

Help the service all you can by co-operation, especially by reporting both your bad and good experiences. Give us both criticism and suggestion; both will receive prompt attention and every possible effort will be made to give you good service

CHICAGO SURFACE LINES
804 Borland Building
Chicago

COURTESY IS EFFICIENCY

Courtesy is a part of every man's work. In the street-railway business it is just as important as running on time, collecting fares, issuing transfers or avoiding accidents.

Four-fifths of the complaints against the street-car service in large cities are based upon avoidable deficiencies in the work of employes—such things as incivility, starting cars too quickly, running-by passengers, etc. We say *avoidable* deficiencies because such defects can be reduced to a minimum *if the public will co-operate with the management in its efforts to eliminate them.*

This co-operation should take the form of reporting both your good and bad experiences. You do yourself and the community a service every time you write us a letter of commendation or criticism.

CHICAGO SURFACE LINES
804 Borland Building
Chicago

YOU ARE ENTITLED TO COURTESY AS A MATTER OF RIGHT

The majority of men have personal standards of courtesy and efficiency which lead them to do their best under all circumstances, without outside pressure or special stimulus.

There are exceptions, however, and we cannot always tell in advance just how well fitted a man is to carry out our intentions toward the public.

Therefore we ask the public to *help us to help our men*—by commendation where it is merited, by criticism wherever it is deserved.

CHICAGO SURFACE LINES
804 Borland Building
Chicago

THE HUMAN EQUATION

There are defects in all human institutions and the defects increase in direct ratio to the number of *human beings* involved in their operation.

It requires fourteen thousand men to operate the surface street-railways of Chicago and three million people are carried daily as passengers.

The service of experts is employed every hour of the day and night to co-ordinate the work of these men in such a way that delays and defects of every character will be reduced to a minimum. To those who are most familiar with the problem of street railway operation in large cities, the wonder is not that the service fails to satisfy every individual every day *but that it serves so many individuals so well every day.*

CHICAGO SURFACE LINES
804 Borland Building
Chicago

In the modern search for new and expensive luxuries we are apt to overlook the possibilities of everyday, inexpensive pleasures.

A street-car ride in the less crowded hours of the day—or at night—contains *all* of the elements of healthful recreation.

It gives you fresh air, change of scene, a chance to relax and forget your customary surroundings. It will take you to the parks, the beaches, the country or into sections of your own city which are as interesting as a trip to foreign lands.

It costs five cents.
Try it today—or tonight.

CHICAGO SURFACE LINES

AT YOUR SERVICE

The most highly paid body of street-railway conductors and motormen in the world is at your service on our lines.

These men are practically a unit in their desire to give good service. The company is back of them in their effort to be courteous and helpful to the public.

You help such men every time you call our attention to the good work they are doing.

ALSO—

Every large organization of employes includes some men who are not as conscientious or as efficient as the majority. The faults of these men are a constant reflection upon the work of their fellow-employes and give a totally wrong impression of the attitude of the company towards the public

You can help the service as much or more by pointing out the deficiencies of these men as you can by calling attention to the merits of the others. We ask you to do *both*, in the interest of better street-car service for Chicago.

CHICAGO SURFACE LINES
804 Borland Building
Chicago

Chicago Surface Lines Advertising—Sample Newspaper Advertisements ployees and the public. At times these courtesy talks are displaced by advertisements calling attention to the points of interest in Chicago in the day time and at night, particular attention being given to the various kinds of amusements. Under such headings as "Get Acquainted with Chicago," "How to Enjoy the Park" and "See Chicago at Night" these advertisements have attracted much attention. As will be noted in the sample advertisements, occasionally the text is turned to an explanation to the public, stating why it should not expect perfect service because of the complexity of the problem and the limitations of the employees. This campaign of courtesy and service has resulted in a marked improvement in the service and a change in the spirit of the employees toward the public. In other words, the management of the Chicago Surface Lines feels that the expense of this publicity has been justified.

Tests Show Satisfactory Return-Circuit Conditions in Providence, R. I.

On Account of the Use of Concrete Track Base and Other Local Conditions Electrical Welding of Rails Was Considered Impracticable, Although Approved in Principle

Robert L. Brunet, public service engineer, Providence, R. I., has submitted a report to Commissioner of Public Works Walter F. Slade upon electrolysis in the city of Providence, continuing an investigation inaugurated last year. The report points out that since 1914 there has been a general improvement in conditions of this character, marked by the elimination in many cases of serious potential variations between the water mains and the negative return system of The Rhode Island Company. Weak points have been found in the water main system in many parts of the city, but none of these can definitely be attributed to recent conditions, possibly having been affected by stray currents at a former date, with breaking-down points just realized.

The investigation was made in a manner similar to that of 1914,* with the exception that the company did not participate. It expressed its willingness to accept the results of the city as conclusive, suggesting, however, that where marked variations existed or where danger points were indicated it would be advisable to check the data obtained. The scope of the tests included the determination of the voltage variations between water mains and the company's tracks. In addition, current values were taken at many points, and at all the test stations both current and potential readings were taken. Conditions were also noted at bridges and between gas pipes, water mains and rails. Readings of voltages between water pipes and rails were generally taken at fire hydrants.

In many of the streets in the positive district, where a difference of potential exists between underground structures and rails, the voltage variations were in the main found to be of less magnitude than a year ago, and the city's engineers concluded thereby that less current is being transmitted by the underground structures than last year, due to improvement in the return circuits. The maximum current observed in the water mains was less than a year ago. The maximum current observed between water mains and tracks was 40 amp.

In Providence the distances are rather long, and in order to reinforce the rail drainage additional negative return feeders must constantly be installed by the company in order to limit the liability to damage to underground structures, as well as the loss of energy through the high resistance medium. Since July, 1914, the company has installed a 500,000-circ. mil negative cable between the tracks at the end of the Douglas Avenue line and those on Admiral Street, and another of this capacity between Admiral Street and Branch Avenue. The service troubles discovered within the past year all seem to indicate that the damage was done at a previous date. Within the past year two insulating joints were installed, one in Cranston and one in Warwick. A detailed review of service troubles examined is included in the report.

In last year's November report, immediately after a test car had been employed to determine the number of open and defective joints in Providence, 946 open and 1245 defective joints were recorded, making an estimated total of 13 per cent of the entire number of joints on the system. Following this tabulation, track in fifteen streets was renewed and double-bonded by the company with No. 0000 bonds, covering not far from 700 joints. The total number of joints estimated in use on the entire city system is 20,894, in 92.6 miles of single track. The city recommends that the defective joints be repaired at once, in order to reduce the dangers of electrolysis.

In the 1914 report it was recommended that the Rhode Island Company electrically weld all of the joints in Providence. Investigations were made and several interviews were held with representatives of the Lorain Steel Company, with the result that it appeared a rather expensive task to attempt electric welding under the local conditions, a concrete base for the track being used in a number of cases. The cause of the excessive cost of electric welding in this case is as follows.

With the headway prevailing in certain sections it was found to be impossible to place cross-overs, between which to operate single-track sections, more than 1000 ft. apart. As the concrete base would have to be set up at least a week, this spacing of cross-overs would permit the company to build about 150 ft. to 200 ft. of track per day. Its engineers believed that it would be of no use to build any faster because the 1000 ft. would only be done before the week was up, and work would have to be stopped for the concrete to set before the cross-overs could be removed. Building 150 ft. to 200 ft. of track would call for welding about six joints per night. The company found that it was required to furnish thirty-two joints per night to keep the welder busy or to pay about $6.50 per hour to keep the welder on the job. Representatives of the welding company conceded the impracticability of using their equipment under these conditions, pointing out that in most cities the street railway does not confine itself to such a short stretch of torn-up track, and sometimes lays temporary track to care for traffic. Where the streets are wide enough the traffic is diverted to parallel lines and a half mile or more is opened up at once. The welding company's opinion is that crushed stone ballast gives better results than concrete, on account of the lack of time in large cities for hardening the latter, the tendency toward hard running and noise, and the liability of corrugation in rails due to excessive rigidity.

H. W. Sanborn, chief engineer The Rhode Island Company, stated in a letter to Mr. Brunet, dated April 21, 1915, that the railway company believes the electrically welded joint to be the best on the market, both mechanically and electrically, but cannot find it practicable to install welded joints on tracks with concrete base. The present agreement of the company with the city requires that tracks be laid on a concrete base, although a modification of this requirement is under consideration. It is recommended that the company investigate in the meantime the electric welding of bonds. The report also favors the installation of permanent pilot wires between selected points on the track system and the basement of the City Hall, holding that the maintenance of low potential variations will be facilitated and the prompt discovery of abnormal conditions hastened. The report also contains the results of various mechanical tests of strength in pipes removed on account of electrolytic action. Temporary bonding during construction and repair work is also advised, with further test-car observations in the spring of 1916.

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*See ELECTRIC RAILWAY JOURNAL, Nov. 14, 1914, page 1109.

Colorado Association Meeting

The thirteenth annual meeting of the Colorado Electric Light, Power & Railway Association was held at Glenwood Springs on Sept. 23 and 24, with a record-breaking attendance. W. F. Raber, general manager Arkansas Valley Railway, Light & Power Company, presided. The program for this meeting was printed in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 18, page 605.

The special feature of the convention was the presence of three members of the Colorado Public Utilities Commission, Messrs. Aylesworth, Rankin and Herbert.

The president in his address drew attention to the work of the association. "During the past year," he said, "the association has made an earnest effort to bring about the recognition of that fundamental principle of all public utility legislation—the elimination of competition, with complete regulation. The future of the business depends largely upon the inducements offered capital for permanent investment."

On motion of L. P. Hammond, vice-president Colorado Power Company, resolutions relating to the matter of federal control of water power were passed. One of these was as follows:

"Be it resolved, That the Colorado Light, Power & Railway Association in annual convention assembled deprecates and protests against the federal policy contained in the Ferris bill directly contravening the views herein expressed, and against any federal policy denying to the States the right to condemn public lands at not exceeding the fair market value of the lands so condemned, or any policy depriving the States of their inherent right to control and regulate their own internal affairs, or conflicting with such control and regulation by the State."

W. N. Casey of the Denver City Tramway Company, in his paper on "Present-Day Street Railway Problems," treated principally of the matter of taking the public into one's confidence, remarking that the relations of the street railway company to the public embraced a great many of its problems. The jitney was naturally taken up in the discussion as it furnishes one of the pressing problems of the day.

F. V. Rankin, engineer of the commission, gave a paper on "Valuation of Public Utility Properties." He said that the whole theory of regulation is built upon the foundation that private ownership shall be required to furnish adequate and satisfactory service at reasonable rates and shall be allowed to earn a reasonable return upon the fair value of the property dedicated to the use of the public.

Fred W. Herbert, auditor Colorado Public Utilities Commission, followed with a paper on "A Uniform System of Accounting." Mr. Herbert said that any system of accounting must be simple but accurate and effective and designed to show satisfactorily a complete analysis of the investment, the earning and operating expenses, and embody enough detail to enable the commission to determine the profitableness and efficiency of the utility and to enable the utility to make its annual report to the commission in conformity with this classification.

"The Indeterminate Franchise and the Certificate of Public Convenience and Necessity" was the subject of a talk given by M. H. Aylesworth, member and attorney Colorado Public Utilities Commission. Mr. Aylesworth interpreted the indeterminate permit as the right to occupy and use the streets of a city or a part of the State highways, service being given for reasonable compensation under regulation by the State, and monopoly being assured to the operating company, but with the power vested in the municipality to buy the property through a vote of its people at a fair value to be fixed by the regulating body of the State.

The next paper, "Depreciation as Affecting Valuations and Assessments," was given by Daniel W. Knowlton of Smith, Knowlton & Hatch, attorneys of Colorado Springs, Col. Mr. Knowlton presented one of the best papers of the convention, discussing his subject fully and with complete knowledge. He treated of tax assessments, "sinking-fund" and "straight-line" methods, and left no point uncovered.

Other papers treated of topics of particular interest to the lighting companies.

Following is the list of officers elected: President, John J. Cooper, Denver, Col., secretary Gilpin County Light, Heat & Power Company; vice-president, L. P. Hammond, Denver, Col., general manager Colorado Power Company; secretary and treasurer, Thomas F. Kennedy, Denver Gas & Electric Light Company. The executive committee will comprise H. U. Wallace, Boulder, Col., vice-president and general manager Western Light & Power Company; W. J. Barker, Denver, Col., vice-president and general manager Denver Gas & Electric Light Company; F. P. Wood, Trinidad, Col., general manager Trinidad Electric Transmission, Railway & Gas Company; W. F. Raber (ex officio), Pueblo, Col., general manager Arkansas Valley Railway, Light & Power Company.

The B. R. T. Mechanical Department

A Review of Organization Progress During the Past Decade with Figures Showing Recent Excellent Work in Safety Promotion

The introduction to the fourth quarterly report of the departmental safety committee, mechanical department Brooklyn Rapid Transit System, reveals in a frank, intimate manner the organization of the department and the degree of co-operation between the executive and the rank and file. An abstract of this report as made by W. G. Gove, superintendent of equipment, follows:

Within the ten-year period covered by Mr. Gove's superintendence, all employees have been classified upon payroll standards, with standard rates of pay for each occupation. Previously there was no set standard rate of pay, whereas the new classification provides (except for carpenters, who have a split rate between the 25-cent and 27½-cent grades) for promotion by steps of 25 cents per day. The rates of pay reflect an average increase of approximately 20 per cent within ten years.

There were but few weekly-salaried employees previous to July 1, 1905, and foremen were paid upon an hourly basis. On that date, however, a new schedule and standard classification was inaugurated. Foremen were placed upon a weekly-salaried basis and received a larger salary than when paid upon an hourly basis. In general these salaries have since been increased.

PROMOTION AND A SQUARE DEAL

Knowledge that a few foremen had practiced favoritism to the disadvantage of employees and appreciation that such tactics reflected no credit upon anyone, least of all upon the management, led to the establishment of a non-partisan system of promotion. An employee can be advanced only by recommendation to the main office of the department, where his record is scrutinized and approval or disapproval obtained. Seniority of service always receives careful consideration, whether for promotion or re-employment after lay-off. This practice is in harmony with the policy announced years ago, namely, that consistent with the work involved, no man for any advanced position would be placed upon the rolls from an outside source where eligible men are already employed.

The weekly-salaried force at the surface carhouse shops now comprises a foreman, an assistant foreman, a responsible night foreman and a clerk, in addition to the regular force employed upon an hourly and daily basis. The elevated shops have also a chief clerk and a clerical force; and at the southern division elevated shop, there is an overhauling department, the head of which reports to the foreman of that shop, independent of the inspection organization. This department is responsible for the overhauling of the entire elevated and subway car equipment.

TIME OFF AND VACATIONS FOR WEEKLY-SALARIED EMPLOYEES

Previous to July 1, 1905, no foreman or employee upon a then so-called weekly basis received time off with pay unless a day off now and then was asked for specifically. At first, one Sunday each month was granted only to the foreman, but now the foreman is expected to be at his shop only on alternate Sundays, the assistant foreman being in charge during the foreman's absence. Upon the elevated lines, the assistants are allowed Sundays off when the foreman is on duty, and upon the surface lines the assistant foremen are granted alternate Wednesdays off with full pay; night foremen upon both the surface and elevated lines receive alternate Saturday nights off with pay; clerks while expected to report at their respective shops in case of emergency, are not ordinarily required to work more than six days per week with Sundays off.

At the large general repair shops, the shops are now closed at 12 o'clock noon each Saturday, remaining closed until 7 a. m. Monday. The foremen and clerks, therefore, except in the shop offices which close simultaneously with the main departmental offices at 1 p. m. on Saturdays the year round, receive Saturday afternoon off the year round with pay, in distinction from the previous practice of working until 4.30 p. m. The hourly-rated employee receives six hours' pay for five hours' work instead of ten hours' pay for nine hours' work.

With the summer of 1907 the company inaugurated a vacation schedule of from one to two weeks (one for employees holding their positions six months and less than one year, and two weeks for a year or more). These vacation privileges were granted to superintendents and foremen and the office force at the three general repair shops, to the office force and heads of the elevated and surface maintenance shops, as well as to all employees at the main departmental offices, including engineers, draftsmen, clerical force, etc. In the spring of 1914 it was decided to include the assistant and night foremen at the elevated maintenance and surface carhouse shops and the clerks at the latter. However, in these latter additional cases, but one week or three days is granted as the one year or six months' tenure of office would indicate.

MILITARY DUTY

Col. T. S. Williams, president Brooklyn Rapid Transit System, has granted leave of absence to all employees who wish to attend encampments of the State militia. They will receive their regular pay, based upon salary received or average wage earned. The only reservation made is that a weekly-salaried employee must take such tour of camping duty as falling within his vacation, and shall not be entitled to an extension thereof, with pay.

WELFARE WORK AND SAFETY WORK

Upon the earnest solicitation of the superintendent of equipment, the management granted free transportation early in 1913, through the use of appropriate badges, to all employees of the surface and elevated maintenance shops. Upon July 1, 1915, 428 employees of this department were using such badges. All weekly-salaried employees receive one or more books of employees' tickets, according to their position and work. This is another privilege gained by their reclassification from an hourly to a weekly basis.

Wherever possible, lounging and lunching rooms have been and are being provided, wherein smoking is permitted. Other efforts have been made to make the shopman's surroundings more attractive. To this end the company has appropriated several hundred dollars for flowers each spring, and maintains lawns and flower beds wherever the property will permit their introduction. Flag poles have been erected and flags displayed upon proper occasions at several of the shops.

As the work of the mechanical department is laid out from season to season and from year to year, and is frequently planned as much as three years in advance, with the idea of maintaining as constant a force (now about 1700) as possible, it is recommended that—

First: All employees at the various surface and elevated maintenance shops and departments of electrical repairs who may be eligible to membership in the Employees' Benefit Association shall belong thereto.

Second: All employees engaged upon such work at the general repair shops where they have every reasonable assurance of continuous employ, should also be members or should promptly apply for membership.

The pension system inaugurated on Jan. 1, 1910, also applies to the mechanical department.

To promote fair treatment and a thorough understanding of the various duties of all employees, a book of rules was formulated after many conferences with the heads of all shops concerned. This book has been issued to all employees of the maintenance shops, and in certain instances to employees at the general repair shops. Substantial bulletin boards are used to post placards, notices to employees and other essential information, that all may be kept posted as to changes or regulations.

The following recent safety suggestions made by employees have been approved:

Provide respirators to those engaged on work where there is much dust.

Install lights over stairs leading from shop to street at eastern division elevated shop.

Alter connections between the storeroom and the Fifty-second Street surface shop.

Use safety appliances at all shops to hold motor shells open when replacing armatures, fields, etc.

The total safety expenditures to June 30, 1915, were $7,813.61. The medical inspection bureau of the B. R. T. Employees' Benefit Association shows the following reductions in accidents for the first six months of 1915 compared with the last six months of 1914: Total accidents reduced from 159 to 123—electric burns alone from 102 to 73. Days lost for the latter injuries were cut from 102 to 73.

COMMUNICATIONS

Box-Frame Motor Practice

THE RHODE ISLAND COMPANY

PROVIDENCE. R. I., Sept. 24, 1915.

To the Editors:

By way of contributing to the discussion of box-frame motor practice, begun in your issue for Sept. 4 by an abstract of an article by J. L. Booth of the General Electric Company, I would state as follows:

When we installed box-frame motors about Jan. 1 of this year we planned a method for removing armatures without tipping the motors up on end for the purpose of avoiding danger of accidents and the trouble resulting from oil spilling out of the commutator and armature bearings. Outside of experimental work we have only had occasion to remove one armature which was defective, and we may not have to remove another for a considerable period of time. The method which we worked out is described in the abstract referred to, page 411, this company being the one mentioned as operating GE-200, box-frame motors.

We designed the cast-iron ring carrying the sheave, which is secured to the commutator end of the motor frame by two loose-fitting cap screws. These can be set in place without a wrench. The ring is a fairly loose fit and is flanged so that it is self-supporting.

With a GE-200 motor the armature is of such light weight and the leverage obtained at the pinion end is so great that one man can easily remove the armature from the frame to a point where a support can be placed under the end of the tube, and final removal can be taken care of by the overhead hoisting block, a sheet metal sling being placed around the body of the armature. The cost of the apparatus used is small and so far it has proved satisfactory.

W. D. WRIGHT, supervisor of equipment.

Automatic and Distant-Control Substations

THE EDISON ILLUMINATING COMPANY OF DETROIT

DETROIT, MICH., Sept. 29, 1915.

To the Editors:

Referring to the recent article on the automatic substation by Messrs. Allen and Taylor, I would state that the conditions requiring a distant-control substation (of which the Detroit Edison Company now has three) and those requiring an automatic substation such as that on the Elgin & Belvidere Railway, are quite different. I believe that the Elgin & Belvidere substation is a sequence of a visit by B. J. Arnold to Detroit, during which I casually mentioned to him and later, by his request, showed to him our Rowena Street substation. Mr. Arnold immediately saw that the stopping and starting of the rotary might be made automatic; under control of voltage variation in the d.c. line. He also saw that the conditions of an electric railway would be better served by such automatic starting and stopping; whereas the conditions of a d.c. light and power network would be better served, as in the Detroit case, by control normally from a distant point, becoming automatic only under abnormal conditions.

The essential difference in the conditions is that the daily load curve of a light and power network can be predicted with reasonable certainty and the starting and stopping times of the outlying rotary can be scheduled within narrow limits for weeks ahead. The only reason why the starting cannot be precisely scheduled is that a dark afternoon requires an earlier start, but the variation to be made for that cause may be left to the discretion of the distant operator. On the other hand the load of an interurban railway varies rapidly within very wide limits, and in an irregular manner. Minor departures from time-table by cars moving in different directions may become cumulative, or may cancel quite erratically, in their effects upon the requirement of current at an outlying substation. A collateral difference is that a considerable variation of voltage is permissible on an interurban trolley wire, and therefore no very fine setting of automatic starting and stopping gear is required. On a d.c. network supplying light, close regulation is customary and the variation of voltage desirable for reliable starting and stopping would be sufficient to cause service complaints. In practice the "distant-control" substation is handled rather carefully for the express purpose of avoiding notable local voltage variations.

There is a future for the automatic substation on railway work. In conjunction with the 1200-volt trolley wire it practically removes the distance limit from d.c. service to thinly settled territory.

ALEXANDER DOW, President.

Taxation of Utilities

COLUMBUS, OHIO, Oct. 12, 1915.

To the Editors:

The question propounded in the ELECTRIC RAILWAY JOURNAL of Sept. 11 by F. N. Fletcher, former member of the Nevada State Tax Commission, namely, "Should utilities be assessed by public service commissions?" naturally opens up the more important question, "Ought utilities to be taxed?"

Mr. Fletcher discusses this second question before he takes up the first. There can be small chance for disagreement with his contention that where utilities are unregulated as to either rates or service and can charge all that the traffic will bear, some form of taxation should be indulged in. Inasmuch, however, as most States attempt to regulate the service and service charges of all utilities, that phase of the subject is of little interest in this discussion.

Mr. Fletcher completely answers this second question when he says at the outset, "In the quite different case of utilities under the intelligent and continuous regulation of public service commissions, it really makes little difference to the utilities whether they are taxed or not." As Mr. Fletcher asserts, such taxes are added to the expense account, "and rates are allowed to cover expenses. The incidence of its taxation," he continues, "is, properly enough, passed on to the consumer." In the old days a utility was allowed to charge more than the service was worth, and the public thought it was doing the smart thing to tax a part of that back into the public treasury. We do not hear so much about this these days, for the reason that as soon as the public began to regulate service and charges therefor, it was discovered that one of the costs was this very charge arbitrarily put upon the service by the public. That cost had to be paid, and the only fund out of which it could be paid was the fund that came from the consumers, who are really the public.

With Mr. Fletcher's contention that utilities ought to be taxed, because only a part of any community uses the service of any one utility and should not receive a lower rate for such service through the exemption from taxation of the property used in furnishing it, I do not agree. It must be apparent that in any community practically all of the people use all of the utilities, most of them directly and all indirectly. Therefore it is too costly to go through the operation of assessing and collecting taxes through service charges, when after it is done practically everybody in the community has contributed. It would be much easier to remove taxation from the service charges, save the cost of assessment and collection, and let everybody contribute to the cost of government in the usual and more economical way.

Of course, the real reason why a utility ought not to be taxed as such, is because its presence in any community enhances the value of the land more than the cost of the utility. The financial benefits of a utility are passed on to the landowner. The consumer has to pay increased rents, which is all right as far as the consumer is concerned, but all wrong if in addition he also has to pay a higher rate for service because of taxes. In other words, the consumer has to pay these taxes twice, once in higher rents and once in higher service charges.

E. W. DOTY,
Former Member Ohio Public Utilities Commission.

Girder and High T-Rail Renewals

NEW YORK STATE RAILWAYS

ROCHESTER, N. Y., Sept. 17, 1915.

To the Editors:

The article which you recently published on "Girder and High T-Rail Renewals," invites considerable study, as there are many points brought up which are worth serious consideration. There are also some statements which presumably will be objected to by a number of the engineers throughout the country.

The wear limit on rails which determines the renewals is a matter that has not been given a great deal of study on account of the truth in the old adage, "The life of the joint is the life of the rail." Another factor which has contributed largely to rail renewal is paving conditions. City ordinances are frequently passed requiring the construction of new pavement, necessitating new tracks even though the rail wear limit has not been reached. In the past, renewals have been made and rail discarded without being worn out because there was sufficient profit to permit this waste. Economic conditions, however, as pointed out in this article, are such that a waste of this kind can no longer be countenanced.

As stated in the article the wear limit of the rail is a variable factor, and different types of rail have different wear limits. For instance, a tram rail, such as Lorain Steel Company's section 73-291, would reach the safe limit of wear when the flanges of the wheels begin riding on the tram. Anything beyond this point is at the expense of safety. This is illustrated in a derailment with which I am familiar, which was the result of the track having a flange bearing on one side, whereas, due to a broken joint and a new piece of rail being cut in, there was no flange bearing on the opposite side. As a result of the flange bearing the wheels had a larger diameter on one rail than on the other, which resulted in the slewing of the trucks to one side and the derailment of the car.

The permissible wear with the groove or trilby rail is considerably greater on account of the guard effect of the groove. However, all things considered, a reasonably safe assumption would be that rail reaches its natural life at the time the flange bearing becomes noticeable.

The article states that rail corrosion is a matter to be considered in rail renewals. While this may be true, there are very few occasions when corrosion is sufficient to warrant renewals. Theoretically the article is perhaps right in the assumption that a well-drained track leads to more rapid corrosion, but actual observations do not verify this, on account of the fact that rail corrosion is more frequently due to electrolysis than oxidization. Therefore, well drained track is less liable to suffer than poorly drained track.

Recent changes in the chemical analysis have materially increased the wear of the rail. In addition to this the harder rail results in a better joint; that is, there is less tendency to cup at the joint with the high carbon rail than with the rail formerly used. As an example of the wear, measurements taken about two years ago show that on open-hearth rail having 0.70 to 0.90 carbon the rate of wear was 1/64 in. per year; whereas, the rail of a different type having 0.40 to 0.60 carbon wore at the rate of about 1/16 in. per year. This difference may not have been entirely due to the chemical analysis as the track was of a different type of construction and different type of rail, but both were subject to the same traffic.

Another factor pointed out in the article which is worth serious consideration is the type of ballast and other details of construction. Though I have been unable to obtain any figures which would show the relative wear of rails laid on a rigid foundation, such as concrete, as compared with rails laid on a resilient foundation, such as crushed stone, yet I am of the opinion that the author's statement will be substantiated. At least it has been my observation that joints cup less on a resilient foundation than they do on a rigid foundation.

The character of the pavement is a matter which, while having no real bearing on the actual wear of the rail, is frequently the reason for renewals. While pavement is a matter which is now almost invariably a local situation and one which must be decided locally, yet there are conditions of which advantage may be taken. For instance, ten or twelve years ago a number of streets throughout the city were paved, and on account of financial or other conditions existing at that time new rails were not placed in the pavement. As a result these rails were worn out much before the pavement or ties. The situation was met by relaying new or second-hand rail on the old foundation without disturbing it in any way, and relaying the paving surface. This resulted in a comparatively cheap reconstruction of track and gave a construction in which the rail and the ties embedded in the concrete would all last about the same length of time, and like the "One-Hoss Shay" would be all scrapped together.

Another matter in connection with pavement is proper maintenance. With suitable paving gangs the pavement can be repaired from time to time, adding such new brick or stone as are necessary, with the result that the life of the paving can be so increased that the rail may be worn out.

Another important factor brought out in the article which affects the track as well as the pavement is the drainage. Inasmuch as dry soil has considerably greater bearing power than wet soil, proper drainage will increase the bearing value of the soil, and by increasing the depth of the ballast, the area of weight distribution can be increased so as to produce a uniform distribution of weight on the sub-grade or soil. This depth of stone or gravel ballast obviates the necessity of putting in a sub-base of concrete under certain soil conditions and also contributes to good drainage.

A matter in connection with the crown of the streets which affects the rail wear but which is not brought out in the article, is the practice in some cities of placing the devil strip rails ½ in. or ¼ in. higher than the outside rails so as to assist in giving the street a crown. This method of laying track is not satisfactory on account of the fact that it increases the weight on the outside rail, increasing the rail wear in addition to increasing the wear on the equipment, particularly with single-end cars. In addition to this there is an increased tendency to create wide gage in track, and as soon as this wide gage obtains there is marked tendency for the cars to nose or sway. Therefore this practice is an increasing factor in the wear of the rail as the track becomes older.

Relative to the formula which the author of the article in question has suggested to determine the proper time for renewal, it would seem to me that this is rather complicated and that it includes a number of factors which need not be taken into consideration. For instance—the taxes, at least in the State of New York, are based upon the franchise value and this has nothing to do with the cost of the track. Another is that the distribution of accounts, whether betterments or operating expenses, has little or no bearing upon the economics of the situation, and it would seem to me that a simpler means of determining the proper time for replacement of rails would be as follows:

Total estimated cost of replacement with old rails less the estimated scrap value, divided by the estimated life of old rail, plus the estimated average annual maintenance on the old track, plus the annual interest on the estimated cost of replacement with old rails, or

$$\frac{R_1 - S_1}{L_1} + M_1 + I_1$$

equals the total maintenance and fixed charges per year with the reconstructed old rail. This figure, the total maintenance and fixed charges per year, should be compared with the total maintenance and fixed charges per year on track reconstructed with new rail, which is arrived at as follows:

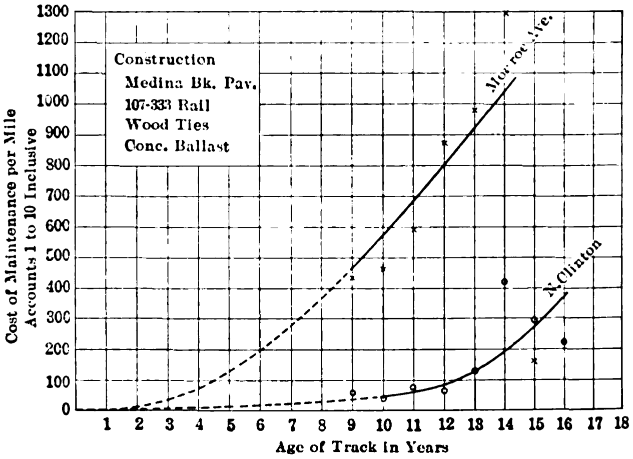
Total estimated cost to replace track with new rail, less the estimated scrap value, divided by the estimated life of the new rail, plus the estimated average annual maintenance per year, plus the interest on the estimated cost to replace track with new rail, or

$$\frac{R_2 - S_2}{L_2} + M_2 + I_2$$

The latter figure equals the total annual maintenance and fixed charges per year with the new rail. When the total maintenance and fixed charges per year with the old rail are greater than the figure arrived at with new rail, then new rail should be used in the replacement. When the opposite condition obtains old rail should be used in the replacements.

In considering this comparison of the estimated total maintenance of each type of construction different factors can be used. For instance, in case the old rail is to be used it might be possible by co-operating with the city authorities to convince them that a cheaper type of pavement would be suitable under the conditions, which would result in that the total estimated cost of replacing old rail would be a less amount, and therefore might favor the use of the old rail. As an example of this, during the present year our plans for reconstruction include some tracks in which the ballast, ties and other material are to be renewed except that the brick which is now in place when taken out will be sorted over and that which is suitable will be relaid. During the past two or three years on construction of this kind we have found it possible to use from 25 per cent to 50 per cent of the old brick which has resulted in considerable saving without detriment to the new construction.

Another street we have planned for improvement this year is outside of the city and the rails have been worn for eight or nine years. This track was originally laid with gravel ballast, 7-in. rail and macadam pavement. It is now proposed to renew the pavement outside of the tracks with brick, and the construction in the track is to be the same ballast with the necessary tie renewals and the same rail, the foundations not being disturbed in any way as the grade of the street remains the same. It is proposed to carry the brick pavement outside of the legal width up to the rail. Between the rails and in the devil strip it is proposed to use a concrete pavement which will be coated with Tarvia. In addition to this there will be placed a Medina block header adjacent to the gage side of each rail so as to take the extra wear due to vehicular traffic along the rail. It is estimated that the concrete pavement under the existing traffic conditions will last about the life of the rail, and this will result in the entire track and pavement being worn out at approximately the same time. Since this stretch of track is adjacent to the city it is probable it will be taken inside the city within the next few years and that sewers, water mains, etc., will be placed. The tracks may therefore be reconstructed without serious loss.



CHARACTERISTIC CURVE OF SINGLE-TRACK MAINTENANCE FOR TWO STREETS WITH DIFFERENT TRAFFIC CONDITIONS

Matters of this kind can only be arranged through co-operation with city and state officials because when these men appreciate that the railway companies are interested in the best results possible they will be willing to make what may seem to be concessions in order to gain the greatest good for the greatest number.

Another factor in the comparison is the estimated maintenance per year. It is a well-known fact that the maintenance increases with the age of the track so that the curve representing the annual maintenance charge would not be a straight line. An example of this is shown in the accompanying cut which is taken from actual maintenance costs on certain streets. It will, therefore, probably be necessary in order to obtain the maintenance item per year to take the accumulated maintenance for the entire life of the track and to divide this by the life so as to obtain an average annual maintenance. This figure could only, of course, be arrived at through a study of the maintenance charges on individual stretches of track, taking into consideration all of the variables, such as traffic, type of construction, etc.

Relative to the conclusions submitted in the article in question, certain of them are questionable. For instance, the conclusion that appears as No. 5 refers to the responsibility of heavy vehicular traffic for rail renewals, but it would seem to me that, with proper maintenance and proper selection of pavements, this condition need not obtain. The same criticism can be made of No. 6, whereby means of proper selection of pavement and rail and with proper maintenance, no one factor could require the renewal of the entire structure.

Relative to the amount of head reduction for groove and girder rails, it would seem that 50 per cent is too large for the older types, 30 per cent being more properly the safe limit. This difference in the per cent, however, may be due to a difference of opinion as to what constitutes the head of the rail. Fifty per cent may be a reasonable figure for wear on T-rails, but it is rather questionable if this amount of rail wear can be obtained where other factors such as the shape of the head, gage of the track, joints, etc., may not be such as to require renewals. On the whole this is an article which covers a field which has not been given a great deal of consideration from the press, and it would be very interesting if a number of the engineers throughout the country would give their opinions and experiences with regard to this matter.

D. P. FALCONER,
Engineer of Maintenance of Way.

Fair Overhead Charges Allowed

Commission Sets 20 Per Cent for Contractor's Profits, Engineering Supervision, Etc., and 12 Per Cent for Preliminary and Development Expenses of Bronx Gas & Electric Company

The recent decision of the Public Service Commission for the First District of New York, in passing favorably upon the application of the Bronx Gas & Electric Company, New York, for permission to fund $16,880 expended from current revenues, took up the question of the company's valuation and the inclusion therein of allowances for certain intangible values—i.e., 20 per cent for contractor's profits, engineering supervision, contingencies and incidentals, and 12 per cent for preliminary and development expenses. The opinion, which was rendered by Commissioner Robert C. Wood, was approved on Sept. 28 by a four to one vote. The company produced no data upon which to base reasonable allowances for these items, and as the early records were missing, estimates based on general knowledge and experience had to be made.

According to Commissioner Wood, it was asserted that the allowance of 20 per cent for contractor's profits, engineering supervision, contingencies and incidentals over and above the net cost of the property, was too large and should be reduced to 10 per cent. In his opinion, however, during the construction period of public utility corporations many and varied expenses have to be met, contractors must be allowed a fair profit, or, if the work is done by the company itself, proper supervision must be provided for. Engineers must be employed to supervise construction and installation of plant and equipment, and a sum must be set aside to meet the unforeseen contingencies that are bound to occur in every undertaking of this character. In appraising the plant and equipment, therefore, a fair allowance should be made for all these items. Allowances of 10 per cent for contractor's profits, 5 per cent for engineering supervision and 10 per cent for contingencies and incidentals are figured on a most conservative basis when taken individually. In this decision they are only taken collectively in the form of 20 per cent. In several cases as decided by this commission, a larger amount was found to be justified, but the figure now approved represents a conservative average of the previous allowances made by this and other commissions. In the Kings County Lighting Company case (2 P. S. C. R. 659) an allowance for these items of 21.6 per cent arrived at in this manner received the approval of the Appellate Division.

Similar arguments are said to apply to, and the same principles should be followed in, the allowances that should be made for preliminary and development expenses. The Bronx Gas & Electric Company was incorporated in 1893 and began business in 1895, when the electrical industry was in its infancy, and the gas business was in a comparatively crude state as compared with that of the present day. The company's franchise rights and field of operations covered a sparsely-settled territory extending over a large area. The company had before it the question of its ability to market its bonds and so raise funds to meet the requirements of the territory it served. The commission has recognized that public utility companies, especially those beginning business in new territory, are entitled to a legitimate sum for certain expenses that must be met before the plant can begin operation. The present allowance of 12 per cent is simply a conservative average of allowances made in similar cases by this and other regulatory bodies.

Commissioner Wood calls attention to the fact that the decision recommends the deduction of $137,722 for accrued depreciation from the net cost of the property. When the statement is made that $267,264 is added for overhead expenses (viz., $160,243 for contractor's profits, engineering supervision, etc., and $107,020 for preliminary and development expenses), it should also be stated that the sum of $137,722 is deducted for accrued depreciation on tangible property other than land. Instead of adding $267,264 to the basic figures of the engineers, the net addition is but $129,542. The total net overhead charges recommended to be allowed are therefore but about 8 per cent of the present capitalization of the company and about 13 per cent of the capitalization as of Dec. 31, 1908. When the $137,722 recommended for accrued depreciation is deducted from the $160,213 allowed for contractor's profits, engineering supervision, incidentals, etc., the amount to be added to the net cost of the property is but $22,523. This sum is about 2½ per cent of the capitalization of the company as of Dec. 31, 1908, and about 1½ per cent of the present capitalization.

A considerable portion of a supplementary memorandum to Commissioner Wood's decision is devoted to showing that the actual overhead charges in the New York & North Shore Traction case (3 P. S. C. R., First District, N. Y. 67) amounted in both instances (contractor's profits, engineering supervision, etc., and preliminary and development expenses) to more than 20 per cent. Commissioner Haywood had stated that these charges amounted to only 9 per cent.

Jitneys in South Bend, Ind.

The Chicago, South Bend & Northern Indiana Railway has been keeping a careful tabulation of the number of jitneys operating in South Bend. Notice is taken not only of the total number of jitneys each day but also of their license number, so that it is possible to keep track of the number of days which each car runs. A graph of these data during July was published on page 399 of the issue of this paper for Sept. 4. The figures for August show that on Aug. 31 there were thirty-eight jitneys in operation, but that since July 1, 336 different cars had been engaged in the service. In other words, 198 gave up to every thirty-eight which stayed in. Aug. 31 was a Tuesday, which is an average day for the jitneys. Saturday is the day of largest traffic. On that day the number is about fifty. Monday seems to be the low day of the week.

Equipment and Its Maintenance

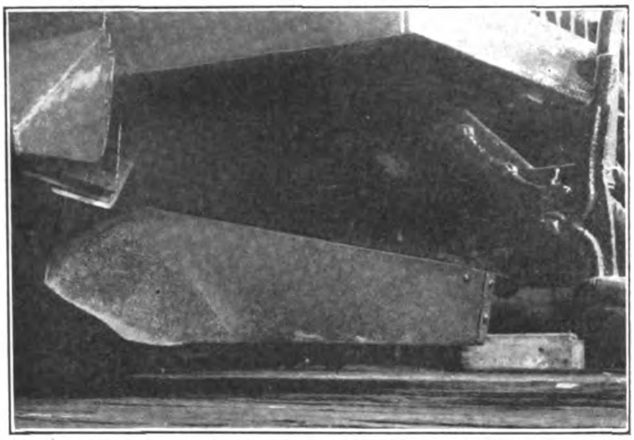
Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Snow Plow and Life Guard Combined

BY C. M. FEIST, MASTER MECHANIC SIOUX CITY (IOWA) SERVICE COMPANY

All cars of the Sioux City (Iowa) Service Company are equipped with a device which has served as a snow plow during the winter months and as a life guard at all times. This combined plow and guard is made of 3/16-in. sheet steel reinforced with ⅜-in. x 2-in. x 2-in. angles. The plow wings distend at an angle of about 120 deg., and they are 14 in. high at the ends and 8 in. high at the nose. The feature of the plow is the method of mounting it beneath the vestibule platform. The nose is pivoted in a fixed position 4 in. above the top of the rail. A trip operated by the motorman from the vestibule floor releases the ends of the wings, which drop to the pavement surface. These wings drag along the tops of the rails clearing away the snow and, in case an obstruction is met, they merely slide over it. In other words this plow readily adjusts itself to any inequalities in the street surface and, at the same time, clears away the snow down to the tops of the rails. The method of pivoting the plow nose is by way of two brackets or hangers which in turn support the ends of a ¾-in. x 4-in. bar with the ends rounded to form the pivots. This combined plow and wheel guard has been in service for a number of years and has been found very effective. A view of one of them is shown in the accompanying illustration.



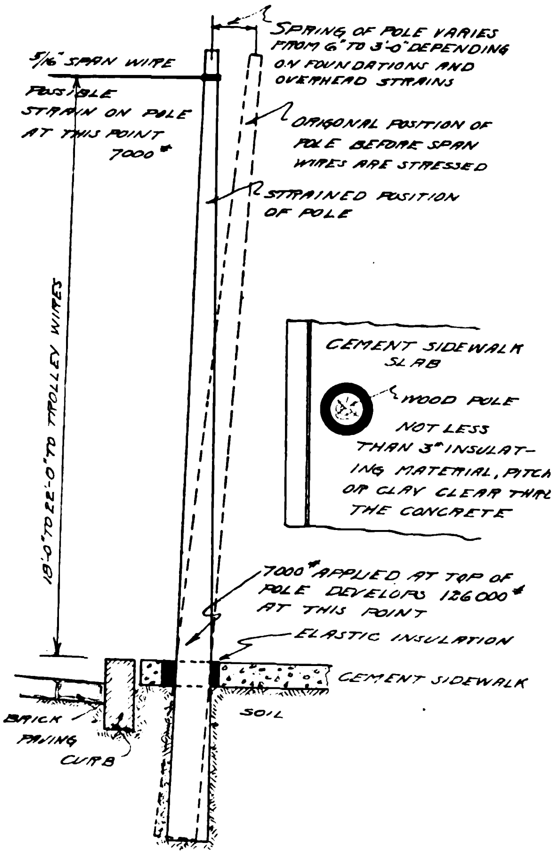
COMBINED SNOW PLOW AND LIFE GUARD

Destruction of Cement Sidewalks by Trolley Poles

BY CARL H. FULLER, GREENSBURG, PA.

It is not an uncommon sight to see long stretches of cement sidewalks disfigured by being badly split, checked and broken, or curbing pushed out of line where the slab surrounds and comes in contact with trolley poles, public service poles, fire hydrants and such obstructions, which extend through the sidewalks to various depths in the soil below. Unquestionably this defect is most noticeable around the trolley poles of the electric railway companies.

The writer has long been an advocate of 3 ft. or more of street lawn between the sidewalk and the curbing, which provides ample space for locating these inevitable obstructions where they will do the minimum of damage and at the same time affords an opportunity to beautify the street by planning trees therein. Unfortunately, the street railway man has to adjust his work to existing conditions by setting his poles through cement sidewalks already constructed and extending to the curb line. To do this, he chips a hole in the cement walk, excavates for and beds his pole, then finishes the job by restoring the cement walk around the pole. Later the sidewalk becomes checked and broken around the pole and the company is blamed for careless workmanship. The railway company is not always to blame for this condition as the walk is frequently laid after the poles are set, the mechanic doing the work also cementing tight around the pole, when in a short time the same defect appears.


SPRING OF POLE VARIES FROM 6" TO 3'-0" DEPENDING ON FOUNDATIONS AND OVERHEAD STRAINS
5/16" SPAN WIRE
POSSIBLE STRAIN ON POLE AT THIS POINT 7000#
ORIGONAL POSITION OF POLE BEFORE SPAN WIRES ARE STRESSED
STRAINED POSITION OF POLE
18'-0" TO 22'-0" TO TROLLEY WIRES
CEMENT SIDEWALK SLAB
WOOD POLE
NOT LESS THAN 3" INSULATING MATERIAL, PITCH OR CLAY CLEAR THRU THE CONCRETE
7000# APPLIED AT TOP OF POLE DEVELOPS 126000# AT THIS POINT
ELASTIC INSULATION
CEMENT SIDEWALK
SOIL
BRICK PAVING
CURB

SKETCH SHOWING STRAIN APPLIED TO CEMENT SIDEWALKS BY TROLLEY POLES AND METHOD TO PREVENT DAMAGE

In several instances coming under the writer's observation either the public has demanded, or the railway company of its own initiative has sought to avoid this trouble by employing various expedients that usually have failed to recognize the threefold basic cause of the trouble. However, the cause is not far to seek and the remedy is neither expensive nor difficult to apply.

The sidewalk slab contains within itself its own most destructive agency, expansion, and competent sidewalk men endeavor to provide for this, when laying walks, by the use of various types of expansion joints. They usually overlook the fact that any pole or other object extending through the slab to any considerable depth in the soil below, being thus anchored, acts effectively to destroy the thin slab of concrete by preventing its lateral movement while undergoing expansion. That this lateral movement is considerable and of enormous force is evidenced by its frequent overturning effect on adjacent curbing. The writer knows of one instance in Guthrie, Okla., where a 200-ft. stretch of continuous sidewalk, effectively anchored at one end, moved uphill under the expansive action of the rising summer temperatures until the upper end projected fully 6 in. over the curbing. Had there been poles in this walk they would have been sheared off at the sidewalk line or portion of the slab surrounding them would have been broken.

Another cause of checking and breakage may be traced directly to the pole itself. The majority of the poles used are of wood, and their swelling alone, due to varying conditions of moisture, is sufficient to crack the thin slab of concrete surrounding them. An evidence of the immense expansive power of wood when swelled with moisture is seen in one of the methods used in quarrying fine building stone. In this a series of holes, sometimes several feet in depth, is drilled along the desired line of cleavage, and the holes are filled with tightly-fitting kiln-dried wood plugs which are then saturated with water. As this process will split huge slabs of the hardest granite, the thin slab of concrete, not being designed to withstand tensile strains, cannot be expected to resist such forces.

The third, and possibly the most destructive, agency where trolley poles are concerned in indicated by the location and direction of the cracks in the sidewalk slab surrounding them, and may be traced directly to the highly stressed overhead work which the pole carries. When the pole is set, the top is inclined from 6 in. to 3 ft. from the vertical and away from the center line of the track. The poles are then connected in pairs by 3/16-in. to ⅜-in. stranded span wires 18 ft. to 22 ft. above the ground, and by means of tackle pulled nearly vertical. A 5/16-in. span wire is capable of producing a 7000-lb. pull which, if the pole is capable of withstanding such a strain, induces a permanent set or spring in the pole with a possible reaction at the sidewalk line up to 125,000 lb. The railway man counts on the resiliency of his poles to take up the expansion and contraction of his overhead, due to the climatic changes of temperature. Between the cool of midnight and the heat of noon, the tops of a pair of trolley poles may vary as much as a foot in their relation to each other, and this movement, to a lesser degree but greatly multiplied in stress effect, is communicated to the thin sidewalk slab that surrounds the pole, and which, being of a comparatively unyielding composition, breaks at the point of contact.

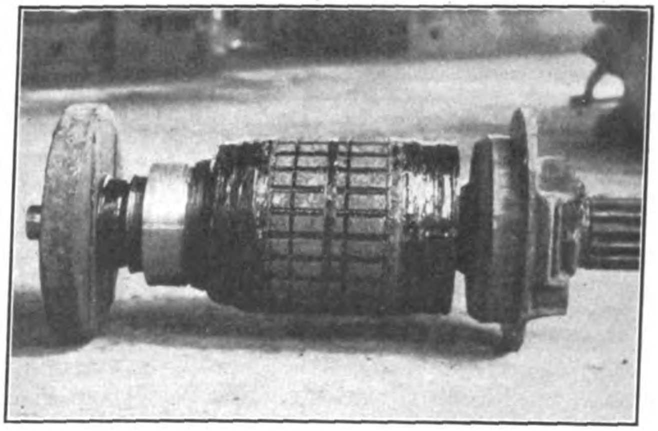
As a remedy, when building new sidewalks around such obstructions, the writer usually specifies that a space of approximately 3 in. be left clear of concrete around the poles, giving them an opportunity to perform the functions imposed by saturation of pole, overhead strains or expansion of concrete. This may be readily effected by wrapping the pole at the sidewalk line with several narrow thicknesses of Carey "Elastite" (the material is ½ in. thick.) or other expansion filler before concreting, or a circle of tin may be used, leaving the desired clearance around the pole to make a form to finish the concrete against. If the latter method is used, care should be taken to fill the metal form with sand, clay or pitch to prevent a careless workman from defeating the object of such precautions by disposing of surplus cement in the interstice. When it is desired to prevent water from entering the joint between the pole and the concrete a soft pitch makes a good insulating material as it readily accommodates itself to any slight movement of the pole or the concrete.

When a hole is cut in an old sidewalk for the purpose of setting poles, the same precautions should be observed before patching the paving, except that the pole may be set closer to the concrete on the side away from that to which the strain is applied, making the insulation eccentric around the pole. Where poles have already been set with the sidewalk laid flush to the pole, any further development of cracks may be prevented by chipping out a 2-in. or a 3-in. ring through the concrete around the pole and filling the interstice with pitch.

The writer does not advocate such insulation as a cure-all for defects in sidewalk work, but experience and observation have demonstrated that such protection will eliminate the damage done by trolley poles.

Handling Box-Frame Motor Armatures in Minneapolis

The Twin City Rapid Transit Company, Minneapolis, Minn., decided to buy box-frame motors in preference to split-frame motors ten years ago and has had no cause to regret that decision, as the box-frame motor has proved in every way superior to the split-frame motor. The practice of the company in handling box-frame equipment is as follows: When it is necessary to make repairs on a motor or truck, the car body is lifted from the trucks by means of an electric crane, and the trucks are sent to the truck shop in trains of six or ten.



BOX-FRAME MOTOR ARMATURE MOUNTED FOR TRUNDLING

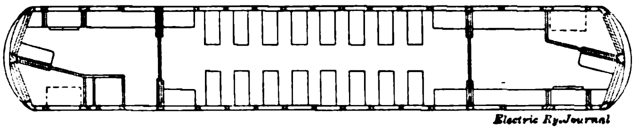
The company's truck shop is well equipped with electric hoists, but has no pits in the floor. When it is necessary to make repairs on a motor, it is lifted from the truck and another motor is put in its place. If it is necessary to remove the armature from the motor for repairs, the waste is removed from the oil boxes, two bolts are removed from the motor head on the pinion side, and eye-bolts are screwed in instead. The motor is then placed on end by means of a small electric hoist and the head is drawn loose from the frame by turning in the two eye-bolts. This is done by two men walking around the motor and using bars in the eyes of the bolts. The armature is then lifted out of the frame without taking off the pinion or head. When the armature is lowered to the floor the end of the armature shaft enters a hole in a wooden wheel, made of 2½-in. plank. The armature is then tipped down on its side and can be rolled on the floor by means of the motor head and this wooden wheel. An accompanying illustration shows the armature with head and wheel. When the armature gets to the winding shop a pinion puller is used to remove the pinion, the head is taken off, new bearings fitted, etc.

The time required to do this work is but little longer than that required to describe the operation.

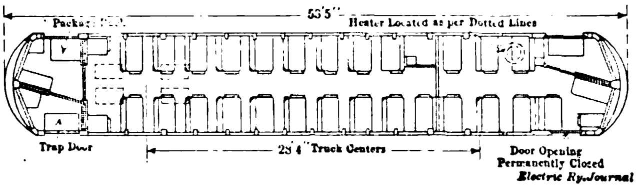
Making Interurban Cars Comfortable

Recently a desire to provide increased comfort for passengers and a more compact seating arrangement induced the Milwaukee Electric Railway & Light Company to remodel a number of its interurban cars. Wider seats were installed and the space between them was increased, involving a reduction in the car capacity from sixty-four to sixty-two seats. The cars were also rearranged with two regular passenger compartments in place of the three which were provided in the original cars, this change giving a seating capacity of forty in the main passenger compartment. In the new plan, also, transverse upholstered seats for seventeen passengers were substituted in the smoking compartment for the longitudinal slatted seats of the old car.

The changes in the arrangement of the compartments were effected by moving the bulkheads, and at the points from which these bulkheads were removed cast-steel angle reinforcements were provided to maintain the transverse stiffness of the body. No changes were made in the arrangement and location of the motorman's cabs, these being unique in that sliding doors in the partitions and trapdoors in the floor permit them to be utilized for the entrance and exit of passengers when either is at the rear end of the car. They are located in the diagonal corners of the car body, and the original exits opposite each are permanently closed.



MILWAUKEE INTERURBAN CAR—ARRANGEMENT OF ORIGINAL CAR


53'5"
Package
Heater Located as per Dotted Lines
Trap Door
28'4" Truck Centers
Door Opening Permanently Closed
Electric Ry. Journal

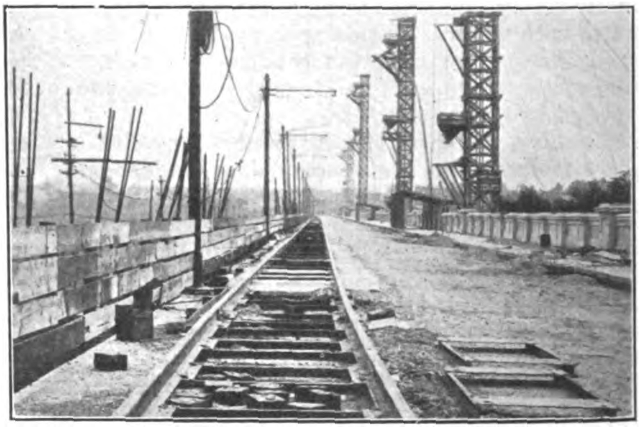
MILWAUKEE INTERURBAN CAR—ARRANGEMENT OF REMODELLED CAR

The new seats are of the Walkover type and are 38 in. long as compared with 35 in. for the old seats, and the spacing has been increased from 29 in. to 33½ in. The new seats in the passenger compartment are upholstered in plush and those in the smoking compartment in rattan. The inside width of the car body was slightly increased by recessing the panels between the window posts, but this did not make up for the increased seat width, which also necessitated a reduction from 24½ in. to 20½ in. in the aisle width. During the winter months one of the seats in the smoking compartment will be removed to make room for the heater equipment. The toilet room has also been moved from one end of the car to a point beside the bulkhead between the smoking and main passenger compartments.

Changes in the lighting system were also effected in a new scheme including ten 56-watt Mazda lamps with reflectors, installed along the center line of the car. These are spaced at regular intervals and wired so that the alternate lamps are in the same circuit. In addition the composition flooring of the old cars was resurfaced and covered with a cocoa matting, and the old inside finish was restored wherever it was in good condition, all of it being thoroughly scraped, stained and given three coats of varnish. It is contemplated that all interurban passenger equipment will be remodeled after this plan.

Steel Ties on a Cleveland Bridge

The Brooklyn-Brighton Bridge, Cleveland, is a reinforced concrete and stone-trimmed structure 2200 ft. long, which will carry two tracks for the cars of the Cleveland Railway and for several interurban lines. In connection with the selection of the type of support for the 7-in., 95-lb. Lorain rail that was used, Charles H. Clark, engineer maintenance of way Cleveland Railway, decided that International steel ties of the "twin" type would be preferable to wood inasmuch as a clearance of only 4 in. between bridge floor and rail base was available. The Cleveland Railway, it may be said, was already familiar with these ties because some 15 miles of track had been equipped with them since the spring of 1910, the first installation, which is in open track, unlike the following ones, and which carries both city and interurban cars, having required no maintenance to date.



STEEL-TIE LAYOUT OF A CLEVELAND RAILWAY ON BROOKLYN-BRIGHTON BRIDGE

The twin ties on the Brooklyn-Brighton bridge are laid to the standard spacing of 6 ft. centers with the usual eight clips per twin-tie. This spacing gives a lineal support to 50 per cent of the rail. The 13-in. x 36-in. plates which constitute the main bearing surface of the tie rest on 4 in. of concrete between the base of the rail and the bridge floor, and the channels, themselves, rest practically on the bridge floor, the track being concreted to about 1 in. above the ties. This concrete in turn is covered with a 1-in. sand cushion and then paved with granite block.

The electric railway system in Rosario, Argentina, which was financed by Belgian capitalists, has modern equipment and service. The cars run only in one direction on most streets. There are altogether 100 miles of street car lines in the city, all operated by the one company.

Switchboard Fittings

The General Devices & Fittings Company, Chicago, has recently furnished switch and bus support equipment for three of the largest power stations to be built, and a description of a few of the new designs that were used should be of interest. Fig. 1 shows a back-connected, positive-lock-type switch with a rating of 6000-amp., 600 volts, 60 cycles, with a 20-deg. Fahr. limit for temperature rise. This is said to be the only switch ever provided with a positive lock that is thrown in or out with the switch handle. The studs are milled from solid copper forgings and slotted 7 in. deep for bus insertions. The studs can also be slotted for vertical buses. All contacts are ground to reduce the millivolt drop to the lowest possible point. All hardware, bolts, nuts, spring washers, etc., are of phosphor bronze, turned from solid rod. The clips are of Sigamond spring copper; the blades are extra hard drawn pure blading copper; the handle fork and entire lock are of Hertz non-magnetic metal; and the handle itself is of black fiber made from rings turned to size and treated. This switch is made in sizes up to 16,000 amp., all sizes above 10,000 amp. being equipped with double cushion locks and interferences.

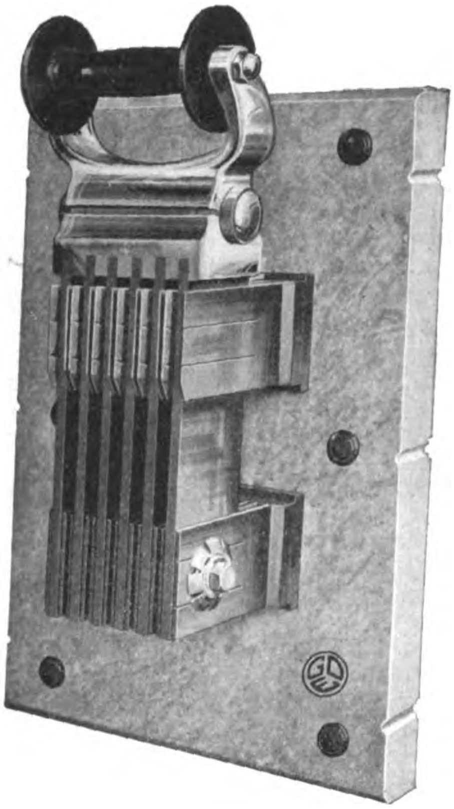


FIG. 1—LARGE-CAPACITY SWITCH

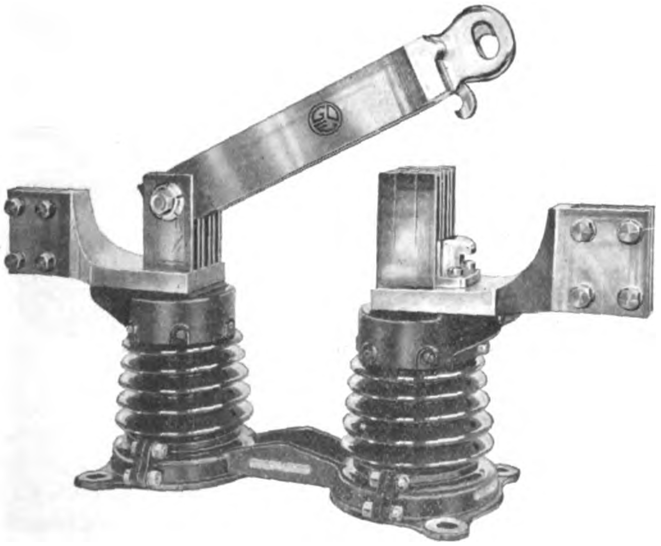


FIG. 2—DISCONNECTING SWITCH

In Fig. 2 is shown a special-extra-heavy switch for 2000 amp. and 15,000 volts equipped with positive snap lock and vertical terminals for bus insertion. The patent bridge base is a continuous unit, giving an assurance of absolute alignment. The clip blocks are one-piece solid copper forgings milled and slotted to micrometer size. Any switch can be arranged, if necessary, for mounting upon pipe frames, either single or double pipe, and on the horizontal or vertical plane for front-connected switches and on the horizontal plane only if the switches are back connected.

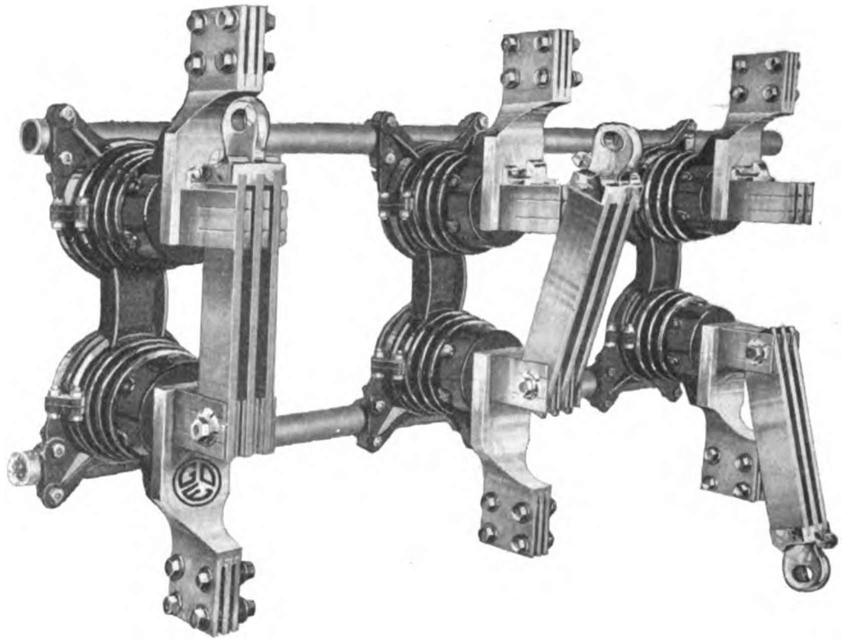


FIG. 3—PIPE MOUNTED SWITCHES

Such a mounting is illustrated in Fig. 3, which shows a triple-pole, locking-type switch equipment mounted upon a horizontal pipe frame. These switches are rated at 2000 amp. and 600 volts, 60 cycles. They are equipped with positive interference locks and are the first of their kind to be made. The bridge bases permit of vertical adjustment, and barriers are provided between switches, although these are not illustrated.

A disconnect-type support for a 15,000-volt expulsion fuse is shown in Fig. 4. These supports are also built for cartridge-type fuses and may be mounted on bridge bases. They are furnished for both flat and pipe mounting.

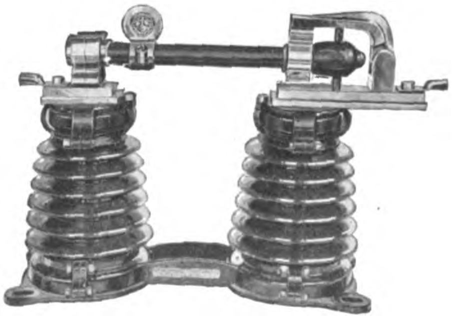


FIG. 4—EXPULSION FUSE SUPPORT

Fig. 5 shows a special three-phase bus support for 600-volt service. In this all metal except the base is Hertz non-magnetic metal, and the bolts are phosphor bronze, machined from solid rod. The support is made in all sizes and voltages and to support up to nineteen bars ¼ in. x 10 in. Any combination of mounting that may be desired can be arranged. This support is adjustable to any need and the weight is 320 lb.

A 15,000-volt special-extra-heavy clamp-type bus support for holding heavy vertical buses is shown in Fig. 6, this being arranged to be mounted in a 36-in. compartment. A similar design may be arranged for 3½-in. copper tubing. This is adjustable all around, and can be removed from the bus with power on bus.

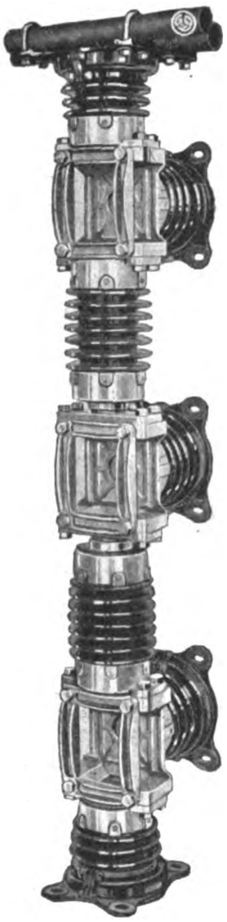


FIG. 5—THREE-PHASE BUS SUPPORT

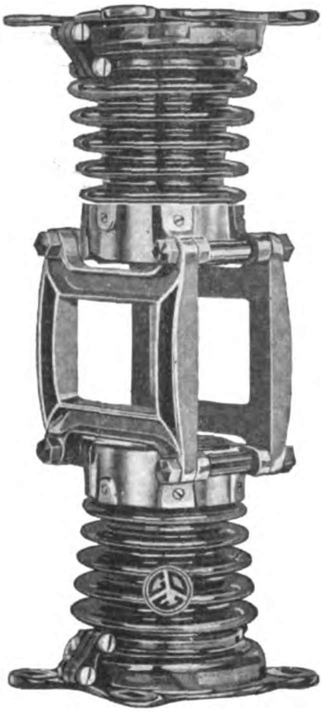


FIG. 6 — COMPARTMENT SUPPORT FOR BUS

Fig. 7 shows a single support to take one phase leg from the big support shown in Fig. 5, this being arranged for mounting on two parallel pipes. It is built to clamp the bus and is not intended for contact or taps.

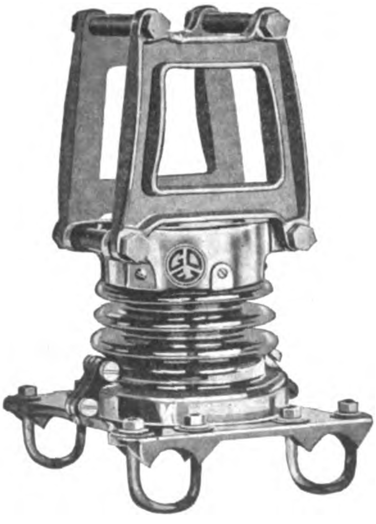


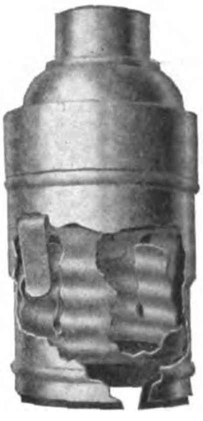
FIG. 7—SINGLE-BUS SUPPORT

All porcelain used in these devices is tested at 280,000 cycles and is also given a combined high potential and high frequency test before shipping, this test being made with all of the regular hardware and equipment in place. All shipments are packed in cartons, each unit complete. The switches are designed with a guaranteed millivolt drop, on both the heavy capacity and the central station standards. Copper forgings are used for all switch work and terminals. The porcelain used has not an equal for design or strength, and is guaranteed to be made only by the wet process.

Lamp Grips for Screw Sockets

A great deal of trouble and inconvenience has been experienced in the use of lamps in sockets when installed where they are subject to vibration. This is particularly true in factories using high candle-power lamps where heavy machinery is operated, and on electric cars. Constant jarring and vibration cause lamps to unscrew or "back off" from the base contact so that the circuit is broken and often the lamp falls.

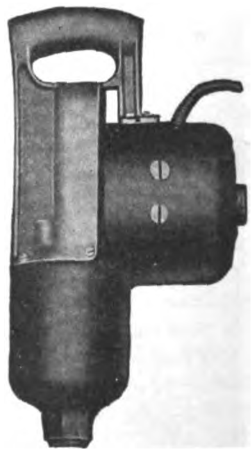
To overcome this difficulty, the Bryant Electric Company has developed a very effective lamp grip. In this new form of socket, the threaded copper portion that receives the lamp is slotted on two diametrically opposite sides in such a manner as to provide two tongues which are flexible. Two flat steel springs are mounted in the porcelain base with the free ends so arranged as to bear on the outside of these copper tongues. This will be clearly understood from the illustration. Thus, without any external adjustment or any other labor than the insertion of the lamp, sufficient tension is brought to bear upon the lamp base to prevent vibration from causing the contact to break even under the most severe conditions. This lamp-grip feature can be supplied, at a slight additional charge, in connection with practically all sockets of both the medium and mogul type manufactured by the above company.


LAMP GRIP

Electric Hammers in Railway Work

In answer to the question that is frequently asked in regard to the ability of the electric hammer to do the work of the pneumatic hammer in railway work, the Western Electric Company states that the former is recommended for every kind of work, except riveting, that can be assigned to any hammer. In electric railway work especially, where there are power mains always ready to be tapped, the electric hammer looms far above its pneumatic brother. In power economy it is 80 per cent more efficient, and in flexibility the advantage is obvious. A pneumatic hammer requires a compressor with its attendant piping; an electric hammer needs no special apparatus since the power mains follow the railway.

Not only will the electric hammer do the things the pneumatic hammer is now doing, but it opens up possibilities in many fields which would not justify the installation of air equipment. It may be used in subways where the trolley hangers, guide wires, etc., must be fastened to concrete; in power houses and substations for all drilling for cable racks, railings, piping, etc.; for scaling paint from iron work on elevated and other structures; for bush hammering concrete retaining walls and stations; for roughing up store stair-


ELECTRIC HAMMER

ways; for chipping scale from condenser tubes, and for taking out foundations, ripping out doorways and the like. The electric hammer, however, cannot be used for riveting and heavy chipping.

When it is remembered that a man with a hand hammer strikes from fifty to seventy-five blows per minute and that operating a pneumatic tool requires compressor, piping and considerable power, there are obvious advantages in a tool which is absolutely self-contained because it may be connected to any lighting socket or trolley circuit and which strikes 1800 blows per minute, as is the case with the electric hammer.

Portable A.C.-D.C. Electrodynamometers

The Western Electric Instrument Company, Newark, N. J., has recently perfected a new line of instruments which mark a distinct advance in the science of electrical measurements, problems hitherto considered impossible of solution having been solved in their design. They constitute, in fact, the latest development in instruments of this type and embody characteristics never before attained.

PORTABLE A.C-D.C. ELECTRO-DYNAMOMETER

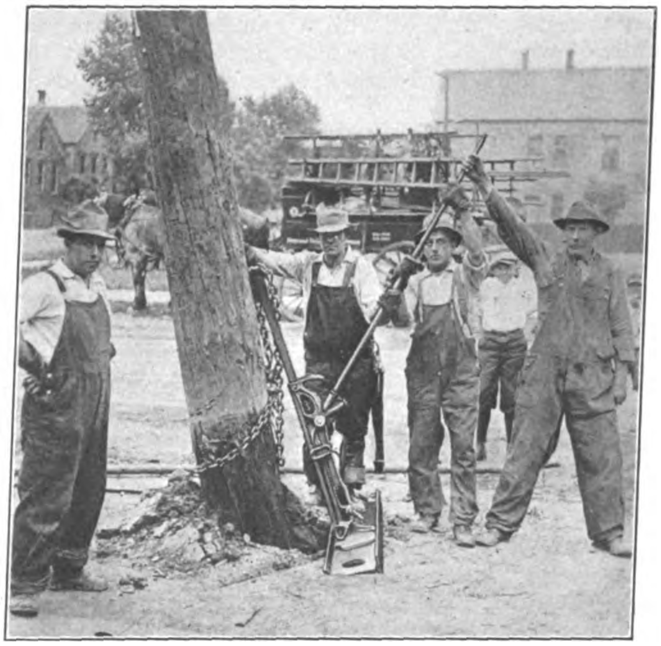
The instruments are made in voltmeter, ammeter and wattmeter forms, all of which are adapted to measurements of precision on either a.c. or d.c. circuits. They are guaranteed to an accuracy of 0.25 per cent full-scale value at any frequency up to 133 cycles per second and any wave form, and they can be used on circuits of any commercial frequency even as high as 500 cycles per second with only slight error.

Double ranges are provided for both current and voltage circuits and the wattmeter can be used for 100 per cent overload indefinitely without introducing error. The movable systems of the instruments have an extremely low moment of inertia and they are very effectively damped. The indications are independent of room temperature or the heating effect of the current passing through the windings, and the instruments are shielded from external magnetic influences. The scales, which are 5¼ in. long, are uniform throughout their entire length in the wattmeters, while in the voltmeter and ammeter the upper four-fifths of the scale is especially legible and uniform, although absolute uniformity is impossible owing to the principle of operation. Each scale is hand-calibrated and is provided with a mirror over which the knife-edged pointer travels. The pointers are equipped with a simple zero-setting device. The dimensions of all of the instruments are 8 in. x 10¼ in. x 5¾ in.

In the wattmeter form instruments can be furnished for very low power factors, such as are involved in measuring core losses in transformers giving full scale deflection for 20 per cent power factor. Temperature errors are very small and can be corrected by reference to the certificates that accompany all Weston instruments. The line includes a polyphase wattmeter that is guaranteed to an accuracy of 0.5 per cent full-scale value on a.c. circuits of any frequency up to 133 cycles per second and any wave form. Even on circuits as high as 500 cycles per second there are only very slight errors due to phase displacement.

Jack Designed to Remove Poles

Railway companies frequently have occasion to remove poles from one location to another or to take them out entirely, and to meet this demand Templeton, Kenly & Company, Ltd., Chicago, have placed on the market a jack designed especially to remove poles. In an actual test it took nineteen minutes for the jack to remove the pole shown in the accompanying illustration, this being done without digging around the pole or employing any other tool. The jack is single acting, operating on the down stroke of the lever and tripping at any point. It has a capacity of 15 tons, a lift of 24 in. and a complete height of 39 in. It pivots on its own base, revolving from 30 deg. to 90 deg. from the vertical, and hence will follow the angle of the pole as it is pulled, a recessed cap holding securely the links of the chain which is fastened around the pole. The jack, together with a 5-ft. heavy chain with a grab hook, a steel lever bar and a section of 10-in. I-beam used for a bearing block, make up the standard equipment for completing the entire operation.



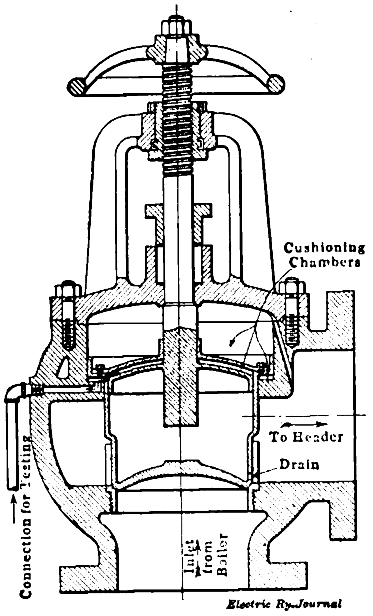
SINGLE-ACTING, 15-TON POLE JACK WITH 24-IN. LIFT

35,000-Kw., 60-Cycle Unit for Chicago

The Commonwealth Edison Company of Chicago has just purchased a new turbine unit, the generator end of which will be the largest 60-cycle machine in existence. The unit was sold by the Westinghouse Electric & Manufacturing Company and will be a tandem-compound machine of the straight Parsons type, rated at 35,300-kva. at 85 per cent power-factor. It will produce electrical power at 12,000 volts, three-phase and 60 cycles, its speed will be 1200 r.p.m. and it will operate in parallel with the Commonwealth Edison Company's 60-cycle system. The turbine will take steam at 220-lb. pressure with 200 deg. superheat and will exhaust against a 29-in. vacuum. Forced ventilation for the generator will be supplied by an external motor-driven blower which is to be placed in the air duct leading from the air intake to the generator. The exciter will be direct-connected to the main machine and the unit complete will measure 75 ft. long by 18.5 ft. wide by 21 ft. high over all. This new unit will be installed in the company's Northwest station and, according to the terms of the contract, will be ready for operation in time to carry the peak load in the fall of 1916.. In design the unit represents a radical departure from the large Westinghouse machines now operating in the Interborough station in New York in that the entire unit will be placed on one shaft instead of being divided into two cross-compounded machines. Auxiliaries for this unit have not been purchased as yet.

Double-Cushioned Non-Return Valves

The non-return or stop-and-check valve made by the Golden-Anderson Valve Specialties Company, Pittsburgh, Pa., is provided with a number of unique features, of which one of the most important is that the automatic action can be tested in service. Consequently the installation of one of the valves in the steam header of a boiler insures absolutely that the boiler will be protected in case of accidents, that the pressure between the various units of the battery will be equalized, and that there is no possibility of turning live steam into a boiler in which repair men may be working.



CUSHIONED NON-RETURN VALVE

As shown in the accompanying cut, the valve is cushioned in both directions and is made positive in operation because of the large area that is effective for the steam pressure which acts to close the valve in case of its automatic operation. This cushioning is carried out by a double dashpot which occupies the full area of the upper portion of the body and thus positively prevents any hammering or pounding. There is only one moving part, the piston or hollow valve, and this is always kept in perfect alignment with the seat, regardless of its position. The valve is therefore practically indestructible and its low maintenance charges make it, in the end, one of the least expensive automatic devices provided for the protection of life and property in connection with the use of steam.

The operation of the valve is simple. When the steam pressure raises the hollow valve there exists a space between the top of the hollow valve and the disk that is integral with the stem, and this space is promptly filled with steam which leaks past the disk. The area above the hollow valve is also filled with steam so that the valve is perfectly cushioned both in opening and in closing. The feature of automatic testing in service consists in permitting an exhaust of steam from the cushioning chambers by opening a small hand valve that may be located at any convenient point. The non-return valve will then automatically close, but by closing the exhaust the non-return valve moves back to the open position ready for automatic action. The makers absolutely guarantee these valves not to chatter, hammer or stick and warrant them to be the most positive, durable and economical automatic valves on the market. All of the valves are made double extra heavy regardless of the service for which they are to be used.

Rating Concrete Mixers

Up to the present time there has never been any standard method of rating batch mixers for concrete. Some mixer manufacturers rate their machines by their capacity in mixed concrete while other manufacturers rate them by their capacity in loose, unmixed materials. It is a well-known fact that a mixer having a batch capacity of, say, 9 cu. ft. of unmixed sand, stone and cement will hold only about 6 cu. ft. of mixed concrete per batch. For this reason the capacities 3 ft., 4 ft. or 9 ft. when applied to concrete mixers have never had any definite significance.

However, the National Association of Mixer Manufacturers at its August meeting took steps toward remedying this difficulty by adopting a resolution providing for the uniform rating of batch mixers. This resolution provides that, in future, catalogs and circulars shall specify the capacity of each mixer as the size of wet-mixed batch and not otherwise. The resolution further provides that the dry, unmixed capacity of a mixer may be approximately as one and one-half times the size of the wet-mixed batch, assuming the use of cement, sand and 1½-in. crushed stone with 1¾ gal. of water per cubic foot of mixed concrete. The members of the association further agreed not to use the dry-batch rating in their correspondence, advertising, etc., unless the standard wet-batch rating was used also and with equal prominence.

The association feels that the step is a very desirable one, and one that will prove beneficial to all contractors, mixer manufacturers and, in fact, every one connected with the concrete and cement industries. A contractor can now arrive at a real comparison between mixers, not only in price but in capacity, a problem that would be exceedingly difficult without a standard rate to serve as a basis.

Standard Screw Threads for Electric Sockets

A statement recently issued by the American Society of Mechanical Engineers covers a report from its committee on standardization of special threads for fixtures and fittings, which submits standards for rolled threads for screw shells of electric socket and lamp bases. Dimensions for four different sizes are given, these approximating ⅜-in., ½-in., 1-in. and 1½-in. diameters of thread. The standard is expressed in the form of dimensions for maximum and minimum gages, the difference of diameter between these being 0.006 in., 0.006 in., 0.008 in. and 0.012 in. for the four sizes respectively. The number of threads specified are respectively fourteen, ten, seven and four per inch, while the depths of thread are 0.02 in., 0.025 in., 0.033 in. and 0.05 in.

Albert H. Hale, a motorman of the Cairo Electric and Traction Company, Cairo, Ill., has been given a patent for a new brake which is constructed in such a manner that the momentum of the car serves to give the power necessary to tighten the brake. Thus, the operator has merely to exert a slight pressure of his hand upon a bar which slides through a ratchet in order to bring the car to a sudden stop. The brake was first tried about three years ago and is now in active service on one of the Cairo cars.

News of Electric Railways

WILKES-BARRE WAGE AWARD REPUDIATED

Representative of Men on Wilkes-Barre Wage Board and Umpire Concede Employees' Contention That Contract Should Be Limited to Flat Scale Basis

Thomas D. Shea, representing the men on the board of arbitration selected to settle the controversy over wages between the Wilkes-Barre (Pa.) Railway and its employees, and Dr. John Price Jackson, State Commissioner of Labor of Pennsylvania and umpire in the arbitration, have handed down a final decision that the contention of the men is correct and that the award made by the board on July 10, 1915, complied with on the part of the company, is not binding. In so doing they recommend that a flat scale of wages of approximately 27 cents an hour should be paid, and state that further negotiations for the fixing of a wage scale must be between representatives of the men and officials of the company. In brief, the situation, in some respects, is practically the same as it was on Jan. 9 last, when the agreement for arbitration was signed by the men and by the company. The official statement of the two arbitrators, dated Oct. 11, follows in part:

"The board of arbitration received a protest on the part of the Amalgamated Association, Division No. 164, on Oct. 5, claiming that the award of the arbitrators was not in accordance with the submission by the two parties, and that when they signed the submission to the arbitrators they had in mind only a flat scale of wages and not a sliding scale with a profit-sharing arrangement, such as was contained in the award.

"The board having given the railway an opportunity to submit evidence bearing upon this protest, and having received a reply, has decided that the contention of the Amalgamated Association is correct, and that the award is not co-extensive with the submission, and, therefore, is not binding. This decision is based largely upon the facts that the contract under which the board was created could readily have been construed as being limited to a flat rate of wages by those having that rate of wages in mind, and because the preliminary negotiations between the company and the employees were based solely upon a flat rate.

"The company and the arbitrator appointed thereby have withdrawn from the case, and as a result the remaining two arbitrators do not care to continue further. The situation, therefore, is now the same as was the case before the agreement for the appointment of the arbitration board was entered into, and the parties at interest are free to enter into negotiations toward a settlement of their differences. The board rules that the association did not accept the terms of the award by reason of the employees having received pay under its terms.

"Though the board does not care to continue its work by modifying the award to meet the conditions that it now deems necessary to make it co-extensive with the submission, it, nevertheless, deems it proper to state that in its judgment a flat rate equivalent to the present sliding scale, plus the amounts it believed would be available through the profit-sharing arrangement, could conservatively be estimated at between 26½ cents and 27 cents an hour. It further deems it proper to advise that in its judgment it would be well for the two parties to delay, reasonably, further negotiations in order that more data may be obtained on the possibilities of the profit-sharing plan."

T. A. Wright, general manager of the company, said that the decision of Dr. Jackson and Attorney Shea did not alter the view of officials of his company with reference to arbitration as expressed by him several weeks ago. He said that "the findings of the board of arbitration as made public several months ago, are final, binding and without appeal." He repeated that the board, after making its award, was automatically disbanded and had no legal right to reconvene or to receive further evidence. Asked whether officials of the company would grant a hearing to the men, Mr. Wright said: "I will always give an audience to a committee of our men. That is as far as I will go at this time."

The representatives of the men concluded their protest against the award of the arbitrators as follows:

"We repeat that your commission was organized to state definitely what the wages of these men should be over and above the present wages paid, and your conclusion in basing the future wages of these men on an increase car-hour earning power, or, in other words, what is commonly known as the 'profit-sharing plan,' is wrong and not within the terms of submission to arbitration."

Commenting editorially on the board's reversal of itself, the Wilkes-Barre *Evening News* of Oct. 12 said in part:

"Dr. John Price Jackson, who served as umpire on the board of arbitrators, has proved himself to be utterly unfitted to hold the responsible position of Commissioner of the State Department of Labor. He has fallen down on his first big job. In the dispute the deliberations of the board were long and thorough. The arbitrators were named in April and their decision was not handed down until early in July. Both sides submitted their briefs in full, and there was a wealth of material bearing upon every phase of the controversy to permit the arbitrators to arrive at a definite decision without resorting to snap judgments. Dr. Jackson had more than ample time to come to a conclusion as to his personal decision, and his recent stand shows his failure to do so.

"Dr. Jackson, through his wavering, fickle and altogether spineless attitude, has established a most dangerous precedent for future labor disputes throughout the State. Apparently, any agreement that does not meet with the approval of either of the contestants in a wage or other economic or industrial dispute, can be appealed from, or perhaps summarily set aside. This, obviously, defeats the very fundamental principles of arbitration as the ideal solution for labor controversies. In view of his palpable failure, Dr. Jackson would do well to resign from the office to which he has been appointed, and thereby make it possible to conserve the value of such an important department, if its functions are properly exercised."

POSTPONEMENT OF THE CONFERENCE ON THE NATIONAL ELECTRICAL SAFETY CODE

The Bureau of Standards announces the postponement of the conference that was to meet at Washington on Oct. 27 and 28, 1915, until a date to be announced later. This sudden change of plans is due to the urgent request of the National Electric Light Association, the American Institue of Electrical Engineers, and the Association of Edison Illuminating Companies that additional time be granted for the consideration of the code of rules that has been formulated by the bureau before they are submitted to a formal conference.

The Bureau of Standards has proposed that the rules be accepted tentatively for a trial period of one year before they are adopted formally by commissions or municipal authorities, and that the joint advisory committee to be established by the Washington conference should take up with the bureau the work of further revision and development of the rules if it was not found by the conference that the code as presented by the bureau or as modified by the conference was satisfactory for preliminary use. It was felt, however, by many members of the associations previously mentioned that more time should be taken and the rules very carefully studied by many who have not done so as yet, and further modified if necessary, so as to make them as generally satisfactory as possible before they are submitted for the consideration of so large and representative a body as the Washington conference would be.

Although the bureau postponed the conference last June for nearly four months it feels that the electrical companies that are most affected by the proposed code should have the fullest opportunity to study it and submit to the bureau any further information and experience bearing on its revision and development which they may think desirable.

COUNCIL PASSES DES MOINES GRANT

The City Council of Des Moines, Iowa, has passed the new franchise ordinance drawn up by a committee of the Des Moines Chamber of Commerce. Mayor Hanna and Councilman Myerly, who fought the draft to the last moment, cast their votes for it on the final ballot. They were cheered by a large audience of citizens when the vote was made unanimous for the franchise.

The franchise will be submitted to a vote of the people at a special election on Nov. 20, and following its approval it will go into effect on Jan. 1, 1916. A feature of the franchise providing for a city supervisor of the street railway system, who will work in conjunction with company officials, will be an innovation in Des Moines. The position will pay from $3,000 to $5,000 a year. Mayor Hanna says the supervisor must be a man with complete knowledge of street railway affairs and that a man from outside the city, who has had experience along this line, may be chosen.

SEATTLE COMPANY OFFERS TO ADVANCE APPRAISAL MONEY

In order that the controversy between the Puget Sound Traction, Light & Power Company, Seattle, Wash., and the city of Seattle, on certain franchise obligations may be terminated soon by a hearing before the Public Service Commission, officials of the company have offered to appropriate for the use of the Public Service Commission an amount not to exceed $10,000 for the completion by the commission of the valuation of the company's property at an early date.

The principal matters in controversy between the city and company are the paving between tracks and payment to the city of 2 per cent of the gross earnings annually. The company, because of its petition on these and other franchise questions before the State Commission, has refused to pave between its tracks in five recent improvements. Mayor Gill threatened to recommend the revocation of franchises unless the company complied with the franchise agreement, which is alleged to have required the company to pave between tracks. Later it was tentatively agreed to begin a mandamus suit to compel compliance. In commenting on the franchise requirements with respect to paving and payment of a percentage of the gross receipts to the city the company's statement says:

"The company cannot comply with those provisions of the franchise and at the same time have additional burdens placed upon it by the Public Service Commission, some of which burdens the city has endeavored to have the commission place upon the company.

"The company lost more than $60,000 by reason of the city's action in illegally compelling the company to sell tickets upon its cars. The position of the company in regard to the sale of tickets was sustained by the courts, but the city made no compensation for the loss which the company sustained during the litigation and prior to the decision. The company also has sustained heavy losses from the operation of the jitney.

"The position of the company is that if it is required to maintain the standard of service ordered by the commission, which is more burdensome than that stipulated by the franchises, the company must be relieved from some of the provisions of the franchises. The question whether the public service commission law has not already eliminated these burdensome provisions and whether, if not, the commission should not relieve the company of these provisions, is one which should be settled in an orderly manner. The decision of the courts is necessary to such settlement. A valuation of the property by the commission is also probably necessary for such settlement. The company proposes to the city to unite with it in bringing about a speedy determination of the questions involved."

The company agrees to keep the unpaved space in paved districts in a safe condition by planking until the controversy is settled, and if the time comes for paying its 2 per cent of earnings before the courts have decided the question it will make payment under protest and, in the event of the court rendering a decision favorable to the company, ask a refund of the money thus paid.

CONSUL REAT ON THE EDMONTON MUNICIPAL RAILWAY

United States Consul Samuel C. Reat at Calgary, Alberta, Canada, has written on "Municipal Ownership in Edmonton" in *Commerce Reports*. In discussing the street railway department, Mr. Reat said:

"On Nov. 8, 1908, Edmonton instituted the street railway system, the largest venture in the municipal ownership program and at present the gravest problem. It seems impossible for this utility to be operated without incurring a big deficit each year. Edmonton has the difficulty to contend with of a large area and a relatively small population. The population of Edmonton is about 40,000, scattered over an area of some 27,000 acres. The establishment of a jitney service has affected somewhat the street railway earnings, but as this service was not established until the spring of 1915 its competition need not be taken into account in this review.

"The trackage of the Edmonton street railway system consists of 43 miles of double track (figured on a single-track basis) and 11 miles of single track. The utility had 258 employees and paid $284,159 in salaries during 1914. Its debenture liability as of Dec. 31 was $3,004,429. The cost of the system to that date totaled $3,063,784, the buildings, track and equipment having cost $2,887,866, discount on debentures $115,876, Strathcona franchise $10,000, and land $50,042. The sinking fund amounted to $174,691. The year's expenditures were: operating, $535,430; maintenance, $80,282; other, $251,958; a total of $867,670; against which were receipts aggregating $642,109, leaving a deficit for the year of $225,561.

"In 1914 the Edmonton street railway had one fatal accident and ten suits for damages, all of which were successful, the department paying $11,182 in damages."

NEW CLEVELAND BRIDGE PROPOSAL

The Cleveland (Ohio) Underground Rapid Transit Company agreed on Oct. 4 to enter no objections to the proposed subway approaches from both east and west to the new bridge across the Cuyahoga River at the foot of Superior Avenue, provided it is allowed to use the bridge upon the same basis as the Cleveland Railway. The company, however, indicated its intention to contest any rental charge, if the Cleveland Railway is allowed to use the bridge free, as has been suggested by Peter Witt, street railway commissioner. An ordinance will be drafted soon to cover this agreement between the company on the one side and the city and county on the other.

In an interview recently C. E. Ruthenberg, socialist candidate for Mayor of Cleveland and author of the ordinance providing for the purchase of the Cleveland Railway by the city, explained his plan of taking over the property. He believes that it would be possible to sell an issue of $34,000,000 of bonds with the railway property as security and have many of the stockholders accept bonds for their holdings. He said that the interest rate on bonds should not be more than 4½ or 5 per cent. Nothing, however, has been said by Mr. Ruthenberg as to the possible basis of exchange of bonds for the stock.

A. J. Campbell, chief engineer of the Foundation Company of New York, said that such subway disasters as occurred in New York recently are very unlikely in the construction of the subway to be built under East Fifty-fifth Street, Cleveland, Ohio, by the Cleveland, Akron & Canton Terminal Railroad, in case the franchise is approved at the November election.

County and city officials and the Cleveland Rapid Transit Railway are still working on plans for the subway approaches to the new Superior Avenue bridge. The main arch of the bridge was lowered into place last week, and it is probable that the construction work will now be hurried along as rapidly as possible. The completion of the bridge will make it possible for the Cleveland Railway to furnish much better service to the West Side.

The street railway approach to the proposed new union passenger station will be through a subway from Lakeside Avenue, according to the latest plan announced. The new station is to be made a part of the group plan, in connection with the new City Hall, the Courthouse and the Federal Building, which have already been completed.

The Cleveland Railway was granted a franchise on Oct. 11 to construct a single track on East Seventy-third Street from Denison Avenue to the city limits.

FULL SCHEDULES IN FORT WAYNE

Operation of cars in Fort Wayne, Ind., continues under full schedules. There has been no serious disorder and a gradual increase in the number of people riding. The Federation of Labor has assessed all members of the unions at Fort Wayne to raise $1,500 a week for the striking car men. Every effort is being made to divert travel to the jitneys, and a stock company is proposed by the labor people to operate a line of large buses with a capacity of twenty-five passengers each in competition with the street railway. The chief of police has issued orders for the immediate arrest of any persons shouting at operating trainmen or seeking to incite violence against them. The City Council has decided, on the advice of the City Attorney, that it was not good policy to pass over the Mayor's veto the ordinance requiring extended experience in operating cars in Fort Wayne. The new men now operating cars have already had the necessary experience provided for in the ordinance, so that present operation by the company in Fort Wayne would not be affected. Mayor Hosey and a committee from Fort Wayne called on Governor Ralston at Indianapolis and requested the appointment of a committee to investigate the strike. The Governor stated that the matters in dispute in Fort Wayne, where a contract had been signed by the company and the employees covering working conditions, should be decided by the courts. In view of Judge Anderson's hearing to be held on the injunction proceedings, Governor Ralston would take no action.

Work on Cleveland Underground Line to Begin by Jan. 1.—W. R. Hopkins, president of the Cleveland Rapid Transit Railway, told the city officials and county commissioners at Cleveland recently that the company will begin work on building its subway before Jan. 1, 1916. This statement was made before the Council in a discussion of plans for subway approaches to the new Superior Avenue bridge across the Cuyahoga River.

New Haven Conspiracy Trial Begun.—William Rockefeller, Lewis Cass Ledyard, Edward D. Robbins and eight other past or present directors of the New York, New Haven & Hartford Railroad appeared on Oct. 13 in the Federal District Court at New York to stand trial before Judge Hunt and a jury on a charge of having conspired to violate the Sherman law by seeking to monopolize all the transportation facilities of New England. The work of selecting jurors was begun at once and three provisional talesmen were agreed upon the first day. It was expected that several days would be consumed in securing a panel of jurors considered to be qualified to pass upon the evidence in the case.

Question of Union Jurisdiction.—W. D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees of America, was authorized at the recent convention of the association in Rochester, N. Y., to name a committee to confer with a similar committee from the Order of Railway Conductors and the Brotherhood of Locomotive Engineers on the subject of jurisdiction where joint operating agreements exist between companies with labor agreements with both associations. Up to Oct. 1 Mr. Mahon had not announced the members of the amalgamated committee. One of the cases awaiting adjudication is that of the Hudson Valley Railway and the United Traction Company, Albany, N. Y.

Brighton Beach Reconstruction Contract Approved.—The form of contract and plans for the reconstruction of the Brighton Beach rapid transit line in Brooklyn, submitted by the New York Municipal Railway Corporation, has been approved by the Public Service Commission for the First District. This contract involved the reconstruction of the line from Church Avenue northward to Malbone Street and the widening of this portion from two to four tracks and the reconstruction of three stations, namely, the Church Avenue, Woodruff Avenue and Prospect Park stations. This work, it is estimated, will cost from $750,000 to $1,000,000. When it is finished it will make the Brighton Beach line four tracks from Sheepshead Bay to Prospect Park station, a distance of about 4 miles. From Sheepshead Bay southward the line is to be elevated into Coney Island and four-tracked. This line is to be connected by a new two-track subway branch through Flatbush Avenue at Malbone Street with the Fourth Avenue subway near the Long Island Railroad terminal at Atlantic and Flatbush Avenues, Brooklyn.

Colorado Commissioner on Weakness of Municipal Ownership.—S. S. Kendall, chairman of the Colorado Utilities Commission, in a recent address, said: "It is a notorious fact that very few cities and towns have the slightest conception as to what it costs them to build, operate and maintain a plant; possibly in some instances they do not care, but as a plain business proposition they should know whether a plant is self-sustaining, or whether it is maintained partially from general revenues. Under a proper system of accounting they will be compelled to segregate all items of income and disbursements which properly belong to a plant from other departments, and will be required to set aside annually from their revenues a depreciation reserve fund to cover depreciation cost. While this is done in most cases of privately-owned plants, it is seldom done in the case of municipally-owned plants. It is only natural that city officials want to make as good a showing as possible and are only too willing to allow their successors to assume the burden of renewals to the property. The result is that in a few years not much value is left to the plant except as junk."

A. G. Snell Bats 600.—The employees of the various departments of the Rockford & Interurban Railway, Rockford, Ill., entered a team in the City Commercial Baseball League, a six-team organization. The season opened on May 1, and games were played every Saturday thereafter until Aug. 14, making a fifteen-game season. The company furnished the uniforms for the team. Fellow employees were very loyal rooters. Out of the fifteen games played, the team won eleven, a percentage of .733, giving it the championship of the league. One game of eleven innings was the only extra inning contest of the season. It was won by the traction champions.. Most of the games were closely contested and the championship was not decided until the last game on Aug. 14, when the railway team defeated the team of employees from the Clark Manufacturing Company. Stewart Ralston, chief clerk to the electrical engineer of the Rockford & Interurban Railway, was the manager of the team. He played the position of catcher. Practically all of the games were won by the heavy hitting ability of the team. A. G. Snell, superintendent of transportation, played at second base. He led the team with a batting average of 600, getting twenty-seven hits on forty-five trips to the plate, six of which were for two bases and two for three bases.

PROGRAMS OF ASSOCIATION MEETINGS

Kansas Gas, Water, Electric Light & Street Railway Association

The Kansas Gas, Water, Electric Light & Street Railway Association will meet in Topeka, Kan., on Oct. 21, 22 and 23.

Association of Railway Electrical Engineers

The eighth annual convention of the Association of Railway Electrical Engineers will be held at the Hotel La Salle, Chicago, Ill., on Oct. 18, 19, 20, 21 and 22, 1915. Following the address of President H. C. Meloy, who is connected with the New York Central Lines, standing committee reports will be presented on "Reciprocal Relations," "Loose-Leaf Binders for Filing Specifications and to Keep Specifications and Standards to Date," "Data and Information," "Specifications for Wiring Crossings for Potentials Above 100 Volts," "Standards for Train-Lighting Equipment." "Electric Headlights," "Wireless Telephone and Telegraph as Applied to Moving Trains," "Industrial Trucks," "Wire Specifications," "Metal Conduit Specifications," "Standard Rules for Car Wiring," "Rating of Train-Lighting Lamps," "Illumination," "Standardization of Cranes," "Turntable and Transfer-Table Motors" and "Compressed-Air Generation" and "Shop Practice."

Financial and Corporate

ANNUAL REPORT

Cumberland County Power & Light Company

The combined comparative statement of income, profit and loss of the Cumberland County Power & Light Company, Portland, Me., and its subsidiaries (intercompany items eliminated) for the fiscal years ended June 30, 1914 and 1915, follows:

	1915	1914
Gross earnings	$2,551,263	$2,447,406
Operating expense	$1,331,992	$1,303,797
Taxes	112,750	106,158
Total	$1,444,742	$1,409,955
Net earnings	$1,106,521	$1,037,451
Interest, etc.	$777,210	$753,305
Preferred stock dividend	138,000	138,000
Total	$915,210	$891,305
Balance	$191,311	$146,146

The comparative statements of the two electric railway subsidiaries, the Portland Railroad and the Lewiston, Augusta & Waterville Street Railway for the same periods follow:

	Portland R. R.†		Lewiston, Augusta & Waterville St. Ry.†	
	1915	1914	1915	1914
Gross earnings	$1,043,735	$1,046,674	$703,897	$677,723
Operating expenses and taxes	647,596	642,867	459,876	458,174
Net earnings	$396,139	$403,807	$244,021	$219,549
Interest charges	$261,730	$247,561	$187,543	$184,834
Dividends	99,950	99,950	36,000	36,000
Balance-surplus	$34,459	$56,296	$20,478	*$1,285

*Deficit.

†Intercompany items are included, and the figures show the results, as if the companies had been operated separately.

The Portland Railroad, leased, showed a decrease of $2,939 in gross earnings during the fiscal year ended June 30, 1915, owing to the inclement weather in July and August, 1914, and to the competition of jitneys (regulated since Sept. 4, 1915, by ordinance) and other automobiles in Portland. Moreover, the operating expenses included $32,000 to cover depreciation on the car equipment, an item not included in previous years. Interest, etc., increased $14,169, this being caused by charging to operating expenses the actual manufacturing cost of additional power purchased from the Cumberland County Power & Light Company and charging the balance to interest, etc.

The Lewiston, Augusta & Waterville Street Railway (controlled through stock ownership) had an increase of $26,174 in gross earnings during the year, attributable to the mild weather conditions during the winter of 1914-1915, to the fact that the Legislature was in session in Augusta and to a satisfactory increase in the freight and express business. The operating expenses included a new item of $16,000 for estimated depreciation of car equipment. The interest charges increased $2,709 on account of interest and discount on additional notes outstanding and an increase in unfunded debt.

FARES COLLECTED ON BROOKLYN ELEVATED

The Public Service Commission for the First District of New York has issued a statement showing the fares collected at stations of the New York Consolidated Railroad and connecting lines of the elevated system of the Brooklyn Rapid Transit Company for the year ended June 30, 1915.

As compared with 1914, the statement shows a material falling-off in fares collected at practically every station on the various lines. At Brooklyn Bridge, for instance, the total fares collected in 1915 were 30,791,711, a decrease of 2,279,593 under the previous year; at the Park Row station 29,205,995, a decrease of 2,259,666; on the Fulton Street city line 25,278,312, a decrease of 1,305,008; on the Lexington Avenue-Cypress Hills lines 19,689,324, a decrease of 798,179; on the Myrtle Avenue-Ridgewood line 12,189,942, a decrease of 392,601; on the Broadway line 9,235,328, a decrease of 89,738.

The Brighton Beach-Franklin Avenue line, while showing a decrease, did not suffer so severely as most of the other lines. The total fares taken in by this line were 12,104,540, a decrease of 160,544 as compared with 1914. The Fifth Avenue-Bay Ridge line showed a decrease of 407,807, its total fares collected in 1915 being 17,707,609. Coney Island Terminals showed a decrease of 474,437, the total fares being 10,647,697; Williamsburg Bridge collected 6,376,304 fares, a decrease of 1,509,263. The grand total on all of the lines amounted to 167,400,086 fares, a decrease of 3,471,194.

THIRD AVENUE BONDS AUTHORIZED

Public Service Commission Authorizes Company to Issue $2,020,487 of Bonds—Might Mean Beginning of Dividends

The Public Service Commission foi the First District of New York on Oct. 8 authorized the Third Avenue Railway, New York, to issue $2,020,487 of first refunding mortgage fifty-year 4 per cent gold bonds. The bonds are dated Jan. 1, 1910. The sum of $4,000,000 had already been issued under an application for $6,650,000 made on Dec. 24, 1913. The amount authorized now has not been in dispute, but the remainder of the $2,650,000 covered by the original application is yet held up. A statement by the company in regard to the general delay was published in the ELECTRIC RAILWAY JOURNAL of Oct. 2.

The items for which payment is provided out of the proceeds of the bond issue just sanctioned, include the following: Balance owing for fifty low-step cars, $93,033; capital stock of the Pelham Park & City Island Railroad at par, $25,000; to reimburse the treasury for expenditure in purchasing bonds, stock and claims against the New York City Interborough Railway over and above $1,000,000 allowed by the order of Feb. 20, 1914, $421,996; to reimburse the treasury for expenditures out of income, including the following: 450 shares of stock of the Pelham Park & City Island Railroad, $40,000; $20,000 of capital stock of the Third Avenue Bridge Company, $20,000; demand notes of the same company, dated July 1, 1914, $96,908; property and additions on Third Avenue Railway lines, Jan. 1, 1912, to Feb. 1, 1915, $431,919; to reimburse the treasury for expenditures during the same period for additions upon the controlled lines of the Third Avenue Railway companies over and above those upon the Third Avenue Railway proper, as just indicated, $451,022; to cover expenses of sale and to make up discounts, $444,507.

The bonds are to be sold at not less than 78 per cent, and provision is to be made for the amortization of any discount on sale. The $4,000,000 of bonds first authorized was to be issued at not less than 82, with amortization also provided for.

In some circles this bond authorization has been accepted as indicating an early payment of dividends on the stock of the company. The expenditures for improvements and betterments have been heavy for some time, and in the absence of authorization to issue and sell bonds, requirements for such purposes have been met from current income. It has been contended that many of these outlays were properly chargeable to capital and not current income, and one group in the board of directors is now expected to insist that certain of these improvements be capitalized, in which case there will be left available money for the payment of dividends.

American Light & Traction Company, New York, N. Y.—The American Light & Traction Company has declared a cash dividend of 2½ per cent on the common stock and a stock dividend at the rate of 2½ shares of common stock on every 100 shares of common stock outstanding. There has also been declared a dividend of 1½ per cent on the preferred stock, all payable on Nov. 1 to stockholders of record on Oct. 15. A. P. Lathrop, president of the company, who recently returned from a month's trip to cities in which the operating companies are located, was surprised by the improvement in general business since his last inspection trip. Detroit is showing a wonderful expansion industrially, but there also has been a great improvement in St. Paul, Milwaukee and other Western cities. According to Mr. Lathrop, the improvement appears to be based on a firm foundation and not at all of a temporary nature. The earnings of the operating companies are feeling the full effect of these better conditions and good gains are being made over last year.

Brooklyn (N. Y.) Rapid Transit Company.—The Central Trust Company, Kuhn, Loeb & Company and Kidder, Peabody & Company, New York, who privately opened subscriptions for their purchase of the new issue of $20,000,000 of Brooklyn Rapid Transit 5 per cent secured notes, noted in the ELECTRIC RAILWAY JOURNAL of Oct. 9, announce that the entire amount has already been over-subscribed. Only members of the old syndicate which underwrote the original $40,000,000 of the issue were given an opportuntiy to subscribe, and the subscription price was 100 less ½.

Fairmount Park Transportation Company, Philadelphia, Pa.—E. W. Clark & Company, Philadelphia, announced on Oct. 1 that they were buying coupons on the $750,000 of first mortgage 5 per cent bonds of the Fairmount Park Transportation Company, due that day. The sale of this property subject to the bond issue was noted in the ELECTRIC RAILWAY JOURNAL of June 26.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.—N. W. Halsey & Company, New York, are offering $5,500,000 of first mortgage 5 per cent bonds of the Fort Dodge, Des Moines & Southern Railroad to yield 5.5 per cent for the eighteen later maturities and 4.5, 4.75, 5, 5.25 and 5.4 for the installments maturing in the years 1916 to 1920, inclusive. These bonds are dated Dec. 1, 1913, and are due serially on Dec. 1, $50,000 yearly 1916 to 1937, both inclusive, and $4,400,000 in 1938, but redeemable all or in part on any interest date at 105 and interest. They are secured by a first lien on 128.75 miles of electrified railroad, extending from Des Moines to Boone, Ames, Rockwell City and Fort Dodge and carrying on both passenger and freight business. The entire outstanding bonded debt of $5,500,000 is said to represent 62 per cent of the replacement value of the physical property.

Hudson & Manhattan Railroad, New York, N. Y.—The Board of Public Utility Commissioners of New Jersey has approved the application of the Hudson & Manhattan Railroad to issue $615,500 of 5 per cent first lien and refunding mortgage bonds to the Central Trust Company, New York, as trustee. The bonds must net the company not less than 80 per cent of par. The authorization of this issue by the Public Service Commission for the First District of New York, with the purposes of the issue, was noted in the ELECTRIC RAILWAY JOURNAL of Sept. 18.

Kansas City Railway & Light Company, Kansas City, Mo.—Kuhn, Loeb & Company, Lee, Higginson & Company and Blair & Company, reorganization managers for the Kansas City Railway & Light Company, have announced that Judge Hook has extended the time for the deposit of Kansas City Elevated Railway general mortgage 6 per cent bonds and general mortgage 4 per cent bonds and Kansas City & Westport Belt Railway first mortgage 5 per cent bonds to Nov. 10. Judge Hook has reserved decision as to whether further deposits of bonds and notes embraced in the reorganization plan other than those above mentioned shall be accepted.

Long Island Railroad, New York, N. Y.—The President of the Borough of Queens has approved the report of C. B. Moore, consulting engineer, in favor of leasing the tracks of the Long Island Railroad for operation of rapid transit trains from Corona to Whitestone and Little Neck. The report shows that the cost of constructing a city built line to Whitestone and Little Neck would be approximately $6,000,000, on which the interest would be $300,000 a year as compared to an initial rental of the railroad tracks for $125,000 a year, with an annual increase of 6 per cent. In regard to the rental figure, the report states that the payment should be based upon the present net earnings of the company derived from the portion of its lines over which it is proposed to lease traffic rights, considering traffic on the Port Washington branch diverted to the rapid transit service and the future development of the territory. A ratio equal to the present net income of the company, increasing in such ratio as the average increase for the last five years, is deemed to offer a fair return for the rights to be leased.

Mansfield Public Utility & Service Company, Mansfield, Ohio.—The preferred stockholders of the Mansfield Railway, Light & Power Company, who in 1912 brought suit for dissolution against the common stockholders and secured on Dec. 28 an order of sale, have formed the Mansfield Public Service & Utility Company with $3,500 of capital stock (par $1), as compared to the former company's capital stock issue of $1,000,000. At the sale the Mansfield Public Service & Utility Company bought the assets for $10,000, subject to a $942,000 mortgage lien. The assets of the old company were appraised at $1,430,000. The court has confirmed the sale, and the transfer of the property is expected soon to take place. The officers of the new company are: President, F. Hertenstein, Cincinnati; vice-president, Reid Carpenter, and secretary, S. A. Foltz, both of Mansfield.

North Branch Transit Company, Bloomsburg, Pa.—It is reported that the Columbia County Court on Sept. 28 appointed A. W. Dusy as receiver of the North Branch Transit Company, which owns and operates 30 miles of electric railway connecting Berwick, Bloomsburg, Catawissa and Danville. The company took over the Columbia & Montour Electric Railway and the Danville & Bloomsburg Street Railway several years ago.

Northern Electric Railway, Chico, Cal.—The reorganization committee of the Northern Electric Railway and its subsidiary and allied corporations has addressed a communication to the creditors of all the corporations, announcing that the plan has been agreed upon and setting forth the procedure necessary to make the plan effective. The time for owners or pledgees of bonds and creditors to become parties to the agreement is now limited to Nov. 15.

Ocean Shore Railroad, San Francisco, Cal.—It is reported that an assessment of $3 per share has been levied on the stock of the Ocean Shore Railroad. A previous assessment was announced in the ELECTRIC RAILWAY JOURNAL of April 24, 1915.

Philadelphia & Western Railway, Upper Darby, Pa.—The revenues of the Philadelphia & Western Railway for the fiscal year ended June 30, 1915, were $422,806, an increase of $50,949 over the preceding year. Of this $401,672 (an increase of $51,141) came from passenger traffic and $1,003 (a decrease of $593) from freight traffic, with other small items included in the total revenues. Operating expenses totaled $210,040, an increase of $1,663, leaving net operating income of $212,766, an increase of $49,286. The operating expenses were made up as follows: Maintenance of way and structures, $47,785 ($5,865 increase); maintenance of equipment, $33,490 ($9,428 decrease), traffic, $2,989 ($534 increase); power plant, $49,415 ($563 decrease); conducting transportation, $60,600 ($3,068 increase), and general, $15,759 ($2,186 increase). The operating ratio for the year was 49.68 per cent, a decrease of 6.36 per cent. The deductions from income decreased by $765 to $147,339, leaving $65,426 to be transferred to profit and loss. During the year the company carried 2,931,693 passengers, an increase of 306,476. The receipts per passenger amounted to 13.7 cents, an increase of 0.3 cent, and the earnings per passenger car-mile 31.4 cents, an increase of 2.8 cents. The expenses per revenue car-mile were 16.2 cents, a decrease of 0.5 cent. The steam railways with which the company competes increased their passenger fare rates in December, 1914, and this favorably affected electric railway passenger revenues, including the receipts from traffic interchanged with the Lehigh Valley Transit Company. In June, 1915, the company paid off $480,000 of floating debt by the sale of first mortgage 5 per cent bonds, due in 1960.

Quebec Railway, Light, Heat & Power Company, Quebec, Que.—The board of directors of the Quebec Railway, Light, Heat & Power Company, which at the last annual meeting was reduced from nine members to six, was recently increased to eleven members. The new directors are Arthur Berthiaume, Treffle Bastien, Louis J. Tarte, Arthur Ecrement and L. G. Morin.

St. Cloud (Minn.) Public Service Company.—The Chicago Savings Bank & Trust Company, Chicago, is offering for sale at 100 and interest, to yield 6 per cent, a block of first mortgage gold bonds of the St. Cloud Public Service Company, dated 1914 and due in 1934. These bonds are subject to redemption on any interest date at 105 and interest on or before Nov. 1, 1920; at 104 and interest on or before Nov. 1, 1925, and at 103 and interest thereafter. The bonds are secured by an absolute first mortgage on the gas, electric light and street railway properties in St. Cloud, and by the electric light and power properties in Sauk Rapids, Rockville, Cold Springs, Richmond, St. Joseph and Waite Park.

San Diego (Cal.) Electric Railway.—The California Railroad Commission on Sept. 28 issued an order extending the time until Oct. 1, 1916, in which the San Diego Electric Railway may issue bonds amounting to $4,748,000 heretofore authorized. The application for this order was mentioned in the Electric Railway Journal of Oct. 9.

San Francisco, Napa & Calistoga Railway, Napa, Cal.—The Mercantile Trust Company, San Francisco, has invited bids for the sale to it on Nov. 5 of a sufficient amount of San Francisco, Napa & Calistoga Railway first mortgage 6 per cent gold bonds for the investment of $6,764 now in the sinking fund. The bids must not exceed 105 and accrued interest and must be in by Oct. 26.

Scranton & Wilkes-Barre Traction Corporation, Scranton, Pa. — Lamarche & Coady, New York, are offering at par (with a 50 per cent bonus of common stock) a block of 6-7 per cent cumulative preferred stock of the Scranton & Wilkes-Barre Traction Corporation. The dividends on this issue are at the rate of 6 per cent up to 1917, and 7 per cent thereafter. This company owns all the bonds and stock, except directors' shares, of the Lackawanna & Wyoming Valley Railroad, the interurban electric railway between Scranton and Wilkes-Barre.

Second Avenue Railroad, New York, N. Y.—The receiver of the Second Avenue Railroad recently announced that holders of receivers' certificates would receive payment of interest for the six months ended Sept. 30, 1915, at the rate of 6 per cent per annum, upon presenting their certificates for appropriate indorsement at the Guaranty Trust Company, New York, on or after Oct. 1.

Taunton & Pawtucket Street Railway, Taunton, Mass.—The Supreme Judicial Court of Massachusetts on Oct. 7 affirmed a decree of the Superior Court authorizing the Federal Trust Company to foreclose a mortgage given by the Bristol County Street Railway in 1901 to secure a bond issue of $200,000. In 1904 the company was declared bankrupt, and the receiver sold the property to persons who subsequently organized the Taunton & Pawtucket Street Railway. The latter company attacked the validity of the bond issue, but the full court now holds that all the real estate, fixtures and rights-of-way owned by the Bristol County Street Railway at the time of the receiver's appointment were covered by the mortgage and an enforcible supplemental agreement thereto.

Tidewater Southern Railway, Stockton, Cal.—An assessment of 10 cents per share was recently levied on the stockholders of the Tidewater Southern Railway. The assessment was effective on Oct. 4, and the sale date was set for Nov. 1.

Washington-Oregon Corporation, Vancouver, Wash.—It is said that plans are slowly materializing for the reorganization of the Washington-Oregon Corporation, which has for some time been in the hands of a receiver. Articles of incorporation have been filed for the Washington-Oregon Utilities Company with a capital stock of $1,750,000, of which $1,200,000 is to be preferred stock and $550,000 common stock. The company is to have a life of fifty years. It will bid for the companies and assets of the Washington-Oregon Corporation when sold. Previous references to the latter company were made in the Electric Railway Journal of May 15 and July 31, the last noting an indefinite postponement of sale.

Wilmington Southern Traction Company, New Castle, Del.—The Wilmington Southern Traction Company, whose entire $250,000 of common stock and $100,000 of preferred stock are now owned by the Wilmington & Philadelphia Traction Company, as announced in the Electric Railway Journal of Oct. 9, has made a mortgage to the Wilmington Trust Company to secure $300,000 of first mortgage 5 per cent gold bonds. The present issue of these bonds is to be $231,000, the remainder being reserved for 85 per cent of the cost of new construction. The bonds are guaranteed principal and interest by the Wilmington & Philadelphia Traction Company.

Worcester (Mass.) Consolidated Street Railway.—Francis H. Dewey, president Worcester Consolidated Street Railway and also president New England Investment & Security Company, which controls the former property and the Springfield Street Railway, is reported to have said in a recent interview that there is no probability of the two sub-holding companies being merged in the immediate future. Old rumors in this connection were noted in the Electric Railway Journal of July 24. President Dewey now states that closer affiliation of the Worcester and Springfield properties will for the present be considered only as it relates to better service for the public. As to liquidation of the sub-holding companies and their consolidation, this will undoubtedly come in time as surely as it comes to all such companies, but it may not happen for ten years yet. It has been under consideration for at least five years and is no nearer a fact now than then.

Youngstown & Southern Railway, Youngstown, Ohio.—It is reported that the New York Trust Company, as trustee, has brought suit for the bondholders to foreclose the $1,500,000 mortgage of the Youngstown & Southern Railway. The appointment of a receiver for this company was noted in the Electric Railway Journal of Jan. 30, 1915.

DIVIDENDS DECLARED

Green & Coates Streets Passenger Railway, Philadelphia, Pa., quarterly, $1.50.

Kentucky Securities Corporation, Philadelphia, Pa., quarterly, 1½ per cent, preferred.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred.

Public Service Investment Company, Boston, Mass., quarterly, $1.50, preferred.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

Youngstown & Ohio River Railroad, Leetonia, Ohio, quarterly, 1 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$189,975	$116,770	$73,205	$40,214	$32,991
1 " "	'14	211,108	119,831	91,277	39,858	51,419
2 " "	'15	377,463	233,585	143,878	80,654	63,224
2 " "	'14	427,855	240,837	187,018	79,871	107,147

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$242,299	*$153,572	$88,727	$40,232	$48,495
1 " "	'14	243,564	*156,117	87,447	40,193	47,254
12 " "	'15	3,056,293	*1,813,726	1,242,567	470,899	771,668
12 " "	'14	3,066,923	*1,952,953	1,113,970	480,077	633,893

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$285,383	*$140,399	$144,984	$65,003	$79,981
1 " "	'14	272,799	*28,777	144,022	63,464	80,558
12 " "	'15	2,567,923	*1,465,251	1,102,672	780,274	322,398
12 " "	'14	2,491,684	*1,433,513	1,058,171	762,736	295,435

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$79,359	*$43,415	$35,944	$15,962	$19,982
1 " "	'14	76,293	*41,221	35,072	15,503	19,569
1 " "	'15	709,775	*465,555	244,220	188,455	55,765
1 " "	'14	670,432	*460,149	210,283	184,754	25,529

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$166,467	*$108,536	$57,931	$43,140	$14,791
1 " "	'14	180,508	*107,927	72,581	41,900	30,681
12 " "	'15	2,149,747	*1,281,951	867,796	494,828	372,968
12 " "	'14	2,249,944	*1,390,416	859,528	491,437	368,091

PORTLAND (ME.) RAILROAD

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$121,917	*$62,414	$59,503	$19,947	$39,556
1 " "	'14	121,027	*59,455	61,572	19,880	41,692
12 " "	'15	1,043,174	*651,087	392,087	261,501	130,586
12 " "	'14	1,033,387	*643,829	389,558	253,497	136,061

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$460,861	*$257,583	$203,278	$186,507	$16,771
1 " "	'14	487,264	*275,914	211,350	186,186	25,164
12 " "	'15	5,668,404	*3,084,826	2,583,578	2,210,856	372,722
12 " "	'14	6,575,622	*3,336,059	3,239,563	2,141,145	1,098,418

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*Includes taxes.

Traffic and Transportation

JITNEY JOTTINGS

Hearing Before New York Commission on First Jitney Petition Under New Law Requiring Certificate from Commission

The application of the Troy Auto Car Company for a certificate of convenience and necessity was argued before the Public Service Commission for the Second District of New York on Oct. 6. Attorneys for the United Traction Company, Albany, opposed the petition. Witnesses for the jitney bus company testified that it has carried more than 200,000 passengers since the cars began to run on Fifth Avenue, Troy, through Lansingburgh. Attorneys for the United Traction Company contended that this was patronage to which that company was entitled in view of its large investments and its heavy expenses in Troy. Testimony showed that the bus line ran parallel to the electric railway and from one to three blocks or from 200 ft. to 1000 ft. to the east of it. The bus company sought to show the need of its service, while the traction company contended that the trolley service was adequate without the buses.

Charles H. Smith, assistant general manager of the United Traction Company, testified as to the service rendered in North Troy. He showed that the schedule provided a minimum of thirteen cars an hour north of Twelfth Street and many more to the south until more than fifty cars an hour were operating at Bridge Avenue in Troy. W. H. Elder, auditor of the company, testified as to the manner in which transfers could be obtained between the Lansingburgh lines and the other lines in Troy and to Cohoes, Waterford, Green Island, Watervliet and Albany. He said the United Traction Company operated 34 miles of single track in Troy. This was one-third of the company's total trackage. Exclusive of expenditures for equipment the company had expended in the last year $124.000 in Troy for improvements and betterments. About $90,000 was spent for the better equipment of the whole system. The annual payroll was $483,000 divided among 732 employees in Troy, and $85,350 was paid in taxes.

In the course of the testimony of Orville C. Bosca for the bus company it was brought out that the North End High School was on the line of the buses and that many of the students rode on the buses. The traction company attorneys called attention to the fact that the students had to pay the full 5-cent fare on the buses while the traction company afforded a half-fare school ticket. Mr. Bosca also testified as to the general character of the district served and the character of the patronage of the buses, their schedule and operation and their comfort and convenience. He said the buses ran on a fifteen-minute headway from 6 o'clock in the morning until midnight.

Commissioner Frank Irvine, before whom the case is being conducted, promised to make a personal inspection of the two lines through upper Troy before the next hearing, and both sides reserving the right to introduce further testimony, the case was adjourned until Oct. 15.

This petition is the first to be filed with the commission under the new law requiring its certificate for all bus lines in cities. In addition to this one there are now before the commission more than a score of applications for bus rights from cities in all parts of the State.

With the overruling of a demurrer filed by the Philadelphia city authorities in Common Pleas Court No. 4 in the suit of the Union Motor Bus Company to stop the enforcement of the jitney ordinance, a new action was begun in the same court by the People's Motor Club to restrain Director of Public Safety Dripps and the police from arresting drivers of "club" cars. An attorney representing the "club," which recently began to revive the jitney business on Broad Street, maintains that the organization has a legal right to extend its special privilege to its members, and that as a private organization it is exempt from the provisions of the jitney ordinance.

Jitney buses at Springfield, Ill., have been operating for several months without any regulation, but recently the City Commission passed a regulatory ordinance. Immediately upon passage of this city law, A. D. Mackie, vice-president and general manager of the Springfield Consolidated Railway, announced that the company would come in under the ordinance and operate jitneys. Mr. Mackie is understood to be negotiating with a defunct jitney company in the West for the rental of a dozen motor buses, and it is said that he expects to complete the deal so as to put the buses in operation in Springfield by Nov. 1. Passengers will be given transfers from the buses to street cars and vice versa.

Several petitions, asking for an election on the proposition of placing the jitney operators under bond and other regulations, were placed in circulation at Houston, Tex., immediately following a special session of the City Council at which a resolution was adopted expressing a willingness to turn the question over to the voters for decision providing the people would petition for what they want. When the original jitney ordiance was passed the Mayor and a majority of the commissioners were opposed to the bond feature which was left out of the ordinance. Since then there has been an insistent demand by many citizens for an amendment of the ordinance to provide for a bond and other stringent regulations. The jitney men object to the election. They say that the bond feature would put them out of business, and they are preparing an ordinance which is expected to be a compromise between those financially interested in the jitney business and the citizens at large who have been agitating regulations more strict than are imposed under the present ordinance. The jitney men's ordinance, to be submitted at an election, will reduce the license fee from $72 to $24 a year and provide for contributions from each jitney operator of a stipulated amount to a fund out of which will be paid indemnity for injury to passengers and pedestrians. The fund would be maintained by monthly assessments.

After jitneys have been operating in Victoria, B. C., for eleven months the City Council has passed a by-law regulating the traffic on practically the same lines as employed by other cities of the same class.

For the purpose of holding the jitney ordinance in abeyance until the next municipal election, Chauffeurs' Union No. 163 at Portland, Ore., has filed with the city auditor referendum petitions containing the signatures of nearly 12,000 citizens. Unless the Supreme Court holds that the use of the emergency clause on ordinances is valid there will be no ordinance in Portland regulating the jitneys until 1917. If the Supreme Court holds that the ctiy has the power to pass emergency ordinances there will be immediate regulation of the jitneys under the ordinance.

The City Council of Jacksonville, Fla., has passed a jitney regulatory measure. The new bill requires among other things that any company operating more than one line of buses shall give transfers on all its lines. A bond of from $2,500 to $50,000 will be required, according to the number of passengers carried.

The National Indemnity Exchange, organized to write jitneys, has been licensed in Missouri, Oklahoma and Minnesota, and is now seeking entrance to Arkansas. Applications for the right to do business in California and Pennsylvania will probably follow shortly. The largest business has probably been done in Minneapolis. In many cities of the States mentioned the jitney owners are not ready to take insurance, because the owners fear the ordinances that are passed may require bonds, and they cannot afford both bonds and insurance. In many cities the bonds required are now so large that there is little chance of auto owners taking insurance. A call came recently from New Orleans, where several hundred jitney owners wanted insurance, and where it was said local ordinances would permit the writing by the National Indemnity Exchange, but Louisiana has no law relating to inter-insurance, and there, as in Texas, the exchange must wait the solving of that problem. In some States, State laws require jitneys and livery owners to give a bond which eliminates the insurance feature.

The city of Kokomo, Ind., has passed a jitney law, under which a bond of $3,000 is required for all five-passenger cars, with $500 added for each additional passenger carried. All buses are to be inspected by the chief of police and not more than 5 cents can be charged for one continuous trip through the city. An annual license fee of $50 is required for each five-passenger bus with $10 more for each additional passenger.

FAILURE OF AUTOMOBILE FREIGHT SERVICE

Well-Developed Automobile Freight Service at Los Angeles on Decline

The jitney freight business in southern California has apparently run its course and commenced a decline almost as rapid as the start, according to reports from Los Angeles. It was believed a year or two ago, according to the *Southwest Commercial Bulletin*, that the automobile truck in southern California would practically supplant the steam and electric railways in handling merchandise between Los Angeles and southern California towns. A study of the situation recently, however, developed the fact that, like the jitney bus, the interurban truck has lived but a little while and now is rapidly ceasing to be.

A few days ago the largest interurban auto truck concern operating in Los Angeles announced that service had been discontinued to two more cities—Anaheim and Fullerton. About a year ago it was possible to get auto truck service at railroad rates to practically every village and hamlet in that part of the State, including points as far distant as San Bernardino. At that time there were dozens of individual truck owners.

The scheme apparently worked well for a few months, but two difficulties developed. The first came when inexperienced and short-sighted private owners began to find that overhead and depreciation on their machines more than ate up their net receipts for handling freight. The second developed in the form of opposition from jobbers and manufacturers who were unwilling to trust valuable merchandise to irresponsible and unknown parties, who in the event of loss and damage could offer no guarantee. In an effort to obviate these difficulties a well-financed company was organized. This company bought fifty or sixty auto trucks and the opinion seemed to be general that these modern machines could be operated over southern California's wonderful system of paved roads at a profit, despite the keen competition of the steam and electric lines. The company also put up a bond for the protection of jobbers against the loss of their merchandise, thus overcoming in a measure the second objection. At first they covered nearly all points but, as indicated above, have slowly cut down until now only a few of the larger near-by towns are served. Apparently, the business did not prove profitable. When asked why the automobile truck apparently had proved impracticable in the interurban handling of merchandise here, a local jobber said:

"The rail lines have all the advantage. We may dream all we want to about competing with them, but they can handle merchandise for a great deal less money than can the auto truck. The life of a box car, they tell me, is more than twenty years. It costs $1,400 against $3,000 or $4,000 for a good auto truck, and yet has four or five times the capacity. An auto truck is junk in three or four years. Another reason is that somehow the merchant expects more of the truckman than he does of the railroad. He will go to the station with his own wagon and pick up freight without the least question, but if he orders it sent by auto truck he expects it delivered on his sidewalk without additional expense. Thus the auto people give more for the money than the railroads. Another trouble is breakage. Despite the greatest care, you will find that the percentage of breakage and loss on auto trucks is materially larger than over the same mileage by rail. The railroads have the advantage of fifty years of evolved system in handling goods, and this tells in the final analysis."

Those who have advocated interurban trucking at Los Angeles express the keenest disappointment that it seems to be a failure. They say that if it cannot succeed here under present conditions it certainly cannot succeed any place else. They point out that nowhere in the world are roads and climatic conditions better than in southern California for such a test. They further point out that the experiment has been well financed and the equipment has been of the highest order.

Directing the Fair Visitor.—The Topeka (Kan.) Railway used large display space and received liberal co-operation from the newspapers in informing the public as to service during the free fair recently. All conductors wore badges, on which was printed "Ask Me," a custom followed by the company during all large gatherings in the city. The railway's business during the week of the fair was 350,000 fares and transfers, of which it is estimated that about 110,000 were people attending the fair. The company built a special spur into the fair grounds.

Three Out of Four Los Angeles Hospital Cases Traffic Accidents.—Los Angeles hospital records show that during the past twelve months more than 9000 cases out of a total of 12,000 entered at the receiving hospital in that city have been due to traffic, practically all automobile. A conference of the police officials, the police court judges and Police Surgeon Wiley followed the report that 75 per cent of all emergency cases in the city are caused by traffic. It was shown that recklessness, ignorance and irresponsibility on the part of motorists cost several hundred lives yearly. Traffic accidents alone made necessary an enlargement of the receiving hospital and the maintenance of a larger ambulance corps. As a result of the conference it was decided to increase the traffic squad, dismiss the commission form of dealing with offenders and require every lawbreaker to go to the police court.

Service Advertised in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., continuing its practice of using display space in the newspapers to inform the public of details of service, recently published an advertisement containing an illustration of Electric Park illuminated, and notifying patrons of the routing of cars to the park during a manufacturers' and merchants' exhibition. An even more striking and serviceable advertisement was one in reference to owl cars. This advertisement showed the outlines of an owl, the eyes formed of headlights, the feet resting on an electric car that was shown illuminated, the moon in the background. The reading matter consisted of the full schedule of owl car service on all lines, with terminals mentioned so that patrons could determine their transfer connections. The hands on a clock in the distance pointed to a few minutes past midnight.

Inducing Excursions Into the Country.—The Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company are making a special effort to interest people in the fall scenery which is to be viewed from the tops of the Silver Hills. At the instance of the companies the local papers in Louisville, Ky., have been taking notice of the numbers of trolley parties which have been made up to take the trip over the river. In connection with what the ELECTRIC RAILWAY JOURNAL said some time ago about the plans of the Louisville & Interurban Railroad to interest Louisville people in the fall scenery, one of the Louisville papers noted editorially at considerable length that the trips were well worth taking and would reward those who made them. The indulgence of the conductors toward those who brought large bunches of their flowers aboard the cars was alluded to in a most appreciative way.

Handling Traffic at the Astor Cup Race.—During the day of the Astor Cup Race on the new Sheepshead Bay Automobile Speedway, Brooklyn, N. Y., on Oct. 9, ample provision was made by the Brooklyn Rapid Transit System for handling the passenger traffic to and from the race. Special six-car train express service was furnished at frequent intervals over the Brighton Beach rapid transit line between Park Row, Manhattan, and the Sheepshead Bay Speedway, at which latter place a terminal had been provided for the unloading of patrons of races formerly held on the old Sheepshead Bay race track. Extra ticket selling booths were in operation at the Park Row station and sixteen ticket sellers were employed at the Sheepshead Bay terminal during the rush for trains directly after the race. An additional fare of 5 cents besides the ordinary 5-cent fare was collected at the Sheepshead Bay terminal. While the attendance at the race was estimated at 100,000 the price for seats and admission was such as to confine the race-goers largely to the automobile owning or hiring class. On this account, despite the huge attendance, the problem of transportation did not present unusual difficulties.

Personal Mention

Mr. L. M. Taylor, Champaign, Ill., has been appointed contracting freight and passenger agent of the Illinois Traction System to be associated with Mr. E. E. Kester.

Mr. W. H. Torrey has been appointed purchasing agent of the Toledo Railways & Light Company, Toledo, Ohio, succeeding Mr. H. W. Thompson, who has returned to Denver.

Mr. Harry O'Brien, superintendent of overhead of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has been appointed by the company to the position of superintendent of telephones, interlocking plants and bonding.

Mr. James Couzens, who has resigned as vice-president and general manager of the Ford Motor Company, Detroit, Mich., is president of the Street Railway Commission of that city, which has conducted the negotiations with the Detroit United Railway for the sale of the lines of the company in Detroit to the city. Approval of this purchase is to go before the voters at the election in Detroit on Nov. 2.

Prof. W. S. Franklin, who recently resigned as head of the department of physics of Lehigh University, South Bethlehem, Pa., will spend the fall and winter in making a lecture tour through the West and South. The lectures will be given principally in universities and technical schools and will cover appropriate topics such as wave motion, mechanical analogies in electricity and magnetism, phenomena of fluid motion, etc. Professor Franklin has been connected with Lehigh University almost continuously since 1897, having previously taught at the University of Kansas and the Iowa State College. He is the author of a number of books on physics and electrical engineering.

Mr. John J. Cooper, who was elected president of the Colorado Electric Light, Power & Railway Association at its Glenwood Springs convention, is secretary and operating manager of the Gilpin County Light, Heat & Power Company, the Arkansas Valley Electric Company and the Brush Light & Power Company and is vice-president of the Hinsdale Mining & Development Company. He has lived twenty-five years in Colorado and has always been engaged in the electrical business, having worked his way up from office boy and stenographer. He was at one time manager of the Trinidad Gas & Electric Company, Trinidad, Col., and is at present stationed in Denver as manager of the supply department of the Mountain Electric Company.

Mr. H. O. Marler, whose appointment as traveling passenger agent of the Pacific Electric Railway, with headquarters at Los Angeles, Cal., was noted in the ELECTRIC RAILWAY JOURNAL of Sept. 25, started railroading at the age of fifteen as office boy and clerk in the general auditor's office of the Santa Fé Railroad in Los Angeles, where he remained until July 31, 1904. On that date he resigned to enter the service of the Los Angeles Pacific Railroad, one of the first electric railroads of California. With the latter company Mr. Marler acted as clerk, receiving cashier, assistant agent and agent respectively until the consolidation of the Los Angeles Pacific Railroad and the Pacific Electric Railway, when he was appointed to the position of ticket stock clerk. Subsequently he served as traveling traffic inspector and chief clerk in the general passenger department, remaining in the latter position until his recent appointment as traveling passenger agent.

Mr. E. L. Moore, superintendent of transportation of the Evansville (Ind.) Railways, has in addition been appointed roadmaster of the company to succeed Mr. E. W. Wheeler. Mr. Moore's first railway experience was with the Johnstown (Pa.) Street Railway, the employ of which he entered in 1900 as a trainman. Later he accepted a position with the Cambria Steel Company, and in 1902 he moved to Columbia, Ind., and accepted a position as conductor on the lines of the Indianapolis, Columbus & Southern Traction Company. During the construction of the extension from Columbus to Seymour in 1907 Mr. Moore worked as construction foreman. On Aug. 1, 1908, he accepted the position of trainmaster of the Evansville Railways, and in July, 1912, he was appointed superintendent of transportation, his control extending over the city lines of Henderson, Ky., operated by the Henderson Traction Company. On the resignation of Mr. Wheeler as roadmaster of the company Mr. Moore assumed the duties of that position.

Mr. Orin B. Coldwell, general superintendent of the light and power department and electrical engineer of the Portland Railway, Light & Power Company, Portland, Ore., heretofore in charge of the construction and operation of the light and power department, will have added to his duties those of the commercial department which have been discharged by Mr. F. W. Hild, former general manager, who has assumed the office of vice-president and general manager of the Denver Tramways. No general manager will be appointed to take the place of Mr. Hild, but the duties heretofore discharged by him will be divided among other members of the executive staff. Mr. Coldwell has been connected with the electrical end of the company from boyhood, except during the time he was at Stanford and Cornell Universities. Mr. Coldwell has resided almost entirely in Portland. He is thoroughly familiar with the operations of the company, having worked his way up from the lower ranks through positions of foreman and superintendent in nearly all of the construction done by the Portland Railway, Light & Power Company and its predecessors.

Mr. J. J. Rockwell has rejoined the staff of the McGraw Publishing Company, Inc., publisher of the ELECTRIC RAILWAY JOURNAL, in the capacity of advertising counsellor to that company and its customers, and will make his headquarters at the company's general offices in New York. Since Mr. Rockwell's previous association with the McGraw Publishing Company, during the years 1910 and 1911, he has been engaged in the advertising agency business in Chicago in connection with the Crosby-Chicago Advertising Agency. In earlier years he was associated with the Mahin Advertising Company and the Long-Critchfield Corporation, both well-known advertising agencies in Chicago. His work as an advertising expert has frequently excited highly favorable comment and his long experience in the general agency business, as advertising manager, in publishing fields, and as counsellor for advertisers in many lines of business, and his special and unusual experience in industrial and technical fields, should enable him to be of peculiarly valuable service to the McGraw Publishing Company and its customers.

Mr. T. P. Kilfoyle, whose election as president of the American Electric Railway Accountants' Association on Oct. 6 at the San Francisco convention was noted in the ELECTRIC RAILWAY JOURNAL of Oct. 9, is auditor of the Cleveland (Ohio) Railway, operating 344 miles of line and 1157 motor cars and 426 other cars in Cleveland, "The Sixth City," and vicinity. He has been auditor of the railway since March 1, 1910, and previous to that time was connected with the auditing department of the company for a number of years except during the short interval while the Cleveland Electric Railway was being operated by the Municipal Traction Company during the administration of former Mayor Tom L. Johnson. Prior to the time when he became connected with the Cleveland Railway, Mr. Kilfoyle was general auditor for the Warren Bicknell Company, Cleveland, Ohio, which operated the Cleveland, Lake Shore & South Bend Railway, the Youngstown & Ohio River Railway and the Springfield & Xenia Railway. Mr. Kilfoyle has been connected with the street and electric railway business for the last eighteen years. Mr. Kilfoyle was born in Cleveland on June 28, 1868. He has been first vice-president of the American Electric Railway Accountants' Association for two terms and has served in other years on the executive committee of the association.

T. P. KILFOYLE

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Belleview & Western Railway, Belleview, Mo.** — Incorporated in Missouri to construct a railway from Graniteville to Belleview, about 3 miles. Capital stock, $40,000. Incorporators: William R. Orthwein and Louis Hudson, St. Louis, and J. H. Long, Belleview.

***Washington-Oregon Utilities Company, Vancouver, Wash.**—Incorporated in Washington to take over the property of the Washington-Oregon Corporation to be sold under foreclosure. Capital stock, $1,750,000, of which $1,200,000 is to be preferred stock and $550,000 common stouck.

FRANCHISES

Los Angeles, Cal.—The City Railway has received a franchise from the Council for the construction of a line on South Park Avenue from Thirtieth Street to Slauson Avenue.

San Jose, Cal.—The San Jose Railroads has received a franchise from the Council for the construction of a modern standard-gage line from the northeasterly city limits of San José to Linda Vista.

Coeur d'Alene, Idaho.—The Spokane & Inland Empire Railroad has received a franchise from the Council to construct a single-track steam and electric railway along certain streets in Coeur d'Alene.

Rockport, Ind.—The Evansville Railways have received a franchise from the Council to construct a line on Washington Street to the bank of the Ohio River.

Franklin, Mass.—The Milford, Attleboro & Woonsocket Street Railway has asked the Council for a franchise to relocate its tracks on Central Street, Franklin.

Buffalo, N. Y.—The International Railway has asked the Council for a franchise on Bailey Avenue between Kensington Avenue and East Delavan Avenue and between East Ferry Street and Seneca Street. The company holds franchises to all of Bailey Avenue except between the streets named. It desires permission to operate double-track lines over the entire length of Bailey Avenue, thus linking the south with the north in an unbroken line.

Utica, N. Y.—The New York State Railways has received a fifty-year franchise from the City Council of Utica to extend its Elm Street line through James Street to Neilson Street.

Elyria, Ohio.—The Cleveland, Southwestern & Columbus Railway has received a twenty-five year franchise from the Council to operate a railway in Elyria. Concessions gained by the city include twenty-minute city service and six tickets for 25 cents.

Pawtucket, R. I.—The Rhode Island Company has asked the Council for a franchise to relocate its present track and lay additional track on Broad Street from Exchange Street to Miller Street, Pawtucket.

Dallas, Tex.—The Dallas Northwestern Traction Company and the Dallas Southwestern Traction Company have received from the Board of City Commissioners an extension of six months on their franchises in which to begin construction of their proposed lines to Denton on the north and Glen Rose on the south. [May 1, '15.]

Dallas, Tex.—The Northern Texas Traction Company has received a franchise from the Council to operate a double-track line on Jefferson Street between the Oak Cliff viaduct and Commerce Street.

Steilacoom, Wash.—The Tacoma Railway & Power Company has received a fifty-year franchise from the Council to build an extension from Steilacoom Boulevard to Starling Street, along Starling Street to Steilacoom Street, along Steilacoom Street to Union Avenue and along Union Avenue to Lafayette Street. The franchise also permits the abandonment of the old line along Lafayette Street between Wilkes Street and the town limits.

TRACK AND ROADWAY

Florence & Huntsville Interurban Railway, Florence, Ala.—A preliminary survey has been made by this company between Florence and Elk River, 27 miles, and it is expected that the entire survey between Florence and Huntsville will be completed soon. Thurston H. Allen, Florence, secretary. [March 20, '15.]

Pacific Electric Railway, Los Angeles, Cal.—This company has filed a petition with the California Railroad Commission for permission to construct more than twenty grade crossings and one under-grade crossing along the Hawthorne cut-off between Watts and Redondo Beach, a franchise for which has been granted.

San José (Cal.) Railroads.—Work has been begun by this company on the construction of a modern standard-gage electric line from the northeasterly city limits of San José to Linda Vista, in place of the present narrow-gage line. The old line will be used from Linda Vista to Toyon.

***Cœur d'Alene, Idaho.**—The project of an electric railway system joining the principal towns of the Cœur d'Alene district and extending to Cœur d'Alene has been revived. Prior to the present European war the enterprise had been successfully financed. French capitalists had sent their engineer here to report on the proposed road, and the report was favorable to early construction. Among the local people interested are Herman J. Rossi, Hugh Toole and William Fishinger, all of Wallace.

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—Work will be begun by this company within ninety days on the construction of a 1¼-mile extension in Clarkston. The route to be followed will be south on Sixth Street to Highland Avenue and west on Highland Avenue to Thirteenth Street. The company has already asked the Council for a franchise to construct and operate the proposed line.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—This company will remove the old rails in Washington Street, Waukeegan, from Sheridan Road to Spring Street. These rails were used when the old Bluff City Electric Railroad operated cars in Waukegan. The company has ordered from the Wisconsin Bridge & Iron Company 225 tons of material for the construction of a bridge near Milwaukee.

Keokuk-Jefferson City Electric Railway, Keokuk, Iowa.—In connection with this company's proposed line from Keokuk, Iowa, to Jefferson City, Mo., a meeting was held in Paris, Mo., at which a committee was appointed to raise $1,350 among the citizens for the survey of the line through Paris. Practically all of the amount has been raised. Funds for the survey have already been subscribed in Clark and Lewis Counties and are being solicited at Shelbina. H. W. Knight, Chicago, is interested. [Oct. 9, '15.]

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—Work on this company's extension to Lawrence is progressing rapidly and it is expected that cars will be operated into Lawrence by the first of the year. Construction of the line to Topeka will be begun as soon as the Lawrence section is completed and operating.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company's extension to Hutchinson is practically completed and it is expected that the track will be ready for the operation of cars to the city limits within five weeks.

***Baltimore, Hancock & Berkeley Springs Railroad, Baltimore, Md.**—Rights-of-way are being purchased for a proposed electric railway to be built from Hancock to Berkeley Springs. Littleton F. Johnson and J. M. Savin, Baltimore, are interested.

St. Paul (Minn.) Southern Electric Railway.—Grading has been begun at White Rock on the Zumbrota extension of the St. Paul Southern Electric Railway. The completion of the line to Rochester will give this company the shortest route to that city from St. Paul, 86 miles.

Hattiesburg (Miss.) Traction Company.—An agreement has been reached between the citizens of Hattiesburg and the Hattiesburg Traction Company whereby the company will extend its lines to the Woman's College at once.

Metropolitan Street Railway, Kansas City, Mo.—Work has been begun by this company on the construction of tracks on Main Street from Twenty-fourth Street to Twenty-seventh Street, through the big cut south of the Union Station.

City Electric Company, Albuquerque, N. M.—This company has taken over the property of the Albuquerque Traction Company sold at a special master's sale on Oct. 1. George Roslington is president of the new company and Lloyd Sturges secretary and treasurer.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has approved the contract and plans submitted by this company for the construction of foundations and structure of Section No. 2 of the Jamaica elevated extension. This comprises 2.2 miles of two-track elevated railway extending from Walnut Street along Jamaica Avenue to Cliffside Avenue. The commission also approved the form of contract submitted by the company for the erection of steel for additional tracks on the Myrtle Avenue line from Willoughby Avenue to Palmetto Street, as well as for certain additional work on the Lutheran Cemetery line.

New York State Railways, Syracuse, N. Y.—Work has been begun by this company raising and improving its track on Douglass Street between Graves and Oak Streets, Syracuse. The work will cost about $9,075.

Cleveland & Ohio Central Electric Railway, Cleveland, Ohio.—Steps are being taken to secure final right-of-way for this company's proposed line. Construction will be begun as soon as the right-of-way is obtained. E. A. Norton, Cleveland, general manager.

Oklahoma & Interstate Railway, Oklahoma City, Okla.—Plans for the proposed interurban line between Galena, Baxter Springs, Columbus and Miami were furthered at a recent meeting of the Galena Commercial Club. The company is ready to begin construction on the line as soon as the $10,000 bonds asked from Galena are voted and the right-of-way obtained. A committee was appointed to go over the proposed route and obtain an estimate of the cost of purchasing terminals and obtaining a right-of-way to Baxter Springs, 5 miles west of Galena, and after the estimate is made to go before the Council and ask it to call a bond election. [Sept. 25, '15.]

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont.—This company will make application to the Ontario Railway Board for permission to extend its tracks on Ottawa Street and Strabane Avenue, Ford City.

Rhode Island Company, Providence, R. I.—Plans are being considered to double-track this company's line on Chalkstone Avenue from Smith Street to Mount Pleasant Avenue. The plan also involves the possible extension to Unit Street.

***Sumter, S. C.**—Plans are being considered to build an electric railway from Sumter to Shiloh, thence via Turbeville to Olanta, about 32 miles. It is reported that the Chamber of Commerce of Sumter is interested. E. I. Reardon, Sumter, is secretary of a committee in charge of surveys, rights-of-way, etc.

Carolina, Greeneville & Northern Railroad, Greeneville, Tenn.—Bristol has been definitely decided upon as the terminus of the Carolina, Greeneville & Northern Railroad. Bristol and Sullivan County subscribed and paid nearly $20,000 toward the preliminary survey, options on rights-of-way, terminal and factory sites, etc. The new line will be built between Bristol and Knoxville via Kingsport, Newport and Sevierville. The new road will use electric power but will be equipped to handle freight cars of the connecting steam roads. [July 10, '15.]

Houston, Richmond & Western Traction Company, Houston, Tex.—Engineers will be in the field within the next thirty days locating the line for the Houston, Richmond & Western Traction Company and actual construction will be begun within sixty days thereafter. The line will extend between San Antonio and Houston, entering each of these cities over the local traction company's rails. Passengers and express will be handled. Motive power will be supplied largely from the Guadalupe River at Seguin and Gonzales. Two routes are being considered for the interurban, one by way of Seguin, Gonzales and Columbus, and known as the northern route, the other by way of Sutherland Springs, Cuero and Yoakum, and known as the southern route. E. Kennedy, who is promoting the line, has already obtained bonus and stock subscriptions amounting to nearly $300,000. He anticipates raising an additional $200,000, represented by town sites and right-of-way. [Sept. 25, '15.]

Ogden, Logan & Idaho Railway, Ogden, Utah.—This company has completed its extension from Ogden to Preston and operation will soon be begun.

Petersburg & Appomattox Railway, Petersburg, Va.—The grading on the Petersburg & Appomattox Railway, which is expected to link Petersburg with Hopewell and City Point on or before Jan. 1, is progressing rapidly. The work has been completed as far as Cedar Level, and a considerable amount of material to be used in the construction of the road has been delivered. Cross-ties are being spread along the right-of-way and the laying of rail will be commenced at Cedar Level within a few days. [Aug. 21, '15.]

Chicago & Wisconsin Valley Railroad, Madison, Wis.—It is reported that this company will resume construction at once on its line between Portage and Madison. J. E. Jones, president. [June 19, '15.]

SHOPS AND BUILDINGS

Wilmington & Philadelphia Traction Company, Wilmington, Del.—The power house of the People's Railway at Sixth and Hawley Streets is now being converted into a carhouse by the Wilmington & Philadelphia Traction Company. The merged systems will receive power from the plant of the company on the Brandywine. The carhouse at Delaware Avenue and duPont Street is being enlarged 30 ft. x 139 ft. The new shops, which will be 30 ft. x 100 ft., will also be located at Delaware Avenue and duPont Street.

Union Traction Company, Indianapolis, Ind.—This company will remove its station at Alexandria, Ind., to a point nearer the business section of the city.

Arkansas Valley Interurban Railway, Wichita, Kan.—Work has been begun on the construction of this company's $10,000 terminal at Hutchinson.

Lehigh Traction Company, Hazleton, Pa.—Work has been begun by this company on the construction of a new carhouse near Hazle Park.

Philadelphia & Western Railway, Upper Darby, Pa.—Steps will soon be taken toward the erection of a new station at Norristown for the joint use of the Philadelphia & Western Railway and the Lehigh Valley Transit Company, whose lines connect at that point, to relieve the congestion now caused by the loading and unloading of cars of both lines in the middle of the street. At a conference of railway officials and the highway and railway committees of the Norristown Borough Council, it was the unanimous judgment that the station should be an overhead structure. The engineers of both companies are now working on the plans.

Ogden, Logan & Toledo Railway, Ogden, Utah.—Among the improvements to be made by this company is the construction of carhouses, storehouses and repair shops amounting to from $145,000 to $160,000.

POWER HOUSES AND SUBSTATIONS

Cumberland & Westernport Electric Railway, Cumberland, Md.—This company has purchased additional coal land at Reynolds, adjacent to a mine that has supplied the power house at that point for twelve years. It is expected that considerable saving will be effected by the operation of the new mining property.

Burlington (Vt.) Traction Company.—This company will install one 500-kw. 600-volt d.c., six-phase, 60-cycle, 900-r.p.m. compound-wound a.c. self-starting rotary converter; three 165-kva., 2400-volt, high-tension to rotary converter voltage low-tension, single-phase 60-cycle O. I. S. C. transformers and one two-panel switchboard. The apparatus has been ordered from the Westinghouse Electric & Manufacturing Company.

Manufactures and Supplies

ROLLING STOCK

Des Moines (Iowa) City Railway is reported as planning to purchase twenty-five new steel cars. This item has not been confirmed.

Trenton & Mercer County Traction Corporation, Trenton, N. J., is reported as preparing specifications for ten new city cars. This item has not been confirmed.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa, has added a new single-truck folding step car to its Fort Dodge Street Railway equipment. The car is of the same type heretofore used by this company.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., was noted in the ELECTRIC RAILWAY JOURNAL of Oct. 9 as having issued specifications for the new double-truck cars. These cars will be 45 ft. 1½ in. over all and will be of all-steel construction, steel carlines being used. The United Gas & Electric Engineering Corporation, New York, which prepared the specifications, has designed the car closely after the type of the new New Orleans cars, except that it will be slightly shorter and will have cork insulation for its roof and sides. These cars will be for city service in Erie, Pa.

TRADE NOTES

W. McKay White has resigned as sales manager of the Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" headlights.

Johnson Fare Box Company, Chicago, Ill., has received an order to equip with fare boxes the ninety-two new cars ordered by the Connecticut Company, which will be operated in New Haven, Bridgeport and Hartford.

W. S. Miller, who resigned as general superintendent of the St. Louis Car Company last November, has moved from his home in St. Louis and has purchased a 140-acre improved stock farm at St. James, Mo. After this enterprise has been thoroughly organized Mr. Miller hopes to locate with some company either in the manufacturing or selling end.

Root Spring Scraper Company, Kalamazoo, Mich., has received an order to equip all the cars of the Michigan Railway's 2400-volt third-rail line from Kalamazoo to Grand Rapids with its No. 3 pneumatically operated scraper. This completes the equipment of all city and interurban cars owned and operated by the Michigan United Traction Company and the Michigan Railways.

Western Electric Company, New York, N. Y., has leased the thirteenth, fourteenth and fifteenth floors of the new Telephone & Telegraph Building at 195 Broadway, to be occupied by the general departments now located at New York, with the exception of the engineering and patent departments. It is expected that the removal into this building will take place during the summer of 1916.

Union Switch & Signal Company, Swissvale, Pa., announces the appointment of George A. Blackmore as general sales manager in charge of the activities of the New York, Montreal and Atlanta offices, with headquarters at New York. Resident Managers A. Dean of New York, T. H. Patenall of Montreal and Sales Engineer Brastow of Atlanta will report to him. He will eventually be located in Swissvale in charge of sales, construction and commercial engineering.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces that, effective Aug. 1, the sale of the standard product of the Westinghouse Machine Company will be handled by the prime mover department of the electric company. E. H. Sniffin, formerly vice-president and sales manager of the Westinghouse Machine Company, has been appointed manager of the prime mover department, and as such will direct the sales of the product of this company as he has done in the past. Mr. Sniffin became associated with Westinghouse, Church, Kerr & Company in 1888, first as salesman and afterward as sales manager. In 1903, when the Machine Company organized a sales department, Mr. Sniffin was made sales manager. Subsequently in 1905 he was elected vice-president, which position he held at the time of the organization of the prime mover department of the electric company. A marine department of the Westinghouse Machine Company has also been established, with headquarters at East Pittsburgh, which will handle all matters pertaining to the sale of marine refrigeration and main propulsive machinery for vessels and auxiliaries using this class of apparatus.

ADVERTISING LITERATURE

General Fire Extinguisher Company, Providence, R. I., has issued a circular describing the successful results obtained from installing the Grinnell automatic sprinkler in a large number of plants and factory buildings.

Internal Combustion Locomotive Company, Inc., Wilmington, Del., has issued Bulletin No. 1 describing its internal-combustion locomotives and railway motors, for railway and street car service, also for industrial usage. Fuel for this method of operation may be gasoline, kerosene or distillates. The locomotives are built for heavy grades and sharp curves and range in weight from 5 tons to 50 tons. Only one man is necessary for operation.

S. K. F. Ball Bearing Company, New York, N. Y., has issued an ingenious advertising circular entitled, "Read What a Few Users Say About S. K. F. Ball-Bearing Hangers," which includes a large number of testimonial letters as to the effective use of the ball-bearing hangers. The circular is prepared in quick reference form. The bottom of each page extends beyond the preceding page. On each margin of extension the substance of each testimonial letter is summed up in one sentence, so that each summary is legible without turning over the pages of the circular.

C. A. Wood-Preserver Company, Inc., St. Louis, Mo., has issued a sheet descriibng examples of the longer life of treated as compared with untreated ties. This contention is well supported by an illustration showing the difference of condition between a treated and an untreated tie of equal time length of service, which were removed from a test track of the Denver City Tramway Company. Mention in the folder is also made of successful results obtained from service on the Asheville (N. C.) Street Railway, Los Angeles (Cal.) Railway, Ohio Electric Railway, Galveston (Tex.) Electric Company, Minneapolis (Minn.) Street Railway, Union Electric Light & Power Company and Greenville (S. C.) Traction Company.

JOVIANS HOLD ANNUAL CONVENTION IN CHICAGO

Business sessions addressed by prominent men in the electrical industry and extraordinary entertainment features marked the thirteenth annual convention of the Jovian Order held at the Hotel Sherman, Chicago, Ill., Oct. 13, 14 and 15, 1915. Reigning Jupiter Homer E. Niesz and his general convention committee did themselves proud in preparing and conducting the business and entertainment program of the convention. The principal addresses were delivered by E. W. Lloyd, vice-president Commonwealth Edison Company, Chicago, and president of the National Electric Light Association, who spoke on "Extending the Utilization of Electrical Energy"; H. M. Byllesby, president H. M. Byllesby & Company, who spoke on "The Public Utility as a Factor in the Development of a City"; Ernest McCleary, past president National Electric Contractors' Association, who spoke on "Safety in Electrical Installations"; John F. Gilchrist, vice-president Commonwealth Edison Company and president Electric Vehicle Association of America, spoke on "Contingent Benefits from Promotion of Electric Vehicle Sales," and H. L. Doherty, president Doherty Operating Company, who addressed the association on "The Relation of the Jobber to the Electrical Industry." Entertainment features included a luncheon tendered by the association of commerce of Chicago Oct. 13, where an address was delivered by Dr. Frank W. Gunsaulus; a reception and dance given by the executive officers and the Past Jupiters' Association Wednesday evening; a luncheon tendered by the Electric Club-Jovian League of Chicago, Thursday; degree team competition at Powers' Theater, Thursday afternoon; annual rejuvenation with a class of approximately 300 candidates, Thursday evening, and the Feast of Jupiter, Friday evening.

Electric Railway Journal

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Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

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BIGGER AND BIGGER STEAM TURBINE UNITS

The rate of development of the art of steam turbine construction is indicated by the fact that just about three years ago, in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 5, 1912, to be exact, we were describing the 20,000-kw. turbines then in process of installation in the new Northwest station of the Commonwealth Edison Company in Chicago. That plant was laid out to contain twelve such units in two buildings. Two units were installed at the outset but the program has now been altered so that there will soon be added a 35,000-kw. unit, the largest yet ordered. While it is true that a turbine of 35,000-kw. capacity has been placed in Philadelphia, the Chicago turbine is rated at a lower power factor, hence is actually larger. While the largest turbines producing power exclusively for street railway purposes are those in the Seventy-fourth Street power plant of the Interborough Rapid Transit Company in New York, both the Commonwealth Edison and Philadelphia Electric companies furnish large amounts of power for traction purposes. Hence these great turbines can be properly considered a part of electric railway progress. The causes impelling the increase in size of unit are numerous. The increasing concentration in power production renders practicable the economical loading of large units. It thus becomes possible to take advantage of the small floor space, fuel consumption, operating costs, etc., of the large unit. If the present rate of increase in size of unit is maintained, and it may be estimated at 5000 kw. per year, but three years will elapse before the 50,000-kw. unit, now the subject of vague rumors, will become a reality. There is no apparent reason why it should not do so. The magnitude of these giants is indicated by the fact that a single 50,000-kw. unit would furnish power for 1600 20-ton cars, or for 2,000,000 20-cp. incandescent lamps, enough for a city of very considerable size.

WANING PROBLEM OF MOTOR-BUS COMPETITION

To those super-enthusiasts who have prophesied the throttling of interurban freight and express business by the motor bus we commend the account published last week regarding the latter's very comprehensive failure in southern California. Following the lead of the jitney, motor-bus competition for long-distance express traffic has in this case started down hill, and the net result of a costly experiment has been that a number of people have learned that the terminal handling and transfer of freight, which is eliminated by the motor bus, is but a small part of the cost of service. This is something that could have been much more readily demonstrated by a little investigation and a few calculations, but because it contained one factor that made for profit, the business was inaugurated on a large scale under the fine old doctrine of optimism that advocates first to make the leap and then to look. It is, perhaps, especially fortunate that the bogey of motor-bus competition in freight service has been exposed at this time. The electric railways sadly need a relief from the bedevilment that has come from this new form of transportation, and there are still two features in connection with it that display evidences of activity. One of these is the growth of the privately-owned automobile; the other is bus service *de luxe* at an increased fare, and while the latter does not appear any more alarming than the original "jitney menace," the former provides enough material for the electric railways to worry about without having to include any other motor-bus problems.

REPORTING THE SAN FRANCISCO CONVENTION

Considerable interest having been expressed as to the manner in which the ELECTRIC RAILWAY JOURNAL was able to mail a 94-page paper, containing a practically complete report of the proceedings, on the day following the closing of the San Francisco convention, a few facts regarding the circumstances are given. It has been customary for the paper to issue four dailies during each convention, giving the proceedings day by day. This year this plan would have meant that the dailies, mailed in San Francisco, would not have brought their report of the convention to our subscribers in the East until a week or so after the convention closed. Hence an adequate telegraphic report was substituted. For the convenience of the convention attendants, however, a small daily bulletin containing matter of transient and local interest was printed and distributed at San Francisco. In reporting the discussion at San Francisco and the papers that were not available in manuscript form previous to the calling of the convention, a total of nearly 18,000 words was telegraphed, the last message being received at 7.40 Eastern time, Friday evening. The lateness of the last dispatches was due to the considerable difference in time between San Francisco and New York and to the time required to file and transmit the message after the close of the ceremonies at the Exposition. However, the last form was closed by midnight and complete copies of the issue began to come from the bindery at about 10 o'clock on Saturday morning, practically according to normal schedule. While our readers undoubtedly missed the dailies there were some compensating advantages accruing from the use of this year's plan. It permitted an ideal arrangement of the reports of society proceedings in the order of occurrence, and the featuring of some of the leading papers in a style more nearly commensurate with their importance than under the plan of previous years. Moreover, the facilities of the ELECTRIC RAILWAY JOURNAL'S own printing office, one of the largest and most complete plants in appointments in New York, were at its disposal. It was a great pleasure to be able to give our readers genuine newspaper service and there is evidence that it was appreciated, thus justifying the effort and expense.

PUBLIC INTEREST IN SURPLUS

The testimony in the recent Interstate Commerce Commission investigation of the Rock Island mismanagement appears to bring out the idea that the public should have no interest in the disposition of net corporate income or surplus so long as rates are reasonable. To our minds this attitude deserves the censure bestowed upon it by the commission. While nominally the surplus belongs to the stockholders and the public has no concern in its disposition so long as such is made legitimately, an indirect public interest does cling to the surplus in that any dissipation of it is almost certain to work harm to the railway factors in which the public is directly interested. As the commission states, if the funds derived from transportation services are expended wastefully or corruptly, the inevitable result must be either increased rates, in order to enable the company to obtain money to pay operating expenses, or bankruptcy.

To critics of this view it seems absurd to imagine that the rates of the Rock Island, for example, are higher because somehow or other the bottom was kicked out of the company's treasury, but they miss the point. We shall take no time to argue whether or not these particular rates are higher on this account, but the real issue, and the only one in which we are concerned, is that with the condemned system of management, they would have to be raised sooner or later, and the public, knowing of this eventuality, has a right to be concerned in all practices that would, from its point of view, result in an adverse effect upon the existing rates.

It can hardly be denied that the analysis of the theory of railroad rates begins with a study of railroad expenditures, and the honesty that is shown by a management in handling its surplus account is a fair criterion of its general honesty. If it misuses the surplus account, it would feel no qualms of conscience in skimping maintenance, paying excessive salaries and otherwise depreciating the property and pinching the stockholders, and in time the officials would be obliged to plead for higher rates to cover their misdeeds or else submit to bankruptcy or a complete reorganization. When property, service and rates are thus threatened, it cannot truthfully be said that the public must look on unconcerned. At present rates are fixed to pay a reasonable return on the fair value of property used by the public. Railway officials have no right to misuse the portion of this reasonable return left after fixed charges so as to restrict the company's earning power and make the whole rate of return seem inadequate.

THE TIME LOST IN MAKING STOPS

With the impetus that has been given to consideration of the influence of stops per mile on schedule speed by the remarkably comprehensive report presented by the committee on schedules and time-tables to the Transportation & Traffic Association at San Francisco, it might be pertinent to call attention to one factor that may be overlooked in discussions of the subject. This is that the time involved by a stop includes not only the interval during which the car is stationary, but also the losses due to slowing down before the stop and to accelerating afterward. These losses frequently amount to more than the actual time that the car remains stationary, and the fact should be clearly specified in case it is intended that they are to be left out of consideration.

It is probable that the extent of the acceleration and braking periods has been frequently underestimated in the past, as some authorities have vehemently asserted that elimination of stops could have only a slight effect upon schedule speed in city service, this fallacy clearly arising from a failure to comprehend that a stop involves more than the time lost in standing still. But as a matter of fact, the braking and acceleration losses are subject to close approximation by calculation and they are much more constant in amount than most of the other units entering into transportation problems. For their determination it is necessary only to arrive at the "average non-stop speed" of a car on the route under consideration and then to apply the elementary formulas of mass acceleration, using the known rates that are established by the capacity of the motors and of the brakes.

The "average non-stop speed" is a figure that may be approximately described as the speed at which a car could be run over the route behind a long gap in the schedule and without accepting passengers, thereby avoiding all passenger stops but subject to the usual vehicular interference. It is materially less than the maximum speed of the car, because on any city route there are of necessity many slow-downs due to various causes other than passenger stops, and while these slow-downs are irregular in number their average is fairly constant and may be well established on any particular route. City cars, for instance, are quite frequently geared for a maximum speed of 20 m.p.h. on level track, but the average non-stop speed for large cities is very generally somewhat less than 15 m.p.h. The difference is inevitable, but that it is reasonably constant under any given set of conditions is easily demonstrable.

For example, on five routes of a certain large city system the schedule speeds were found to range from 7.2 m.p.h. to 9.4 m.p.h., the schedules being generally considered to be easy, and the average number of stops per mile was found to range from 14.4 to 7.7. Allowing for a fifteen-second loss at each stop and deducting the resulting time loss per mile on each route from the respective schedule time per mile, there is provided a basis for estimating the non-stop speed for each route, and this works out at a figure that ranges from 12.2 m.p.h. to 13.8 m.p.h., giving a variation of only 6 per cent above and below the mean. So small a variation from a constant figure for the non-stop speed in this city is significant in view of the widely different conditions with regard to stops and schedule speeds that existed on the five routes under consideration, the speeds varying more than 13 per cent from the mean figure and the stops per mile no less than 30 per cent.

Once that the average non-stop speed on any route is determined by trial or estimate—the latter being really accurate enough for all ordinary purposes—the calculation of the time lost in retardation and acceleration becomes simple. Assuming, for example, a braking power that provides retardation at the frequently used figures of 2 m.p.h.p.s. and an average non-stop speed of 15 m.p.h., the operation of bringing the car to a stop will require 7.5 seconds, during which time the car will travel 82.5 ft., according to the old formula to the effect that distance equals one-half the rate of acceleration multiplied by the square of the time interval.

If the brakes had not been applied, however, and the car had continued to move at a speed of 15 m.p.h., this distance of 82.5 ft. would have been covered in 3.75 seconds, instead of the 7.5 seconds that were actually used up during the braking period. In consequence the loss in time due to braking would be the difference between the two figures, or 3.75 seconds. By the same method it may be determined that an acceleration of 1.5 m.p.h.p.s. would cause a loss of five seconds, so that the total loss due to both braking and acceleration would be 8.75 seconds. This loss, added to the average space of time that elapses while the car is actually stationary at a stopping point, or, say, seven seconds, gives a total loss of some fifteen seconds per stop, and this figure will be found to be not far from a general average in any city service.

Of course, a car does not, literally speaking, approach every stop at the average non-stop speed. Frequently the presence of a wagon on the rails just ahead of the car will involve a dragging stop from a speed of 5 m.p.h. or even less. But on the other hand this is offset by the cases wherein the car has a clear street ahead of it and also by the fact that acceleration in the majority of instances is carried to a speed materially exceeding the average that is permitted by the interference of vehicular traffic.

On this basis, then, the savings in time effected by eliminating stops on any particular route may be at least approximated, and as indicated by the foregoing figures, the saving will be important even when the average time devoted to passenger interchange at each stop is at the absolute minimum. When, however, this interchange time amounts to seven seconds or more, as is frequently the case, and the additional time loss due to acceleration and braking makes the total loss at each stop average some fifteen seconds, the stops may actually involve the expenditure of about as much time as is devoted to getting the car over the road. Twelve stops per mile, to be specific, will produce a time loss of three minutes per mile, and even under favorable conditions will set a practical limit of 8.5 m.p.h. for the schedule speed. The elimination, however, of six of the stops will cut the time loss to 1.5 minutes and, under similar conditions, will raise the limit for the schedule speed to 11 m.p.h.—an increase of 30 per cent.

A UNIVERSAL CAR

If the latest car of the Bay State Street Railway had nothing more to commend it than its mechanical ingenuities it would still be a remarkably fine example of car design. But the designer had bigger things in view than to make a stanchion form part of the conduit system or to cast a motor nose integral with the magnet frame at its center of weight. In brief, the car has been designed from the standpoint of the progressive operator rather than from the standpoint of the equipment man alone.

During the past three or four years the industry has been favored with some very radical departures in car design, all to the end of securing lower floors and easier boarding facilities. The Bay State car attains the same desirable ends while holding to the standard car outlines, and public criticism of freakishness is avoided. The blend of old and new practices appears most prominently in the access and fare collection features. Ordinarily the car will be operated as a modern fully-vestibuled, non-bulkhead car; but when winter or other special conditions demand it, bulkhead doors may be withdrawn from pockets which do not project even to the outer line of the corner seats. As for fare collection, prepayment with a platform fare box is the rule for one-fare operation, and inside collection with a register for multi-fare operation, and both of these conditions have been provided for.

Another aspect of accessibility appears in the pneumatic door and step control which is operative from any part of the car. This is an excellent feature. Motormen and conductors who have to open and close heavy doors several hundred times a day become too sluggish to do quick work; and in any event the mind of one should be concentrated on the road ahead and of the other on the collection of fares. Many a fare is overlooked and many a precious second wasted when the conductor has to tug at heavy, clumsy door and step mechanisms. In addition, the possibilities of modern steel-car construction have been splendidly exploited in an arrangement of sash that really does make the same car equally agreeable for winter or summer, and in a width of seat rarely found except in steam railroad cars.

Manifestly, the Bay State car has been designed to meet a wide range of operating conditions. In fact, its congeries of metropolis, cities, towns, villages and wide stretches of open country served by means of 1000 miles of track is matched by hardly any other system in the country, and a design so adaptable to practically every class of service and to every brand of climate may well be characterized as universal.

Bay State Combination Car

New Car for All-the-Year-Round Service on Both City and Suburban Lines Has Been Built by the Bay State Street Railway, Special Regard Having Been Given to Convertibility, Accessibility, Convenience and Safety of Operation—This Article Describes the Body Equipment

The Bay State Street Railway, Boston, Mass., has recently completed a convertible car embodying many novel features of design and representing in many respects a noteworthy advance in practice. The new design is the outcome of several years' study of the varied service conditions on the system and exhaustive comparisons of rolling stock designs in different parts of the country, and special recognition was accorded to the importance of the following desiderata: Accessibility, convenience and general appearance from the standpoint of the traveling public; safety in operation; convenience for the operating crews; adaptability to all-the-year-round service; economy in use, and suitability to the company's present and future needs.

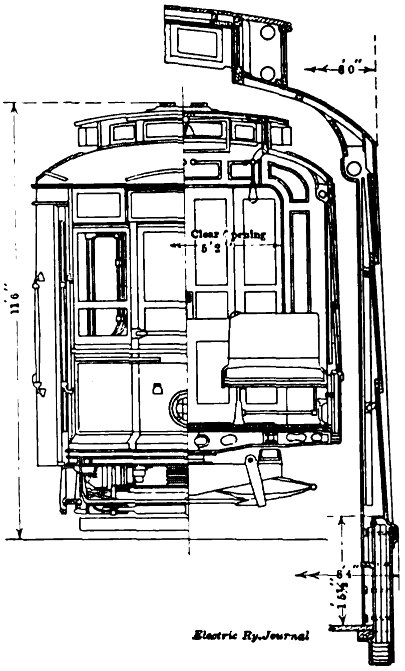
The new car was designed by E. W. Holst, superintendent of equipment Bay State Street Railway, and was built at the works of the Laconia Car Company under the immediate supervision of the railway's equipment department. The general dimensions are shown in the following table:

Length of body	30 ft. 6 in.
Length over bumpers	42 ft. 9 in.
Width over side plates	8 ft. 2 in.
Height, rail to trolley base	11 ft. 6 in.
Seating capacity	44 to 47
Height, rail to first step	13 in.
Height, second step	12½ in.
Height, platform to door sill	9½ in.
Diameter of wheels	30 in.
Truck centers	20 ft.
Weight, completely equipped	40.970 lb.

Needs of Passengers First Consideration

Accessibility is one of the main features of the design. The vestibules are built with a clear door opening of 3 ft. ½ in., and the first step is only 13 in. high or 3 in. nearer the rail than in previous Bay State cars. The car has a width of 6 ft. 3 in. over vestibule corner posts, and the elimination of the ordinary wooden folding-door construction for the motorman's inclosure gives a liberal area within the vestibule which may be traversed or occupied by passengers. From the rail to the vestibule floor is only 25½ in., and the 9½ in. rise from the platform to the door sill is easily negotiated.

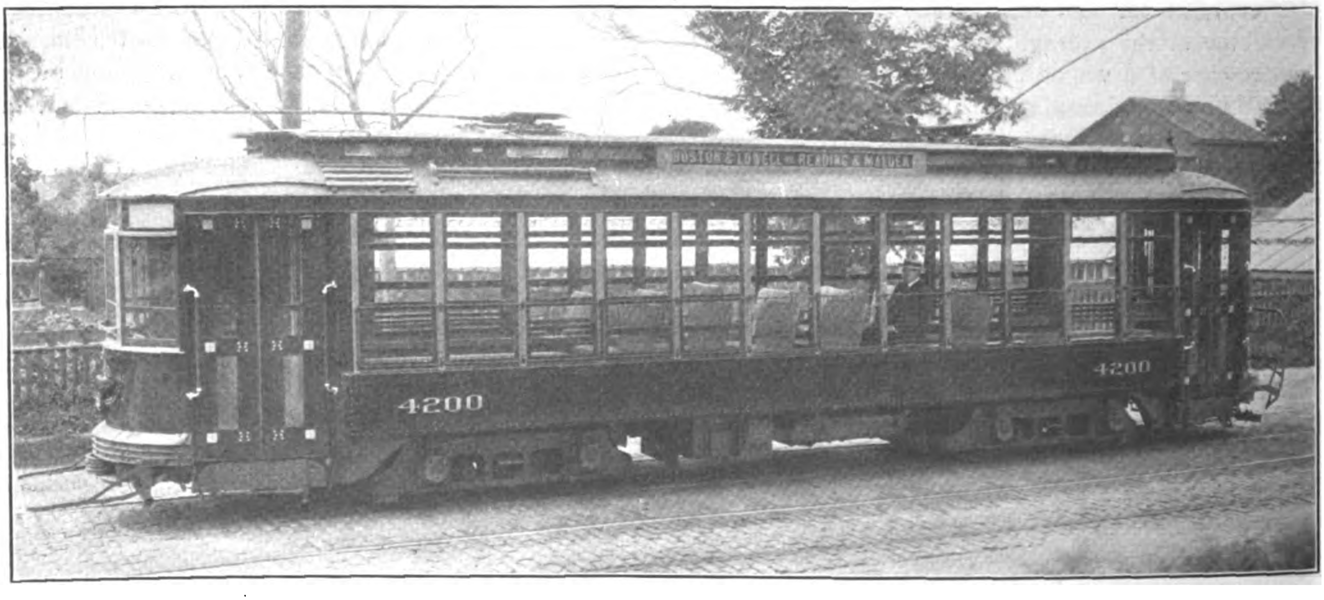
The side view of the car illustrated on this page shows the size of window opening to be so liberal that the body of a seated passenger is visible to the knees. The suitability of the car for open service is therefore self-evident. The front corner view, shown on page 856, displays the liberal length of grab handles, 2 ft. each, and the unusually large signing facilities, as well as the steps folded beneath the vestibule door well within its vertical plane.



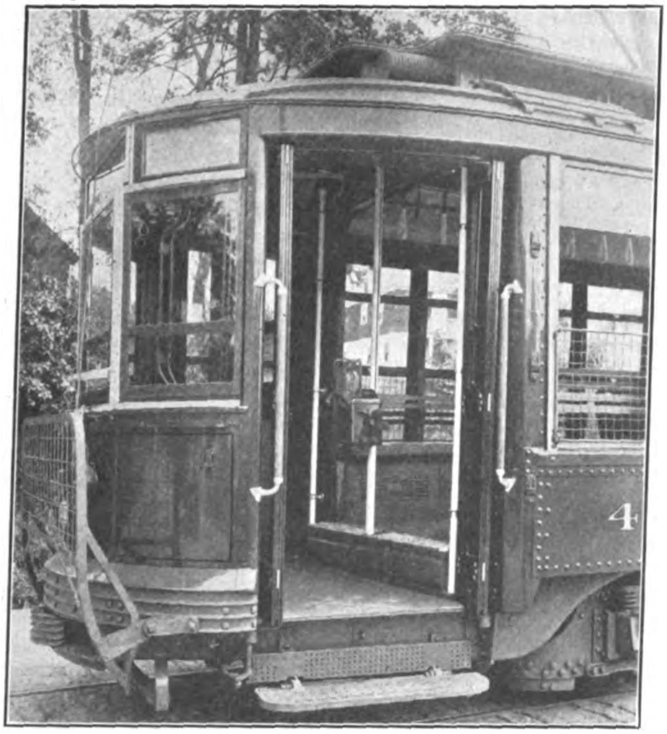
BAY STATE CAR—CROSS-SECTION SHOWING SIDE SHEATHING AND WINDOW ARRANGEMENT

Fare Collection

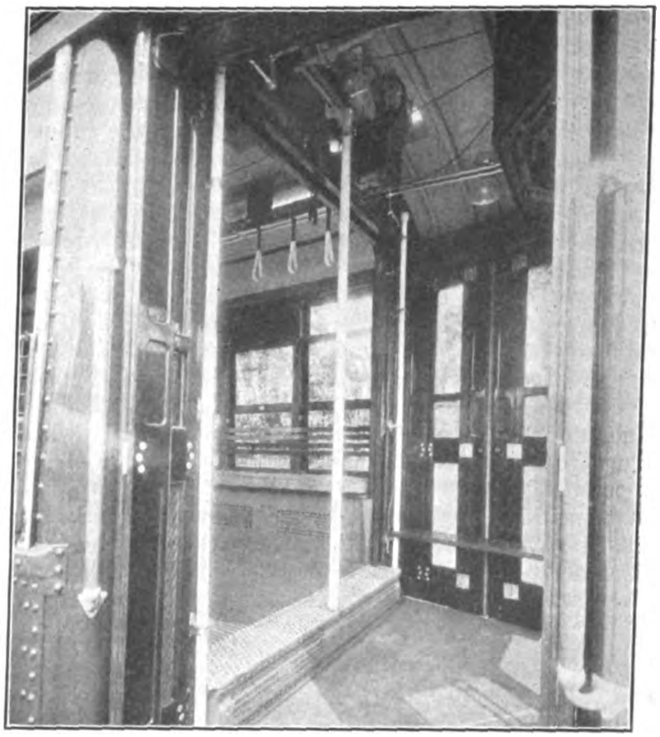
The arrangement of the fare box is shown in the two illustrations at the top of page 855. In one of these the box is in position ready for prepayment service, and in the other it is pushed up out of the way into the monitor extension. The box is equipped with an International register. It records dimes, nickels and pennies, and slides up and down on a white-enameled 1¾-in. steel tube that is provided with a ¼-in. slot. The register is carried on a saddle extending through the slot



BAY STATE CAR—GENERAL VIEW SHOWING THE EXTENDED MONITOR OVER THE VESTIBULE; WINDOWS REMOVED FROM THE REAR HALF OF THE CAR



BAY STATE CAR—VIEW SHOWING FARE BOX LOWERED INTO OPERATING POSITION



BAY STATE CAR—FARE BOX CONCEALED IN ROOF MONITOR. HEATER UNDER THRESHOLD

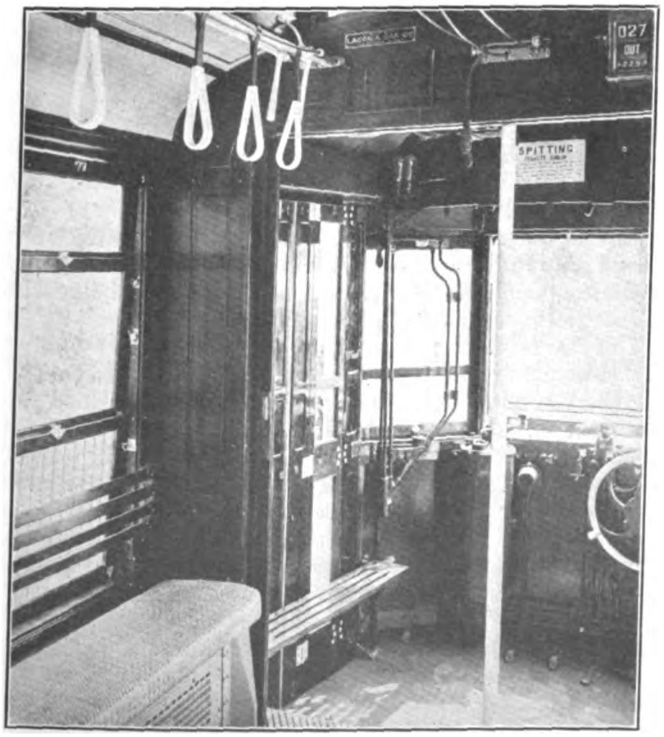
to a plunger about 11 in. long, the inside of the tube being lubricated. In the monitor extension is a specially designed spring counterbalances for the weight of the fare box on the tube runway.

The register saddle is of pressed steel and it is equipped with a lug for padlocking the fare box. When lowered the register locks automatically in place. At the top and bottom of the vertical rod the register locks into place with a spring catch that may be released by hand.

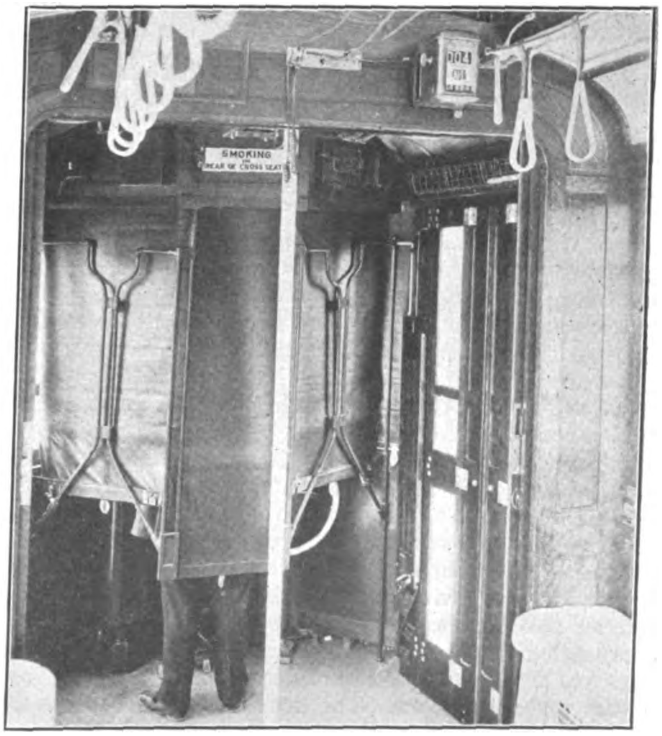
This arrangement greatly facilitates the use of the car on lines in which hand collection of fares may be in effect, or in interurban service that involves the collection of fares at fixed points or the collection of a large number of fares at a certain limit, followed by extended operation without the prepayment feature. The rod supporting the fare box is also utilized as a grab handle.

Within the car a new and compact design of fare and transfer register is in service. the equipment being mounted against the head of the bulkhead, as shown in the view on this page. These units are also of International design and are each only 5½ in. square and 8 in. high. The figure displays, however, are full-sized, as in previous larger registers.

A view on this page also shows the motorman's curtained compartment, which has a frame of ½-in. tubing.



BAY STATE CAR—VIEW SHOWING PIPE FRAMING FOR MOTORMAN'S CAB FOLDED OUT OF THE WAY



BAY STATE CAR—VESTIBULE SEAT FOLDED. MOTORMAN'S CURTAINS AND FARE REGISTER

Directly behind the motorman the curtain is carried to within 2 ft. of the floor, the diagonal curtains on either side being 12 in. shorter. The tube framing affords an extremely light and convenient means of throwing a cab into service, and it is designed to fold against the oblique sides of the vestibule. This arrangement adds to the comfort of the motorman in both summer and winter by reason of the improved ventilation secured at his working position and it enables him to gain instant privacy with ease.

The vestibules are each provided with two folding wooden seats holding three persons each. There is a clearance of 3 in. between the back edge of each seat and the door framing, virtually giving a 10-in. width for occupancy by the passenger. When the vestibule seat is not in use, it is turned flat, the front end of the seat being hinged to a folding bracket that effects the change in position with the minimum amount of radial movement inside the vestibule, the bracket being equipped with a spring which tends to hold the seat in a flat position against the door frame when not lowered. When lowered, the seat drops into place with a slot at the free end fitting the vertical tubing that serves as a hand rail at the inside edge of the bulkhead.

The operating handles used by the motorman are arranged within easy reach of his seated and standing positions. These include, in addition to the master controller, hand-brake wheel and air-brake valve, a combination switch for the arc and incandescent headlight, whistle cord, sander control, destination sign handle and door-operating handles. The lighting, heating, air-brake and circuit-breaker switches are mounted in the vestibule near the ceiling.

Each pair of vestibule doors is opened and closed by a pneumatic engine mounted in the upper part of the vestibule above the doors and in a compartment fitting closely under the bonnet. The valves are controlled by horizontal rods with lever handles inside the car body proper and by wirepull rods located above the motorman and conductor in the vestibules. Any pair of doors can be opened from either vestibule. Ball bearings are used in the bulkhead doors and in the brackets of the vestibule doors. The door-operating engines on one side were built by the Burdett-Rowntree Manufacturing Company, Chicago, and those on the other by the Consolidated Car Heating Company, Albany. A wire basket for holding signal flags is mounted on the vestibule door header, and in place of the usual card regulating smoking, a reversible "Limited Smoking" and "No Smoking" sign is provided. The shape of the brackets enables the sign to be reversed by a single lifting movement of the hand, avoiding the delay and "thumbing" so often encountered in the reversal of card signs tightly banked against a close-fitting frame.

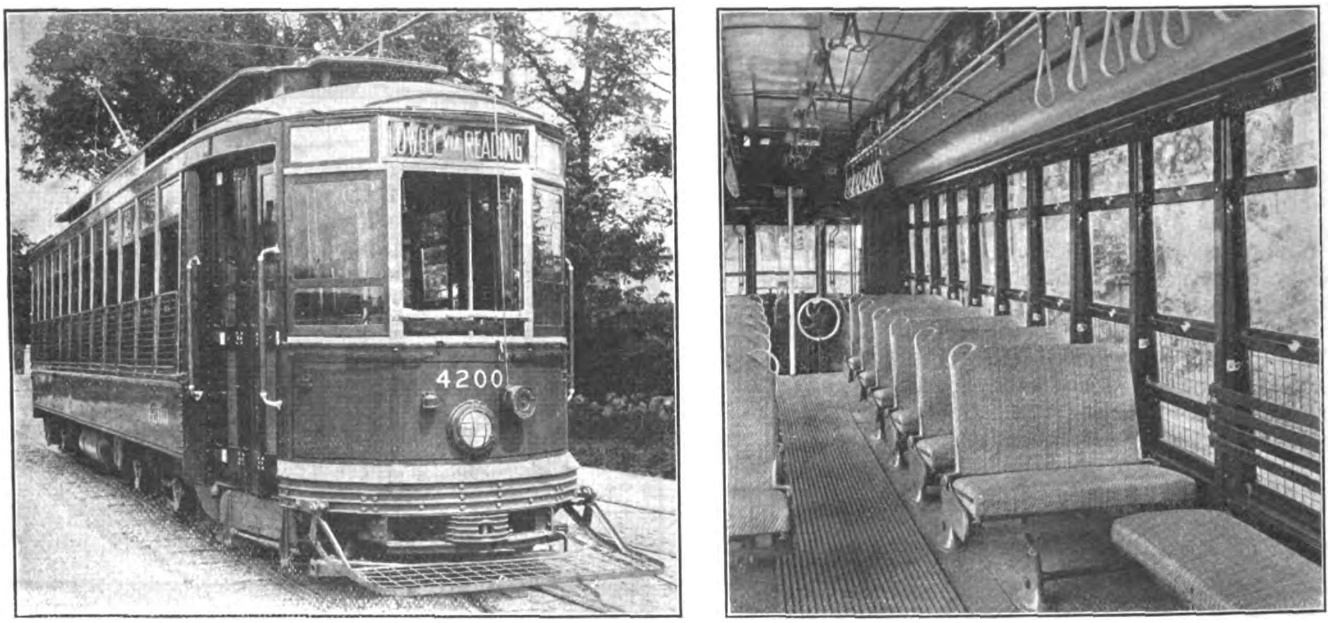
NEW IDEAS IN LEGIBLE SIGN ARRANGEMENT

Extra sign spaces are provided at each side of the destination sign in the vestibule hood, for use in connection with special car or other temporary service. The letters on the route signs are 6 in. high. All the signs are of Hunter make, the side signs being illuminated by the regular lamps employed in interior car lighting. The extra sign panels in the vestibule hood are each equipped with a shutter revolving on a horizontal axis, so that when the sign is not in use, all the light from a sign lamp mounted in the center of the compartment behind the destination panel passes through the latter. When the shutter is opened the flux then divides between the signs without noticeably decreasing the legibility of the front indication.

The sign frame forms part of the car framing, as a gusset extending upward from the post in the vestibule front ties the latter into the frame, the post being cut off at the overhead compartment.

The car interior is lighted by 56-watt lamps mounted in "Holophane" reflectors, the general lighting following the company's practice as described in the ELECTRIC RAILWAY JOURNAL of Sept. 28, 1912, and Sept. 27, 1913. Seven interior lamps are used, mounted in the center of the monitor, and in the vestibule an additional lamp with reflector is mounted below the ceiling over each door and providing flood-lighting at the steps. The air gages in the vestibules are each equipped with a hooded incandescent lamp of low power, supplied from the trolley circuit through resistance.

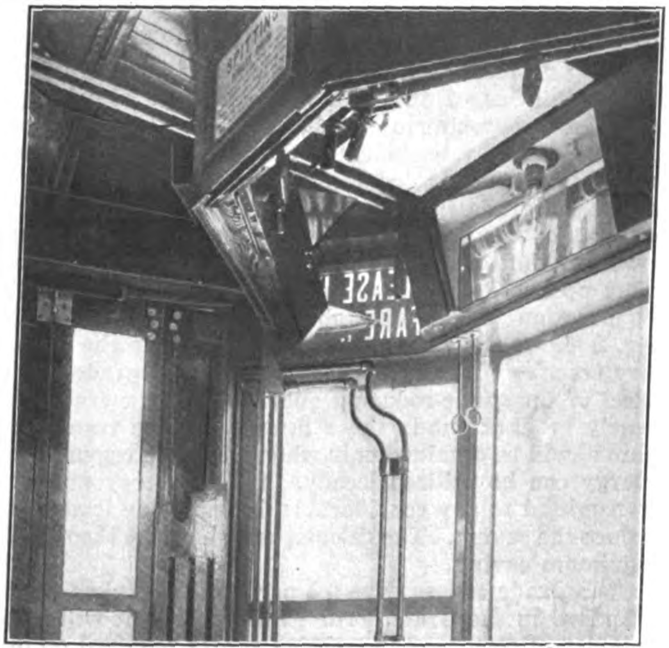
The thresholds are provided with safety treads of "Aero" metal. This metal is also used for all interior fittings. The space beneath the threshold is made available for the installation of two truss-plank electric heaters for vestibule service, perforated covers



BAY STATE CAR—FRONT VIEW OF THE CAR AND GENERAL VIEW OF THE INTERIOR, SHOWING LOW WINDOW SILLS AND TRIPLE SASH WINDOWS being provided on the riser. The threshold is 8¼ in. wide and the ramp leading into the car has a rise of 2 in. in a distance of 5 ft., making both ascent and descent scarcely noticeable. Vertical tubes at the inner edges of the bulkheads are used as combination grab handles, as stiffeners for the bulkhead framing and as electric conduits.

SEATS EQUIVALENT TO STEAM RAILROAD WIDTH

The seats were made by Heywood Brothers & Wakefield Company to the railway's special design, the twelve cross-seats being mounted on pedestals spaced on 29¾-in. centers. The width of these seats is 16 in., and the spacing gives extra room for the passenger's knees and for hand baggage. As the pedestals are set somewhat close to the aisle, a footrest 23 in. long is made possible, also affording increased comfort. Again, between the cross-seats and the longitudinal seats a space of 11 in. is provided as compared with ordinary practice of 8 in. or 9 in. The longitudinal seats are 7 ft. long and 16 in. wide.



BAY STATE CAR—SIGN BOXES AND SWITCHES ON HEADER OVER MOTORMAN'S COMPARTMENT

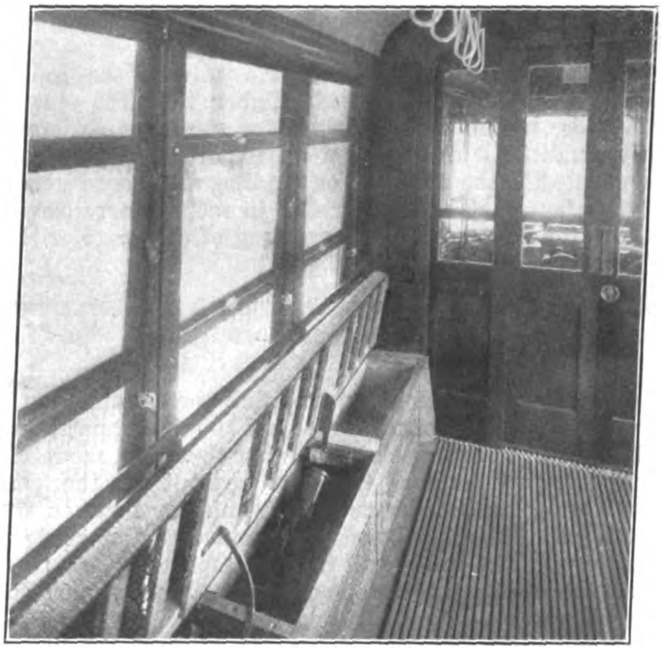
The cross-seat backs are of cane, tapered at the lower portion of the back and formed around a ¾-in. x 4-in. hardwood back frame. This method of recessing provides an extra inch on each side of the lower part of the seat back, adding to the comfort of the rider in the seat and affording additional knee space as well. The cross-seats are 32 in. long, and as the window ledges are not carried above the seat level the full width of the seat is available. The car sides extend but 17½ in. above the floor and allow one overhang of 6 in. at the window sill and 4 in. over the aisle. The total length of seating space figures 42 in. or enough for three persons to the seat in a pinch.

OTHER DETAILS, INCLUDING VENTILATION

The upper windows, 49 in. x 24 in., are permanently fixed. They are built into one frame, the rails being gained into the posts under the post cap, to form a longitudinal reinforcement in the framing of the superstructure. This takes the place of the usual wide letterboard. On each side of the car are four sections of electrically welded screens extending 20½ in. above the window seats. The window pockets are wide enough to permit the emergency installation of a 7-in. x 24-in. cold-weather sash, this sash being capped by an arm rest screwed into the sides of the posts. The lower movable sashes, each 18 in. x 24 in., are interchangeable and can be lowered into the window pocket when released by eccentric catches.

At the bottom of each window pocket are two rubber stops ½ in. thick, bolted to plates covering handholes on the under side of the side framing, which can be quickly removed for cleaning. The window pockets are 22½ in. deep below the sill and are 2¾ in. wide inside. The sashes are ⅝ in. thick. The arrangement enables the windows to be left open at the top and bottom; open at the top only; at the bottom only, giving a protection of shoulder height; and in winter with cold-weather sash in place, a 10½-in. opening can be obtained.

A Barrett jack of special design for oblique application up to 45 deg. is housed with two wedging blocks in a compartment below one of the longitudinal seats. At the further end of the seat is a compartment for the crew's wearing apparel, lost articles, etc. It is lined with galvanized iron, which can be removed for cleaning, and which is provided with ½-in. holes for draining out of doors. Panel heaters in front of the compartment hasten drying.



BAY STATE CAR—COMPARTMENTS FOR JACK, WEDGING BLOCKS AND CREW'S WEARING APPAREL UNDER SEAT

Under another long seat are two compartments for sand. The forward compartment is provided with a spout leading to the wheel, the latter merely providing extra storage capacity. Electric heaters in front insure dryness. Under one of the longitudinal seats, also, are mounted a magnetic switch and a supply switch for the heater system, which is of the Consolidated type, with two circuits of twelve units each. Thermostatic control is provided and all heating units are interchangeable.

The ventilation system is unique in its combination of the usual monitor sash, of "Automatic" ventilators (also in the monitor) and of special ventilators placed in the vestibule ends of the monitor. These are built as balanced sash, acting as outlets or inlets according to speed conditions. The equipment also includes Rico sanitary straps, Kilbourne sanders and Wilson trolley catchers.

The second article will treat the framing, motors and control of this car.

Notes on Mountain Railway Electrification

A Comparison of Effective Grade Reduction by Lengthening Grades and by Electrification, and a Study of Electrification Possibilities, Theoretical and Practical

BY F. CASTIGLIONI, NEW YORK

In a recently published book describing the construction of the Grand Trunk Pacific Railroad* the writer described the successful efforts of the engineers to avoid the use of grades greater than 0.4 per cent and curves sharper than 4 deg. This was done to produce a high-efficiency line, the efficiency being limited by the ruling grade. In this case the grades were kept within limits by lengthening the line as necessary. The Canadian Pacific Railway spent $1,250,000 in doubling the length of the "big hill" which lies between Hector and Field in the Kicking Horse Pass. These illustrations are cited to show to what great lengths steam railroad companies will go to keep down the grades and will serve as a point of departure in discussing the relation of electrification to mountain railway work.

It will be shown that for electric railways the limits of low gradient can be made higher than for steam railroads, which means that under the same satisfactory conditions of operation an important saving can be effected in the first cost of the line, as a consequence of the fact that steeper grades in mountain railroads may often mean either a shortening of the route or the choice of a cheaper right of way.

MECHANICS OF MOUNTAIN TRACTION WITH REFERENCE TO COST OF ROAD

To illustrate some of the problems involved in crossing mountain ranges let us assume that the terminals of a mountain division of a railroad are 100 miles apart, that they are at the same elevation, that there is a mountain ridge between them, that the summit of the pass over which the road must run is midway between termini and 2640 ft. above them, and that the grade is uniform. The grade will then be 1 per cent and there will be 50 miles of line on each side. Next assume that an alternate design providing for 0.5 per cent grade is prepared, necessitating the lengthening of the line on each side to 100 miles. Then the relative amounts of energy necessary to reach the summit in the two cases will be, assuming 8 lb. per ton friction, 7,392,000 ft.-lb. per train ton for the 1 per cent grade and 9,504,000 ft.-lb. for the 0.5 per cent grade.

It should be noted that the reduction of the average grade from 1 per cent to 0.5 per cent means not only an increase of 28 per cent in the energy necessary to reach the summit, but also a nearly double construction cost corresponding to the doubled length of the line.

A further remark is that the easier grade is more likely to compel the adoption of helicoidal approach tunnels, such as are encountered in the Simplon and Gothard lines, which tunnels are costly undertakings for the scant gain of about 100 ft. in elevation which they afford.

Looking at this problem from another point of view, there might be the case that, with the same length of the roads, the solution with 1 per cent grade offers the possibility greatly to reduce the length, or entirely to abolish the long summit tunnel that is necessary for the solution with 0.5 per cent grade. With 8 lb. per ton resistance, 147,840 ft.-lb. per mile of track are required on a 1 per cent grade and 95,040 ft.-lb. are required on a 0.5 per cent grade, an increase of but about 55 per cent in energy which might well be compensated by the decreased interest charges.

The great cost of reducing grades emphasizes the advantage of electrification of the heavy grades instead of lengthening the line to reduce them. The electric locomotive is particularly adapted to steep grades, especially if part of the energy consumed in climbing the grade can be restored to the line in descending it. The advantages of electrification are greater the higher the grade, not only on account of the larger possible saving from regeneration but also because, with a given resistance, the amount of energy required to climb the grade in less than proportional to the grade.

THEORETICAL POSSIBILITIES OF ENERGY REGENERATION

Taking up more in detail the matter of regeneration, the possibilities of this can be seen more clearly by means of a few simple calculations. The efficiency of regeneration may be taken at 80 per cent at the locomotive so that after deducting from the tractive effort due to the grade the tractive effort lost in friction, 80 per cent of the balance will be available for restoring power to the line. Fig. 1 shows the average tractive effort up and down hill with different grades and with regeneration under the above-mentioned conditions. Fig. 2 shows the ratio of the regenerated to the necessary tractive effort over the same range of grade. The effect of the grade-reducing qualities of regeneration is clearly brought out in these figures. These results, of course, will be obtained only when all of the regenerated energy can be utilized locally. If the energy must be transmitted to any considerable distance line losses will reduce the saving. The calculations show the theoretical maximum saving.

As a grade of less than 0.5 per cent was taken as the standard in the Grand Trunk Pacific case, it will be of interest to compare the tractive efforts required on different grades with that corresponding to one-half of 1 per cent grade. The calculations for this comparison are shown in the accompanying table and the results are plotted in Fig. 3. The ratios given represent also the increase in the length of an incline of one-half of 1 per cent grade necessary to cause the same total energy consumption for up and down travel as is required on the corresponding grade of the original length. For instance, the same amount of energy would be expended for the round trip on 10 miles of 3 per cent grade as on 15.56 miles of 0.5 per cent grade.

These calculations give weight to the assertion that the steepness of the grade and the elevation of the summit are much less important if regenerative electrification is adopted, and indicates that it may pay to take a railroad over a hill rather than to adopt a circuitous route around it.

Coming now to the practical side of operation it needs no argument to show that the electric locomotive has been commercially developed so that its use is entirely practicable on mountain divisions of steam railroads. It has not only shown better overload capacity than the steam locomotive, but it can take care of overloads without warning much better than can its steam competitor. Electrifications, such as those completed or contemplated, involve special divisions with their own locomotive requirements whether steam or electric locomotives are used. While it would be desirable to have one locomotive that would be satisfactory on heavy grades and level track, this is not a necessary requirement. With electric locomotives in many cases, the only difference between the locomotives on the plain and mountain divisions would be a difference in gear ratio.

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*"The Making of a Great Canadian Railway," by Frederick A. Talbot, published by Seely, Service & Company, Ltd., London.

RESULTS ACHIEVED WITH THREE-PHASE ELECTRIFICATIONS

For regenerative purposes the system par excellence is, of course, the three-phase one. Withholding for the present any judgment as to the regenerative qualities of the single-phase system now being tried out in this country and the regenerative direct-current system soon to be tried out in practice, it will suffice to refer to the simple three-phase system in which regeneration is an inherent and automatic quality.

Although the three-phase system has been one of the main contestants in the "battle of the systems" and has made a fine record, it has not been advertised as much as the older systems. Pending the development of the universal system of electrification we must for the present be contented with selecting the right system for the right place. Some of the facts regarding the achievements of the three-phase system in mountain work are worthy of consideration.

In an article printed in the issue of the ELECTRIC RAILWAY JOURNAL for March 6, 1915, by G. Pontecorvo, it was stated that the Italian three-phase electrification comprised 417 miles of track in operation or being electrified, 300,000 hp. in locomotive capacity, grades of 3 per cent and 3½ per cent, locomotives of 2000-hp. capacity, regeneration up to 54½ per cent, etc. In addition to the technical data given in Mr. Pontecorvo's article there are other facts which must be kept in mind. In comparing the mileage and total capacity of the three-phase system in Italy with that of other systems the difficulty experienced in securing the necessary capital must be considered, as the Italian railways do not earn enough to permit the paying of a reasonable rate of interest.

Furthermore, the three-phase system was selected in Italy by the railroad engineers primarily to fit the requirements which they regarded as being of foremost importance, namely, ruggedness of rolling stock and energy recuperative ability. It was difficult to secure the co-operation of manufacturers in developing the system. Again there is a great deal of objection to the use of the double overhead contact line, but in Italy the double overhead line has given no trouble. Some engineers in America have suggested that the voltage of 3000 used on the Italian railways was the limiting voltage, but that this is not the case was demonstrated by F. Spinetti in the *Bollettino del C.N.Ing Ferroviari.* He shows that the working potential between overhead wires is limited only by the reliability of the transverse insulating bridges at the overhead switches, which, following the construction adopted in Italy, is related to the distance between the current collecting devices of the locomotives. Figures are given to demonstrate that a comparatively small increase of this distance, to be obtained with somewhat larger locomotives, would allow the adoption of 8000 to 12,000 volts as a safe working potential, with corresponding improved design of the motor to work directly on this voltage without need of interposed transformers. The operation of the Cascade Tunnel electrification on the Great Northern Railway demonstrates that the three-phase system is not impossible under American conditions.

It is true that in the electrifi-

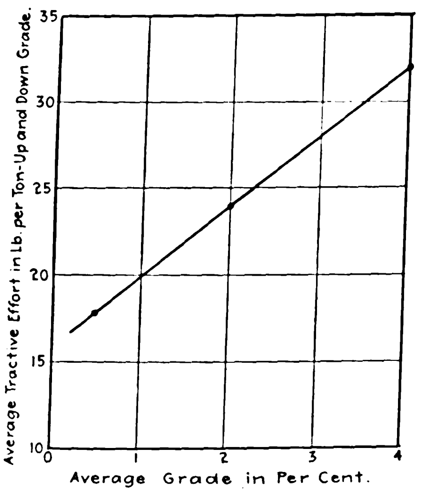


FIG. 1—AVERAGE UP-AND-DOWN-GRADE TRACTIVE EFFORTS WITH REGENERATION

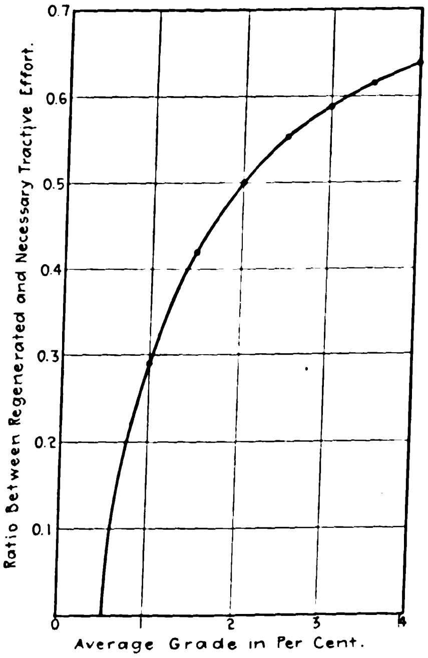


FIG. 2—PROPORTION OF REGENERATED TRACTIVE EFFORT ON DIFFERENT GRADES

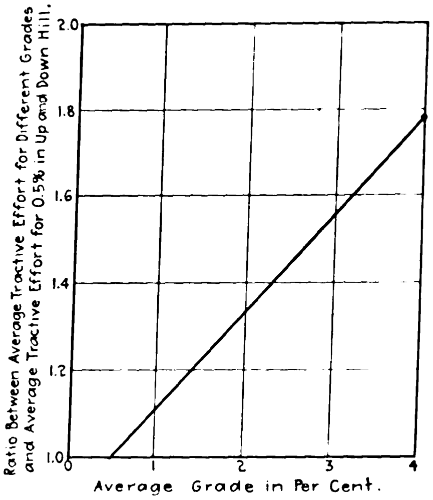


FIG. 3—AVERAGE TRACTIVE EFFORT COMPARED WITH THAT ON A HALF PER CENT GRADE

RESULTS OF CALCULATIONS OF RESULTS OF REGENERATIVE BRAKING IN MOUNTAIN ELECTRIFICATIONS

Grade, per cent	0.5	1	1.5	2.0	2.5	3.0	3.5	4.0
(*a*) Train resistance, pounds per ton	8	8	8	8	8	8	8	8
(*b*) Grade resistance (up hill), pounds per ton	10	20	30	40	50	60	70	80
(*c*) Total tractive effort (up hill), pounds per ton	18	28	38	48	58	68	78	88
(*d*) Gross regenerative tractive effort (down hill), 80 per cent of (*b*)	8	16	24	32	40	48	56	64
(*e*) Net regenerative tractive effort (down hill), (*d*)-(*a*)	0	8	16	24	32	40	48	56
(*f*) Net tractive effort for up and down hill (*c*-*e*)	18	20	22	24	26	28	30	32
(*g*) Ratio of regenerative input tractive effort $\frac{e}{c}$, per cent	0	28.6	42.1	50	55.2	58.8	61.6	63.7
(*h*) Tractive effort per grade unit $= \frac{c-e}{\text{per cent grade}}$	36	20	14.67	12	10.4	9.33	8.57	8.0
(*i*) Ratio of tractive effort compared with 0.5 per cent grades, or ratio of the inverse lengths of grades to obtain the same total input as for 0.5 per cent grade $= \frac{(h)\text{ for any grade}}{(h)\text{ for 0.5 per cent grade}}$	1	1.11	1.22	1.33	1.44	1.56	1.67	1.78

cation described by Mr. Pontecorvo the amount of regenerated energy at the power house is only 14 per cent of the total under a given schedule, but it is also true that the Italian electrifications are on short sections of road, scattered in such a way as to render difficult the adoption of such schedules as will prevent the waste of regenerated energy in the power-house rheostats. This loss would be eliminated in a system with a sufficiently large and diversified load.

CONCLUSION

All of the foregoing is intended not as a criticism of the plan of the Grand Trunk Pacific Railway in adopting a maximum grade of one-half of 1 per cent, but merely to emphasize the point that regenerative electric traction may offer means for the adoption of certain routes which, from the viewpoint of mountain steam railroading, would be condemned *a priori*. This is of importance in creating the new means of communication which the increased traffic demands, in spite of the fact that the best routes are already occupied.

It seems therefore advisable that, in studying new projects of mountain railroads, the alternative scheme of "electric traction from the start" be carefully considered, because it not only can offer all of the operating advantages of steam traction, but also can show new advantageous solutions and considerable savings in the construction of the road.

Municipal Tramways Association Conference

The annual conference of the Municipal Tramways Association, which was held in London, England, on Sept. 23-24, was of a decidedly curtailed character owing to the war. There were no entertainments of any description. Two papers were presented, one of which, entitled "Tramways During War Times," was by James Dalrymple of the Glasgow Corporation Tramways. In this the author outlined the immediate effects of the war upon the working force of the railway, stating that it was impossible to obtain skilled workmen for the repair shops, and that the total working force had been very materially reduced in all departments. In regard to wages the majority of the shop employees had either received increases agreed upon between the masters and the men in each particular trade, or else had been paid a war bonus of 50 cents per week by the corporation.

The reduction in force had been particularly marked in the platform men, and while the railway was still taking on as many men as could be employed, there were more than 800 women conductors in service and still more of them were being engaged. The regular course of training for the women extended over eight days and they had been found to be very quick in picking up their duties. The women received the same pay as the men and had the same working hours, duties and reliefs, no difference whatever being made between conditions under which each sex was working, except that women were not asked to learn to operate the cars and were very rarely asked to work seven days in one week. Women conductors, he said, were now working on all routes of the Glasgow system. Some routes were very much quieter and more respectable than others, but it was found that even on the toughest routes the influence of the women conductors was all for good. They appeared to be able to handle an unruly passenger quite as firmly and perhaps more successfully than a man.

Mr. Dalrymple's paper provoked an extended discussion in which practically every phase of the question of women conductors was considered. The consensus of opinion was that the experiment of employing women in this capacity had been quite a success. At the conclusion a resolution was passed to the effect that the Municipal Tramways Association urge the removal of any of the present restrictions as to the employment of women as street car conductors in the metropolitan area of London.

The second paper to be presented, entitled "Financial Problems," was read by Alfred Baker of the Birmingham Corporation Tramways. He cited experiences with an increase in fares during the later days of the war, these increases ranging from 25 per cent to 33 per cent with an abandonment of the workmen's reduced fares. The public expressed no objection to the change, which resulted in an increase in receipts from about 23 cents per car-mile to 26 cents per car-mile. In the discussion opinions of very divided character were expressed regarding the advisability of increased fares, a number of delegates believing that there was material danger of decreased gross receipts with general increases in the fares that were charged.

State Railways Win Pageant Prize

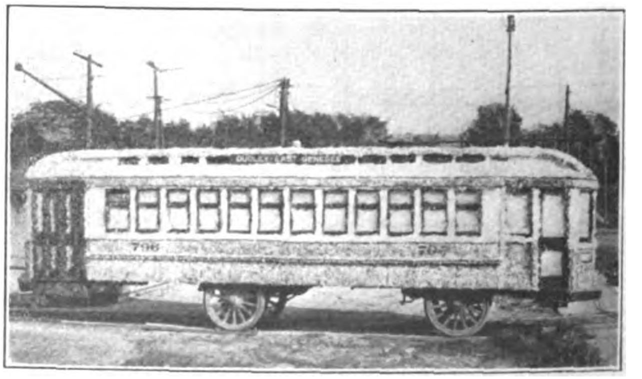
During the recent State fair week in Syracuse, N. Y., an automobile pageant was held and the New York State Railways received a silver cup for the most attractive float entered. The cup and float are illustrated herewith.

FIRST PRIZE
AUTO PAGEANT
1915
NEW YORK

SYRACUSE PAGEANT CUP

The float was designed and constructed under the personal supervision of F. L. Hinman, master mechanic of the company. It was made exactly five-eighths of the size of the company's standard pay-as-you-enter car and reproduced this car to the minutest detail. It was illuminated exactly like an actual car and was provided with miniature coupler, trolley catcher, headlight, fenders, signs, trolley pole, etc. The car was covered with white, yellow and maroon paper flowers.

One feature of the float which was especially successful was the representation of the spark caused by the contact of the wheel with the trolley wire, by means of two small green lamps placed on the top of the trolley wheel. When these lamps were lighted they imitated the spark very successfully.



FLOAT SHOWN BY NEW YORK STATE RAILWAYS IN SYRACUSE STATE FAIR AUTO PAGEANT

The pageant in which this float was shown was viewed by approximately 60,000 people and the company received some very desirable advertising, especially in view of the fact that it succeeded in capturing the cup.

Municipal Co-operation in Utility Management*

Four Theories of Municipal Co-operation in Private Utility Management are Described and Illustrated—Building of Extensions is Fertile Field for Co-operation—Diversion of Gross Earnings for Municipal Purposes is Unjust

BY P. J. KEALY, COMPANY MEMBER KANSAS CITY (MO.) RAILWAYS BOARD OF CONTROL

The franchises under which early public utilities were promoted, constructed and operated were generally granted on easy terms and contained many loose provisions, the chief interest of communities at that time being to make certain that the investment would be undertaken and the service furnished. Because of this viewpoint, competition and duplication were encouraged in every possible manner and franchises were indiscriminately granted to all comers. While in many of the Eastern states perpetual franchises were granted, in the majority of states these public utility grants were limited by statute to periods of from twenty to forty years. In recent years, therefore, owing to the expiration of a large number of these older franchises, the mutual relations existing between the public utility and the community have received deep consideration.

Within the last decade a clearer and better-defined understanding of the entire situation has been brought about. The owners of the utilities more than ever realize that it is necessary for them to accord the best service to the public, and that public confidence and satisfaction are the greatest assets of any public service company. On the other hand, careful and disinterested studies have proved that public utilities as a whole are not so profitable as the public has been led to believe was the case, and that municipalities must show liberal treatment to the private companies, that they may continue to attract the additional capital necessary to meet the increasing demands for service.

REGULATED MONOPOLIES

Perhaps the foremost advancement in either state or municipal co-operation in public utility management is the recognition of the fact that competition within the same community generally results in an economic waste without improved service. The National Civic Federation's committee on public ownership in a report made some time ago stated: "Public utilities, whether under public or private ownership, are best conducted under a system of regulatory and legalized monopoly." This theory has been recognized in practically every state public utility law, most of which provide that before a competitive utility can be operated a certificate of convenience or necessity must be approved by the commission. In several of the states this even applies to the installation of municipal plants, and in many instances the desire of municipalities to enter into the public utility business has been refused by the state commission on the grounds that there already existed within the municipality a privately-owned utility of sufficient size to meet the existing demands for service.

The present tendency, as reflected in most of the more modern franchises, is toward recognizing that the interests of the community and the private company furnishing public service to that community are identical and that the interests of each can be best served by mutual and concerted action. No public service commission act yet passed, however, provides for as much detailed participation in or supervision of the affairs of a private company as is essential to the successful operation of a partnership management. Where the city is interested in other than the mere standard of service required, therefore, a closer participation in the company's business is necessary than that which public service commissions can generally exercise under their enabling acts.

EXTENT OF MUNICIPAL CO-OPERATION

There have been a number of important franchises granted within the last eight or nine years, in which the trend or extent of municipal co-operation is well illustrated. Several different theories, all purporting to reach the same end, have been used, the more important of which are as follows:

1. That the company be permitted a fixed return, if earned, upon an agreed valuation, all earnings above this to go to the city or to be used to reduce the rate for service.
2. That the company be permitted a fixed return on an agreed capitalization, the surplus over this to be divided between the public utility and the municipality.
3. That a certain percentage of the gross earnings be paid to the city, the city in addition to supervise and regulate the service.
4. That the sliding scale plan be used.

FIXED RETURN WITH VARIABLE FARE

An example of the first theory is that of the Cleveland traction ordinance, which permitted a return of 6 per cent on an agreed capital value and fixed a rate of fare for service under which it was estimated the earnings would return this per cent to the company. In addition, a reserve fund was created into which the surplus earnings above the amount paid to the company are deposited. When this reserve reaches a fixed maximum, fares are automatically decreased, and when the reserve is depleted to a certain minimum, the fares are automatically raised. In addition, the ordinance provides a fixed amount to be expended for operation as well as for maintenance. The weakness of this theory, as developed in the Cleveland situation, is twofold: (1) The evil exists in this contract that is inherent in any contract which limits the operating company to a fixed per cent of return, in that the incentive to the company toward providing efficient management is thereby utterly lacking; (2) the building of extensions tends to decrease the reserve and increase the rate of fare, for the reason that generally all extensions are development lines and unprofitable during the first few years of their operation.

The electric motor, by making available the cheaper outlying property at the same rates of fare, has done more to solve the question of improper housing conditions and slums than all of the sociological studies, investigations and corrective measures that have been undertaken in this country. Any ordinance provision which tends to limit or discourage extensions, either directly or indirectly, will permanently jeopardize and injure the best interests of the city, and will more than offset any of the meritorious provisions. The very life and vitality of every American city is concerned in developing the outlying property, making possible cheap home sites and, by preventing a zone system of fares or rates, avoiding the slum conditions generally found in Europe where such a system is in effect.

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*Abstract of a paper read before the American Institute of Electrical Engineers in St. Louis, Mo., on Oct. 19, 1915.

FIXED RETURN WITH CITY PARTICIPATION

The second theory is one on which both the Chicago and Kansas City traction settlements were made. The Chicago traction ordinance provides that the company shall be permitted a 5 per cent return upon an agreed capital value and that the surplus earnings above this return shall be divided between the city and the company, 55 per cent to the former and 45 per cent to the latter. The city, through the Board of Supervising Engineers, participates actively in the management of the company, supervising and directing every phase of its operation, such as the routeing and scheduling of cars, the approving of all engineering work, the supervision of contracts and the approval of capital expenditures. The original Chicago ordinance, as passed in 1907, did not provide for the participation of the Board of Supervising Engineers in the operation of the company, its powers under the original ordinance being confined to the approval of capital-account charges and the supervision of all engineering features. The vital interest of the city in proper service was recognized by amending the 1907 ordinance in 1913, so that the board would supervise the routeing and scheduling of cars in addition to the features previously mentioned.

All of these methods of city co-operation were provided for in the Kansas City ordinance, passed in July, 1914. In addition, the Kansas City ordinance goes a step further and provides that not only will the city co-operate in the management through a board similar to the Chicago board, but it will also be represented on the board of directors of the company, five of the eleven directors being appointees of the Mayor. The city will thus not only have representation in the ordinary operating affairs of the company, but will be cognizant of all financial and corporate matters as well.

CITY SUPERVISION WITH PER CENT OF GROSS EARNINGS

The third method of municipal co-operation is, among others, the basis of the Chicago telephone and electric light franchises and of the St. Paul electric light franchise. The Chicago telephone ordinance provides that in addition to 3 per cent of the gross earnings being paid to the city, a telephone inspector is to be selected by the city (but paid for by the company), who will be responsible for supervision of the telephone service. He receives the various complaints and is charged with the responsibility of correcting these as far as he may be able. In addition, the rates are regulated every five years. Similarly, in the electric light franchise a fixed per cent of the gross is paid each year, the rates are regulated at stated intervals and the city electrician exercises supervision over the service at all times.

SLIDING SCALE PLAN

The fourth or sliding-scale method is illustrated in the Boston gas ordinance passed by the Legislature on May 26, 1906. Of all the ordinances passed within the last few years, this is one of the few in which the efficiency of management is recognized. The initial rate of gas was fixed at 90 cents per 1000 cu. ft., which rate permitted a return of 7 per cent on the par value of the capital stock. For each reduction of 1 cent per 1000 cu. ft. made to the consumer the company is allowed an extra dividend of one-fifth of 1 per cent. In other words, at 90 cents per 1000 cu. ft. the company's return is 7 per cent, whereas if it can sell gas at 85 cents the company is allowed an 8 per cent return. An itemized statement of the production, distribution and depreciation expense must be published annually. If the profit each year is more than 7 per cent and no reduction is made to the consumer, 1 per cent on the par value of the outstanding capital stock is set aside for contingencies or lean years. This reserve is never to exceed one-twentieth of the par value of the stock. In case the surplus in any year exceeds this 1 per cent (8 per cent on the capital stock), and the reserve is equal to one-twentieth of the par value of the stock and no reduction in the price of gas is made to the consumer, the surplus is to be paid to the various municipalities through which the company distributes gas, on the basis of the miles of mains installed in each community.

As to the practical working of this scheme, gas originally sold at 90 cents and then at 85 cents. It is now selling at 80 cents, so that the company is earning 9 per cent dividends. Thus the company has a direct financial incentive in reducing operating expenses in every way, and in providing the most efficient methods of gas production and distribution, since it shares directly with the public the profits of efficient management. According to Louis D. Brandeis, "Boston has reaped from the sliding-scale system far more than cheaper gas and higher security values. It has been proved that a public service corporation may be managed with political honesty and yet successfully and that its head may become a valuable public servant. * * * Gas properties which, throughout the greater part of twenty years, had been the subject of financial and political scandals developing ultimately bitter hostility on the part of the people, are now conducted in a manner so honorable as to deserve and secure the highest public commendation."

LIMITATIONS ON EXTENSIONS

Many of the franchises contain limitations on the extensions to be made from year to year. In St. Paul the electric light franchise, for example, provides that the lines need not be extended to power customers having a demand of less than 2 hp. per day for each 100 ft. of underground conduit extension or each 300 ft. of overhead extension. In the Philadelphia gas agreement, the extensions are likewise limited to the prospective business. Similarly, in the Chicago traction ordinance the construction of a definite number of miles per year was provided. In the Kansas City traction ordinance a minimum of 4 miles of track a year is set, with the added provision that any track which will pay 6 per cent on its cost above operating expenses shall be constructed, and that any trackage constructed and paid for by property owners or other individuals becomes the property of the city and must be operated by the traction company.

BUILDING OF EXTENSIONS BY PRIVATE ASSESSMENT

One of the most fertile fields for co-operation between city and utility is that of assistance in financing the unprofitable extensions (and as previously stated, most extensions are unprofitable), and this not only when privately owned but also when publicly owned. Generally all extensions to municipally-owned water plants are made out of earnings. This can only be possible when the rates to the consumer are too high, for if extensions were considered as a permanent investment and therefore made from borrowed funds instead of from earnings, the present rates could and should be reduced. Furthermore, the building of extensions, whether to a water system, street railway system, electric light system or gas system, has a decided bearing on property values within districts proposed to be served. For instance, the building of street railway extensions generally increases the price of outlying property from $3 to $10 a foot. In cases where rapid transportation is found, rents are invariably higher than in sections of the city where such is not the case. In other words, extensions generally directly benefit the property owner and work to the disadvantage of the rate payer. Hence, if municipal co-operation in public utility management is to exist in the fullest sense and equity is to be shown to the three parties interested, *i.e.*, the operator, the municipality and the rate payer, some method should be devised whereby the cost of unprofitable extensions should be borne at least partly by the property owner who derives the major benefit therefrom. Recognizing this general principle, Cleveland is proposing to build certain track extensions by assessing their cost against the abutting property, while Philadelphia is planning to embark on a rapid transit program costing many millions of dollars, which property owners will pay for in proportion to the benefits received. Several of the larger municipal waterworks systems are considering this manner of providing for the increasing cost of extending their systems. A more general application of this theory would furnish a partial solution of the difficulties experienced by most public utilities in attracting the funds with which to satisfy the ever-increasing demand for service.

INJUSTICE OF DIVERTING GROSS EARNINGS TO MUNICIPAL PURPOSES

Another development regarding the relations between the city and the privately-owned utility, which is constantly finding expression in the most unexpected sources, is the idea that it is unjust to pay any per cent of the gross earnings of a public utility into the municipal treasury. This was one of the provisions most frequently found in the early ordinances, and even in many of those passed within the last few years it has been rigidly insisted upon. It is now generally recognized that such a diversion is unfair to the consumer. The portion of the company's profits that goes into the municipality's coffers and thus is used for the benefit of all of the inhabitants, has been realized only from those citizens using the particular service, and it should, therefore, be expended in perfecting and increasing the service and not in reducing general taxes. "Better service" is the present-day slogan, but as long as a considerable portion of the income of the operating company is diverted to municipal purposes, better service is to that extent handicapped.

For instance, the city of Toronto now receives under an ordinance, passed in 1891, about 20 per cent of the gross earnings of the traction company, which sum amounts to from $900,000 to $1,000,000 per annum and forms a very large proportion of the total municipal receipts. Within the last few years the city has made numerous investigations and has tried in diverse ways to bring about a betterment of its street-car service. The amount of money, however, which the city derives from the traction company is secured from giving improper service. At least 50 per cent of the total received by the city from this source goes to reduce the taxes of five large corporations in that city. On the other hand, the additional fixed charges involved in any of the solutions of Toronto's traction problems, as worked out by various engineers, would annually cost not to exceed one-half the amount that is now paid to the city and diverted from the street railway business.

In Chicago a fund of approximately $15,000,000 has been built up out of the city's share of the traction earnings at the expense of the strap-hanger. The ordinance contemplated that this money should have been expended long since in subway construction and thus reduce the downtown congestion, but for reasons unknown it has not been done.

In promoting the future co-operation of the municipality in private management, therefore, all profit from the corporation going to the municipality should, as far as practicable, be devoted toward improving the service of the corporation from which it is derived.

KANSAS CITY PLAN OF CO-OPERATION

Of all the contracts that have been passed within the last seven or eight years, perhaps the street railway ordinance adopted on July 7, 1914, in Kansas City provides for municipal co-operation in most detail. The manner in which the municipality will co-operate in the financial, corporate and detailed operation of the property is as follows:

The total agreed capital value is $30,000,000. On this fixed value it is provided that the company shall be entitled to a 6 per cent return "if and when earned." It is further agreed that before the company participates to any extent in the earnings above the fixed return of 6 per cent, all excess earnings shall be put back into the property until $7,500,000 of the total value shall have been made good with physical property and the capital account not increased thereby. When this is accomplished the company and the city will divide the surplus earnings above the 6 per cent return in the proportion of $2 to the city and $1 to the company. The city is to receive certificates of ownership for the values made good out of earnings. Should the city devote its portion of the surplus toward the purchase of the property, then when one-half of the capital value has been paid the city will take over the ownership of the entire system, subject to a mortgage indebtedness for the other half.

That all these various interests of the city may be properly safeguarded, the contract contains the following general partnership provisions:

1. The company is to be incorporated with a board of eleven directors, five of whom are to be nominated by the city.
2. Those features pertaining to the detailed operation of the road are delegated to a board of control, consisting of two members, one appointed by the company and one by the city, each of equal authority, with provision made for the selection of an arbitrator in case of dispute.
3. Whatever mortgages are placed upon the property must be drawn up in a manner satisfactory to the city counselor and approved by him in writing.
4. An independent audit shall be made annually by the city comptroller of all books, vouchers and expenditures of the company.

Power-Supply Problem in Canada

A recent report issued by the United States Department of Commerce states that plans have been approved by the Hydro-Electric Power Commission of Ontario, and forwarded to the Provincial Government, which will make the commission independent of all private power developments and provide a power supply for many years to come. As outlined by Sir Adam Beck at London several months ago upon the opening of the first hydro-radial car line in the province, the plans called for an initial development of 100,000 hp. by utilizing the maximum head of power on the Niagara River. It is stated that the commission is now facing the end of the present sources of supply, and that the 100,000 hp. supply contracted for with the Ontario Power Company will soon be exhausted by the increasing demands of the municipalities, which even the big increase from the new plant at the Falls and those in the province will not meet. With the advent of rural car lines on an important scale the commission must be in a position to furnish practically unlimited power.

Pennsylvania Railroad's Industrial Trucks

Operating Data and Costs Are Given for Electrically Operated Trucks in Freight Houses, Baggage Rooms and Shops and for Tractor Service for Freight Cars in City Streets

In a paper by T. V. Buckwalter before the Electric Vehicle Association at its convention in Cleveland on Oct. 18-19, the results of the operation of electric trucks on the Pennsylvania Railroad were outlined. The author separated these trucks into three classes, namely, baggage and mail trucks for use in passenger stations, warehouse trucks for freight stations, and shop trucks for railroad shops and general industrial purposes, and in addition he took up the use of electric tractors for moving freight cars over street railway tracks.

Baggage trucks are characterized by a height of platform equal to about two-thirds the height of a baggage-car floor. This works out at about 30 in. The length is controlled generally by existing elevator sizes and ranges from 9 ft. to 12 ft. The width is generally 44 in. A modification of this type has a platform only 9 in. high for use in depressed-track stations where the car floor is but slightly higher than the station platform.

Warehouse trucks are characterized by a platform that is depressed at one end to facilitate loading, the delivery of the load being made from the end of the truck. The height of the platform is limited to about 10 in. and the width to about 40 in. The over-all length is less than 9 ft. to provide ease of handling.

Shop trucks are subject to a variety of conditions in regard to size and bulk of material handled and this has required a variety of dimensions. A distinct design has not, therefore, been developed, but adaptations have been made of the baggage and warehouse types.

All trucks have been constructed with double-end control, permitting operation with equal facility in either direction and reducing congestion to a minimum. An exception, of course, is made in the case of warehouse trucks, which must have a low frame at one end. Space required to turn is reduced by steering with four wheels instead of two, the operation being made exactly identical in either direction. This eliminates the dangerous practice of running two-wheel-steering trucks backward.

Sufficient traction for all ordinary work is available with a two-wheel drive. The motors are operated at

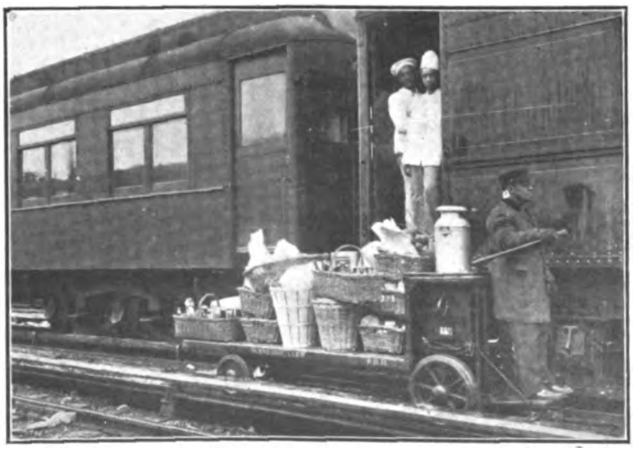
Table I.—Monthly Operating Costs in Dollars for Electric Trucks, Pennsylvania Railroad

Shop Trucks

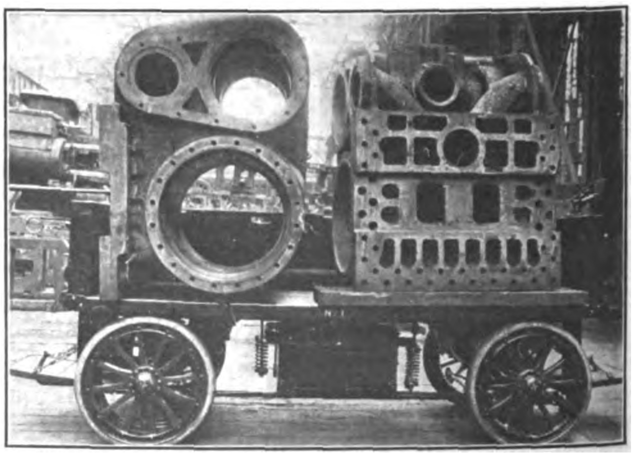
Shop	Average Monthly Data All Trucks											Averages per Truck Month		
		Labor			Material									
	Number of Trucks	Driver	Repair Trucks	Battery Repairs and Charging	Truck	Battery	Tires	Kilowatt-Hours	Current Cost	Total Cost		Total Cost	Current Cost	Saving
Harrisburg	1	48.98	2.62	1.76	1.89	4.40	5.39	209	5.43	70.47		70.47	5.43	154.80
Verona	1	59.96	5.30	2.74	1.55	1.09	3.48	587	8.81	82.94		82.94	8.81	154.65
Trenton	1	32.48	5.72	2.84	8.36	1.56	6.35	792	9.90	67.20		67.20	9.90	134.60
Juniata	2	76.64	13.23	11.82	5.36	11.42	1.73	1,426	11.14	131.33		65.66	5.57	109.15
Altoona Car Shops	3	116.96	12.52	18.26	21.96	12.54	.....	1,251	8.57	190.81		63.60	2.85	96.12
Renovo	2	92.95	2.84	12.35	1.63	8.28	.....	1,168	18.05	136.10		68.05	9.02	93.61
Mount Carbon	1	32.36	0.39	2.39	0.40	1.13	.....	272	8.80	45.47		45.47	8.80	93.22
Altoona Machine Shops	9	560.42	88.96	35.89	45.79	13.72	29.77	2,342	14.06	788.61		87.62	1.56	92.22
Pitcairn	4-5	168.46	44.48	30.24	22.07	22.64	20.81	789	4.05	312.75		67.99	0.88	89.64
South Pittsburgh	1	42.35	1.83	1.76	0.22	0.51	....	392	4.60	51.27		51.27	4.60	64.04
Meadows Shop	1	....	2.85	1.06	0.74	0.08		734	29.40	34.13		34.13	29.40	21.75
Sunnyside Yard	10-14		40.89	14.32	22.29	3.21	12.80	4,938	38.86	132.37		12.73	3.74	.....
West Philadelphia	1	10.27	1.68	0.08	0.01	0.06		208	1.44	13.54		13.54	1.44	.....
Jersey City, Pier L	3-5		30.10	30.93	22.18	35.05	9.38	1,340	45.77	173.42		51.00	13.46	.....

Baggage Trucks

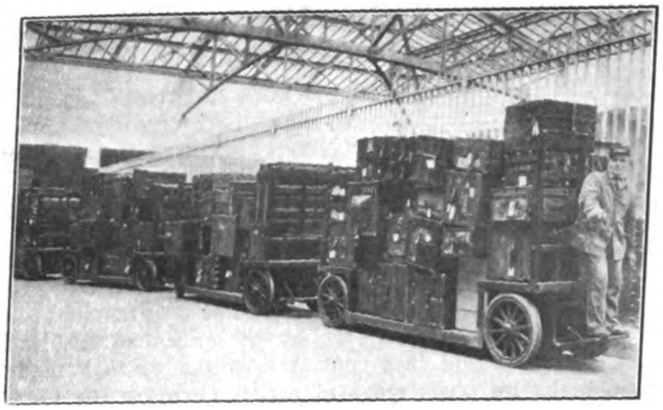
Station	Average Monthly Data All Trucks									Averages per Truck Month	
		Labor		Material							
	Number of Trucks	Truck Repairs	Battery Repairs and Charging	Truck	Battery	Tire	Kilowatt-Hours	Current Cost	Total Cost	Total Cost	Current Cost
Baltimore	2	6.54	6.02	1.30	0.62	1.53	953	11.50	27.50	13.75	5.75
Philadelphia	34-35	87.55	96.36	128.52	12.30	8.19	6,821	88.66	421.58	16.93	3.56
Pittsburgh	17-28	158.50	136.98	128.90	40.07	3.43	6,731	34.96	503.13	17.97	1.25
New York	64-66	198.11	172.03	248.73	475.38	23.64	5,016	66.63	1184.48	18.08	1.02
North Philadelphia	4-10	23.29	33.28	15.09	32.76	6.11	1,534	43.56	154.09	24.85	7.03
Washington	18	90.46	58.17	67.59	37.91	114.72	11,810	85.88	455.00	25.28	4.77
Jersey City	3-5	40.88	17.66	16.24	21.48		956	19.12	115.38	29.58	4.90
Harrisburg	1	10.44	4.17	0.96	39.02		588	12.01	66.60	66.60	12.01



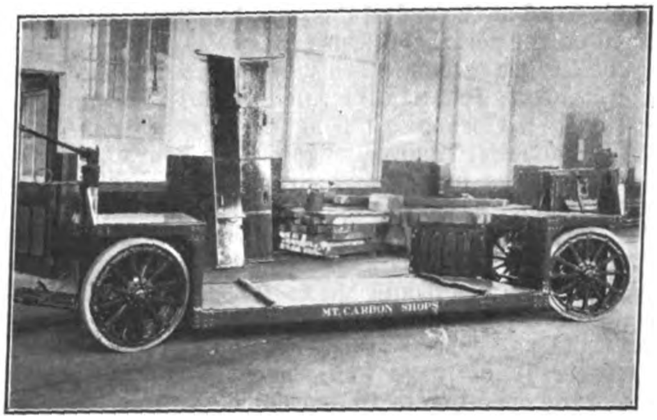
PENNSYLVANIA ELECTRIC TRUCKS—WAREHOUSE TRUCK FOR COMMISSARY DEPARTMENT



PENNSYLVANIA ELECTRIC TRUCKS—SHOP TRUCK OF STRAIGHT-FRAME CLASS



PENNSYLVANIA ELECTRIC TRUCKS—DROP-FRAME BAGGAGE TRUCK WITH THREE TRAILERS



PENNSYLVANIA ELECTRIC TRUCKS—SHOP TRUCK WITH TRANSVERSE RAILS FOR HANDLING MOUNTED WHEELS

24 volts, this being the minimum at which efficient operation is obtainable. Low voltage for the battery provides distinct advantages, such as a minimum number of cells and a minimum number of connectors, reducing the possibility of connector breakage and reducing the cost and weight per unit of capacity. The capacity is limited to 4000 lb., this being the maximum that can readily and safely be handled within the narrow and congested inclosures at terminals, but a 50 per cent overload capacity has proved desirable.

High speed has been found to be of little or no value for the reason that speed is entirely a matter of condition of the runways and the amount of congestion thereon. The present standard is from 6 m.p.h. to 7 m.p.h. with an empty truck and from 5 m.p.h. to 6 m.p.h. with a load.

The operating data (Table I, page 864) show all charges for the year 1914 for 212 trucks. The table is arranged in two sections devoted to total charges for all trucks at each installation and averages per truck month for each installation. Naturally there is a wide variation in some of the charges, due to the difference in power cost which ranges from ½ cent to 10 cents per kilowatt-hour and to the number of trucks in the installation and character of work done. The figures for shop trucks include labor charges for drivers, but the baggage trucks do not include these charges for the reason that the trucks are driven by baggage porters. However, the figures do not represent the total savings, as the increased efficiency of the shop due to having material handled on a regular and prompt schedule does not admit of calculation.

The saving effected in baggage service is considerable but this is difficult of calculation as the character of the service has changed considerably since the introduction of electric trucks. The labor force has not, generally speaking, been decreased, but on the other hand the business has increased. Rush periods can now be handled without borrowing untrained men from other departments, and a better class of men continue in the service as compared with the rapidly changing force of the old days.

The operating department considers that the most important advantage of the electric baggage truck is the relief to terminal congestion and the prompt dispatch of trains resulting from avoidance of baggage delays. The fact that the saving effected is not stated on certain installations does not indicate absence of saving but rather that the figures were not available, as the installations in question would be near the top of the list. Under the heading "Number of Trucks" is indicated the number of trucks in service at the be-

TABLE II—DATA DERIVED FROM TWO AND ONE-HALF YEARS' OPERATION OF ELECTRIC TRACTOR

Cost of tractor		$13,400
Cost of maintenance and operation	$13,145	
Interest at 6 per cent on $13,400	2,010	
Depreciation, less tires and battery, $9,200, at 5 per cent	1,150	
Depreciation battery, $3,200, at 25 per cent	2,000	
	$18,205	
Total cost of service		$18,205
Total number of cars (in and out)		22,639
Total cost of service if horses had been used, 22,639 at $1.86		$42,108
Saving by electric tractor		$23,902
Total saving over investment, per cent		178.4
Annual return on investment, per cent		71.4
Average cost of service per car		$0.805
Average weight per car, tons		33
Cost of service per ton (in and out)		$0.0243
Total miles operated		8,804
Total number of cars handled in internal movements		15,202
Grand total cars (in, out and internal)		37,841
Cost of maintenance and operation per car		$0.347
Cost of maintenance and operation per ton		$0.0104
Cost of maintenance and operation per mile		$1.49
Cost of service per working day by tractor		$24.67
Cost of service per working day by teams		$57.06
Saving per day		$32.39

PENNSYLVANIA ELECTRIC TRUCKS—WAREHOUSE TRUCK WITH TYPICAL LOAD

PENNSYLVANIA ELECTRIC TRUCKS—BAGGAGE TRUCK OF STRAIGHT-FRAME CLASS ginning and at the end of the year, but the averages are based on the actual truck months.

The electric tractor which was described in the ELECTRIC RAILWAY JOURNAL for April 26, 1913, had an average daily performance during the first six months of 1915 as follows: Hours on charge, 8.1; hours in service, 8.2; discharge in ampere-hours, 526.1; miles per day, 12.8; number of cars handled, 36.3; total movement per day, 25; total weight handled in tons per day, 1215.8. Since the tractor was placed in service the number of cars handled per month has increased from 690 to 920, and the cost per car has decreased from 83 cents to 58 cents.

Table II on page 865 shows cost data obtained from the operation of this machine. In this connection it is also interesting to note that in two and one-half years of service there has been a loss in time of only nine days due to failures of the machine. The return on the investment is 71.4 per cent, or a daily saving of $32.39. The cost of the service per ton, based on the cars moved in and out of the warehouses, is 2.4 cents, but the operating cost on all cars handled is only 1.04 cents per ton. Internal movements have reference to cars moved from point to point within the trackage operated by the tractor, these not being included in the total cost of the service.

National Association of Railway Commissioners

The twenty-seventh annual convention of the National Association of Railway Commissioners was held in the Municipal Auditorium at San Francisco, Oct. 12 to 16 inclusive. Among the reports presented were those on grade crossings and trespassing on railroads; legislation; powers, duties and work of railroad commissioners; railroad taxes and plans for ascertaining fair value of railroad properties; rates and rate-making; railway capitalization; safety appliances; statistics and accounts of electric railways; rails and equipment, and physical valuation.

At a banquet tendered the association by the California Railroad Commission on Oct. 13 about 750 delegates and guests were present to hear the speakers. Max Thelen, president California Railroad Commission, acted as toastmaster. Clifford Thorne of the Iowa Railroad Commission, president of the association, spoke briefly on the topic, "Is Regulation Worth While?" Theodore N. Vail, president American Telephone & Telegraph Company, gave an address on "Some Observations on Modern Tendencies." Warren Sanford Stone, president Brotherhood of Locomotive Engineers, presented some statistics on the relations between railway earnings, railway financial practices and railway employees' pay. Judson C. Clements, member Interstate Commerce Commission, made an address on "Public Control of Railway Capitalization." Paul Shoup, president Pacific Electric Railway, Los Angeles, Cal., spoke on "The Railroads and the Public," and John M. Eshelman, former president California Railroad Commission, made an address on "The State and Public Utilities."

In the election of officers, Judge Robert R. Prentice, chairman Virginia Corporation Commission, was chosen president of the association, and Max Thelen was made first vice-president. E. C. Mills, New Hampshire State Commission, was elected second vice-president, and William M. Connolly, chief clerk of the division of valuation, Interstate Commerce Commission, was re-elected secretary of the association. Washington, D. C., was chosen for the next annual convention, which will meet on Nov. 14, 1916.

Motor Cars on Railroad Systems Discussed by New York Railroad Club

At the meeting of the New York Railroad Club, held on Oct. 15, W. R. McKeen, consulting engineer Union Pacific Railroad, Omaha, Neb., presented a paper on "The Value of Motor Cars on Railroad Systems." He showed that on many steam railroad branch lines the use of the gasoline motor car would increase revenue by stimulating passenger travel and would decrease operating expenses so as to make passenger travel profitable. He stated that the financial success and universal popularity of the trolley car is not so absolutely the result of the fact that it operates on city streets and picks up passengers at street corners, for on the most successful interurban systems the passengers are taken aboard at stations as on steam railroads. The electric cars with frequent service can be scheduled as to leaving and arriving times to suit the convenience of the public, and in consequence they get the business. Mr. McKeen showed how the same purposes can be accomplished on branch steam railroad lines by means of the gasoline motor car. He stated that on some branch lines the average passengers per train will run below twenty, while even under favorable conditions the average will be only between thirty and forty, one-third of the train capacity. The motor car permits passenger and freight service to be separated and each can be furnished according to its own requirements.

Mr. McKeen's paper provoked very lively discussion, among those taking part being H. B. Emerson, consulting engineer; Arthur L. Jones, General Electric Company; E. B. Bailey, purchasing department Union Pacific Railroad, and Roger B. Williams, Jr., president Central New York Southern Railroad. While in the discussion attention was directed to the high cost of the gasoline motor car, its utility was especially emphasized. Mr. Williams, whose road is a short one connecting Ithaca and Auburn, N. Y., with an electric system in Ithaca, stated that the experience of his company with the motor cars was very satisfactory.

Rust Protection in Steel-Car Design

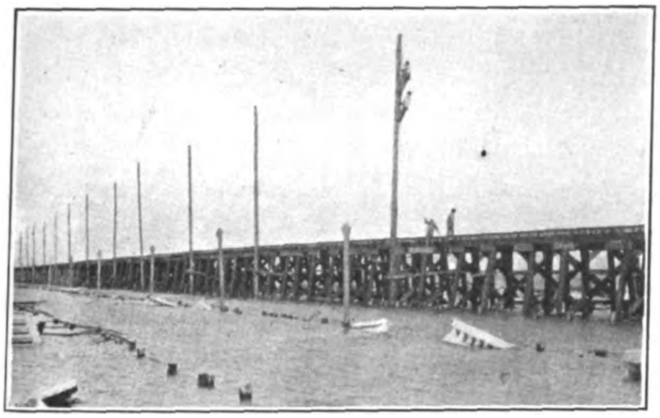
The subject of steel-car design from a protection standpoint was discussed at some length at the recent Master Painters' Convention in Detroit, Mich. It was said that, in the construction of steel cars, the body should be made as plain as possible. No countersunk rivets or butt joints should be used. Open corners should be eliminated as far as possible, as they will hold dust and moisture, ultimately causing corrosion. Sharp corners should also be eliminated and the joints should be soldered inside and out. Better results are obtained where Gothic sash are eliminated and where the monitor decks are plain and without projections that will hold dust, cinders and moisture. Roofs also should be of the plain-arch type and should be constructed without standing seams, and where side and deck panels are used they should be bent in one piece. The arch type has preference over the monitor-deck roof on steel equipment for this reason. Better results will be obtained if the interior of the steel car is finished in wood, as expansion and contraction on a steel finish causes the paint to crack. In general the delegates expressed an opinion that was in favor of special smooth steel sheets for passenger cars, claiming that the extra first cost of these sheets will be fully warranted from the standpoint of painting and maintenance. Some roads were said also to have used aluminum doors with very great success, as it was very difficult to prevent the corrosion on the inside of steel doors.

Record Reconstruction at Galveston

A Mile-Long Trestle Was Built in Seven Days, Subsequent to the Great Gulf Storm of Two Months Ago, Serving to Re-establish Rail Communication with the Mainland

The cyclonic storm of Aug. 16 and 17 at Galveston, Tex., which cut off the water supply and destroyed communication by rail between the island city and the mainland, involved extraordinary efforts in the work of reconstruction, according to E. B. Van de Greyn, consulting engineer, Houston, Tex. Every resource at the city's command was called upon, with the result that in seventeen hours after work was begun water was flowing across the bay through a hastily built pipe line laid on what was left of the causeway, and it took only seven days for an army of workers to construct a mile of timber trestle to restore railway connections across the bay.

Although Galveston, after the storm, had boat service which supplied food, it was imperative that rail connection with the mainland be restored as quickly as possible. A large force of men was at once put at work getting tracks in shape leading to the causeway, and the building of a single-track creosoted pile trestle was commenced as soon as equipment and materials could be delivered. The Santa Fé Railway undertook the building of the 3700 ft. at the north end, and the Southern Pacific Railway handled the 1700 ft. at the south or island end. On the latter section a railroad pile-driver was used at the island end and a slip or skid driver was started from the southerly end of the arches. For the 3700-ft. section a railroad driver was started from the mainland end, a skid driver from the northerly end of the arches, and another skid driver started on cribbing at an intermediate point.



GALVESTON RECONSTRUCTION—ERECTION OF POLE LINE ON TEMPORARY TRESTLE

Materials were brought in on barges and floated to the drivers. A temporary track laid outside and to the east of the approach and extending out from the mainland was also used for handling supplies. Bents were 14 ft. on centers, four piles to a bent. Driving was carried on day and night with two twelve-hour shifts and in seven days 5400 ft. of pile trestle was built ready for train service.

Steam trains and the interurban cars from Houston are now operating over the pile trestle. The interurban cars are taken back and forth across the trestle by locomotive, but the Stone & Webster Company is now constructing a trolley pole line next to the trestle to enable cars to operate across it under their own power.

First Annual Convention of Safety Federation

Adoption of a model ordinance to govern all street traffic which will be offered to cities all over the country as a basis for legislation was the big feature of the first annual convention of the Safety Federation of America, held in Detroit, Mich., on Oct. 18, 19 and 20. The model ordinance for cities which will form the vehicle for activity of federation members for some time to come was prepared by the street traffic committee of the federation, of which Police Commissioner Gillespie of Detroit is chairman. The report of the committee's deliberations fills a printed booklet of twenty pages and gives in detail the effort to establish a standard for traffic regulations in all cities of the United States.

While the federation ordinance aims particularly at the control of automobile traffic its provisions will be of vital interest to street railway operators because of the number of collisions between automobiles and street cars. It covers licenses, lights, brakes, warning signals, whistles, noise, smoke, accidents, the way vehicles are to be driven, speed, age of drivers, barring of intoxicated drivers, distance from street cars, rights of pedestrians and numerous other matters, giving the police full control of all traffic.

Standard police traffic signals, to be used in all cities, are among the especial provisions. One of the most important clauses is that every automobile driver must have a license from the police of his city. He must be sixteen years of age and must not have physical ailments that might affect the operation of the car. In addition to the model traffic ordinance the convention decided to issue a safety-first primer for children and distribute millions of copies all over the United States.

Safety-First Meetings in Ohio

On Sept. 16 two meetings of employees of the Northern Ohio Traction & Light Company were held in Akron, Ohio, in the interest of the safety-first movement. More than 500 persons attended the afternoon meeting, and 1000 were present in the evening. Special cars on the northern division brought many of the employees to the city. For the past two years the company has been deeply interested in the safety-first movement, and its men have been organized to carry out the idea. As a result the reduction in the number of accidents has been more than 50 per cent. This record was made in spite of the fact that the number of car-miles operated was larger than ever before. The increase in the number of automobiles in use has also made the liability to accidents greater than in the past. The road has a safety committee of fifty members selected from the 1600 or 1700 employees, and the suggestions made by this committee are generally adopted.

Company Rewards Employee for Good Service

Homer S. Martin, interurban conductor for the Southern Traction Company, Dallas, Tex., has been presented with a gold-headed umbrella engraved as follows: "Presented to Homer S. Martin by Southern Traction Company in Recognition of Good Judgment and Faithful Performance of Duty on Sept. 21, 1915." On the occasion referred to another car crashed into the interurban which Mr. Martin was running near Ennis. Although he had ample opportunity to escape, Mr. Martin stayed at his post and endeavored to get his car out of the way. The company also presented Mr. Martin with passes for himself and wife over all its lines.

DELEGATES AND GUESTS OF THE AMERICAN ASSOCIATION AND MANUFACTURERS' ASSOCIATION ASSEMBLED IN CONVEN

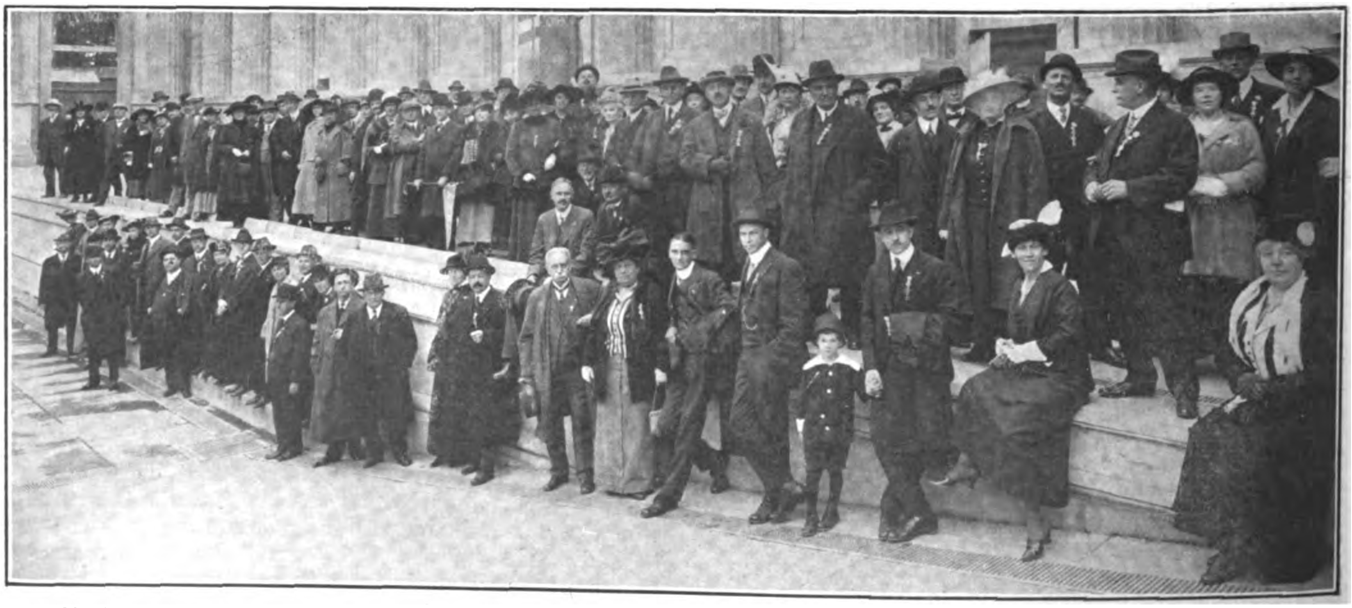
American Association News

Chicago Selected for Mid-Winter Meeting—Successful "Red Special" Tour Ended in New York on Friday—Dr. E. B. Rosa Addressed Washington Section—Denver Tramway Section Enjoyed Fine Illustrated Lecture

SAN DIEGO AND EASTWARD

Friday, Oct. 15, was Transportation Day at the Panama-California Exposition. The San Francisco convention delegates left the Coronado headquarters for the exposition grounds at 10 a. m., and were officially received in the president's reception room at 11. An address of welcome was delivered by George Burnham, vice-president of the exposition. This was responded to by William Clayton, vice-president and managing director of the Spreckles Companies, and by Charles L. Henry, president of the association. The party then divided to inspect the buildings and exhibits of the exposition and to attend the various features on the program arranged by the exposition authorities for Transportation Day. These included a "monkey drill" by the First Cavalry, U. S. Army, a concert by the band of the 13th Coast Artillery Corps, a special organ recital by Dr. J. Humphrey Stewart on the large outdoor organ, and a reception at the Women's Headquarters, California Building, tendered to the visitors by members of the Women's Boards.

Saturday was Aviation Day at the exposition, but there was no flying on that day owing to the recent accidental death of one of the aviators. However, the visitors inspected the flying machines in the hangars, after which they returned to headquarters for luncheon. In the afternoon a special train on the San Diego & Southeastern Railway took the guests to Tia Juana, Mexico, the Monte Carlo of the Southwest, and returned them to the hotel in time for dinner. The Eastern journey was begun at midnight on Saturday, Riverside being reached early Sunday morning and several hours were spent there. Monday, Oct. 18, was spent in the Grand Canyon of Arizona, and on Tuesday afternoon a two-hour stop



CONVENTION PARTY IN THE OPEN-AIR GREEK THEATER AT THE UNIVERSITY OF CALIFORNIA DURING A VISIT TO OAKLAND AND BERKELEY ON OCT. 8

TION AT SAN FRANCISCO, CAL., OCT. 8, 1915. BUILDINGS OF THE PANAMA-PACIFIC EXPOSITION IN BACKGROUND

"LOOKING PLEASANT" ON THE CLAREMONT GANGPLANK DURING VISIT TO OAKLAND AND BERKELEY

ON THE SALOON DECK OF THE CLAREMONT DURING VISIT TO OAKLAND AND BERKELEY

THE EAST AND THE WEST MEET ON THE DECK OF THE STEAMER CLAREMONT, DURING VISIT TO OAKLAND AND BERKELEY ON OCT. 8

was made at Albuquerque, N. M., where the attention of the visitors was attracted to the new one-man cars recently put in operation on the local railway system. These cars were double-ended with small wheels and with "Wee" motors. They were reported by the management to be operating very satisfactorily.

The remainder of the journey was uneventful but it was enlivened by various guessing and other contests, and it ended successfully by the arrival in New York on Friday morning.

The illustrations on pages 868 and 869 will serve as a permanent souvenir of the "Red Special" tour. All of these views were taken on Oct. 8, the final day of the convention, and the one on which the exercises were held at the exposition grounds. For the views of the excursion later in the day to Oakland and Berkeley, this paper is indebted to W. R. Alberger, vice-president and general manager San Francisco-Oakland Terminal Railways.

In the telegraphic report last week of the presentation of testimonials to the managers of the Red Special train at Coronado Beach on Oct. 14, a line was omitted which caused an error in the case of two of the gifts. E. C. Cook, of the New York Central lines in charge of the train, received a traveling case, and the purse was given to Fred. C. J. Dell, assistant to Secretary McConnaughy, in recognition of his many courtesies to the delegates on the trip.

CHICAGO SELECTED FOR MID-WINTER MEETING

At a meeting of the American Association executive committee held on Oct. 7 in San Francisco, Chicago was selected as the place for the mid-winter meeting. The appointment of a committee of three by the president to arrange for the meeting was authorized, this committee to confer with a similar one from the Manufacturers' Association.

WASHINGTON COMPANY SECTION

The October meeting of the company section No. 4 was held on Oct. 11, with President George G. Whitney, chief clerk Washington Railway & Electric Company, in the chair. The attendance was about 125.

The feature of the evening was an address by Dr. E. B. Rosa, chief physicist of the United States Bureau of Standards, who explained to the section the work of the bureau, particularly that relating to the standardization of electrical appliances. He encouraged the members to secure copies of the publications of the bureau on subjects in which they are interested. After the address vocal selections were rendered by W. S. Madigan, accompanied by F. J. Allen of the commercial department of the Potomac Electric Power Company.

The president announced that a general business session would be held on Oct. 25, at which time it was hoped to greatly augment the present membership due to the operation of the new scale of dues. He also stated that Robert G. Wall would address the section on "The Science of Business Building." After the formal exercises a buffet luncheon was served.

DENVER TRAMWAY SECTION

At the meeting of the Denver Tramway Company section held on Oct. 21 an illustrated lecture was delivered by Dr. George B. Vosburgh on "Transportation and the Modern City." More than 100 colored slides were used in illustrating the lecture. Some of the slides showed scenes from various departments of the tramway company, including electrical apparatus, tracks, buildings and club lights.

COMMUNICATIONS

Reminiscences of Early Days in the Street Railway Business

BOARD OF PUBLIC UTILITIES
LOS ANGELES, CAL., Oct. 13, 1915.

To the Editors:

I spent yesterday at Universal City with those who had come down from the American Electric Railway Association convention in San Francisco. My mind was filled with thoughts of the early days of the American Street Railway Association, inaugurated by H. H. Littell, and of the wonderful changes that the years have brought about.

How many to-day appreciate the important assistance rendered the association in its infancy by the STREET RAILWAY JOURNAL? Very few, I fear. My thoughts were full of C. A. Richards, Thomas Lowry, Charles Green, W. H. Hazzard, William White, William Richardson and his son, William J. Richardson, Charles B. Holmes, Julius S. Walsh, P. C. Maffitt and C. B. Fairchild. Why prolong the list? Most have found rest and a new generation is now bearing the burden. When the association was formed I was the only civil engineer employed by the year on a street railway in the United States. That was the reason that I was so active at the early meetings. My paper on the "Ventilation of Stables" had a wide circulation here and abroad. It was copied in the *Scientific American Supplement* and when it appeared again in its columns some time after I thought the fact had been overlooked and wrote for information. The editor replied that the demand for that paper had been so great that the issue was exhausted and hence it was published again. What a change in motive power since I reported to the St. Louis Convention "On the Progress of Electricity as a Motive Power." I think that this was in 1884. Some years past the secretary of the association wrote me that it possessed no copies of the first five meetings, and asked me to send mine. This I did, for while I valued my copies very highly I thought the association should have them.

At the Universal City gathering I did not meet one of the "old guard," but it seems fit that the present generation should be reminded of those who have gone before and from whose efforts the giant association of the day results.

AUGUSTINE W. WRIGHT,
Commissioner.

Cumulative Voting

COMPAÑIA ELÉCTRICA Y DE FERROCARRILES DE CHIHUAHUA
CHIHUAHUA, MEXICO, Aug. 31, 1915.

To the Editors:

Referring to the editorial on cumulative voting in your issue of Aug. 14, we should like to be informed more in detail regarding this method of voting at corporation meetings.

E. R. LOZAÑO, Director General.

[For the benefit of Mr. Lozaño and others in the electric railway field who may desire some details in connection with the practice of cumulative voting, we are pleased to publish a few general facts and formulas.

When the voting at a corporation meeting is carried on under the cumulative plan, the result of the election is not determined alone by the number of shares voted. Each stockholder under such a condition is entitled to as many votes as shall equal the number of his shares of stock multiplied by the number of directors to be elected, and he may cast all of such votes for a single director or may distribute them among the entire number to be voted for, or any two or more of them, as he may see fit. The right to vote in such a manner is specifically guaranteed in some states by the fundamental law, in others by the corporation statutes, and in others by provisions in the corporate charter or by-laws. Cumulative voting, however, is not a common law right, and where it is not provided for by law or corporate rules, stockholders cannot insist upon resorting to such a method unless all consent to its adoption.

Various formulas have been devised to cover possible combinations that arise in connection with cumulative voting. The simplest case is where A desires to know the minimum number of shares necessary to elect a certain number of directors. This is shown by the following formula:

$$x = \frac{ac}{b+1} + 1$$

where x represents the necessary minimum number of shares, a the entire number of shares of capital stock, b the whole number of directors to be elected and c the number of directors sought to be elected by x shares. A typical case of a corporation with $100,000 of capital stock (1000 shares, par $100), five directors to be elected and two to be chosen by A will show the working of the system. The minimum number of shares here needed by A is 334, giving him 1670 votes, as compared to the 3330 votes of B's remaining 666 shares. If A splits his vote between his two candidates, each receives 835. If B is to defeat A's desire to elect two directors, he himself must elect four out of the five. Hence B must divide his vote among four candidates, three receiving 832 and one 834 votes. None of these, however, will win over A's directors with 835 votes each. By using this formula B on his side would find that it would be impossible for him to elect four directors without a tie in the face of A's opposition unless he himself held 668 shares and A only 332.

The foregoing formula presupposes that the capital stock is divided between two factions, but in actual practice there are often more than two factions and also a large outstanding neutral or unallied body of stockholders. Thus if M is known to have a certain number of shares under his control, the number of unallied shares that N must acquire by purchase or proxy to elect a certain number of directors is shown by this formula:

$$y = \frac{cr + b + 1}{b - c + 1}$$

where y represents the number of shares that N must procure, r the number of shares held by M, b the total number of directors to be elected, and c the number to be elected by N. If a third party, O, enters the lists with a desire to elect only one director when M has r shares and N has y shares, he must control z shares, where

$$z = \frac{y}{c} + \frac{1}{b}$$

Then N, in order to secure his c directors against M and not give up one director to O, must secure y' shares, where

$$y' = \frac{cr}{b - c} + 1$$

If O desires then to elect his one director, he must control enough shares to defeat one of M's candidates, or z', where

$$z' = \frac{r}{b - c} + \frac{1}{b}$$

As previously intimated, while these formulas are designed primarily to show the very least number of shares necessary to accomplish different ends, they may be used to calculate mathematically, when the disposition of the capital stock is known, the number of directors it will be safe for any faction to try to elect so as not to lose any directorships by overreaching.—EDS.]

Automatic Railway Substations

GENERAL ELECTRIC COMPANY
SCHENECTADY, N. Y., Oct. 11, 1915.

To the Editors:

The abstracts which you have recently published of the A.I.E.E. paper by Messrs. Allen and Taylor, and of my article in the *General Electric Review* on the subject of the automatic control of substations, will doubtless bring to the attention of many operating engineers the advantages which may be derived by such control. It is a little early to predict how far the automatic feature may be extended but it is possible at this time to note some of the applications and limitations of the scheme.

In proposing a system of control the design must be a compromise which will provide suitable protection against ordinary contingencies without introducing too many complications. There is almost no contingency which cannot be provided for if the equipment is made sufficiently complicated. With such a scheme as Messrs. Allen and Taylor described, many of the operations depend upon the proper functioning of various relays which cannot be considered as rugged pieces of apparatus. It is thus desirable to eliminate as many of these devices as is possible and experience alone will determine the minimum amount of protection that is necessary.

While the system described by Messrs. Allen and Taylor has been applied to synchronous converters it is evident that similar control is equally applicable to motor-generator sets.

The use of a load-limiting resistance is rather unique in its application here, but where the amount of energy to be controlled is large the size of these resistance units becomes formidable and cannot be neglected. It might appear at first sight that the energy wasted in the limiting resistance would be an item which would tend largely to offset in saving gained in no load losses by automatic operation, but when it is realized that the resistance is in circuit only on comparatively heavy overloads and that the overloads, particularly on a railway system, are of short duration, it can be seen that the energy loss is quite small. The overload relays are made adjustable to suit the conditions in each installation. Where automatic equipment is provided for lighting systems the losses, if a resistance were used, would undoubtedly be greater than those on a railway system owing to the fact that the overloads appear more gradually and persist for longer intervals. Thus, on lighting systems it might be preferable to provide some other means of load limitation.

As C. W. Place points out in his paper appearing in this month's issue of the A.I.E.E. *Proceedings*, a complete series of automatic stations may be employed on a system, or some of the substations may be automatically controlled and others manually controlled. It might even be feasible to have one or more of several machines in a substation automatically controlled and the rest manually controlled, one of the advantages in this last case being that a good load factor on the station is maintained under varying load conditions. It will be the local limitations on any one system which will determine what proportion of the equipment shall be automatic.

CASSIUS M. DAVIS,
Railway and Traction Engineering Department.

Girder and High T-Rail Renewals

MONTREAL TRAMWAYS COMPANY
MONTREAL, CANADA, Oct. 16, 1915.

To the Editors:

In reference to the exhaustive article in the issue of the ELECTRIC RAILWAY JOURNAL for July 31 on "Girder and High T-Rail Renewals," the pertinent question "What is the life of rail?" is the one that has puzzled street railway engineers for all time. The rapid change in the types and sections of rail on account of the paving conditions, the evolution in weight, speed and traffic, density of rolling stock, changes in the chemical composition of rail, improvements in rolling-mill practice and demands of municipal authorities, make it impossible to answer with accuracy either theoretically or from experience. It is also very certain that a considerable amount of seemingly extravagant rail renewal on many systems during the past has been due not to absence of engineering ability to "make a dollar go farthest," but to other conditions which have become the controlling factors in the decision to lay new rails instead of relaying the old.

The desirability of arriving at some conclusion on which to base the life of rail is unquestionable, but thus far only a theoretical formula can be deduced and only a basis from which the subject may be discussed can be arrived at. The line of economical life cannot be based entirely on a formula but it may be possible to test financial operations with it.

In the first place, it is necessary that we decide what should be considered the reducible head area; whether in the case of plain girder rail it is that portion of the head above a line drawn horizontally between the top of the fillets, or bottom if you please, or where the vertical sides of the head intersect the lines defining the under side, or whether it is that area above the lines of the underside of the head intersecting at the center of the web. The latter is probably the more definite and should be considered 100 per cent.

In the case of grooved girder and tram girder rail the practical reducible area is much more difficult to fix. Certainly it is not where the tram or groove becomes flange-ridden. However, when this stage of wear is reached the effect on wheel flanges becomes a factor. Frequently some of the most prosperous properties are seen with grooved girder rail worn to the point where the lip or tram has been entirely sheared off without seriously affecting the track's operable condition, but probably subjecting it to rather unusual maintenance charges for both the track and paving.

When the reducible head area is found or agreed upon (this should be considered separately as regards the type of rail and whether it is to be used on tangent track or on curves) and the ultimate wear limit is considered, it is found that the percentage of allowable head wear depends as much on the manner in which the head is worn as on the section of the rail itself, and many vary from one extreme of 20 per cent to the other extreme of 60 per cent to 70 per cent of total head area. In my opinion a reduction of 35 per cent of the area is a fair average wear limit, and I believe that my conclusion is borne out by many engineers of experience.

To determine the economical phase of rail renewals during reconstruction it is necessary to know the tonnage or wheel movements carried by the old rail from the time of installation, and also the prospective moving loads, from which the approximate life of the rail in years may be estimated. It will be found that the results will vary with different types and weights of rail and classes of construction.

In a certain reconstruction work caused by tie and foundation failure (which, by the way, was solid concrete) it was observed that 1,760,000 tons had been moved per 1/64 in. of vertical wear. The total wearing value was assumed at 40 per cent of the head area or about ⅝ in. of vertical wear. This was found to work out to a fifteen-year total life for the rail. With this as a basis and assuming the probable future traffic and wear, it was found to be economical to make a complete renewal of the entire track construction unless the rail had at least seven years of remaining life. Naturally, years only enter into calculations of this nature when finances are involved and not economical physical values where percentages only should apply.

From the noted wear of 1/64 in. per 1,760,000 tons movement it might be suggested that an assumption be made that the ultimate economical life of a rail is reached when it has carried 70,000,000 tons, corresponding to a total vertical wear of ⅝ in. or 40 per cent of total head area of this particular section. In a recently written work treating on this subject, published in Europe, a figure of 40,000,000 tons was given for eight years of past life and the remaining life put at eight years, thus making a total of 80,000,000 tons as the ultimate tonnage which the rail would carry. This is near the figure arrived at by my own observations. This might mean a rail life of fifteen years under a heavy car and vehicular traffic, twenty years or thirty years in smaller communities, or, under correspondingly less traffic, even fifty years.

Other observations, well over 100, indicate that the average vertical reduction per year on a certain section of plain girder rail on a large property was 0.021 in., giving a wearing life of eighteen years. On another property some fifty scribings gave a wearing value of fourteen years. Both of these calculations were based on a 35 per cent reduction of the head area of plain girder rail. These may be easily reduced to terms of tonnage or car movement, whichever is considered most convenient.

Causes necessitating track reconstruction, such as paving conditions; worn, corroded, corrugated, or surface bent rails; tie, joint or foundation failures; municipal demands, etc., are so numerous that a large percentage of these causes preclude the application of any definite formula in considering the question of rail renewals, except under what might be termed ideal conditions. Even when ideal conditions exist and a rail-wear limit has been fixed, it is still questionable if any formula such as was suggested in the article could be applied.

Such conditions, when they present themselves, would undoubtedly be worked out along the lines suggested, though perhaps not reduced to a formula. The final decision would be made not entirely on the result of the calculations, but according to the engineer's knowledge and experience of the local conditions and the time, labor, materials and finances available for the work. Even granting that all these were at the engineer's disposal, local considerations, such as relaying partly-worn rail in some less-traveled section of the system, might become the governing factor in the final decision.

Each system, and in fact each street, has its concluding factors in determining when the rail is ready for renewal, and these can only be determined definitely by examination, experience and knowledge of past and future demands. The joint is not such an important factor as it has been the custom to believe. With the advent of the several joints of the welded type which can be readily applied by skilled labor, the improvements in mechanical joints and the devices for building up and grinding off worn or cupped joints, it is possible to keep them in good condition even when the rail itself is made useless by corrugation, brake applications or rolling of the metal.

One instance has come to my attention where ¼ in. was added to the height of the head of a plain girder rail in order to prolong its life. Actual experience with this rail was that before even the additional ¼ in. was worn off the municipal authorities demanded a rail of the grooved girder type. Accordingly the plain girder rail was removed with probably the same wearing value as the section originally had before the ¼ in. was added.

Summing up the rail renewal question it seems to me that:

1. To determine a fixed percentage of head area to be used generally as the ultimate rail wear limit is impossible, as it is bound to vary with the head area, the weight and type of rail and the manner in which it is worn.
2. Each section of rail and in fact each local situation will have a wear value of its own which should be determined accordingly from the observed rate and manner of wear.
3. The rate of rail wear and the ultimate wear limit should be known or considered in terms of wheel or tonnage movements, and the future wear value in years determined from this.
4. A definite formula as a guide in determining rail renewals during track reconstruction can only be used when the question can be determined solely from an economical standpoint.
5. Considering the innumerable factors entering into the renewal of rail the actual economical life is not the most important one.
6. The conditions governing each piece of track renewal are usually purely local, even as compared with other sections of the same property, and the question of rail renewal must be governed by these conditions.

These conclusions apply generally to all types of rail, but more particularly to plain girder rail. Grooved and tram girder rails involve many different considerations, and I am not prepared to make any definite statements regarding them owing to the usual lack of information.

These comments also apply only to the problem of rail renewals as it confronts the street railway engineer in his daily practice. When considered in connection with the appraisal of a system of track work, and the percentage of depreciation is to be determined, the question must be looked at from a different standpoint since the appraisal of any system is more or less in the nature of a general one.

No definite standard seems to have been established in approaching the various phases of the question of track appraisal. As a basis to determine rail depreciation it seems quite reasonable that a general fixed wear limit might be established, even though it may not have any appreciable effect on a total valuation. The average value of depreciated rail is a comparatively small item in the appraisal of track construction; the substructure presents a much more expensive and complicated problem.

In conclusion I would say that it seems scarcely logical that track depreciation should be considered on an assumed basis of a certain percentage per annum. The more scientific way, it seems to me, would be to consider it in recognition of traffic carried, or in terms of ton or wheel movements per square inch of area worn, thus securing a common base or standard which may be applied generally to all properties notwithstanding their wide variation in traffic density.

W. F. GRAVES, Chief Engineer.

BROOKLYN RAPID TRANSIT SYSTEM
BROOKLYN, N. Y., Oct. 6, 1915.

To the Editors:

The article on "Girder and High T-Rail Renewals" which appeared in the issue of the ELECTRIC RAILWAY JOURNAL for July 31, 1915, is a very broad treatment of a subject which is of much importance to maintenance engineers at the present time because their efforts are largely directed toward reconstruction of existing lines. Many properties are forced by present financial conditions to consider track renewals with the view of economizing in all possible ways. Hence such studies of rail life and the economies of the renewal problem have great value, especially when covered in such an exhaustive way.

There are a number of conclusions presented in the article and the following comments on them appear appropriate: Experience seems to warrant the correctness of conclusion No. 1. There is some doubt as to just how much value there may be in the "betterment" of chemical composition of rail mentioned in conclusion No. 2. Improvements in the method of manufacture are much more important and there is still room for advancement along this line. The statement made in the article that "apparently corrugation has been eliminated or at least greatly delayed by the titanium treatment" is questionable. The writer has found instances where corrugation developed rapidly, although the rails were so treated.

There can be no disagreement with conclusion No. 3. In addition to joint failures, corrugation, especially on rather old rail, should be included in conclusion No. 4 as an important factor in limiting rail life. It is often impossible to grind them out without removing the last wear value. Conclusions No. 5 and No. 6 seem to be true as a general observation. Concerning conclusion No. 7, the wheels will bear more study with respect to their influence on rail wear. This is especially true of the maintenance of correct wheel contours. In connection with conclusion No. 8, it might be stated that the more recent girder-rail designs appear to have wear areas more nearly equal to plain girder T-rail sections.

Arbitrary headwear limits as a basis for rail renewals, mentioned in conclusion No. 9, have not, in the writer's belief, been very much used by street railway engineers. The writer fails to see the use in attempting to set arbitrary wear limit values for American Electric Railway Association's rail sections as suggested in conclusion No. 10. They would have to cover too many types of wheel flanges and treads. The wear limits given in conclusions Nos. 11, 12 and 13 seem reasonable. Conclusions No. 14 and No. 15 are the most important and contain the essence of the whole rail-renewal and wear problem.

R. C. CRAM,
Assistant Engineer Way and Structure Department.

Modification of Tunnel Permit Sought

The Public Service Commission for the First District of New York has applied to the Secretary of War for a modification of the permit granted by the government for the construction of the proposed tunnel under the East River from Fourteenth Street, Manhattan, to North Seventh Street, Brooklyn. This permit makes the city responsible for all damages which may occur in the prosecution of the work. The commission fears that such a condition would make the city liable for all damage, even such as may be beyond its control. A similar provision was eliminated by the government in the permit for the new tunnels under the Harlem River, and the commission requests that it be omitted from the permit for the Fourteenth Street tunnel.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

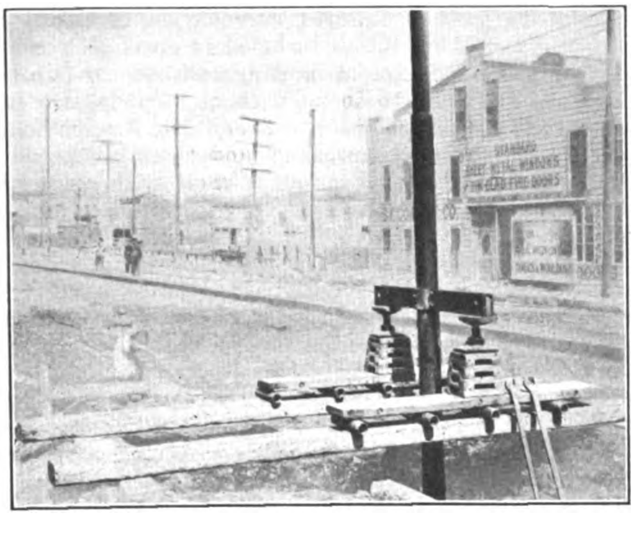
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Speedy and Inexpensive Pole Moving in San Francisco

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

The accompanying illustration shows how iron poles with their concrete settings are raised, lowered or moved in San Francisco. The California pioneers laid out sidewalks that have proved in modern times to be too generous and when 19-ft. sidewalks are reduced to 15 ft., or 15-ft. ones to 12 ft., the trolley poles have to go back. In the past twenty years several thousand such involuntary pole-moving jobs have arisen, and the illustrated appliance as originally devised has proved so far to have no superior for speed and economy.

The pole is clamped between two 1-in. x 7-in. x 6-ft. wrought-iron plates by four 1-in. machine bolts and a ¾-in. cupped set-screw. These rest at each end on heavy house-raisers' screw-jacks which stand on 3-in. x 12-in. x 8-ft. planks resting on 3½-in. diameter iron pipe rollers. When the pole and concrete setting has been cleared from the adjacent earth and hoisted slightly from the ground the whole load and appliance is rolled back by crowbars on 5-in. x 12-in. x 16-ft. way-planks.



POLE-MOVING APPLIANCE USED IN SAN FRANCISCO

Laborers do all the work. If there were enough of these jobs to make it pay, faster-operated lifting jacks would reduce the cost. The simple house-raising jacks, however, are foolproof and more suitable for laborers and the sandy soil in which the tools are often thrown about.

The appliance is used also for raising poles and their settings where grades are raised, or for lowering them when the grade of the walk is dropped.

On very long moves the trenching may cost more than the expense of setting a new pole and digging out the old one but on moves of 4 ft. or 5 ft. the use of this appliance results in the move being made for about half the cost of the pole substitution plan. There is approximately the same amount of digging in both cases but, whereas with the appliance there is no concrete work, with the pole-substitution plan the new pole must be set in concrete and the old pole must be chopped out of the hard old adhering concrete before it can be removed. Furthermore, there is surplus excavated material to be hauled away under the latter procedure and none in the former.

No guys are usually needed in this work as, on account of the mass of concrete about the lower part of the pole, the center of gravity of the whole is below the point of attachment of the clamping plates and the pole moves back erect and perfectly safe. The span wire is cast off temporarily until the pole has been located in its new position and the excavated soil back-filled and tamped or flooded-in, according to its character.

The photograph shows the appliance in place in an unusually difficult situation. This iron pole and its 2-ft. x 2-ft. x 6-ft. concrete setting had to be raised 5 ft. and moved back 6 ft. in a treacherous, new, dry, sand fill.

Watch Standards

BY A. J. BOARDMAN, DIVISION SUPERINTENDENT TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

Along with the standardization of equipment, overhead material, roadway, details of electric lines, will eventually come the minimum standard of watches in the train service of interurban lines. Comparatively little has been said on this subject, although reference has been made in the ELECTRIC RAILWAY JOURNAL on Sept. 27, 1913, to the excellent systems of watch inspection on the Illinois Traction System, Aurora, Elgin & Chicago Railroad and Chicago & Milwaukee Electric Railroad. In the past it has been found, in spite of strict methods of inspection, that trainmen have substituted watches for inspection and carry inferior grade watches. This has led to the numbered inspection card, which has to be returned whether the watch is rejected or accepted, and the frequent and additional check of watches on the road to see if trainmen are carrying the watches which they had inspected.

On the Terre Haute, Indianapolis & Eastern Traction lines watch statistics show a predominance of Hamilton watches, ninety-three being used. Other makes include Waltham, thirty-nine; Hampden, twenty-seven; Illinois, twenty-seven; Elgin, ten; Ball, five; Rockford, one, and South Bend, one. The minimum standard size is No. 16.

The watch inspector of the Terre Haute, Indianapolis & Eastern Traction Company at Indianapolis, serves without pay and keeps record of all watches inspected twice a year in addition to frequent examinations that he is called upon to make. A watch inspector for the Terre Haute Division is located at Terre Haute. The rules governing the method of comparing time, registering, variation and use of standard clocks are the A. E. R. A. standard. The instructions to watch inspectors, which follow, are similar to those in use by several steam roads and are worthy of careful consideration by all interurban lines.

INSTRUCTIONS TO WATCH INSPECTORS

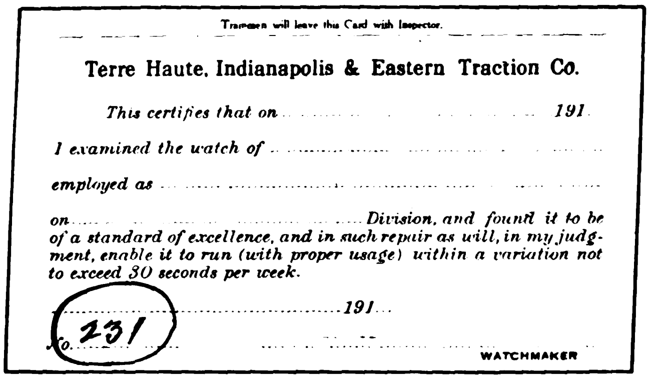
When watches are presented for inspection, care should be exercised not to impose any hardship on the employees, and in case of any doubt to give the employee the benefit, if it can be done with safety to the service, but safety and reliability must be first considered. There must be no discrimination of any kind on account of trade preference. The inspector of watches must act for the company, not as an individual working for personal ends. Orders for inspection should be presented to the inspector on whom they are drawn. Watches that have been rejected by one inspector must not be passed by another, except upon an order from the superintendent.

The minimum standard of excellence for old watches now in service shall be of a grade equal to what is known among American movements as the "fifteen-jeweled, Brequet hair spring, patent regulator, adjusted" in such repair as will enable them to run within a variation of not to exceed thirty seconds per week. This quality of movement is represented by the Waltham "Crescent Street," the Elgin "Raymond" and other makes of equal grade adjustments. Their general finish should be such as to enable them to keep time as close as the average of the standard named. Inspectors should satisfy themselves that the watches are capable of giving reliable service, and in this there should be more than the average degree of certainty, for old watches, like old machinery, are apt to be more or less unreliable. All watches put up in open face cases must wind at the figure twelve, except such open face watches as have heretofore passed inspection.

The standard schedule for new watches includes twenty-one and twenty-three jewel watches. However, it has been demonstrated by experience that such high-jeweled watches are impracticable and short lived for railroad service. Their complicated and delicate construction renders them liable to get out of order easily and repairs are expensive. It is recommended, therefore, that employees, when purchasing new watches for railroad service, shall select seventeen and nineteen-jewel grades which have steel escape wheels, sapphire pallets, double roller escapements, Brequet hair springs, patent regulators, adjusted to temperature, isochronism, and five positions. Besides the regular standard (seventeen-jewels) the nineteen-jewel watches must have two bearings jeweled in the going parts of the main spring barrel, to fill all requirements.

In the care of the watch the following points are important, especially in railroad service: The movement must be clean and the oil fresh. If the oil becomes sticky or gummy from any cause, it must be removed and fresh oil put in. Frequently fine watches, after being put in order and regulated, will begin to change their rate at the end of six or eight months, caused by the chemical changes taking place in the oil. It should be noted that none of the pivots are running dry, especially in the balance pivots, which require careful attention, as their running dry causes irregular rating and injury to the pivots by their cutting from lack of oil. The hair spring is a very important item; it must be true, not warped or bent. The regulator pins should be straight, so that the hair spring will strike flat and true. The pins should be just close enough to allow a slight vibration of the hair spring between them, this vibration should allow a clear space to be visible, by the aid of the glass, between the hair spring and the pins, and the vibration must be equal between the two pins. The regulator should stand as near the center of the index as practicable. The balance wheel must be true and perfectly poised. This should have constant attention, as the severe usage of railroad service may jar the balance out of poise or spring the pivots slightly, especially the heavy balances. The main spring should be taken out every time the watch is cleaned and tested to see if it fits the barrel properly, and if its movement is perfectly free and its strength fully developed to the end that the motion of the balance will not fall off during the first half of the day. The main spring must be free from gummy oil or rust spots, and slightly fresh oiled, but if found lacking in any of the above points, must be replaced by one of the best quality, as the finest watch will not keep correct time, if it has a cheap, poor mainspring.

The dial wheels should be free. Care should be taken that they do not come in contact with the dial. The second hand may be set too close to the dial without being noticed. There must be no friction between the minute and the hour hand, and the hour hand must not come in contact with the dial at the hub. The stem wind must be free and easily worked—not binding or grinding at any point. Lever-set watches are considered safer and are recommended for railroad service. The condition of the case should be an item for inspection—one with loose joints, gaping open, will admit dust and dirt and would not be a safe covering for a reliable movement. Every watch must be carefully tested for magnetism, and if it is charged to more than its normal degree, must be demagnetized.



Trainmen will leave this Card with Inspector.

Terre Haute, Indianapolis & Eastern Traction Co.

This certifies that on *191*

I examined the watch of ....

employed as ....

on .... *Division, and found it to be of a standard of excellence, and in such repair as will, in my judgment, enable it to run (with proper usage) within a variation not to exceed 30 seconds per week.*

.... *191*...

No. 231 .... WATCHMAKER

NUMBERED INSPECTION CARD RETURNED BY WATCH INSPECTOR TO SUPERINTENDENT

When employees leave their watches with inspectors for cleaning, "standard loaner" watches must be furnished free of charge by the inspector for temporary use. "Standard loaner" watches must have the same careful attention as the watches of employees, and must be fully up to the standard for new watches, as their correct rating fills a most important requirement of the time service.

The watch certificate, marked O. K., must be turned in at the company's office while the owner's watch is being repaired. Two inspections will be made yearly, during April and October.

Watch inspection certificates are to be given out at the general superintendent's office. These certificates are numbered so that they can all be accounted for, and should the inspector reject a watch, the first slip must be turned in and another one issued so that an O. K. can be given on the "loaner" watch. Then when the owner's watch has been repaired, he must apply to the office for another certificate so that an O. K. on the rejected watch can be given.

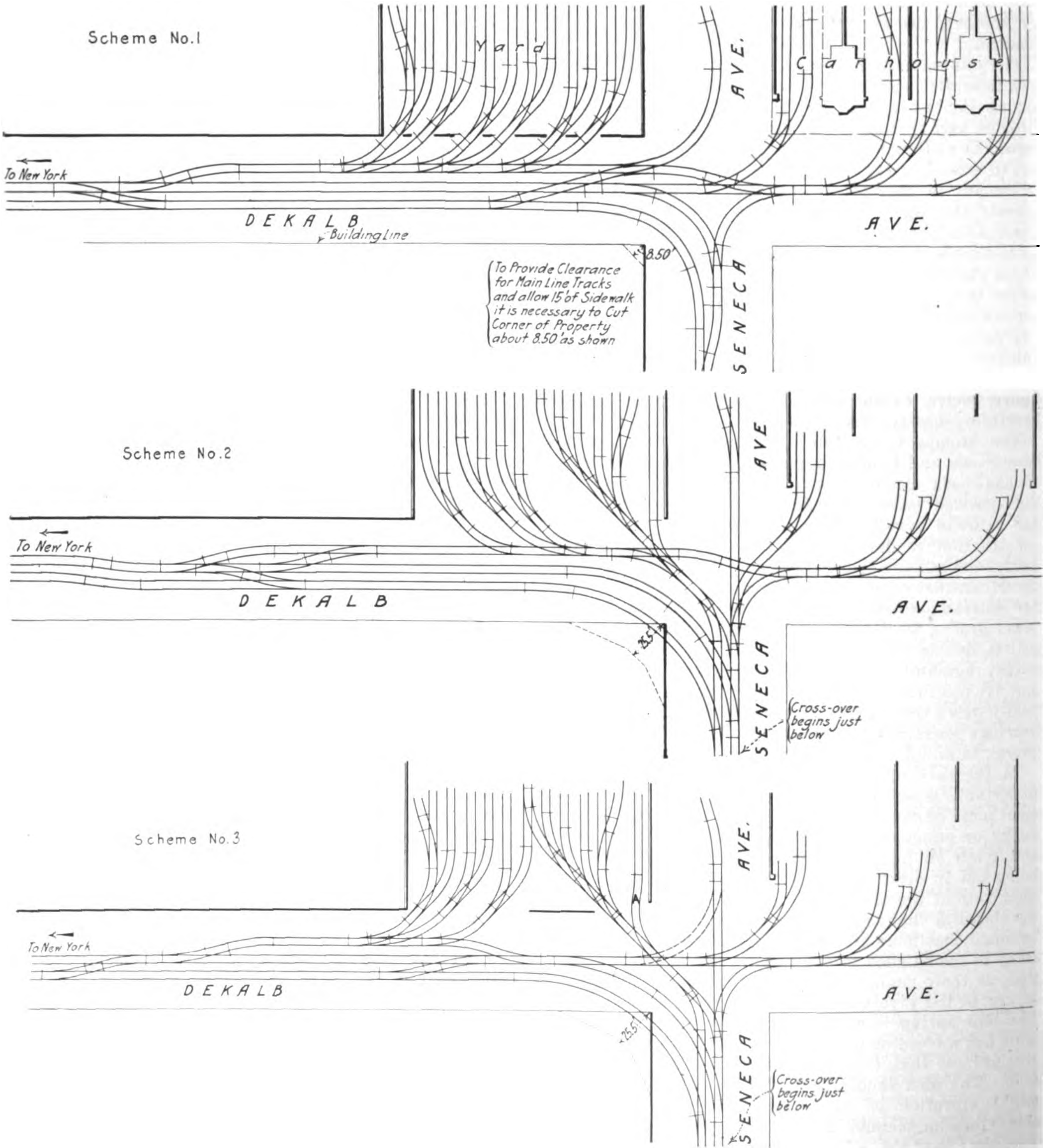
Yard Entrance Track Layout Possibilities

BY S. STRIEZHEFF, WAY AND STRUCTURE DEPARTMENT
BROOKLYN RAPID TRANSIT SYSTEM

The accompanying illustrations show the possibilities of variations in yard entrance layouts; not only theoretical variations as to angles and radii which may satisfy the whims and fancies of the cloistered draftsmen, but practical variations to conform with different requirements of construction and maintenance, and with the needs of transportation.

Confronted with the problem of laying out the special work for the entrance into a proposed car storage yard on the Brooklyn Rapid Transit system, the writer originally designed scheme No. 1. The purpose of this was to allow cars ending their runs at this point in the system to enter the yard and the adjoining carhouse directly, with as little shifting and changing of trolley poles as possible, and to permit those cars going down Seneca Avenue to the end of the line to come back and enter the last three bays of the carhouse directly. If these cars had entered the yard there would have been involved a considerable holding up of traffic and changing of trolley poles.

At the suggestion of the transportation department the second scheme was prepared, with a view to having all branchoffs right-hand instead of left-hand. This involved the turning round of the yard-entering special


Scheme No.1
Yard
Carhouse
AVE.
To New York
DEKALB
Building Line
AVE.
8.50'
To Provide Clearance for Main Line Tracks and allow 15' of Sidewalk it is necessary to Cut Corner of Property about 8.50 as shown
SENECA
Scheme No.2
AVE
To New York
DEKALB
AVE.
25.5'
SENECA
Cross-over begins just below
Scheme No.3
AVE.
To New York
DEKALB
AVE.
25.5'
SENECA
Cross-over begins just below

YARD ENTRANCE TRACK LAYOUT POSSIBILITIES—THREE SCHEMES FOR THE SOLUTION OF A COMPLICATED TRACK LAYOUT IN BROOKLYN, N. Y., IN ORDER OF DEVELOPMENT—THE THIRD SCHEME IS THE PREFERRED ONE FOR THE CONDITIONS SHOWN work. However, as all yard tracks were to discharge into Seneca Avenue, or into DeKalb Avenue ahead of the curves leading into Seneca Avenue, it was found physically impossible to follow this suggestion for mere lack of room unless the right-hand half of the yard were to discharge onto a skew ladder, as shown. Furthermore, it would be necessary for such a ladder to connect with the main line directly on the curves leading into Seneca Avenue. This would require the placing of a switch on a rather sharp curve, a practice held to be very undesirable. After a conference of interested persons, this undesirable feature was eliminated by the suggestion of a skew ladder converging into a single track and then branching into tracks tangent to the main line east-bound and west-bound tracks on Seneca Avenue, the latter tracks turning into DeKalb Avenue on long radius curves with allowance for car clearance. It was possible to previde such curves by taking a corner off the property shown in the illustrations, which is owned by the company.

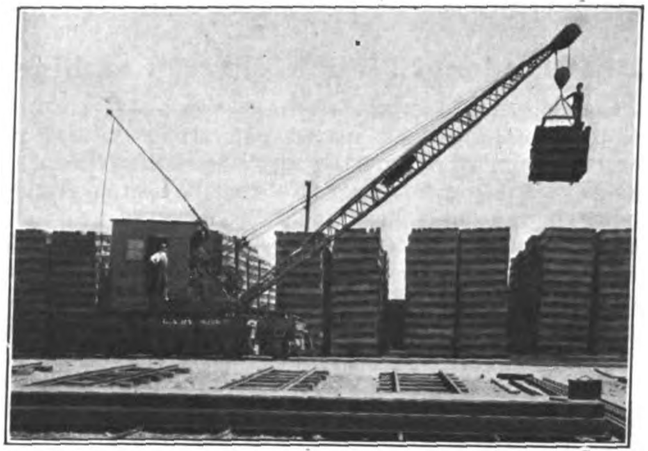
The next step in the development was the idea that it would be more convenient to have the left side of the yard provided with special work as shown in Scheme 1. The arrangement shown in Scheme 3 was therefore evolved and this is possibly the best arrangement under the circumstances. With this layout it is possible to have cars come into the yard and carhouse, and leave, in two directions, so as to accommodate short-line service and full-trip service. This is accomplished so effectually that there is practically no unnecessary shifting of cars and no running against traffic, with the exception that cars coming out of the carhouse down Seneca Avenue would have to run against traffic for some 80 ft. This layout also cuts down the fire hazard by half because, with tracks discharging in two directions, it is possible, in case of fire, to empty the yard in one-half the time required with a different track layout. Then again, the life of the yard-entering special work is practically doubled because only one-half of this special work is used by cars coming into, or out of either half of the yard. The position of track A represents another feature of convenience as it allows a more gradual down grade for this track which leads to a proposed lower-level transfer table and shop-track layout.

[NOTE—It would be interesting to have the ideas of other track-layout experts on this problem.—EDS.]

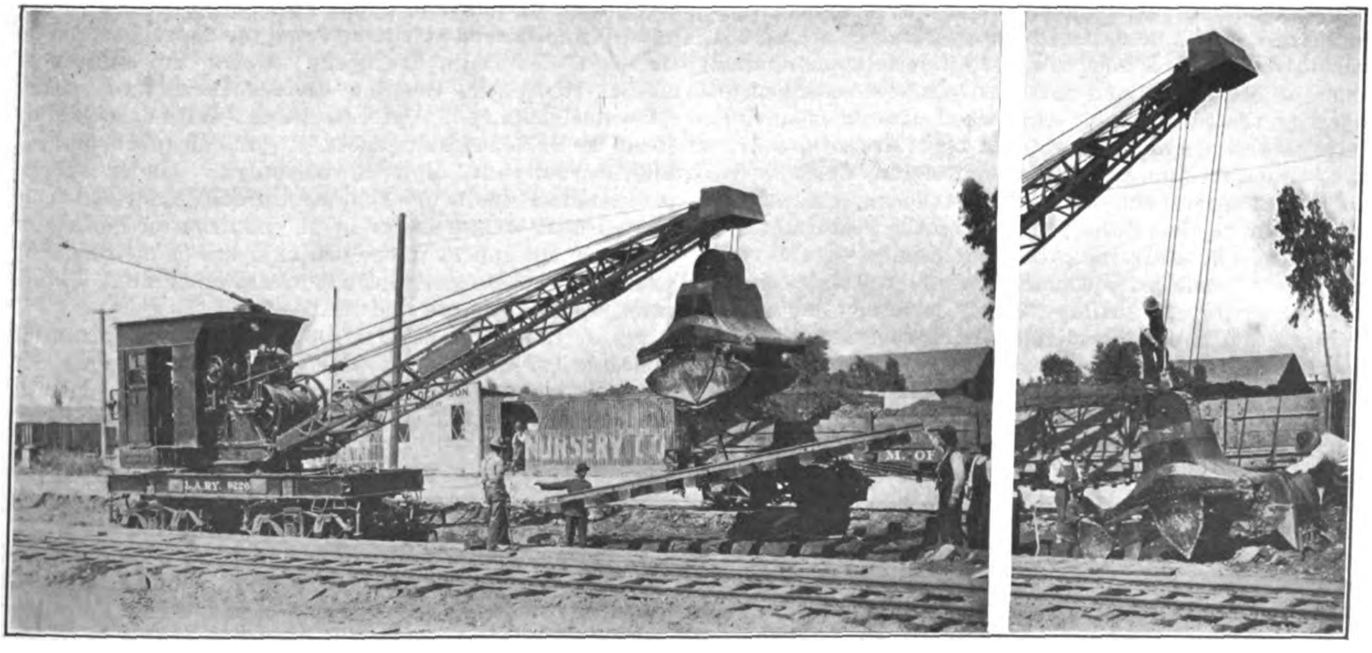
Uses of the Locomotive Crane in Electric Railway Work

BY G. J. KUHRTS, CHIEF ENGINEER LOS ANGELES RAILWAY

During the year 1914 the Los Angeles Railway purchased a 15-ton electrically-operated "Brown Hoist" locomotive crane. This crane has a 75-hp. motor to operate the hoisting and turning mechanism, and four 50-hp. Westinghouse motors for the operation of the car. It is also equipped with a single K-35-G-2 controller, a Westinghouse D-3-E-G compressor with straight and automatic air brakes, and weighs when ballasted about 60 tons. For convenience in operation in loading and unloading material we secured two lengths of boom, one 50 ft. and the other 30 ft. long, the shorter boom being sufficiently short to permit operation beneath our overhead construction.


PILING TIES WITH LOCOMOTIVE CRANE

We have recently been engaged in the reconstruction and paving of tracks in the southwest part of the city and have been able to effect a considerable saving by excavating the trench with the crane, using a 2-yd. grab bucket and loading directly onto cars on a side track. In cuttings from 14 in. to 5 ft. deep in sandy soil we have been able to save between 50 per cent and 75 per cent of the cost of ordinary shoveling, depending upon the depth of cut. The accompanying illustrations show the machine in the operations of loading and



LAYING TEMPORARY TRACK SECTIONS FOR DITCHING, AND DITCHING WITH THE GRAB BUCKET dumping. They also show the method of placing the track sections in position. These sections are four or five in number and about 18 ft. long. Under favorable conditions we have been able to handle as much as 60 cu. yd. per hour. The machine requires three men to properly operate it, but it is customary to place shovelers directly behind the shovel to trim up the bottom and sides of the trench so as to leave a completed job.

The greatest saving, however, in the use of machines of this class is in the material yards where materials of all kinds are handled and much valuable space is conserved. As an example, it may be stated that we unload from gondola cars 60-ft. girder rails weighing 2320 lb. each, turning and piling them to any desired height, with three men, a saving over ordinary hand methods of twenty-seven men, and we do it in less time.

Car Record and Trouble Board Combined

Simplicity and facility have been attained in the new combined rolling-stock record and trouble board recently put in service by the mechanical department of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill. As shown in the chart headings reproduced herewith, all cars are divided into three general classes, namely, freight, passenger and foreign cars, and the passenger equipment is classified into four-motor and two-motor cars. Under these general headings are listed in the vertical columns, the car numbers of each class and the various parts of the car equipment which may be undergoing repairs, defective or renewed. In the horizontal line under these various headings and on the same lines with the car numbers, hooks are provided on which the various car record tags are hung. It is contemplated that the board will hold one year's trouble record of all parts of the equipment. At the end of each month the total number of defects of each class are recorded on tags which are hung at the bottom of the board.

FREIGHT CARS										PASSENGER CARS																						FOREIGN	
										4 MOTOR CARS											2 MOTOR CARS											FREIGHT CARS	
CAR BODY	DRAW BARS	LUBRICATION	AIR BRAKES	TRUCKS	TAKEN OUT OF SERVICE B.O.	OVERHAULING	O.K.	CAR	NO'S	BODY	LUBRICATION BEARINGS	TROLLEYS HEATERS MOTORS	CONTROL EQUIPMENT WIRING	AIR BRAKES PUMPS	TRUCKS 3rd RAIL DEVICES	OVERHAULING	CHANGE OFF	O.K.	CAR	NO'S.	BODY	LUBRICATION BEARINGS	TROLLEYS HEATERS MOTORS	CONTROL EQUIPMENT WIRING	AIR BRAKES PUMPS	TRUCKS 3rd RAIL DEVICES	OVERHAULING	CHANGE OFF	O.K.	CAR	NO'S	O.K.	B.O.

TROUBLE AND EQUIPMENT RECORD COMBINED

Tags of several colors are used in the vertical columns to show at a glance the progress of the repairs at any time. A yellow tag indicates that repairs of any class are to be made on equipment, shows the date and is marked with the initials "B.O.," meaning bad order. When a job is completed the card is reversed, the date is recorded and the initials "O.K." are stamped on it in large type. A red tag indicates that a car has been reported in bad order and has been taken out of service, but that the character of the defect is unknown. A red tag with the word "Hold" indicates that the car is being held in the shop for special repairs which have not been classified. A green tag on this hook, dated and containing the initials "O.K.," indicates that the special repairs have been made. A white tag indicates that special work is being done on equipment which is not classified. Two tags which the mechanical department tries to keep off of the board are the blue one representing a defect which has been repaired but is reported back for the same trouble, and the black one, which indicates that a car has been taken out of service because the equipment is defective.

From the foregoing it will be seen that this board indicates at a glance the number of cars in bad order and the renewals and repairs to the different parts of the equipment. It also checks up poor work done by the men on the different parts of the equipment, since this is evident at once from the number of blue and black tags on the board. The board is also a check on repacking journals. Motor-axle bearings are repacked every 15,000 miles and armature bearings are repacked every 25,000 miles. All tests are also recorded on the board under the different classes of equipment shown. On the tag for special work all cars painted, overhauled or reinforced are recorded. This board was devised by J. W. Bowman, master mechanic, and J. P. Ganyon, general foreman of the repair shops.

Report on Special Steels by W. C. Cushing

The use of special steel for track generally and in particular for track appliances such as switch points and crossings is discussed at length by W. C. Cushing, chief engineer maintenance of way, Pennsylvania Lines, in the report to the International Railway Congress which was to have held its ninth session in Berlin, 1915. The report is published by the American Railway Engineering Association. It is a compilation of results obtained from practices and tests made on American railways, and, in addition, describes some practices rather minutely in order to clear up some misapprehensions on the part of foreign engineers. Under the subject of special steels Mr. Cushing divides them into special alloy steels and special process steels. With special alloy steels he includes manganese, nickel, nickel-chromium, high carbon and high silicon steels. Under special process steels he includes all steel products derived from special heat treatment, or by the addition of metalloids which do not appear in the test analyses of the resulting product. Such steels include titanium-treated, aluminum, electric process and heat-treated steels.

As a result of a careful analysis of the information collected for this report, which contains 193 pages, Mr. Cushing has drawn the following conclusions regarding the merits of special steels in rails and various other track appliances:

1. Cast manganese steel has been proved by long experience, under exacting conditions, to be a satisfactory and safe metal for frogs and switchpoints.

2. The trials of rolled manganese steel for rails and for the manufacture of frogs and switches have not been so extensive as with the cast product, but have been continued to a sufficient degree to enable us to conclude that it will ultimately be entirely suitable for

those uses at locations where great strength, toughness and a maximum abrasive resistance are desirable.

3. The experiments with nickel and with nickel and chromium in certain proportions in rail steel have not, up to the present time, been entirely satisfactory; but the accepted employment of nickel steel in bridge construction, and the trials of nickel and chromium in other proportions in rail steel, especially when incorporated as two of the natural elements of the iron ore, justify continued use.

4. The use of high carbon (over 0.80 per cent) in rails weighing 85 lb. per yard, in combination with 0.92 to 1 per cent of nickel, and 0.24 to 0.29 per cent of chromium, has not been satisfactory. The conditions with rail sections of greater weight might be entirely different.

5. Further study of the qualities possessed by high silicon rails, that is, steel with over 0.30 per cent of silicon, is advisable.

6. The value of the use of ferro-titanium in rail steel manufacture as a "physic" for improving the condition of solidity of the metal is conceded, but at the same time steps should be taken to overcome its injurious effect in deepening the "pipe" in the ingot.

7. Heat-treated rails and those manufactured with the assistance of the electric process are at present in experimental use only, but the possibility of future value is promising, and the study should be continued.

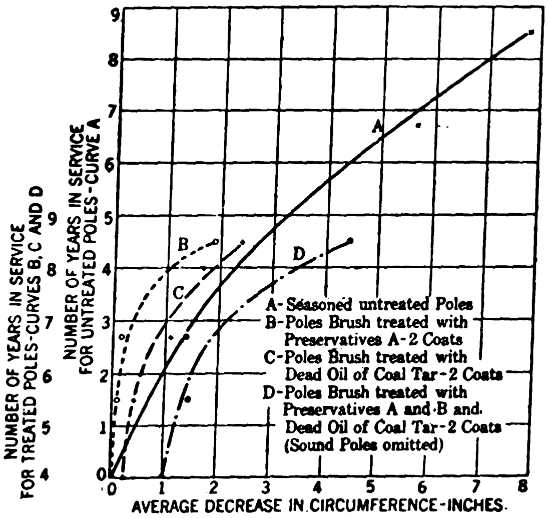
Effect of Preservatives on Wood Poles

At the St. Louis meeting of the American Institute or Electrical Engineers, held on Oct. 19, F. L. Rhodes and R. F. Hosford presented an exhaustive report on the effects of preservative treatment on wood poles. The report covered large numbers of poles treated by several methods and the observation extended over a considerable term of years, some treatments dating back to 1897. The report included pole-length treatment, and treatment by the brush and the open-tank processes.

While it was stated that, because of the present incomplete state of our experience with the different types of treatment described, conclusions can be reached for only a part of the problems whose solution was sought, several important conclusions were reached. One of these is that the seasoning of poles affords at best only moderate advantages in the way of increased life, its greatest value being as a preparation for the successful application of preservatives. Another is that the practice of applying to poles a preservative high in antiseptic power and insoluble in water has been shown to yield increased life, the amount of preservative applied and the depth to which it is made to penetrate appearing to exercise controlling influences upon the results obtained. Again, mechanical failure of the treated layer is indicated as the principal limit to the effectiveness of the application of a preservative.

Among the deductions from the observations of poles treated for their whole length the following are significant: The principal cause of deterioration in the top section appeared to be the cutting off of the top, hence all timber should be completely framed before treatment. The bleached and other lighter colored poles yielded a percentage of decayed specimen considerably above the average for all poles inspected. As the lighter colored poles are presumably those which retain the lesser amounts of preservative it follows that the life will increase with the amount of preservative applied. Poles which were located at high altitudes showed more than the normal amount of decay, while the lowest proportion of decayed poles were located in muck. On one line 50 per cent of the poles showing no tar were decayed, as against 39 per cent decayed among poles showing streaks of tar near the ground line, and 18 per cent decayed for poles streaked with tar throughout their length. The data from this line show that the conditions to which the top of the pole is exposed favor the more rapid removal of the volatile constituents of the preservative than occurs in the butt section. The poles suffered losses in the proportion of the low boiling constituents in the preservative, the data indicating that no appreciable loss by evaporation occurs in the case of constituents of the oil distilling above 270 deg. C.

The study showed that success with the brush treatment could only be expected when it was applied to seasoned poles, it being desirable that the part of the surface to be protected by the preservative should be dry and thoroughly cleaned. The preservative, preferably heated to 150 to 200 deg. Fahr., was applied to the cleaned surface by means of a brush, preferably one with a long handle, and the application was most conveniently carried out when the pole was placed so that it could be rotated while the preservative was applied to the upper segment of its surface. The best results were obtained by applying a second coat of preservative after the first had had time to work its way into the wood. There was no clear evidence of any advantage derived from applying a third coat. For the usual case of heavy decay concentrated at the ground-line section, a treatment extending from 1 ft. above the ground line to 2 ft. below it should be sufficient.



RATE OF DECAY OF CHESTNUT POLES COLLECTED AT MOUNT PISGAH, N. C., AND INSTALLED IN GEORGIA

The open-tank treatment caused a substantially greater penetration of the preservative into the wood than did the brush treatment. The penetration was from ¼ in. to ½ in. as compared with from 1/16 in. to ¼ in. for the brush treatment.

Treatment with coal tar was found to be ineffective in preventing decay, as the tar formed a superficial coating, tar-coated poles deteriorating practically to the same extent as untreated poles.

There was no indication that decay will proceed more rapidly on treated poles, once it starts, than it does on untreated poles. The indications were, therefore, that any gain due to the retardation of the beginning of decay through treatment will be retained. The tests indicated a greater addition to the life of poles through treatment for a Northern location as compared with a Southern one.

Regarding the effect of treatment upon insect activity it appeared that, as the insects follow decay, the retardation of decay is accompanied by retardation of insect activity.

Alternating Current Signaling

A really comprehensive treatise covering the installation and operation of equipment for a.c. signals has just been published by the Union Switch & Signal Company of Swissvale, Pa., under the title of "Alternating Current Signaling." The book is no perfunctory description of a manufacturer's line of merchandise, but constitutes, rather, a notable addition to existing literature on a very important subject that is hardly understood by anyone aside from the experts who devote their entire time to this one phase of signal operation. In fact, the new book, which is made up in convenient pocket size and bound with leather, will unquestionably serve both as a reference work for signal engineers and as a text-book for those who feel the necessity for learning about the details of this relatively new and rapidly-growing feature of the railway industry.

In the historical sketch, which precedes the technical material, the authors have pointed out that it is due to the requirements of electric railways that alternating current signals first came into being some twelve years ago, and although their use was confined to electric railways for several subsequent years, they have now been installed upon thousands of miles of steam railroad, bidding fair eventually to displace the older d.c. signals altogether. Their general introduction, which has been due not only to their improved economy but also to a vastly increased reliability, has as a matter of fact, eliminated so many of the weaknesses to which d.c. signaling is subject that the art is actually in process of revolution and the electric railways are in an excellent position to play a leading rôle in the changes in practice that are bound to come with more reliable apparatus. Indeed, the possibility of false clear signal indications has largely dominated the viewpoint of the steam railroads because of experience with d.c. signaling in the past. That their outlook is changing is now manifest, and the fact that electric railways have been instrumental in bringing this about, through the demand for alternating current signaling, lends special interest to that subject and makes the new book especially timely.

To make the work comprehensible to readers who are unfamiliar with the fundamentals of either alternating current or alternating-current track circuits, two of the first chapters have been devoted to an elementary exposition of their subjects. They are followed by a remarkably clear and thorough description of the various types of relays that are commonly used, including explanations of the features that are peculiar to each and their special uses, together with a very interesting set of curves showing voltages, currents and power factors to be expected with various lengths of block. A separate chapter is devoted also to track currents on electric railways owing to the complications involved by the propulsion current in the rails.

A chapter on signals, which covers the mechanical and electrical details of semaphore operation, submits an interesting comparison of series and induction motors and discusses existing practice in signal lighting. This includes a very complete section that is devoted to light signals of both the colored-light and beam-light types, these being accorded a visibility range of from 2500 ft. to 4000 ft. and being considered by the authors perfectly satisfactory for high-speed service.

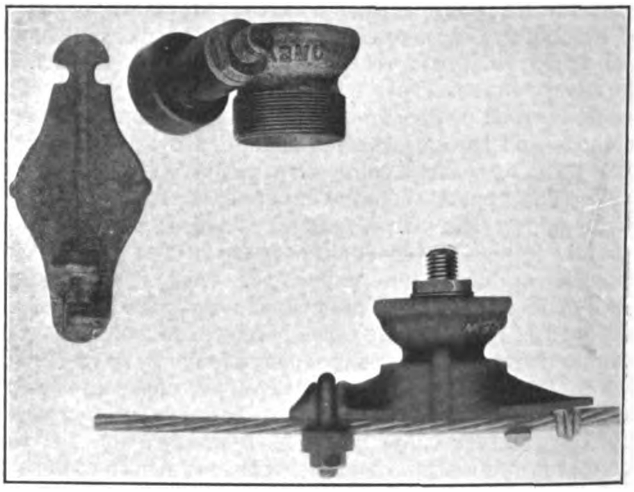
The subject of transmission systems and power house equipment is covered by a highly technical chapter in which are discussed such matters as voltage and line-wire size, frequency, practical calculations of resistance, reactance and impedance drops and the like, this being of distinct value to the signal engineer, as the problem of transmitting the small amounts of power involved in signal operation can find no parallel in the ordinary conditions that are considered in text-books on electrical distribution. This section is liberally interspaced with tables of general data and is throughout a thoroughly practical discussion for the benefit of those who have actually to install and operate the equipment.

Owing to its wide introduction for interurban signaling, the T. D. B. system is discussed in a separate chapter, and in this is published for the first time a circuit scheme for the arrangement. Other chapters cover a.c. interlocking and accessories, and the book concludes with an analysis of track-current calculations and a series of tables and data covering information that is useful to the signal engineer and maintainer.

A Straight-Line Hanger That Stays On

The Drew Electric & Manufacturing Company, Indianapolis, Ind., announces a new galvanized straight-line hanger type, No. 1039, known as the "Sta-on." As this name implies the hanger cannot be shaken off the span. This feature is obtained by fitting the top of the hanger with one pair of sister hooks at one end and a U-bolt at the other end. It is a simple matter to slip the hanger on the wire by means of the sister hooks and then to fasten it by screwing upward the two bolts of the U. It is clear also that these bolts also permit easy removal of the hanger. The top of the hanger is grooved slightly to bed the span wire.

The features of this hanger may be summarized as follows: It cannot accidently come off the wire, either on bracket or span construction; in span construction, no matter how slack the wire, it will stay in an upright position; where span wire is slack in special work, the hanger will not drift out of line or turn sideways; it does not injure or strain the span or eyebolts; it can be installed loose on new work, thus allowing the wire to be lined up.



STRAIGHT-LINE HANGER AND DETAILS

This hanger eliminates all trouble in lining up trolley, as it does not have to be forced on or off the span a number of times to get the trolley in line. This advantage is very useful on curves. In general, adjustments can be made merely by loosening the bolts a little and veering the hanger around as much as may be necessary.

R. L. Weber, author of the article on "Kansas City's New Cars" appearing on page 771 of the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 9, calls attention to the fact that the name of Robert P. Woods, member of the Kansas City board of control representing the city, was incorrectly given therein.

News of Electric Railways

TRANSIT ISSUES IN THE COMING ELECTIONS

Voters in Detroit, Toledo, New York State, Des Moines, Philadelphia and Cleveland All Have Important Matters Before Them

The elections to be held in November will be unusually significant to the electric railway industry. In Detroit on Nov. 2 there will be submitted to the voters for their approval the purchase by the city of the lines of the Detroit United Railway within the city under terms agreed upon by the Detroit Street Railway Commission and the officers of the company. On the same day in Toledo the new street railway franchise to the Toledo Railways & Light Company will go before the electorate. In New York State on Nov. 2 the voters will have before them the question of acceptance of the new State constitution, with its significant provision making the Public Service Commissions constitutional bodies. Later in the month the new franchise for the Des Moines City Railway will go before the voters. The election in that city will be a special one and will be held on Nov. 20. In Philadelphia the successful carrying out of the transit program prepared by the Blankenburg administration hinges apparently on the election to the Councils of that city on Nov. 2 of candidates pledged to the support of the plan. In Cleveland subway and rapid transit franchises to the Cleveland & Youngstown Railroad and the Cleveland, Akron & Canton Terminal Railroad will come up for approval on Nov. 2.

Ten days before the Detroit purchase plan election finds a very definite alignment of interests on the question. Mayor Marx, the Street Railway Commission, and all the forces of the administration are backing the proposed purchase arrangement. Against the plan are the Federation of Labor, the Municipal Ownership League and the local union of the street railway employees. As previously stated, the labor people have taken the position that the proposed plan would be injurious to organized labor. The Municipal Ownership League is opposing the purchase on the ground that the unknown price will be so high as to prevent successful municipal operation. As for the Detroit United Railway it has lived up to its announced intention of not participating in any discussion concerning the municipal ownership proposal. In its last public utterance, made in August, the company did, however, protest against pending propaganda picturing the company as sort of a "foreign devil."

The Wayne County circuit judges have refused to enjoin the submission of the Detroit purchase proposition at the election on Nov. 2. At the same time the court refused to pass on any of the legal questions raised in the petition for an injunction to prevent the election, specifically reserving jurisdiction over all questions except as to the vote. The court ruled that the right of the people to vote on a matter like this is partly legislative and partly ministerial and, except in cases of imperative necessity, should not meet interference at the hands of the judges. The bill of complaint, upon which the injunction was asked, is likely to be revived in the Circuit Court if the purchase plan is adopted by the electors, inasmuch as it raises a number of questions as to the constitutionality of the contract entered into between the city and the railway whereby, if carried, the price of the property is to be fixed by the Circuit Court.

The work of Henry L. Doherty, chairman of the board of directors of the Toledo Railways & Light Company, in the interest of an extension of the franchise of that company seems likely to bear fruit. The special franchise committee of the Council in that city, after preparing a tentative draft of an extension ordinance for presentation to the Council, insisted at first on putting the matter before that body without any recommendation. Mr. Doherty contended that the work done in preparing the draft would amount to nothing unless the Council accepted or rejected the proposal. The committee still demurred. At this point the Toledo Franchise Association took the matter up and began the circulation of petitions for the initiation of the franchise. On Sept. 13 the Council by a vote of twelve to six decided to receive the report of the committee. Before Oct. 2 petitions containing 22,135 signatures urging the submission of the franchise to a referendum vote at the November election had been filed with the city auditor. These signatures equalled the entire vote at the recent primary election, and most of those who signed were said to have expressed themselves in favor of the franchise.

If the revised constitution is ratified by the voters of the State of New York, the short ballot will be inaugurated in New York State at the beginning of 1917. The new constitution retains the Governor, Lieutenant-Governor, Comptroller and Attorney-General as elective officers, but the successors of the Secretary of State, the State Engineer and the State Treasurer are to be appointed by the Governor. The department of the State engineer in fact will be supplanted by a department of public works, with the head to have supervision of the construction, care, maintenance and operation of all the public works of the State, including canals, highways and public buildings, and this department will plan all the engineering, architectural and construction work required by the State department. If the voters approve the revised constitution the State budget will in the future be submitted to the Legislature by the Governor instead of being initiated in the Legislature and subject only to a limited veto power by the chief executive. The Governor's appointments are freed from the requirement of confirmation by the Senate, except in the case of members of the Industrial, Public Service, Conservation and Civil Service Commissions, which are regarded as quasi-judicial bodies. The Public Service Commissions are made constitutional bodies. So are the Tax Commission, the Industrial Commission and the Civil Service Commission.

In Des Moines litigation involving the validity of the franchise of the Des Moines City Railway was begun by the city in 1900. This long fight now seems likely to end with a franchise practically the same as the one under which the company then was operating. The new grant was drawn up by a committee representing the Des Moines Chamber of Commerce. It has bene adopted unanimously by the City Council. Sentiment in the city appears to be overwhelmingly in favor of a final settlement of the franchise question on the basis now offered. The new franchise will provide six fares for a quarter, half-fare for school children, a guarantee of service as good as the best in any city of the nation the same size as Des Moines, and a valuation of $5,000,000 as of the present time if the city decides to buy the property within twenty-five years, which is the term of the franchise. No valuation is fixed for the purpose of determining profits. The company guarantees the service and takes its chances on the profits.

In Philadelphia the success of the rapid transit plan advanced by Director of City Transit Taylor seems to hinge on the election to the Councils of representatives pledged to the transit program. The Philadelphia *Ledger* says that George D. Porter, until recently Director of Public Safety of the city under Mayor Blankenburg and now candidate of the Franklin party to succeed the Mayor, "wants the agreement made between the Department of City Transit and the Philadelphia Rapid Transit Company put into effect." This agreement provides in short for the immediate construction of the Broad Street subway, the Frankford elevated, the Woodland Avenue elevated and other lines at a cost of $55,000,000, a universal 5 cent fare and abolition of the present exchange tickets. The *Ledger* said on Oct. 16: "There is nothing that stands between the people and the achievement of their desires except a group of selfish politicians. The Philadelphia Rapid Transit Company is on record as favoring the transit plan. There is none to object except a few 'leaders,' who do not wish this situation to pass without their getting something out of it. It is a simple thing for the people of Philadelphia to take matters into their own hands and decide this great issue now and for all time. All that they have to do is vote for candidates who favor rapid transit and against candidates who do not favor it."

The Cleveland & Youngstown Railroad ordinance, which will be submitted to the voters of Cleveland at the election on Nov. 2, is intended to permit the establishment of a high level freight terminal in connection with the rapid transit line. The franchise of the Cleveland, Akron & Canton Terminal Railroad, to be voted upon at the same time, gives the company the right to build a subway under East Fifty-fifth Street, Cleveland, from the lake front to Morgan Run on the south side of the city. This will open to a number of railroads entering the city from the south a strip of lake front of about 3800 ft. The companies now have no means of reaching the lake and all their freight must be transferred. It is the purpose of O. C. Barber, who is at the head of this movement, to erect an immense grain elevator and large coal docks and loading machines on the lake front, in order that the roads using the subway may have direct connection with the lake shipping facilities. The subway is to be operated by electricity, but will be used by steam railroads.

STRIKE AT WILKES-BARRE AGAIN

Traffic in the Wyoming Valley of Pennsylvania is tied up for the second time within six months by a strike of the employees of the Wilkes-Barre Railway. The trouble dates from last April, when arbitrators chosen by the company and by the employees awarded a sliding scale rate of wages after a comprehensive series of hearings in which both sides were heard. The employees filed objections to the award recently, alleging that when arbitration was agreed to by them it was on the condition that a flat wage rate be fixed. A majority of the board of arbitrators was called together, Samuel D. Warriner, representative of the company, refusing to attend. Thomas D. Shea, representing the men, and Dr. John Price Jackson, the umpire, repudiated the sliding scale award as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 16, page 839. Since the first award of the arbitrators was reversed by themselves, the carmen demanded 27 cents an hour. T. A. Wright, general manager, refused to pay the rate, and as a result the strike was declared.

The company has taken advantage of the opportunity to make needed repairs to its lines, work and service cars being the only ones operated. These were not molested by the striking motormen and conductors. A statement given out by Mr. Wright made it evident that no change in the situation would take place until after a meeting of the board of directors. Mr. Wright holds that the men have broken faith by not accepting the original award of the arbitrators, and in his statement says that the question is now one of principle and resolves itself into which one is right, the company or the men.

An effort to mediate in the strike is being made by the State authorities. Patrick Gilady, mediator of the State Department of Labor and Industry, and James A. Steese, chief clerk to Commissioner John Price Jackson of the same department, arrived in Wilkes-Barre and held informal talks with several of the officers of the trolleymen's union, and hoped to be able to arrange a conference with the officials of the company.

Holding that the original award of the arbitrators in the wage dispute between the Wilkes-Barre Railway and its employees is binding and without appeal, the directors of that company, in a statement covering a page of the local newspapers, set forth the position plainly that it will not agree to any suggestion made by two of the arbitrators who have repudiated their award. The only ray of hope to be found in the statement which might pave the way for an early settlement of the trouble is in the expressed willingness of the company to submit to the courts of Luzerne County the question of whether or not the two arbitrators had any right to repudiate the award.

A reasonable time will be allowed by the company for the men who are out on strike to return to their positions on the wage basis fixed in the original award of the arbitrators. The company desires to reopen its lines with all the men back in their places, but if at the end of a reasonable time, not definitely fixed by the company as yet, there are not enough employees back for duty, steps will be taken to fill vacancies with new and competent men. Union leaders refuse to comment upon the company's statement.

GOVERNMENT'S CASE AGAINST NEW HAVEN OUTLINED

R. L. Batts, one of the special counsel appointed by the government to prosecute past and present directors of the New York, New Haven & Hartford Railroad on a charge of conspiring to monopolize the transportation facilities of New England, spent the entire session on Oct. 18 in the Federal District Court at New York in explaining to the jury the intricacies of New Haven finance. Mr. Batts told the jury that the government did not hold all combinations illegal and laid it down as a principle that the test of the legality of a combination was whether it was such as would be developed naturally in the normal way of business. Moreover, Mr. Batts told the jury they need consider not only what was done but what was intended to be done and that they should convict if they found an intent to monopolize.

In speaking of the acquisition of the electric railways of New England, which began in 1905, Mr. Batts said it involved the policy of spending however much money might be necessary to acquire a monopoly. He suggested the price paid for a property might be taken as another test by the jury of the legitimacy of the expansion it produced, and he instanced the purchase of the Rhode Island electric railway system from Senator Aldrich and his associates.

BUS FRANCHISE RECOMMENDED IN NEW YORK

The franchise committee of the Board of Estimate of New York City, composed of Mayor Mitchel, Aldermanic President McAneny and President Mathewson of the Bronx, recommended on Oct. 15 that a franchise be granted to the New York Motorbus Company to operate double-deck, side-entrance cars over 31 miles of streets in the Borough of Manhattan from Union Square on the south to Fort George on the north. The committee recommended rejection of the application of the Fifth Avenue Coach Company, which operates the only buses now running in Manhattan, for a franchise for new lines and extensions totaling, according to the committee's figures, 21 miles. It also rejected offers from Grindley & Brunner. Other competitors dropped out several months ago.

Two main north and south routes are laid out in the proposed contract. Starting at Union Square a West Side route would extend to Fort George by way of Seventh Avenue, Broadway, Amsterdam Avenue, Eighty-sixth Street, West End Avenue, Broadway and St. Nicholas Avenue. The East Side route would extend from Union Square to Ninety-sixth Street through Irving Place, Lexington Avenue, Twenty-third Street, Madison Avenue, Thirty-ninth and Fortieth Streets and Park Avenue. From 110th Street there would be a bus line to 168th Street by way of Manhattan Avenue, Morningside Park East, Convent Avenue and Broadway. The fare on these lines would be 10 cents. The 5-cent lines include three crossing Central Park on the transverse roads, others through Thirty-first, Thirty-third, Thirty-ninth, Fortieth, Forty-sixth and Forty-seventh streets, and two lines from Union Square to the Pennsylvania Station, all short cross-town lines. From each of the 5-cent cross-town lines a person could transfer to a 10-cent line by paying another nickel. According to the committee's report, the Fifth Avenue company offered the city a guarantee of from $35,000 to $65,000 a year, or a total of $750,000 for the term of the contract, which is fifteen years, with ten years renewal privilege. The Motorbus company offered from $30,000 to $60,000 a year, or $735,000 for the fifteen years. The Fifth Avenue company insisted, as the Motorbus company did not, that its payments to the city be deducted from any franchise tax that migh be levied in the future. The most important feature of the Motorbus company's offer, according to the franchise committee, is that it agrees to extend its lines or to operate new ones whenever the city shall direct. It is also provided that if there is a deficit on the new lines thus ordered the city shall pay it, but if the deficit amounts to 75 per cent of the company's payment to the city under the franchise, routes will be abandoned as the city directs.

The New York Motorbus Company has deposited with the city a certified check for $60,000 to guarantee performance if it gets the franchise. Its president is Howard Conklin of 1 Wall Street. Other directors are Stanley M. Conklin and Harold B. Weaver, the company's consulting engineer, who is vice-president of the Manhattan & Queens Traction Corporation. The company agrees to have 100 buses running within eight months.

HOLYOKE ARBITRATION BEGUN

Arbitration proceedings in the Holyoke (Mass.) Street Railway's disagreement with local division No. 537 of the Amalgamated Association were opened on Oct. 19 at the Holyoke City Hall. The board of arbitration consists of Attorney James E. Cotter of Boston, appointed by Governor Walsh; Attorney William H. Brooks of Holyoke, representing the company, and former Mayor John J. White of Holyoke, representing the employees. James H. Vahey, Boston, is acting as counsel for the union, assisted by John H. Reardon, Worcester. T. D. O'Brien, Holyoke, appeared as counsel for the company. About 250 men are organized in the local union, and the company operates in Holyoke, Amherst and Sunderland, serving 75,000 people.

The opening session was mainly devoted to a review of the subjects to be arbitrated. The present scale of wages is: first six months, $2.30 a day; second six months, $2.45; second year, $2.60; third year, $2.70; fourth year, $2.85 a day. The questions to be arbitrated are: (1) Shall the present scale be continued to June 1, 1916? (2) Will the company make its schedules in accordance with the so-called nine-in-eleven-hour law of 1913, and shall the company pay for all runs in excess of nine hours and not in excess of 9.25 hours, an extra half-hour's time; and for all runs between 9.25 and 9.5 hours one hour's extra time, at the exact rate of an hour divided by 9, viz.: First six months, 25 5/9 cents an hour; second six months, 27 2/9 cents; second year, 28 8/9 cents; third year, 30 cents; fourth year and thereafter, 31 2/3 cents an hour? (3) Will the company pay for overtime work done by motormen and conductors on other than regular runs at the exact hourly rate quoted above (from section 2 of the agreement)? (4) Will the company establish a nine-hour day for employees of carhouses, shops and miscellaneous departments for week-days, to be completed within ten consecutive hours, and for Sundays and holidays an eight-hour day to be completed within nine consecutive hours, at the present day rate? (5) When any conductor or motorman is ordered to report at any other than the regular reporting or relieving time, shall he be paid for all time between his regular reporting or relieving time and the time he is ordered to report? (6) Where men are compelled to dead-head to and from runs, will they be paid at their regular hourly rate? (7) In the computation of time, except as otherwise provided, shall fractions of hours be considered as full hours, and paid for as such? (8) Shall tower cars be operated at all times by motormen holding rating in the passenger service, and shall such cars be subject to the rules of seniority bidding? (9) Shall all runs of nine hours or less be considered as full days and paid for as such? It is also for the board to decide whether its decision shall continue until June 1, 1916.

FIXING THE BLAME IN CLEVELAND

The Cleveland (Ohio) Railway has been dragged into politics. Peter Witt, street railway commissioner, points to his record in that office and claims credit for maintaining the fare at 3 cents, although the people are now paying for transfers.

Harry L. Davis, another candidate, has expressed opposition to municipal ownership of either the street railway or the light plant and refers to the amount of money already spent on the municipal light plant, which is benefiting only a comparatively few people at the present time.

Charles P. Salen pledges aid to the street railway employees in securing a change in the operating schedules. He says the present schedules, arranged by Mr. Witt and the company, make swing runs the rule.

B. F. Mills, candidate for Mayor of Lakewood, is opposed to the pending franchise renewal there, and Frank G. Carpenter, candidate for Mayor of East Cleveland, is criticising the present administration because it did not force the company to move its tracks in Euclid Avenue while a sewer is being installed.

OHIO SUPREME COURT ON STARK COUNTY FRANCHISE

The Ohio Supreme Court, in a decision rendered on Oct. 19, holds that the franchise of the Northern Ohio Traction & Light Company in Stark County, which the company contended was perpetual because no specific time had been set for its termination, may be terminated by either party at any time. This suit was brought by Stark County in an endeavor to force the company to reduce the fare between Canton and Massillon from 15 to 10 cents. The lower courts held in favor of the company. It is believed that a suit will now be instituted to nullify the company's light franchise in Barberton. The conditions are much the same as those that apply to the railroad franchise in the county. The case may be carried to the United States Supreme Court.

Appeal in Toronto Extension Case.—The City Council of Toronto, Ont., has decided to appeal to the Privy Council against the order of the Ontario Railway Board and the decision of the Appellate Court confirming the order requiring the Toronto Railway to extend its tracks from the Canadian Pacific Railway crossing on Yonge Street to Farnham Avenue.

Marginal Railroad for Providence.—Construction and ownership by the city of a marginal railroad along the new city sea wall at Field's Point, together with tracks across city-owned land to connect with the Southern New England and New Haven lines beyond Allen's Avenue, will be recommended to the City Council of Providence, R. I., by the committee on harbor.

Ordinance Introduced for Extension of San Francisco Municipal Lines.—Supervisor Charles Nelson has introduced before the Board of Supervisors of San Francisco, Cal., an ordinance providing for a bond issue of $5,000,000 for the extension of the lines of the Municipal Railway. The extensions are to be into the North Beach, Sunset and Potrero districts and through Twin Peaks tunnel. The ordinance has been referred to the committee on public utilities.

Completing the St. Paul Southern to Rochester.—Directors of the St. Paul (Minn.) Southern Railway are considering a proposition to lease 25 miles of track of the Great Western or Northwestern Railway from Zumbrota to Rochester. The line is now operating between St. Paul and Hastings, and work is being pushed on the 34-mile stretch between Hastings and Zumbrota. Grading through to Rochester, if the lease is not consummated, is expected to be finished by May 1 and operation begun by Dec. 1, 1916.

Municipal Railway Employees Seek Wage Increase.—Representatives of the platform men employed on the San Francisco (Cal.) Municipal Railway have presented to the Board of Public Works demands for one day off each week and an increase in pay, which would aggregate about $12,800 a year. The men are now receiving $3 a day for an eight-hour day, this amounting to about $78 a month. Under the present system they receive no pay for days they do not work. They are now asking for $90 a month, with one day off each week.

Twelfth Year for Railway Technical School.—The twelfth annual winter session of the British Columbia Electric Technical School, which was established in January, 1904, has opened and throughout the coming winter employees of the British Columbia Electric Railway, Vancouver, B. C., who are interested in technical subjects will meet weekly to hear lectures and to discuss matters connected with the electrical field. J. G. Lister, a graduate of the Imperial College of Technology, London, England, has acted as instructor of the technical school since its organization. In order to encourage faithful work the company has this year decided to issue certificates to the men based on attendance and attention. In addition Goeffrey Porter, assistant chief engineer of the company, has offered prizes for the best kept sets of notes on the lectures.

Cincinnati Sues Cincinnati Traction Company for Franchise Tax on Income of Roads Using Its Tracks.—On Oct. 16 the city of Cincinnati brought suit in Common Pleas Court to recover from the Cincinnati Traction Company and the Cincinnati Street Railway $20,810, claimed to be due as franchise tax, with interest, under its contract with the roads. Two other roads use certain tracks belonging to these companies and pay 3 cents per passenger for their use. The Cincinnati Traction Company and the Cincinnati Street Railway have paid the city taxes on the amounts represented by the portion of the fares they receive, but the city now demands the tax on the amounts the leasing companies received, also. It is said that the suit was brought partially for the purpose of safeguarding the city in the adjustment of the rate of fare in 1916, the year that the adjustment is to take place under the contract between the city and the company.

Chicago Elevated Differences Being Settled in Conference.—The date for beginning the arbitration hearings in the settlement of the differences between the employees and the elevated railroads of Chicago was set for early in October. Since the decision to arbitrate was made in July the employees and the management decided that they could settle their differences without resorting to arbitration. Accordingly at a regular meeting of the elevated employees on Oct. 9, it was voted to take up the differences with the management direct. This was agreeable to the company, and such satisfactory progress has been made in disposing of the various questions in controversy that it is expected an agreement will be reached between the committee of the employees and the management during the week ended Oct. 23. The terms of settlement will then be published in the *Union Leader*, the official organ of the employees. After six days the agreement will be submitted to the men for approval.

Arbitration Declined at Oakland.—The directors of the San Francisco-Oakland Terminal Railways, Oakland, Cal., have declined to submit to arbitration the proposition from the representatives of its employees as to whether the agreement dated Oakland, Oct. 29, 1908, includes employees other than the track oilers and the platform men. G. K. Weeks, president of the company, said in a communication to the men: "What you propose to arbitrate is in no sense a grievance. It is a demand which contemplates an extension of the authority of your union far beyond the limits of the present contract. Your demand is not for an interpretation of the existing agreement, but for a new agreement that shall include under its terms all classes of employees. This matter is of such far-reaching consequence that the officers of the company cannot consent to abdicate their authority in favor of any outside arbitration committee, or anyone else not familiar with the property and the problems connected with its management." On Oct. 10 the report of the grievance committee representing the employees that "the time was not opportune for a strike" was adopted by an overwhelming vote.

Contract Award for Philadelphia Elevated Railroad Sections.—Director A. Merritt Taylor, of the Department of City Transit of Philadelphia, Pa., on the afternoon of Oct. 19 awarded to the McClintic-Marshall Company, Pittsburgh, Pa., the contract for the manufacture and erection of the steel superstructure of three of the four sections of the Frankford elevated line in Philadelphia, extending from Girard Avenue north to Unity Street, Frankford. The company's bid was $1,455,000. The McClintic-Marshall Company also was the lowest bidder for the fourth section, from Girard Avenue south to Callowhill Street, with $249,000, and an alternate bid of $261,400. It is expected that this contract will be awarded in the next few days, after a decision is handed down on the removal of Reading Railway grade crossings on Front Street. This will make the company's total bid for the superstructure of the entire line, $1,176,400. The contract provides for beginning the work on April 1, 1916, and completing it the following Oct. 31. The construction of the concrete track floor and the station buildings is not included in the contract.

PROGRAM OF ASSOCIATION MEETING

Illinois Electric Railway Association

The Illinois Electric Railway Association will meet on Oct. 29 at the La Salle Hotel, Chicago. The presentation of committee reports and a business session make up the program. The question of amalgamating the Illinois Electric Railway Association, Illinois State Electric Association and the Illinois Gas Association is to be considered.

Financial and Corporate

PARIS SUBWAY IN WAR TIME

Report for 1914 Shows Effect of Outbreak of War Upon Number of Employees, Service and Receipts

The report for 1914 of the Metropolitan Railway, which operates the subway system in Paris, France, is of exceptional interest as showing the fluctuations in the number of employees, service and receipts caused by the outbreak of the European war on Aug. 1, 1914. The year 1914 opened well and for the first seven months the results compared favorably with those of the same period of the two previous years, and the prospects were excellent when war broke out.

The subsequent general mobilization naturally depleted the staff and limited the service. By Aug. 5 2817 male employees, or 56 per cent, had been called to service, and by Sept. 1 this number was increased to 3831 or 75 per cent. Many of the services were suspended, the length of line worked being reduced from 77 km. to 41 km. and the number of stations kept open from 169 to 63. By the employment of women, the sons of men mobilized, very old and very young men, etc., however, the stations and some of the lines were gradually reopened, and by Dec. 1 the last station was in service and all lines were running from 7 a. m. to 10 p. m. With allowance made for the partial interruptions to service caused by the mobilization, the average length of line operated for the entire year was 73 km. At the end of December, 1914, the number of employees was only 3658 as compared to 5478 at the end of 1913.

The beginning of hostilities, of course, affected the receipts adversely. On Aug. 1, after the mobilization order appeared, the receipts increased to $38,981, or 57 per cent, over the corresponding day in 1913, but on Aug. 3, with the stoppage of part of the lines, fewer trains and general paralysis of Paris life, the drop began and reached 15 per cent, as compared to this date in 1913. On Aug. 4 it was 43 per cent, on Aug. 5 50 per cent and on Aug. 9 53 per cent, the total receipts falling to $19,592. On Aug. 15 the low points was reached with receipts of only $7,729, a drop of 58 per cent. The gradual return to working, however, influenced the receipts, and after Aug. 20 they sensibly improved. After Aug. 30 they went up to more than $18,111, but dropped afresh to $10,080 until Parisians began to return in large numbers after the victory of the Marne. In September the daily average receipts were $12,610, in October $16,047, in November $20,026, and in December $22,617, as compared to $33,860 in December, 1913.

An analysis of the results by lines and by categories of passengers showed that the class most seriously affected was the working people, who use the outside lines most in normal times. The great decrease was in the return tickets issued before 9 a. m. and used in returning mostly between 6 and 8 p. m. For instance, on Aug. 3 the number of first and second-class tickets issued was higher than for the corresponding day of 1913, but the return tickets fell off more than 50 per cent.

UTILITY DEVELOPMENT IN CALIFORNIA

The California Railroad Commission recently published a report outlining the public utility development work carried on in that State from March, 1912, when the commission assumed jurisdiction over stocks and bonds, up to September, 1915, a period of approximately three and one-half years. During this period stocks, bonds, notes and certificates amounting to $466,000,000 were authorized. Of this amount $175,000,000 was authorized for the payment of maturing debts; $248,000,000 for new construction, additional development of existing utilities and new ventures, and the balance for miscellaneous purposes. The authorization for new improvements was distributed as follows: Steam railroads (including $25,000,000 for expenditures outside of California), $102,800,000; electric railways, $32,500,000; gas and electric companies, $80,000,000; water companies, $18,500,000; telephone and telegraph companies, $2,500,000; warehouses, $1,600,000, and pipe lines, $10,000,000. Approximately $200,000,000 of the foregoing has already been expended or is in the process of expenditure.

ANNUAL REPORT

New York Railways

The comparative statement of income, profit and loss of the New York (N. Y.) Railways for the fiscal years ended June 30, 1914 and 1915, follows:

	1915	*1914	Change
Gross operating revenue	$13,399,767	$13,860,837	—$461,070
Operating expenses	8,551,432	8,775,620	— 224,188
Net operating revenue	$4,848,335	$5,085,217	—$236,882
Taxes	1,042,859	1,092,105	— 49,246
Income from operation	$3,805,476	$3,993,112	—$187,636
Non-operating income	527,242	460,476	+ 66,766
Gross income	$4,332,718	$4,453,588	—$120,870
Income deductions:			
Interest on underlying bonds, rents, etc.	$2,741,015	$2,710,384	+ $30,630
Interest on New York Railways first real estate and refunding mortgage 4 per cent bonds	691,538	651,838	+ 39,700
Total	$3,432,553	$3,362,222	+ $70,330
Balance	$900,165	$1,091,366	—$191,200
Add:			
Surplus at beginning ning of year as adjusted $232			
Addition during the year—net 61,048			
	61,280	21,544	+ 39,735
Net income—surplus available for interest on adjustment mortgage 5 per cent bonds	$961,445	$1,112,910	—$151,465
Deduct:			
Interest on adjustment mortgage income bonds.	961,381	1,112,678	— 151,297
Surplus	$64	$232	— $168

*The figures for the year ended June 30, 1914, including the surplus at the beginning and end of the 1914 period, are adjusted to accord with changes in classification made during the year ended June 30, 1915, so that a proper comparison may be obtained.

The gross passenger revenue for the year was $13,010,933, a decrease of $410,748 or 3.06 per cent. This abnormal falling off may be attributed to the general business depression prevailing throughout the year, and to the interference with traffic resulting from subway construction. The statistics of the operating department show that the delays from causes of the latter character were 100 per cent greater than in 1914. There was also a great deal of interference by trucks and other vehicles unnecessarily blocking and using the company's tracks. With proper regulation of this traffic, street railway traffic could be facilitated by at least 10 per cent. Other street railway operating revenue was $388,834, a decrease of $50,323 or 11.46 per cent. This is accounted for principally by a reduction in the receipts from advertising and the sale of power.

The operating expenses totaled $8,551,432, a decrease of $224,188 or 2.55 per cent. The total charge to maintenance accounts for the year, including the reserve for maintenance and depreciation (equal to 20 per cent of the total operating revenue), was $2,679,953, a decrease of $92,214. This decrease resulted from the falling off in the total operating revenue. The amount applied to the reserve account was $757,976, an increase of $433,204 as compared with last year. There was actually expended during the year for the maintenance of way and structures $1,008,579, and for the maintenance of equipment $913,398, the total maintenance expenditures showing a decrease of $525,418, caused in part by the necessity of deferring certain repair work until the streets approach normal conditions. The transportation expenses were $4,344,661, a decrease of $81,222, of which $38,505 applied to the power supply accounts and $42,717 to operation of cars.

During the year there was charged to operating expenses for injuries to persons and property the sum of $975,820, which is equal to 7½ per cent of the gross passenger revenue, a decrease of $65,687 as compared with the preceding year. This decrease was caused by the falling off in the gross passenger receipts during 1915 and the fact that the accruals for the first six months of the preceding year were based on the rate of 8 per cent and the second six months 7½ per cent of the gross passenger revenue. The actual expenditures made during the current year amounted to $929,386, an increase of $124,252 or 15.43 per cent over last year, while the remainder reserved was $46,434, a decrease of $189,939 or 80.36 per cent.

The actual disbursements for the current year and those arising out of the operations during the receivership and liquidated during this year equaled 7.2 per cent of the gross passenger revenue, compared with 6.4 per cent last year and 6.6 per cent the year before. The increase was largely caused by the liquidation of a greater volume of the accumulated liability. The experience of the company so far seems to indicate that an allowance of between 7 per cent and 8 per cent for injuries is necessary under present conditions. During the years prior to the receivership the expenditures were between 10 per cent and 11 per cent a year—a reduction of more than $400,000 a year. Claimants succeeded in only 25 per cent of the cases during the year, as compared with 34 per cent last year. The company voluntarily settled 3594 claims for $270,000 before suit was brought and compromised 1514 actions before trial for $296,928, leaving as the result of contested suits 185 judgments paid to the amount of $62,877.

The taxes assignable to street railway operations amounted to $1,042,859, a decrease of $49,246 or 4.51 per cent, the greater portion thereof applying to the special franchise taxes by reason of a reduction in the assessed valuation. This reduction may be attributed to the favorable results obtained in the litigation of the special franchise tax cases of the Metropolitan Street Railway decided in favor of the company in December, 1914. This year the State Board of Tax Commissioners gave full consideration to the decision in these cases, and the aggregate assessment of $31,799,950 is considered fair. The current year is the first since 1899 in which no proceedings have been necessary to review the assessments.

During the year the company issued $1,751,000 of first real estate and refunding mortgage 4 per cent bonds and $4,950 of convertible 4 per cent scrip for the acquisition of 5017 of the 6000 outstanding shares of the Twenty-third Street Railway. This transaction has resulted in a net saving per annum of approximately $13,014. The company also acquired by purchase at auction the $2,473,400 of 4 per cent first consolidated bonds of the Central Crosstown Railroad, which were held as collateral for the latter's 5 per cent notes amounting to $1,882,987 owned by the New York Railways.

The following table shows some of the comparative operating statistics for the years ended June 30, 1914 and 1915:

	1915	1914	Change
Rates per car mile:			
Total revenue from operations	38.40c.	40.10c.	—1.70c.
Maintenance of way and structures:			
Expended	2.89c.	4.67c.	—1.78c.
Reserved	1.64	.06	+1.58
Maintenance of equipment:			
Expended	2.62	2.41	+ .21
Reserved	.53	.88	— .35
Operation of power plant	2.66	2.80	— .14
Operation of cars	9.70	10.01	— .22
Injuries and damages:			
Expended	2.67	2.33	+ .34
Reserved	.13	.69	— .56
General and miscellaneous expenses	1.58	1.55	+ .03
Total operating expenses	24.51c.	25.40c.	— .89c.
Number of passengers carried:			
Cash fares	251,264,521	261,762,151	—10,497,630
Revenue transfers	15,062,586	11,230,492	+ 3,832,094
Free transfers	109,943,330	110,607,435	— 664,105
Total	376,270,437	383,600,078	— 7,329,641
Ratio of free transfer passengers to revenue passengers, per cent	41.28	40.52	+ .76
Average fare per passenger:			
Per passenger (including transfers)	3.458c.	3.499c.	— .041c.
Per revenue passenger	4.885	4.916	— .031
Operating expenses per passenger:			
Per passenger (including transfers)	2.273c.	2.288c.	— .015c.
Per revenue passenger	3.211	3.215	— .004
Average number of cars operated daily	1,165	1,183	— 18
Car miles	34,891,203	34,564,090	+327,113

NORTHERN ELECTRIC PLAN COMPLETED

Full Details of Reorganization Plan That Has Been Approved by Representatives of Parties in Interest

The reorganization plan for the Northern Electric Railway, Chico, Col., and its allied corporations, which, as announced in the ELECTRIC RAILWAY JOURNAL of Oct. 2, has been signed by creditors' representatives, by protective committees for stockholders and bondholders, by the Sloss trustees and certain San Francisco banks, has now reached its final stages. Deposit of securities, etc., is being urged, and the plan will now be submitted to the California Railroad Commission for its approval. As stated in last week's issue, the time for owner or pledgees of stock and creditors to assent to the agreement is limited to Nov. 15.

The main feature of the reorganization plan, which was described as to preliminary details in the issue of July 10, is that the rights of the bondholders and creditors of the railway companies are substantially preserved in effect for a period of at least five years from July 1, 1915, during which time it is hoped that increase in population and improved business conditions throughout the territory covered will materially increase the revenues and give the roads a chance to work out the payment of all claims. This extension of time is secured without the creditors being called upon to make any advances of money.

A new corporation is to be formed with a capital stock of $2,000,000 to take over, after foreclosure of the various mortgages, all the properties of the Northern Electric Railway, Northern Electric Company, Sacramento & Woodland Railroad and the Northern Electric Railway—Marysville & Colusa Branch. There will be an issue of $500,000 of first mortgage twenty-year bonds, which will be used only for the purpose of discharging prior or superior liens, repairs to or re-construction of the roadbed, purchase of rolling stock and other equipment, compensation of receiver and his attorneys, expenses of reorganization, etc. In addition the new company will have an issue of $5,300,000 of general mortgage 5 per cent thirty-year bonds, interest for first five years payable annually and only from the net earnings and to the extent of such net earnings, at a rate not exceeding 5 per cent per annum non-cumulative. These bonds will be exchanged, bond for bond, for bonds held by the owners or pledgees of the bonds of the Northern Electric Company, Sacramento & Woodland Railroad, Marysville & Colusa Branch and Chico Electric Railway. Another issue of $7,000,000 of 5 per cent thirty-year income bonds, interest payable annually only from the net earnings and after the payment of interest on the outstanding prior bonds, will be exchanged, bond for bond, for first consolidated mortgage 5 per cent ten-year gold bonds of the Northern Electric Railway. Abut $450,000 of these bonds will be pledged to secure the debts of the unsecured floating debt creditors.

The new corporation will assume and agree to pay each and all of the admitted debts of the Northern Electric Railway and its affiliated companies. Creditors may, if they wish, after the new company is incorporated, exchange their present notes for new notes of the new corporation. W. P. Hammon, E. J. de Sabla, Jr. and E. R. Lilienthal will agree to be bound the same as they now are for notes made, endorsed or guaranteed by them and will waive the right to plead the statute of limitations for the period of six years.

The Sloss Corporation and Sloss Securities Company will transfer $500,000 in cash or securities to the new corporation. This will constitute a fund to be used during the first five years to pay to the holders of promissory notes made or endorsed by Leon Sloss or Louis Sloss and secured, under the plan, by general mortgage bonds, interest upon such bonds to the extent of the deficiency, if any, between the interest which the new corporation may pay out of its income and the full 5 per cent interest provided for by the bonds; also to pay the interest upon the promissory notes due and unpaid on July 1, 1915. At the end of five years any remainder of this fund will be used for the retirement of outstanding first mortgage bonds and the balance, if any, will be distributed pro rata to the other creditors holding notes made or endorsed by Leon Sloss or Louis Sloss. Sloss Securities Company will cancel and discharge promissory notes and other claims and demands which that company holds against the railway companies to the extent of about $1,700,000.

In consideration of the $500,000 to be so paid over to the new corporation and the cancellation of such claims and demands, all of the railway creditors will release the Sloss interests from further liability to them, except that the present unsecured floating debt creditors will retain their rights against the Slosses as stockholders of the present companies. W. P. Hammon, E. J. de Sabla, Jr. and E. R. Lilienthal will each be offered the privilege, for a period of three years, which the new corporation may extend for another year, of being likewise released from all liability upon notes made, endorsed or guaranteed by them, upon the payment of $500,000. In the event of such payment one-half of the amount so paid will be used for the purpose of redeeming any outstanding first mortgage bonds, and the other half will be divided among creditors other than underlying bondholders as security for claims.

All of the stock of the new corporation will be placed in trust with the Union Trust Company, San Francisco, for five years, with the power of selling the same for not less than $2,000,000. In case of such sale the money will be distributed pro rata among the creditors other than those whose claims are secured by the underlying bonds. The new corporation will have a board of fourteen directors, four of whom will be selected by the owners of the general mortgage bonds, four by the pledgees of general mortgage bonds, four by owners and pledgees of income bonds, one by the unsecured creditors, and the remaining one by the note endorsers. While the stock is so held in trust, the trust company will vote the same in accordance with the instructions of the bondholders and creditors. If the stock shall not be sold during the period of five years, it shall then be sold at public auction and the net proceeds distributed among the creditors, or it shall be otherwise disposed of as a majority of the creditors may then determine. If no sale or other distribution is made, the stock itself will be distributed among the creditors, other than those holding underlying bonds as security, and the creditors will then own and operate the road.

THIRD AVENUE PAYS DIVIDEND

Quarterly Dividend of 1 Per Cent Is First Since 1907 on Stock of Reorganized Company

The directors of the Third Avenue Railway, New York, N. Y., on Oct. 15 declared a quarterly dividend of 1 per cent, payable on Jan. 1 to stockholders of record on Dec. 15. According to reports, it is the intention of the directors to continue the dividends regularly and thus put the road on a 4 per cent basis.

The present dividend is the first paid on the stock of the reorganized Third Avenue Railway. The old Third Avenue Railroad, prior to 1889, paid dividends for a long time at the rate of 7 per cent. When the road was leased to the Metropolitan Street Railway dividends continued at the rate of 5 per cent until October, 1907, when they were suspended by the receiver for the Metropolitan company. F. W. Whitridge, president of the new company, maintained that there should be no dividends until the property had been thoroughly built up and until a proper surplus had been laid aside for the future welfare of the road.

Ever since the new management went into office on Jan. 1, 1907, there has been a clamor among stockholders for dividends. President Whitridge always reasserted his intention to reconstruct the road and put every cent back into the property in order to perfect the operating conditions. Early this year a committee of stockholders appointed by President Whitridge at the latest annual meeting made an investigation which resulted in a recommendation for a quarterly dividend of 1 per cent. Later a sub-committee of the board of directors was appointed to consider the future policy of the company as regards dividends and outlays for improvements, but this sub-committee on July 14 announced that the dividend question would be left for the full board of directors to decide in the autumn. The present declaration is now the outcome.

It was announced after the directors' meeting that the $2,020,000 of 4 per cent Third Avenue Railway bonds recently authorized by the Public Service Commission for the First District of New York had been sold to the Central Trust Company at 80. The company reserves the right to repurchase the bonds at any time at the same price and accrued interest.

Albuquerque (N. Mex.) Traction Company.—The holdings of the Albuquerque Traction Company were purchased on Oct. 1 at foreclosure sale by H. A. Jastro for $50,000. The following day the holdings were taken over by the newly-organized City Electric Company, of which George Roslington, the receiver of the old company, is president. Mr. Jastro, who was the former president of the old company, is a bondholder but not a stockholder in the new company. The new company has purchased seven pay-as-you-enter cars from the St. Louis Car Company, and it is reported that various other improvements are to be made. On Oct. 3 Mr. Roslington's final report as receiver was approved by the court. This showed receipts of $13,831 since May 8 and disbursements of $17,379. The property, however, was more than self-supporting until a carhouse fire put all but two cars out of operation.

Brooklyn (N. Y.) Rapid Transit Company.—The Brooklyn Rapid Transit Company through one of its subsidiaries, the South Brooklyn Railway, has applied to the Public Service Commission for the First District of New York for permission to purchase the majority stock of the Prospect Park road at $200 a share for 1768½ shares, or $353,700 in all. This stock is held by the Long Island Railroad, which has been leasing the right-of-way to the rapid transit company for $45,000 a year. The application is opposed by minority stockholders, who state that this rental is the company's only source of revenue and insist that the commission should require the Brooklyn Rapid Transit Company to purchase all the stock at a uniform price.

Denver (Col.) Tramway.—The recent suspension of the quarterly dividend of the Denver & Northwestern Railway, announced in the ELECTRIC RAILWAY JOURNAL of Oct. 2, was the result of a similar suspension by the Denver Tramway, the operating subsidiary of the former company. According to a statement sent out by the board of directors to the stockholders of the two companies, there was during the three months ended Sept. 30, 1915, a decrease of $57,211 in tramway gross earnings, a decrease of $19,835 in operating expenses, and a decrease of $34,623 in net income applicable to dividends and sinking fund requirements as compared with the corresponding period of last year. It has been necessary to expend a considerable sum of money in new construction and proper maintenance of the company's property, and owing to world-wide unfavorable financial conditions the directors deemed it not advisable to sell at a sacrifice any of the bonds in the treasury to replace these funds taken from the working capital. The board of directors therefore decided that the interests of the operating company, as well as its bondholders and stockholders, would be better conserved by discontinuing, for the present, any dividends, thereby strengthening the company's cash position. Under these circumstances the Denver & Northwestern Railway could not declare its quarterly dividend.

Fort Wayne & Springfield Railway, Decatur, Ind.—Fannie R. Armstrong et al. have filed a suit with Judge Anderson of the Federal Court, asking that a judgment of $4,750 be rendered for conversion of bonds, with interest from June 4, 1911, that the judgment be declared a prior and preferential claim against all the property of the Fort Wayne & Springfield Railway, and that the court resume jurisdiction over the line and appoint a new receiver to take charge of the property and offer it for sale to satisfy claims of the plaintiffs. As noted in the ELECTRIC RAILWAY JOURNAL of Aug. 28, this property was sold at foreclosure sale on Aug. 12. Latest advices, however, are to the effect that the company will be resold at a private sale on Oct. 25, under an order issued by Special Judge Hartford, Portland. The court refused the petition of Lizette Dirkson and Emma Gerke, who purchased the road at the Aug. 12 sale, to extend for thirty days the time for making the final payment of $78,000. Their initial deposit of $5,000 was forfeited. It is again reported that attorneys representing Fred A. Dolph of Chicago, who recently announced his intention to electrify the purchased steam road between Huntington and Bluffton, Ind., intend to bid in the electric line at the new sale.

Gary & Interurban Railroad, Gary, Ind.—Suit was recently filed in the Federal Court of Indianapolis, Ind., by the Central Trust Company, Chicago, to foreclose on the first refunding $10,000,000 mortgage of the Gary & Interurban Railroad. Defaulted interest on $1,000,000 of this is said to be the direct cause of foreclosure. The company's receipts were affected by jitney bus competition, beginning when the large industries in the Gary district resumed full operation after the recent business depression. The court appointed Charles D. Davidson of Gary as receiver.

Havana Electric Railway, Light & Power Company, Havana, Cuba.—A semi-annual dividend of 3 per cent has been declared on the $15,000,000 of common stock of the Havana Electric Railway, Light & Power Company, payable on Nov. 13 to holders of record on Oct. 23. This compares with 2½ per cent paid last May and 5 per cent during the calendar year 1914. A dividend of 3 per cent this year was also declared on the preferred stock.

New York (N. Y.) Railways.—The committee of Frank L. Hall, Charles P. Howland and George B. Leighton, representing the holders of the adjustment income 5 per cent bonds of the New York Railways, has, in connection with its call for proxies for the annual meeting on Dec. 6, noted in the ELECTRIC RAILWAY JOURNAL of Oct. 9, issued a circular stating that counsel have been engaged in the preparation of suit for the recovery of the $1,500,000 shortage from the full interest on the bonds up to and including the coupons of April 1, 1915, and that the suit is now in shape to be actively pressed at the coming fall term of the courts. In the meantime the committee has been conducting an investigation of the company's affairs, which has convinced it that the system of accounting adopted by the company is not in accordance with the terms of the deed of trust, and that if the accounts were properly kept the bonds would be assured of their full interest.

New York (N. Y.) Municipal Railway Corporation.—The New York Municipal Railway Corporation, the operating subsidiary of the Brooklyn Rapid Transit Company's new subway lines, has applied to the Public Service Commission for the First District of New York for permission to issue $20,000,000 of 5 per cent sinking-fund gold bonds under its first mortgage dated July 1, 1912. These bonds, with $40,000,000 previously authorized, will form part of the collateral for the issue of $60,000,000 of Brooklyn Rapid Transit Company's six-year 5 per cent secured gold notes, the final $20,000,000 of which were recently sold, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 9 and Oct. 16. The proceeds of the latter are to be applied as follows: In the discharge of obligations already incurred under the dual subway system, $3,457,520; cost of equipment of rapid transit systems, $7,680,000; cost of reconstruction and extension of lines of New York Consolidated Railway, $4,030,620; toward the cost of plant construction and equipment of elevated tracks, $2,620,000; for the extension of present lines, $1,611,860, and for discount, $600,000 (to be amortized out of earnings).

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The San Francisco-Oakland Terminal Railways is now paying, through its regular agencies, the interest on San Francisco, Oakland & San José Railway first mortgage 5 per cent bonds, which came due on July 2 but was deferred for lack of funds. Some time ago the company announced that interest on the bonds of its constitutent corporations, coming due between July 1 and Dec. 31, 1915, would be paid as sufficient funds could be accumulated from current earnings, payment to be made in the order of seniority of the bond issues. Other payments previously made in accordance with this policy were noted in the ELECTRIC RAILWAY JOURNAL of Sept. 11.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—The ELECTRIC RAILWAY JOURNAL has secured official information discountenancing the recent report in financial circles that the properties owned by the Tri-State Railway & Electric Company were bid in by the bondholders' committee at a postponed foreclosure sale on May 27 and subsequently sold to the Duquesne Light Company, Pittsburgh, Pa., or interests identified with it. The facts are that during July, 1915, the Virginia & Ohio Securities Corporation acquired the capital stocks of all the companies formerly owned by the Tri-State Railway & Electric Company and purchased at foreclosure sale by the bondholders' committee of that company. The line in Steubenville was deeded to the Steubenville Railway, all the stock of which is owned by the Virginia & Ohio Securities Corporation. These changes were noted at the time in the ELECTRIC RAILWAY JOURNAL of July 24 and Aug. 21. None of the properties were sold to the Duquesne Light Company, and the control of the Virginia & Ohio Securities Corporation does not lie with any of the Pittsburgh companies. The Virginia & Ohio Securities Corporation has no bonds outstanding, but has issued and outstanding $1,250,000 par value of common stock and $1,000,000 par value of 7 per cent cumulative preferred stock. The properties owned or controlled by this company are as follows: Steubenville, Wellsburg & Weirton Railway, Wellsburg Electric Light, Heat & Power Company, Hancock County Electric Company, Steubenville Railway, Steubenville Bridge Company, Beaver County Light Company and Midland Electric Light & Power Company.

DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1¼ per cent, preferred Series B; quarterly, 1¼ per cent, common.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Cumberland County Power & Light Company, Portland, Me., quarterly, 1½ per cent, preferred.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Havana Electric Railway, Light & Power Company, Havana, Cuba, 3 per cent, preferred; 3 per cent, common.

Jacksonville (Fla.) Traction Company, quarterly, 75 cents, preferred.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

Third Avenue Railway, New York, N. Y., 1 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.						
1m., Aug.,	'15	$1,181,948	*$649,007	$532,941	$372,679	$160,262
12 " "	'15	14,088,122	*7,552,322	6,535,800	4,346,834	2,188,966
1 " "	'14	1,166,345	*$661,823	504,522	353,469	151,053
12 " "	'14	14,033,070	*7,717,431	6,315,639	4,093,067	2,222,572
CONNECTICUT COMPANY, NEW HAVEN, CONN.						
1m., Aug.,	'15	$796,221	*$506,579	$289,642	$98,145	‡$214,122
1 " "	'14	802,417	*571,018	231,399	98,889	‡153,789
2 " "	'15	1,602,703	*981,568	621,135	196,410	‡470,532
2 " "	'14	1,601,184	*1,142,759	458,425	196,219	‡305,371
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO						
1m., Aug.,	'15	$343,543	$201,845	$141,698	$51,136	$90,562
1 " "	'14	360,055	214,559	145,596	53,319	92,177
8 " "	'15	2,416,902	1,467,650	949,252	403,820	545,432
8 " "	'14	2,488,442	1,535,909	952,533	413,588	538,945
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY						
1m., Sept.,	'15	$2,009,979	$1,115,491	$894,488	$815,611	$78,877
1 " "	'14	1,949,440	1,113,964	835,476	807,970	27,506
3 " "	'15	5,847,648	3,297,930	2,549,718	2,448,149	101,569
3 " "	'14	5,813,676	3,362,683	2,450,993	2,426,099	24,894
REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.						
1m., Aug.,	'15	$260,792	*$158,298	$102,494	$58,560	‡$44,078
1 " "	'14	255,488	*155,057	100,431	57,063	‡43,456
8 " "	'15	1,968,619	*1,218,592	750,027	459,648	‡291,451
8 " "	'14	2,003,459	*1,231,906	771,553	450,111	‡322,677
RHODE ISLAND COMPANY, PROVIDENCE, R. I.						
1m., Aug.,	'15	$511,492	*$349,743	$161,749	$120,284	‡$42,852
1 " "	'14	535,817	*351,133	184,684	121,035	‡65,691
2 " "	'15	983,640	*669,158	314,482	240,568	‡76,601
2 " "	'14	1,071,395	*705,234	366,161	237,299	‡133,299
WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.						
1m., Aug.,	'15	$24,718	*$22,182	$2,536	$1,598	‡$970
1 " "	'14	27,733	*23,849	3,884	1,198	‡2,698
2 " "	'15	50,734	*44,900	5,834	3,188	‡2,708
2 " "	'14	54,932	*47,305	7,627	2,397	‡5,253

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*Includes taxes. ‡Includes non-operating income.

Traffic and Transportation

JITNEY JOTTINGS

The Railroad Commission of California Has No Jurisdiction Over Motor Bus—First Jitney Application Passed Upon by New York Commission

The Railroad Commission of California has issued an order declaring that it could not exercise jurisdiction over motor-bus and auto-stage lines. The same decision was rendered in the case of the Western Association of Short Line Railroads against the Wichita Transportation Company and the case of the United Railroads, San Francisco, against the Peninsula Rapid Transit Company. The first of these cases dealt with the auto stages running from San Diego, Cal., to Imperial Valley points, and the second with the auto-bus lines operating between San Francisco and San Mateo. The decision draws particular attention to the fact that "every common carrier" is declared to be a public utility and points out that "it is unquestionably true that the company is a common carrier at common law, and that the constitution has declared that the common carrier is a public utility, but it is equally true that this section of the constitution distinctly declares that corporations and persons declared to be public utilities shall be subject only to such control and regulation by the Railroad Commission 'as may be provided by the Legislature.' It is distinctly provided that the Railroad Commission shall have and exercise 'such power and jurisdiction' to supervise and regulate public utilities 'as shall be conferred upon them by the Legislature.'" It is the opinion of the Railroad Commission that the Legislature did not confer this jurisdiction.

In an opinion rendered on Oct. 22 by Commissioner William Temple Emmet, the Public Service Commission for the Second District of New York has decided the first application for a certificate of convenience and necessity for a jitney bus line under the law passed by the last Legislature. Commissioner Emmet's opinion lays down in broad lines the principles which govern the commission in this and future applications, though declaring expressly that each case will be decided on its merits. The present application, however, that of William B. Gray for authorization of six routes in New Rochelle, is characterized as one so typical as to afford most favorable opportunity for discussion of the problem in general. Commissioner Emmet's opinion is of some length, he says, in order that future applicants may be guided by the principles there set down. The commission grants certificates to four of the six routes provided for in the franchise from the municipality on which the application is based and refuses two others. The four routes authorized run on the same streets with existing electric railway lines only for the short distances necessary to reach the New Haven Railroad station, whereas the routes for which certificates were refused were for the most part on the same streets with the existing trolley lines.

The Pennsylvania Public Service Commission has now actively started hearings on the status of the jitneys in that State. Argument is being heard before the commission in the case begun by the Scranton Traction Company against three proprietors of jitneys running between Scranton and Carbondale, upon the decision of which rests the fate of the jitney business in Pennsylvania. The company alleges that the jitney owners should be taxed the same as any other corporation and should obtain a certificate of public convenience similar to other public service corporations. C. L. S. Tingley, vice-president of the American Railways, of which the Scranton system is a part, and H. B. Gill, Philadelphia, counsel of the company, are arguing the case for the company.

Jitney operators of Rochester, N. Y., have presented to the Common Council a petition to do business in the streets of the city, according to the requirements of the jitney law, which compels them to file such a petition and then to make application to the Public Service Commission for a certificate of necessity and convenience.

The City Council of Atchison, Kan., has passed an ordinance regulating jitneys. It provides for the examination of drivers, a license of $10 a year and bond of $1,000.

FARE INCREASE ASKED IN MILWAUKEE

Company Outlines Conditions That Make Increase in Fares Imperative

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has entered a plea for an increase in fares. In "Plain Talks to Our Patrons," the first of a series of advertisements in the daily newspapers published on Oct. 16, the public is urged to aid in obtaining a higher rate of fare and in removing burdensome restrictions. Ten months ago the company hoped to be able to do certain things, or most of them, out of its earnings at existing rates. It now finds that it can not do these things. Conditions affecting the business have changed. New factors have appeared that cut earnings and bid fair to cut them for a long time to come far below the point at which the company can do what it wished to do. The company said in part:

"If we are to do these things, or any of them, we must earn more or spend less. If we earn more, we can do all of them. If we merely spend less, we can do only one of them. That one is, the payment of a fair return on the capital invested in the business. THIS IS THE FIRST NECESSITY OF ANY BIG BUSINESS THAT HAS TO BORROW MONEY TO MAKE EXTENSIONS OR LARGE-SCALE BETTERMENTS OF ANY KIND. IF IT DOESN'T PAY A FAIR RETURN ON CAPITAL ALREADY ENLISTED, IT CAN'T GET ADDITIONAL CAPITAL WHEN IT NEEDS MORE.

"Our alternatives appear to be:

"1. To reduce the service; or,

"2. To ask the Wisconsin Railroad Commission to: (a) let us stop selling car tickets at six for 25 cents and 25 for $1 and charge a flat 5-cent cash fare in the city; or (b) let us charge 1 cent for a transfer and draw in the city one-fare zone to create one more suburban 2-cent zone, or,

"3. To ask the proper authorities to relieve us of heavy and unfair charges for paving, cleaning and sprinkling streets; or,

"4. To keep on operating our lines for a return which each year is smaller, which is away below the 'fair return' State regulation entitles us to, and which in the fiscal year 1915 has come very near the vanishing point.

"NOBODY WANTS TO SEE SERVICE REDUCED. The whole tendency of public service is toward more liberal standards of loading and headway of cars. This costs money and most of the public is entirely willing to pay for it. Milwaukee is growing and needs not less but more street railway service.

"So, if any relief is to be had, it must come from higher rates and lower taxes. Here are the main facts we face to-day:

"1—DURING THE PAST FOUR YEARS MILWAUKEE'S STREET RAILWAYS HAVE EARNED NET $494,797.15 LESS THAN A FAIR RETURN OF 7½ PER CENT ON THE RAILROAD COMMISSION'S LOW RATE VALUATION.

"2—DURING THOSE FOUR YEARS THEY HAVE EARNED NET $1,672,053.67 LESS THAN A FAIR RETURN ON THEIR ACTUAL CASH INVESTMENT.

"3—THAT HUGE DEFICIT IN NET EARNINGS, WORSE EACH YEAR, MENACES THE COMPANY'S CREDIT AND PREVENTS ANY FURTHER EXTENSIONS OR BETTERMENTS AT OUR COST.

"What we want, then, is relief from losing rates, unfair taxes and public burdens foreign to street railway business. And we want our patrons, if you feel that our request is a fair one, to back us up in getting this relief. We are going to give you facts and figures proving we are entitled to it; that it is as much in yours and Milwaukee's interest as in our own.

"We are public servants chartered to do a public service. You are the State. Through your State government, you fix a top limit to what we can earn in any one year. You don't let ours, like other businesses chartered by the State, earn a big profit one year to offset little or no profit—or a net loss—in dull years.

"WHEN YOU DO THAT YOU BIND YOURSELVES MORALLY TO LET US ADAPT OUR RATES TO CHANGING CONDITIONS, SO THAT EACH YEAR WE SHALL EARN THE 7½ PER CENT YOUR RAILROAD COMMISSION AND YOUR COURTS HAVE AGREED IS NECESSARY TO GIVE GOOD SERVICE AND MAINTAIN THE COMPANY'S CREDIT.

"OUR CITY AND SUBURBAN LINES HAVE NOT EARNED THAT 'FAIR RETURN' FOR FOUR YEARS PAST. THEIR NET RETURN HAS BEEN STEADILY FALLING. THERE IS NOT A CHANCE THAT THEY CAN EARN IT HEREAFTER, UNDER EXISTING RATES, TAXES, INCREASING WAGES AND OTHER BURDENS.

"You have said, by your public agencies, that we are entitled to earn it, and must earn it in order to give good service. We are now asking you to help us get changes that will let us earn it."

HEARING IN WISCONSIN ON OPERATING RULES

The Railroad Commission of Wisconsin set Oct. 21 as the day for a formal hearing on the subject of operating rules and other regulations affecting service and safety on all electric railways, both city and interurban, in Wisconsin. The standard code of rules for interurban operation and the standard code of rules for city operation adopted by the American Electric Railway Association have been suggested by the commission as the basis of the discussion. Particular attention will be directed to that portion of the rules in regard to flagging at railroad crossings, the display of signals and markers, operation of interurban trains by written order, etc. Other matters to be taken up at the hearing will be the use of spring switches and switch targets on interurban lines, height of car steps, width of doors and aisles, use of one-man cars, use of pilots or fenders for interurban cars and use of fenders or life guards for city cars, and the type of gates and fences along private right-of-way.

MOTOR BUS FEEDER FOR SEATTLE MUNICIPAL RAILWAY

Plans for an auto-bus feeder line for the Seattle Municipal Railway, recently authorized by the City Council despite the Mayor's veto, were outlined briefly in the ELECTRIC RAILWAY JOURNAL for Oct. 2, 1915, and further details are now available. The contract will allow the operator of the auto-bus line 3 cents on every transfer from the railway. The length of haul on the bus line is 1.3 miles, this covering a ride from the north terminus of Division "A" of the Municipal Railway to Ballard, a suburb of Seattle. The bus receipts, therefore, will approximate 2.3 cents per passenger mile. The remaining 2 cents of the 5-cent fare that will be charged on the Municipal Railway for transfer passengers will cover an average haul on the railway of 2.75 miles, giving receipts of only 0.73 cents per passenger mile.

The present standard fare on the Seattle Municipal Railway approximates 4 cents, tickets being sold six for 25 cents and twenty-five for $1, the same rate that is charged by the Puget Sound Traction, Light & Power Company. This rate will be maintained after bus operation commences, but the 4-cent tickets will not carry the transfer privilege. The maximum length of haul for the railway is 4 miles, although the average haul is 2.75 miles.

The fare on the buses will be 5 cents either for transfer passengers or for those who do not wish to transfer. Apparently, but one bus is to be installed, as the headway is to be twenty minutes, the round trip distance being 2.6 miles. Bus service is to be discontinued daily at 7 p. m. The contract between the bus line and the city of Seattle will extend for a period of one year and can be terminated upon thirty days' notice by either party. The bus operator will be required to file with the city a $10,000 bond to indemnify passengers on the bus who may sustain injuries. Tickets and transfers used in conection with the joint operation will be provided by the bus operator for the bus line and by the city for its railway line, an accounting being made once a month. The city is to refrain from making agreements with any other bus company during the life of the present contract, which has had its details practically decided by the Board of Public Works of Seattle, although at the present time the contract has not been formally executed.

In view of the relatively favorable terms of the contract from the standpoint of the bus operator, these having been attained at the expense of the railway, the question arises as to why the city does not install a bus line of its own. In answer to this it is reported that the city has neither the funds nor the authorization to engage in the operation of a bus line as a feeder for the municipal railway line, the voters refusing at an election on March 2, 1915, to sanction propositions which called for the improvement and extension of the municipal railway service. These propositions were: The purchase of auto buses to connect Divisions "A" and "C" of the municipal line, involving an expense of not more than $50,000; and as an alternative, a proposition to extend Division "A" of the municipal railway, involving an expense not to exceed $100,000. It may be said that the jitney-bus lines now in operation in Seattle do not compete with the present municipal line as the territory served by the latter is unpaved and is not considered profitable territory by bus-operators.

CHICAGO OPERATING ORDER QUESTIONED

The local transportation committee of the Chicago City Council has directed the corporation counsel to institute court proceedings to test the right of the Public Utilities Commission of Illinois relative to the "seats for all" order and trailers, reviewed in the ELECTRIC RAILWAY JOURNAL of Oct. 9, page 775. To determine just what the rights of the Chicago Surface Lines are under the 1907 ordinances, L. A. Busby, president of the company, has sent the following letter to the local transportation committee of the City Council:

"We hand you herewith a copy of the opinion and order of the State Public Utilities Commission, dated Sept. 29, 1915, with reference to the Chicago Surface Lines. In transmitting a copy of this opinion and order we wish to call your attention to the fact that the order is not only in direct conflict with important provisions of the traction ordinances, but purports to assume jurisdiction of the commission over the street railways to the exclusion of control by the city. We regard the traction ordinances of 1907 as constituting valid and binding contracts between the city and the companies. The conflict of authority occasioned by this order presents some serious problems with reference to which we should be advised as to the city's views and position."

W. W. Gurley, legal adviser of the Chicago Surface Lines, is reported to have said:

"We expect to comply with the 1907 ordinance obligations. We consider the ordinances to be a contract. Trailers are prohibited by the ordinances and we are not going to put on trailers."

Head-on Collision at Adrian, Mich.—Eighteen persons were injured in a head-on collision between two cars on the Toledo & Western Railroad near Adrian, Mich., on the night of Oct. 14.

Increase in Syracuse Suburban Fare Postponed.—The Public Service Commission for the Second District of New York has suspended the proposed increases in fare on the Syracuse & Suburban Railroad until Dec. 1. A date for a hearing will be set at a time convenient to all the parties concerned.

Fares Discussed by Massachusetts Street Railway Association.—R. W. Perkins, president of the Shore Line Electric Railway, Norwich, Conn., addressed the Massachusetts Street Railway Association on "Zone Systems of Fare Collection" at the regular monthly meeting at Young's Hotel, Boston, on Oct. 13. President D. A. Belden occupied the chair.

First Aid Courses in British Columbia.—Organization for first aid work among the employees of the British Columbia Electric Railway, Vancouver, B. C., is being effected. Last year ninety men were enrolled in the three first aid classes, a large number of whom completed the course and received their St. John ambulance certificate. The first aid movement has been made to include all of the employees of the company.

Score Hurt on Staten Island.—A car of the Staten Island Midland Railway, New York, N. Y., bound for St. George, became unmanageable on Oct. 13 on the steep grade of Wright Street, Stapleton, backed down the hill with increasing momentum, and crashed into another crowded car which was rounding the curve from Canal Street. The impact drove the second car into a third which was following it. More than twenty people were injured.

Rear-end Collision in Brooklyn.—Two trains of the Brooklyn (N. Y.) Rapid Transit Company collided in the rush hour on the evening of Oct. 18 in the tunnel on the Manhattan side of the Woodruff Avenue Station in Flatbush. Twenty-five persons were injured. The first train had been brought to a sudden stop just before the crash through the application of the emergency brakes by a passenger whose identity the police are seeking to establish.

Reduction in Fare Asked.—Application has been made to the Public Service Commission of Missouri asking for an order requiring the Metropolitan Street Railway, Kansas City, to put in a 5-cent fare between the western limits of Independence and Fifteenth Street and Grand Avenue, Kansas City. This involves a trip of 12 miles, according to the petition. It is contended that the company now gives transfers for 20-mile trips between Kansas City points.

Experience Ordinance Passed in Cincinnati.—The City Council of Cincinnati, Ohio, on Sept. 28, passed an ordinance which requires that all new motormen and conductors shall have at least ten days' instruction on cars in Cincinnati before they are allowed to take charge of city or interurban cars. This experience must be had immediately preceding the date of employment and under a conductor or motorman who shall have had at least three years' experience on street cars of Cincinnati, one year of which shall have been immediately preceding the date of giving such instruction.

Trenton Fare Hearing Oct. 25.—The Trenton & Mercer County Traction Corporation, Trenton, N. J., appeared before the Board of Public Utility Commissioners of New Jersey on Oct. 19 to defend the proceedings in which it is sought to make the temporary order of suspension in the fare case permanent. It was decided to begin the hearing on Oct. 25. The United States District Court recently decided to recognize the jurisdiction of the Board of Public Utility Commissioners in suspending the proposed increase of rates in Trenton by the elimination by the Trenton & Mercer County Traction Corporation of its six-for-a-quarter tickets.

Reduction in Fare Granted in One Case, Refused in Another.—A reduction of 5 cents in the one-way cash fare from Jefferson Street station in Portland to Garden Home over the Oregon Electric Railway has been ordered by the Public Service Commission of Oregon. The fare now will be 15 cents. From Capitol Hill to Garden Home the one-way cash fare was cut from 15 cents to 10 cents, while the fare from Portland to Greenburg was lowered from 30 cents to 25 cents. The commission has dismissed the complaint for a cut in rates from Jefferson Street station to Tualatin, Metzger and Beaverton, and to these stations from Capitol Hill. It found the present fare reasonable in this instance. Estimating the cost of reproducing new the Oregon Electric system, the commission found, would involve an expenditure of $12,667,001.

Washington Company Plans Fifteenth Christmas Entertainment.—Through President Clarence P. King of the Washington Railway & Electric Company, Washington, D. C., and subsidiaries, including the Potomac Electric Company, it is announced that at a meeting of the board of directors it was decided to again offer the children of employees of all interested companies the annual Christmas entertainment, making the fifteenth year of the event without interruption. The performance will take place a few days after Christmas Day at the New National Theater. As in the past, special cars will be provided to transport the youngsters to and from the theater free and at the conclusion of the entertainment suitable holiday gifts will be distributed. The purchasing committee will make all purchases of gifts from the local merchants. It is expected that more than 1800 children will be in attendance.

Bay State Street Railway Opens Fare Publicity Campaign.—In connection with the forthcoming hearings before the Massachusetts Public Service Commission relative to the proposed fare increase on the Bay State Street Railway the company has begun a publicity campaign in the Boston dailies, in dailies printed in important cities on its lines, and in selected weeklies, to set forth the fundamental necessity of a rate revision. The first statement, printed on Oct. 14, shows in tabular form the increased cost of food, clothing, coal, house furnishings and building materials in the past twenty years, the average being 45 per cent above prices in effect in 1895. All prices are shown on a 5-cent basis, and attention is called to the fact that the company's fare has remained stationary throughout the entire period, although the road is subject to these increased expenditures, even if indirectly, in certain cases.

New Downtown Loops Proposed for St. Louis.—The Board of Public Service of St. Louis announced recently that following a series of conferences with officials of the United Railways three street railway lines will be eliminated and tied to other lines, the dangerous curve of the Hodiamont line at Thirteenth and Locust Streets will be abolished, and a system of new loops, costing $125,000, in the downtown district, will be constructed by the United Railways, at its own expense. The report of Charles S. Butts, chief assistant engineer under Director of Public Utilities Hooke, declares that officials of the United Railways have worked in harmony with the Department of Public Utilities in bringing about these betterments, and that further conferences will be held to consider extensions to outlying districts, the straightening out of some of the present lines, and the elimination of tracks now considered unnecessary and useless for adequate service.

Educational Addresses Started in New Albany.—In connection with the safety-first work of the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company, New Albany, Ind., a course of educational addresses has been arranged by Robert Hutchens, who is looking after this work for the companies. Heads of departments of the companies appear at the regular meetings and discuss matters which are under their control. At the last meeting, held recently, Robert G. Gordon, attorney in Louisville for the companies, addressed the members of the organization in New Albany on the legal status of the electric railroads and their employees. He went into detail as to the responsibilities and the liabilities of the company and its employees and discussed the question of what was expected of the men in cases of accidents and when they were summoned to court. The purpose of this series of addresses is to give the trainmen of the two companies a comprehensive grasp of the whole enterprise so that they will be able more readily to appreciate their individual relations to the whole.

Transfer on a Transfer Denied in Albany.—On the opinion of Seymour Van Santvoord, chairman, the Public Service Commission for the Second District of New York has again decided that it cannot compel the United Traction Company, Albany, to give a "transfer upon a transfer" on a trip between Albany and Troy, where a passenger requires the use of a line in each city as well as the interurban line. He points out that while the present transfer rules on the Troy-Albany line, as they enable a passenger to ride approximately 20 miles for 15 cents, are not unjust, there should be some provision for a limited use of transfers within restricted zones so that passengers might make use of lines in both cities for short distances without the payment of an extra 5-cent fare after paying the 10-cent fare between the two. The decision now rendered comes from the reopening of the old complaint of William S. Lodge and others and the consolidation of all the cases connected with the Troy Road transfer situation. The opinion says that this reopening was not the result of change in the personnel of the commission, but that it was due to possible changes in the circumstances of the case since Commissioner Decker decided it five years ago. The commission finds, however, that Mr. Decker's opinion then rendered still holds good, but in rendering its present decision expressly reserves the privilege of reopening the case again should circumstances again seem to demand it.

Personal Mention

Mr. George McAneny, president of the Board of Aldermen of New York and formerly borough president of Manhattan, is to retire on Jan. 1 to become associated with the New York *Times*. It was as head of the transit committee of the Board of Estimate that Mr. McAneny did his most notable public work, co-operating with the Public Service Commission for the First District of New York in the successful effort to secure the dual subway system now under construction and involving an expenditure of more than $350,000,000 by the Interborough Rapid Transit Company, the Brooklyn Rapid Transit System and the city.

Mr. A. J. Purinton, formerly general superintendent of the East St. Louis & Suburban Railway, East St. Louis, Ill., has been appointed general superintendent of the Atlantic City & Shore Railroad, Atlantic City, N. J., to succeed Mr. George F. Faher, resigned. In 1910 Mr. Purinton resigned as manager of the Toledo & Chicago Interurban Railway, now the Fort Wayne & Northwestern Railway, to become general superintendent of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., where he remained until 1912, when he was appointed general superintendent of the East St. Louis & Suburban Railway Company, operating more than 190 miles of electric railway in East St. Louis, opposite St. Louis, Mo., and elsewhere in southern Illinois.

Mr. George F. Faber has resigned as general superintendent of the Atlantic City & Shore Railroad, Atlantic City, N. J. Mr. Faber began his railroad career with the Pennsylvania Railroad as a clerk in the superintendent's office, where he served from 1890 to 1892. He next became connected with the accounting department of the East Cleveland Railroad. From 1894 to 1901 he was associated with the Warner & Swasey Company, Cleveland, Ohio, but resigned from this company to re-enter the electric railway field with the so-called Appleyard lines in Ohio. Mr. Faber next accepted the position of superintendent of the Elgin-Belvidere Electric Railway, then under construction. He subsequently became general superintendent of the Western Ohio Railway, Lima, Ohio. Early in 1909 he accepted the position of traffic manager of the Chicago, Lake Shore & South Bend Railway, and in August, 1910, was appointed superintendent of transportation of the Michigan United Railway, now the Michigan United Traction Company. He has been connected with the Atlantic City & Shore Railroad since April, 1913.

OBITUARY

William Henry Nix, roadmaster of the Toronto (Ont.) Railway, died on Oct. 13. Mr. Nix was born in England, and settled in Toronto when he was thirty years of age. He became connected with the Toronto Railway as a driver of horse cars. His organizing power secured rapid advancement for him through various positions to the post of roadmaster.

Edward D. White, for more than a quarter of a century with the Brooklyn City Railroad, now included in the system of the Brooklyn (N. Y.) Rapid Transit Company, is dead. Mr. White was born in Brooklyn ninety-four years ago. He retired from the board of directors of the Brooklyn City Railroad early this year. During his long association with the road he was a director for twenty-seven years, a member of its executive committee for twenty-six years, and vice-president for nineteen years.

Andrew Radel died suddenly on Oct. 15 at his home in Bridgeport, Conn. Mr. Radel was born in Newark, N. J., fifty-three years ago. He moved to Bridgeport from Newark twenty years ago. Before that time he was interested in the development of a number of electric railways now included in the system of the Public Service Corporation of New Jersey. After going to Bridgeport, he assisted in building several electric railways there, which are now controlled by the Connecticut Railway & Lighting Company. At the time of his death, Mr. Radel was a director in the Newark & South Orange Traction Company and vice-president of the New Brunswick Traction Company. He was also president of the Seaview Railroad and Narragansett Pier Railroad, both of which are operated under lease by the Rhode Island Company, Providence, R. I.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***South Mountain Street Railway, Kleinfeltersville, Pa.**—Application will be made for a charter to construct an electric railway between Kleinfeltersville and Womelsdorf. Incorporators: Ralph L. Eberly, Clifford Strauss and Elmer A. Reist.

Pottsville & St. Clair Electric Railway, Pottsville, Pa.—Incorporated in Pennsylvania to construct a line from Pottsville to St. Clair. Capital stock, $13,200. Incorporators: W. B. Rockwell, president; Van Dusen Rickert, Ira G. Walborn, C. F. Crane and Otto E. Farquhar, all of Pottsville. Mr. Rockwell, president of this company, is manager of the Eastern Pennsylvania Railway. [Aug. 14, '15.]

***Central Power Company, Chattanooga, Tenn.**—Application for a charter has been made by this company in Tennessee to construct an interurban line from Chattanooga to Cleveland. Capital stock, $50,000. Incorporators: G. B. Adams, M. N. Whittaker, Sam Whittaker and Lon Foust.

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has received a permit from the harbor commission to operate the municipal terminal railway at the harbor. The company will also handle the cars of any other railroad which may connect with the city's tracks. The permit gives the city trackage rights over 2 miles of the Pacific Electric Railway Company's line, including the drawbridge between pier A, Wilmington, and municipal dock No. 1 in the outer harbor.

San José, Cal.—The San José Railroad has received a franchise from the Council for the construction of an extension on Alum Rock Avenue. The company bid $150 for this franchise.

Lisbon, Me.—The Lewiston, Augusta & Waterville Street Railway has asked the Council for a franchise to relocate its tracks on 131 ft. of pile trestle and 35 ft. of steel girder bridge across the Sabattus River and 434 ft. of track on fill.

Lawrence, Mass.—The Bay State Street Railway has asked the Council for a franchise to build a double-track extension on the State Highway and on Water Street from the Lawrence-Methuen line to Ames Street.

Cincinnati, Ohio.—The West End Rapid Transit Company has asked the Council for a franchise to construct an electric railway from Anderson's Ferry to Third and Sycamore Streets. [Sept. 11, '15.]

Cleveland, Ohio.—The Cleveland Railway has received a franchise from the Council to construct a line through Parma township to Bean Road. The franchise extends to May 1, 1934.

Columbus, Ohio.—Supplementary franchises were granted to the East Linden Electric Railway by the Council of Columbus on Oct. 18 for two proposed routes, one from the Leonard Avenue viaduct to East Linden and the other through Shepard. The new ordinance authorizes lines on Hayes and Champion Avenues to Long Street and from East Linden west on Hudson Street to Neil Avenue.

Tacoma, Wash.—The Puget Sound Traction, Light & Power Company has asked the Council for a franchise to construct pole and power lines along the county roads in the districts of Puyallup, Burnett, Alderton, McMillin and Sumner. The franchise asks for three years in which to construct the lines.

Janesville, Wis.—The Janesville Traction Company has filed a surrender of its franchise with the Wisconsin Railroad Commission and has applied for an indeterminate permit, which will be granted by the commission.

TRACK AND ROADWAY

Alabama City, Gadsden & Attalla Railway, Gadsden, Ala.—Material has been ordered by this company for the reconstruction of its tracks on Gardner Street between Ninth Street and Twelfth Street and work will be begun as soon as the material arrives. The tracks will be lowered according to the grade established by the city.

Fort Smith Light & Traction Company, Fort Smith, Ark.—The Fort Smith Light & Traction Company has been ordered by the Fort Smith-Van Buren Bridge Commission to remove all its property and equipment, including tracks and feed wires from the Fort Smith-Van Buren Bridge. Subsidiary companies of the company were also ordered to remove their property. This action is the result of the traction company and the bridge commission failing to agree upon a contract for the use of the bridge.

Pacific Electric Railway, Los Angeles, Cal.—A new line has been begun by the Pacific Electric Railway, which will serve El Segundo, Hawthorne, Lawndale, Farmington and Belvedere districts, as well as provide a new outlet from Los Angeles to Redondo Beach. The new line will leave the present Gardena line at Ionia Avenue and will directly connect at Hawthorne with the El Segundo line, already completed, as well as the Belvedere line to Redondo. Representing that the lines were being operated at a dead loss the company has made application to the city commission for the abandonment of service on the West Seventh Street and municipal dock local lines in Long Beach.

Municipal Railways of San Francisco, San Francisco, Cal.—The extension of the Geary Street Municipal Railway across Golden Gate Park from Tenth Avenue and Fulton Street to Fourteenth Avenue and Lincoln Way and thence to Judah Street is to be begun at once and it is expected that the line will be completed before Jan. 1. The supervisors have ordered the extension and are now making formal publication of this order preliminary to starting active construction.

Tampa (Fla.) Electric Company.—This company has completed the laying of double track from the Tampa Bay gates to the Boulevard, thus affording better service on the Union Station line.

***Moline, Ill.**—Moline capitalists are considering plans to construct a line from Moline to Coal Valley, with a possible extension to Galva and Cambridge.

Bloomington, Pontiac & Joliet Railway, Pontiac, Ill.—Work of changing the route of this road out of Pontiac to the north is progressing. The poles are set and the overhead work nearly completed. The necessary work for connecting the new track laid on Main Street with the old one on Wabash Avenue has been finished and it is expected that the track will be laid within a few days north to the crossing of the Illinois Central Railroad.

Union Railway, Gas & Electric Company, Rockford, Ill.—At a recent meeting of the Rockford Real Estate Board, held in Rockford, it was decided to appoint a committee to act with other civic organizations to urge the Council and the Union Railway, Gas & Electric Company to extend the franchise of the company and to secure needed extensions to various parts of the city.

Lafayette & Northwestern Traction Company, Lafayette, Ind.—Financial arrangements have been made for the construction of the first half of this company's line and the right-of-way is now being secured. The route has been changed from West Lafayette through Octagon and this change will shorten the route 3 miles. The M. A. Talbert Company has the contract for building the line from Lafayette to Kankakee, Ill. [Aug. 14, '15.]

Des Moines (Iowa) City Railway.—This company plans to extend its line over the Seventh Street bridge and rebuild about 20 miles of track in Des Moines.

Louisville (Ky.) Railway.—This company's Chestnut Street extension to Shawnee Park, via Twenty-seventh and Madison Streets, is nearly completed and it is stated that in all probability service will be begun on or before Dec. 1.

St. Paul (Minn.) City Railway.—Work will be begun at once by this company on the extension of its St. Clair Street line in St. Paul.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—Work has been begun by this company on the reconstruction of its line from Pass Christian to Gulfport and Biloxi.

Springfield (Mo.) Traction Company.—Material has been received by this company for the relaying of its track on Booneville Street, and work will be begun at once.

United Traction Company, Albany, N. Y.—This company plans to install new curves from State Street south into Broadway, to shift the tracks several feet east at the crossing at Broadway and Church Street and to connect the new double tracks at the south end of the Plaza with the present tracks in Broadway at Steamboat Square.

Interborough Rapid Transit Company, New York, N. Y.—The proposed form of contract for the construction of Section No. 2 of Routes Nos. 19 and 22, being a part of the Southern Boulevard and Westchester Avenue branch of the Lexington Avenue subway, has been submitted by the Public Service Commission for the First District of New York to the Interborough Rapid Transit Company, which will be the operator of the line, for its criticisms and suggestions. The company is made a party to the contract, and will bear part of the construction cost. The underground portion of this line ends at Bancroft Street, Bronx, and Section No. 2, which will be elevated, extends northerly from that point along Westchester Avenue to Eastern Boulevard, or Pelham Bay Park. This is the last section of the new city-owned lines to be let in the borough of the Bronx. The commission has now completed negotiations with the Federal Government for the construction of the necessary fixed bridge across the Bronx River. This was the last obstacle to the construction of the line. The company must return the contract within ten days, after which it will be put in final form and advertised for bids.

West End Rapid Transit Company, Cincinnati, Ohio.—City Solicitor Schoenle of Cincinnati has given the West End Rapid Transit Company an opinion to the effect that the consents of owners of abutting property along the route on which it proposes to build a line for the entrance of the Cincinnati, Lawrenceburg & Aurora Electric Street Railway to the business section of the city are not necessary. The charter provides for the construction of a commercial railroad, he said, and its purpose is somewhat different from those of an ordinary street railroad.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company plans to construct an extension of its lines from New Castle to Beaver Falls.

Bartlesville (Okla.) Interurban Railway.—Construction has been begun at Dewey Avenue and Fifth Street, which is the final step toward completing the connecting link of the loop of the Bartlesville Interurban Railway with the main line. The line will be extended to Dewey Avenue and East Third Street.

Oklahoma & Interstate Railway, Oklahoma City, Okla.—Both Columbus and Galena have called elections for voting bonds as bonuses for the Oklahoma & Interstate Railway. Columbus has been asked to vote $20,000 and Galena $15,000. Philadelphia financiers have agreed to purchase the bonds, and officers of the company say that actual construction will be begun by Dec. 1. It is practically certain that Columbus and Galena will vote the bonds, because it has been stipulated in the contracts that before the bonds are turned over to the company, the lines connecting Columbus with Galena, and Columbus with Commerce, must be completed and in operation. It is stipulated that this must be accomplished by May 1, 1916. [Oct. 16, '15.]

New Toronto, Ont.—The Council of New Toronto has passed a resolution that the Hydro-Electric Power Commission of Ontario be requested to investigate and report upon the cost of constructing and operating an electric railway from Toronto through New Toronto to London.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont.—Claiming that the by-law did not receive the assent of the ratepayers, and further, was canceled by a new Council, the City of Windsor on Oct. 14 asked the Appellate Division to set aside the order of the Ontario Railway Board, which gave the Sandwich, Windsor & Amherstburg Railway power to construct a loop line at Ferry Avenue, Windsor. The court dismissed the appeal, but varied the order of the board to read without prejudice so that the city might take free action to test the legality of the railway company's action.

Willamette Valley Southern Electric Railway, Portland, Ore.—Operation has been begun by this company between Mount Angel and Portland.

***Columbus, Pa.**—It is reported that grading has been begun for an electric railway from Columbus to Mayville. C. E. Bentley, Jamestown, N. Y., engineer.

Montreal (Que.) Tramways.—At a recent meeting of the Outremont Council, it was decided to notify this company that it will be required to extend its line in the spring from Mount Royal Avenue along St. Jean Baptiste, Rockland and Maplewood Avenues, Outremont.

***Beaumont, Tex.**—Plans are being considered by A. R. Crawford, Normangee, and associates to construct a line from Beaumont to Waco, via Normangee, Madisonville, Huntsville and Cold Springs.

Virginia Railway & Power Company, Richmond, Va.—When this company tears up its tracks along the Boulevard north of Broad Street so that thoroughfare may be repaved, the track will not be relaid, but will be placed on Altamont Avenue. The company will not be permitted, if it extends its line, to run across the newly-built bridge on the Boulevard over the Richmond, Fredericksburg-Potomac Railroad Company's tracks, but in all probability the city will request the company to build a bridge over Altamont Avenue at a cost of $6,000 which will be refunded by the city when the structure is completed.

Everett Railway, Light & Water Company, Everett, Wash.—The Riverside Commercial Club has petitioned this company for an extension of its lines on Riverside Avenue. The plan is to have a line extended north on Chestnut Street to Sixteenth Street, east to Summit Street and south on Summit Street, making a complete loop.

Chicago & Wisconsin Valley Railroad, Madison, Wis.—Application has been made to the Secretary of State for an amendment to this company's charter, changing the name to the Wisconsin Interurban System. The new system has acquired all title and interest to property owned by the company absorbed. The company proposes to build lines from Madison to Janesville, Madison to Portage, from Middleton connecting with the Portage line and from Madison to Fond du Lac. The road will be financed by Herbert Green & Company, Chicago. J. E. Jones, who was the original promoter of the line, will be actively connected with the new organization. [Oct. 16, '15.]

SHOPS AND BUILDINGS

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.—Construction has been begun by this company on its freight shed on Water Street, Augusta. The building will be 25 ft. x 60 ft.

Pekin (Ill.) Municipal Railway.—The carhouse of the Pekin Municipal Railway at Rosedale, under construction for the past several weeks, was damaged by fire on Oct. 10 to the amount of more than $1,000.

Southern Traction Company, Dallas, Tex.—This company has completed the construction of its passenger station at Milford.

POWER HOUSES AND SUBSTATIONS

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company is doubling the capacity of its Lowellville plant from 20,000 hp. to 40,000 hp. A 20,000 hp. turbo-generator has been ordered from the General Electric Company and also eight Babcock & Wilcox boilers, equipped with Taylor automatic stokers, similar to the ones now in use. The contract for the engineering and installation of the plant has been let to the Stone & Webster Engineering Corporation. To accommodate the new equipment the power house itself will be greatly enlarged.

Ashland Light, Power & Street Railway, Ashland, Wis.—Dismantling of the original power plant of the Kentucky Electric Company, at Louisville, has been completed and the machinery and much of the structural materials have been shipped to Wisconsin. The Ashland Light, Power & Street Railway bought everything except the reinforced concrete smokestack which the Louisville Gas & Electric Company is now wrecking.

Manufactures and Supplies

ROLLING STOCK

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., has ordered five flat cars from the Laconia Car Company.

Pekin (Ill.) Municipal Railway in a fire which recently destroyed its car barns lost a storage-battery car which had formerly been operated on its lines.

Boston (Mass.) Elevated Railway has ordered from the Laconia Car Company forty-eight additional center-sections for the construction of Lindall articulated cars out of its present car equipment.

United Traction Company, Albany, N. Y., has issued specifications for fifteen new cars, the purchase of which was recommended by the Public Service Commission, as noted in detail in the ELECTRIC RAILWAY JOURNAL of Aug. 21, 1915.

Trenton & Mercer County Traction Corporation, Trenton, N. J., was reported in the ELECTRIC RAILWAY JOURNAL of Oct. 16, as preparing specifications for ten new city cars. This company advises that its specifications are of a preliminary nature only.

Durham (N. C.) Traction Company is contemplating the purchase of a few new cars, through its operating company, the Doherty Operating Company, New York. The number of cars is undecided and specifications will not be ready to send out for about two or three weeks.

Des Moines (Iowa) City Railway was reported in the ELECTRIC RAILWAY JOURNAL of Oct. 16 as expecting to purchase twenty-five new steel cars. This purchase is contingent on the passage of a proposed ordinance for renewing its franchise, which has been approved by the City Council and which will be submitted to a referendum-vote on Nov. 20.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Oct. 16 as having issued specifications for ten new city cars, has placed the order for these car-bodies with the Southern Car Company. The cars will be of the end-entrance type, with closed vestibules, folding and sliding doors and folding steps. Sixteen cross-seats and two longitudinal seats at each end of the body will furnish a seating capacity of forty-eight. Trucks will be of the maximum-traction type.

TRADE NOTES

National Car Wheel Company, Rochester, N. Y., has re-elected Edward H. Chapin as vice-president of the company and as a member of its board of directors.

Electric Service Supplies Company, Philadelphia, Pa., has appointed the Grayson Railway Supplies Company, St. Louis, Mo., as its Southwestern sales representative in the States of Missouri, Arkansas, Texas and Oklahoma.

Railway Specialties Corporation, New York, N. Y., has appointed J. N. Ebling as general manager to succeed Fred W. Roth, resigned. Mr. Ebling has been for five months sales manager of this company and continues to serve in this capacity in addition to that of general manager. He was previously connected for about four and a half years with the United States Light & Heating Company, Niagara Falls, N. Y.

Stanley H. Smith has been appointed district sales manager of the Pennsylvania Steel Company in charge of the Chicago territory, succeeding R. E. Belknap, who has been appointed district sales manager of the same company, for the New York territory. Mr. Smith has been a salesman in the Pennsylvania Steel Company's Chicago office for the past year, having come from the Cleveland office of the same company where he served in a similar position.

T. L. Smith Company, Milwaukee, Wis., has purchased the exclusive manufacturing and selling rights of the Albrecht excavator and loader and is in position to make prompt shipments of these machines. This excavator and loader can be used for excavating, for big foundations, basements and drainage ditches, for back filling, for loading sand, gravel and other similar materials, and as an economical investment for the contractor who handles street and highway paving. It can be used to advantage on the ordinary roadway in place of the regular horse scraper.

Van Dorn & Dutton Company and the Van Dorn Electric Tool Company, Cleveland, Ohio, have acquired a new site on Woodhill Road between Kinsman and Buckeye Roads, on which they will shortly begin the erection of new plants, which will afford opportunities to more than double the capacity of their present factories in the production of gears for the former company and of electrically operated drilling and reaming machines, grinders, etc., by the latter company. The new plant of the Van Dorn & Dutton Company will be 400 ft. x 50 ft. x 80 ft., two stories high on the street level. The building site is on sloping ground, the contour of which permits the erection of a third story the greater part of the length of the building and a fourth story at the rear end. The plant of the Van Dorn Electric Tool Company will be a two-story building, 50 x 275 ft. The two buildings will be joined in the front by one two-story office building, as the management personnel of both companies is largely common. In addition to the main buildings a thoroughly equipped hardening and treating plant will be erected. Ample railroad facilities are provided by a switch from the Cleveland Belt Line Railroad. It is expected to occupy the new buildings by April 1, 1916.

ADVERTISING LITERATURE

S. K. F. Ball Bearing Company, New York, N. Y., has issued a catalog describing the applications of its ball bearings for car lighting generators.

Holophane Works of General Electric Company, Cleveland, Ohio, has issued a catalog describing the principles and designs of its holophane refractors for street lighting.

Westinghouse, Church, Kerr & Company, New York, N. Y., have issued a folder describing the new Communipaw engine terminal of the Central Railroad of New Jersey, which this engineering company designed and built.

Ohmer Fare Register Company, Dayton, Ohio, has issued a folder describing its transfer machine for printing and issuing transfers on street cars. This machine was described in detail in an illustrated article which appeared in the ELECTRIC RAILWAY JOURNAL of Sept. 11, 1915.

Barrett Manufacturing Company, New York, N. Y., has issued a large folder containing a bird's-eye view of the modern plant of the National Lamp Works of the General Electric Company at Nela Park, Cleveland, Ohio, all the buildings of which are covered with Barrett specification roofs. The foundations and all the connecting tunnels are water-proofed with specification pitch and felt and practically all of the buildings have Tar-Rok sub-floors.

Hamilton Watch Company, Lancaster, Pa., has issued advertising literature on its watches for railroad men. The fact that 56 per cent of the watches in service on railroads where there is an official watch inspection are Hamilton watches, is quoted as an indication of its unusual time-keeping qualities. One of the booklets contains numerous testimonials from conductors, locomotive engineers and train dispatchers as to the liability of the watch. For railroad use the company recommends its larger watches because they are built heavy and their larger dials with bold figures and large black hands enable one to determine the time more quickly at greater distances, especially in a dim light. One of the booklets issued contains convenient blank forms for tabulating watch inspection records.

Searchlight Company, Chicago, Ill., has issued a bulletin which contains a discussion of the oxy-acetylene process of cutting and welding. The booklet explains the properties of acetylene and shows by the history and method of its production the advantages of this particular process, i. e., the securing of an absolutely pure and dry gas by means of a thorough washing process. The elimination of such impurities as phosphorus, sulphur and ammonia is important, as these have a chemical reaction on most metals, and consequently will affect the welding of such metals. When the acetylene is thoroughly dried it is put in cylinders by being absorbed by acetone, which at a pressure of ten atmospheres will absorb 250 times its own volume of acetone. Through the use of a packing made of infusorial earth and pitch the acetylene gas is released in a dry condition without any acetone being released. This dry acetylene is capable of producing a temperature of 6300 deg., a heat unattainable by a gas which is not dry.

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ANALYZE RAIL RENEWAL PROBLEMS

Some engineers have looked askance at the formula suggested in our issue of July 31 to test the economy of renewals in the "Girder and High T-Rail Renewal" article. Others have expressed the opinion that financial considerations based on pure economy seldom govern rail renewals but that municipal demands or public policies compel renewals regardless of the economy of the problem. By the same token, it is the public desire that all railway companies should reduce fares, but this is no reason why the companies should do so. To make a renewal before economy dictates and without a place to relay the old rail so as to obtain its complete wear life is equivalent to a fare reduction. Way engineers cannot afford to be responsible for an increase in the expense of operation which amounts to a reduction in fares. We do not mean to say that rail renewals in the past have been generally made on an extravagant basis, but we seriously doubt whether all track engineers in the past have so carefully analyzed their maintenance problems that they know, to a reasonably close degree, the economy of each case as it presents itself. True, some of the factors entering the problem must be assumed, but an assumption carefully made on the basis of experience is much better than a mere guess. If the municipal authorities demand a renewal before it is really needed, the actual loss to the company in dollars and cents is the kind of an argument the public can understand. The mere expression of opinion of an engineer, particularly when he is a company man, is of little avail. In other words, we believe that rail renewals, like other operating problems, are capable of scientific analysis.

MAN VERSUS THE MACHINE

A recently-published report on the disastrous troop-train wreck that occurred in England some four months ago discloses evidence of the most amazing character as to the contingency of that decidedly mysterious mental process frequently classed as "man failure." The accident, which was the worst in the history of English railroading, appears to have been brought about by a signalman's failure to comprehend the presence of a passenger train standing in the block beyond his signal tower hardly 100 ft. away. Although the signalman had actually alighted from this train but a few minutes before, and could hardly have helped seeing it from the tower window, he cleared the block for a following train, quite as if he wanted the wreck to occur. In this case there were none of the contributory causes such as incompetence, fatigue, intoxication, or distraction from the duty at hand, that could possibly be brought forward. "Man failure" was the only explanation, and as an astounding climax to a lengthy record of experiences pointing to the inevitability of mental lapses in long-continued work of a repetitive nature, it emphasized the importance of automatic means where such conditions are involved. The manual block system of signaling, which was in use at the point where the wreck occurred, has unquestionably many material advantages, but in the face of such a failure of the human controlling agency, which here might well have been dominated by Edgar Allen Poe's "imp of the perverse," the value of the automatic signal becomes obvious. The action of a machine in case of failure can, at least, be predicated in advance and made subject to mechanical checks.

A VICIOUS "EXPERIENCE ORDINANCE"

The "experience ordinance" recently passed by the city of Cincinnati was undoubtedly intended as a form of support to traction employees who might be considering future strikes. Everyone will admit that inexperienced platform men ought to have ample instruction before being placed in complete control of a car. No street railway could afford regularly to take the risk of accident damages incident to the operation of cars by untaught recruits. For that reason the ordinance is about as valuable to the city as an armless dogcatcher. Yet the character of the legal restrictions governing the procedure in this case actually renders it impossible for the company to act in emergencies, regardless of its ability to obtain experienced car operators, because the ordinance requires that new men must be instructed only by old employees who shall have been in service for "one year immediately preceding the date of giving such instruction." Obviously, if all the old employees suddenly leave the service, the instruction of new men to take their places can hardly be undertaken without recourse to miracle-working. The facts are that if the ordinance was enforced in such a case, the community would suffer more under it than the railway company. The company would then have a choice of two things. One would be to assume that the law automatically relieved the railway from its obligation to run cars. This would give the walking public plenty of time to ponder over the wisdom exhibited by their chosen authorities. The other plan would be to disregard the law. If it should do this the company would undoubtedly be sustained by public opinion, because we cannot believe that the many sensible people in Cincinnati really think that the present trainmen in that city possess a monopoly of all knowledge in regard to proper car operation.

ENGLISH MUNICIPAL FARES RAISED

American electric railway operators will find it difficult to sympathize with the mingled astonishment and disapproval that was aroused at the recent Municipal Tramways Association Conference in London, when Alfred Baker, general manager of the Birmingham municipal lines, described the adoption of an increased scale of fares. Rather will they heartily indorse the action taken in Birmingham. According to Mr. Baker, the municipal tramways of England at the beginning of operation dealt "generously" with the public in the matter of cheap fares, long distances and liberal wages. In time, however, it was discovered that the general costs were steadily mounting, and the situation became worse after the outbreak of the war. In Birmingham, for example, the wages of the traffic and permanent way staff have increased 10 per cent since 1913, taxes have more than doubled in the last three years, and the cost of stores and materials (exclusive of permanent way materials) has shown an average increase of 27 per cent on account of the war. With expenses thus coming perilously close to receipts, the municipal tramway committee raised the fares and increased the receipts £1,666 a week without a public murmur.

Mr. Baker refused to say, however, that raising fares is a general remedy for all municipal tramways to use in meeting the higher costs of operation, and from the outspoken criticism by some managers the plan in truth does not seem likely to be widely adopted. Yet in fearlessly pointing out the weakness of English municipal tramways to-day as a result of their excessive and unbusiness-like liberality of operation, Mr. Baker has brought into prominence a question that sooner or later must be decided in connection with every municipal undertaking, whether in England or elsewhere. It cannot be argued that the present higher costs are only the transitory result of hostilities, for many municipal committees were forced to look anxiously at the financial condition of their undertakings even before the war broke out, and many of the increased burdens of the last year or so will, we believe, show a tendency toward permanency.

The question that is thus presented for municipal advocates to solve is one which involves the fundamental concept of municipal operation as viewed by two distinct schools. One faction believes that a municipal tramway should be run as a business enterprise to return a profit, while the other maintains that such objects as cheap fares, more frequent service and extensive city developments through tramway operation constitute the goal to be reached, whether the tramway shows a loss or profit. The first view is the one usually advanced when the road is municipalized. The advocates of municipal ownership want simply that the city should have the "profit" which the company formerly earned. But as politics creep into its operation and as demands are made for the extension of the lines in this direction or the other and for higher wages, these concessions and economical operation are found incompatible. Then follows the demand that the deficit should be made good by the general taxpayer.

In their ardor for making concessions to the riding public many English municipal lines have lost sight of the fundamental economic relation between the price and the cost of transportation, but now with the increased cost of operation their concessions to the patrons have turned to plague the inventors in a way that commands attention. We hope that the volume of higher costs will bring enlightenment as to the value of cost-accounting principles in fare-making.

NEW ROCHELLE MOTOR-BUS LINE

The franchise which was granted for a motor-bus line in New Rochelle last week by the Public Service Commission of New York, Second District, places the bus line on an entirely different basis than that of the ordinary jitney. Indeed, with the provisions that children under five and policemen and firemen on duty shall be carried free, that buses shall run on at least a twenty-minute schedule from 6.30 a. m. to 1.30 a. m., that 3 per cent of the gross earnings shall be paid quarterly to the city, that a bond shall be given to insure prompt payment of this and other obligations and that the franchise shall be forfeited in the event of the insolvency of the holder or failure to operate the system in accordance with the terms of the franchise, it reminds one of a railway franchise. In granting the franchise the commission also has emphasized its present policy of protecting already established utilities under its jurisdiction from unnecessary competition and has rejected two of the six routes for which application had been made by the motor-bus company. The reason given was that these routes were too closely competitive with the existing trolley system. The maximum headway is to be twenty minutes and the fare is to be 5 cents. The length of each route is from 1 mile to 1½ miles.

If the motor bus company should accept this franchise and should begin operation the installation will form an interesting example of the relative merits of 'bus and electric street car operation under somewhat similar conditions. Although the average passenger ride in this case will probably be less than a mile we are rather skeptical of the success of the project. The promoter will have to average three passengers per mile or four and a half passengers for each half trip of 1½ miles to pay operating expenses, reckoning these at 15 cents per bus-mile, and will have to carry considerably more than this number to provide for depreciation, taxes, a profit and interest on the investment. The possibility of doing this in local service in a town like that of New Rochelle, with its population of some 32,000 people, is not great. We are by no means disposed to decry the use of motor buses or to deny that there is a field for them in passenger transportation. We think there is a good field and one which is much wider than that to which they have been at present applied. But we do believe that where the franchise calls for a regular schedule and other similar traffic regulations, as in this case, the number of places where motor buses can be made to operate successfully on a 5-cent fare is very limited.

PAVEMENT SAND CUSHION BECOMING OBSOLETE

Comparatively recent experimental pavements in which brick or granite block was laid on a mortar cushion, instead of the usual sand cushion, demonstrate the utility of the former which, it is believed, will eventually relegate the sand cushion among the other obsolete practices of pavement engineers. Several years ago granite-block pavement was laid on a mortar cushion by the Houston (Tex.) Electric Company with most satisfactory results. As early as 1904 the Philadelphia Rapid Transit Company paved between its rails with granite block on a dry mixture of sand and cement and the pavement is still in service.

More recent experiments made on highways and in paved streets have also proved the advantages of the mortar cushion. This type of cushion is just as applicable to the track allowance as it is for highway or street-paving purposes and will undoubtedly eliminate many of the common defects which can only be attributed to the unstable sand cushion. To obtain the maximum life of any pavement, it must be impervious to water. When a rigid surface is laid on a resilient cushion it is practically impossible to make the surface waterproof. Water percolating through the joints or along the rail in any type of unit pavement carries silt which ultimately starts a pumping action in the pavement surface. During wet seasons or on pavements that are sprinkled frequently this silt, along with the sand, is forced to the surface and a pocket or rut is formed in a comparatively short time. Deterioration of this kind, however, is not as serious as that resulting from freezing and thawing of the sand cushion. Many instances could be cited where the brick surface has been heaved so badly by freezing and thawing that complete relaying was necessary.

Better pavement surfaces at a lower cost per square yard may be obtained with the dry sand and cement mixture than with the old-style sand cushion. A mortar cushion, together with a grouted filler, insures a pavement absolutely impervious to water, and eliminates the shifting and yielding incident to a sand cushion which is largely responsible for uneven pavement surfaces. Sand cushions were supposed to have furnished a resilient base for the rigid pavement surface. If such a base resulted the sand cushion could not perform its function properly because any movement would unquestionably decrease the life of the pavement surface. The mortar cushion lends itself just as readily to construction as the sand cushion and produces a pavement surface which will not fail because of wide changes in temperature. Openings in the pavement to make repairs will cost slightly more, perhaps, but this is to be expected if pavement life is to be prolonged. Any structure designed to facilitate repairs is quite certain to fail before one designed with wear life as the governing factor. A longer wear life will make fewer repairs necessary, and in the end the increased cost of making openings in the pavement will be more than offset by reduced pavement maintenance.

LARGE AND SMALL POWER PLANTS

Although one cannot deny that there is a great fascination in such large generating units as have been described in recent issues of the ELECTRIC RAILWAY JOURNAL, it is profitable occasionally to note some of the interesting developments that are going on in small plants. An example of such a plant is that of the Springfield (Ohio) Railway, described in this week's issue. In this plant the condensing, coal and ash-handling and oiling equipments are as ingenious and as worthy of study as the respective elements in many plants of ten or more times its size. This is also an excellent example of a rehabilitation in which a considerable part of the old plant was incorporated effectively in the new, and that without serious interference with operation.

That the small railway power plant is an important element in transportation is indicated by the fact that two-thirds of the energy used by electric railways, or roughly 6,000,000,000 out of a total of 9,000,000,000 kw.-hr., is still generated in the railway companies' plants, or was at the time of the last census report. There is undoubtedly a well-defined tendency on the part of electric railways located in the territory of large central stations to buy energy, but, in spite of this fact, it is significant to note that between 1907 and 1912 there was an increase in generating capacity of electric railway power plants of 45.4 per cent. The figures for 1912 show that in that year a total of 495 companies had a combined generating capacity of 3,665,000 hp., or an average of about 7400 hp. each. Allowing for a few extremely large plants this means that there is a very considerable number of plants averaging about the size of that in Springfield.

In these plants it would appear that there is need of more economical operation to offset increasing unit costs. While in the states containing very large cities the cost of energy per kilowatt-hour has decreased or remained stationary, in other states it increased about 14 per cent in five years. In the United States as a whole it decreased more than 15 per cent in the same period, due to the large plants. It thus behooves the managers of the small plants to study their problems most carefully and look to savings in labor and material, both in operation and in maintenance. Even if a plant is not near enough to a large central station to force competition in cost of electrical energy production, it is desirable to generate this energy as cheaply as possible to offset in part the increase in costs of other components of transportation. The power plant must have reasonable appropriations for the purchase of equipment which will conduce to this end, as the use of labor-saving devices is an important element of economy.

While the ELECTRIC RAILWAY JOURNAL will continue to chronicle the interesting achievements in the power plants of 100,000-kw. capacity or more, the editors realize that to the average railway man such plants are of general rather than immediate interest. The small and moderately-sized plant will therefore, as heretofore, continue to have a large share of attention in the columns of this paper.

A Railway Power Plant Rebuilt Without Interfering with Operation

A Plant of Moderate Size Has Been Newly Housed and Equipped with Efficient Auxiliaries, Including a Novel Form of Condenser and an Original Oiling System—Reciprocating Engines Are Retained for the Present

The Springfield (Ohio) Railway, a subsidiary of the American Railways, Philadelphia, Pa., has just completed the remodeling of its power plant located at the corner of Power and Warder Streets in Springfield. The new plant has been built around and within the old one without interference with operation. The company has now a most satisfactory plant, and one up to date in every particular with the possible exception of the use of reciprocating engines instead of the more popular steam turbines. The impelling reason for the use of reciprocating engines in the new plant was that the American Railways had on hand, in addition to the two McIntosh & Seymour units originally installed here, two excellent engines which had been displaced with steam turbines in other stations. While the reciprocating engines were installed in this plant for the present the possibility of changing later to turbines was considered and provision was made for doing so.

In rebuilding the plant without interfering with operation many puzzling problems in piping support, etc., had to be solved. How some of them were solved is indicated in several of the illustrations which accompany this article. Of particular interest were the schemes used for taking care of the flue gases while installing the fan and economizer, for supporting the steam header while the wall behind it was removed, and for protecting the operating machinery amid the dirt and confusion.

THE BUILDING

The pair of illustrations above show the appearance of the two stations, and subsequent pictures indicate the way in which one was gradually superimposed on the other. The new building was designed for this superposition so as not to interrupt regular service. The general layout of the plant is indicated in one of the line cuts. The new building is one story in height, with walls of brick and foundation of concrete below ground and ashlar cut masonry above ground. It is divided by a firewall into engine and boiler rooms of equal size, and in the former is installed a 20-ton Whiting crane. A basement for the accommodation of auxiliaries extends beneath the entire building. No wood was used in the construction of the building, the doors, door frames and window frames being of steel and the floors and roofs of concrete.

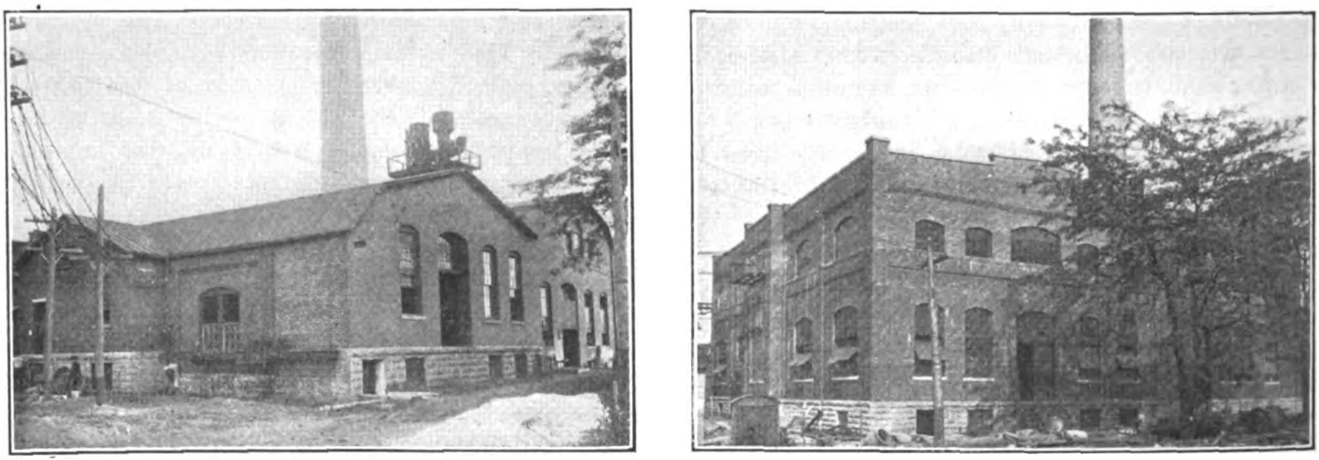
THE BOILER ROOM

In the boiler room the firing aisle is located against the partition. Over this aisle is a suspended steel bunker of 300 tons capacity carrying below it a weighing larry from which the coal is spouted to the stokers. The larry is motor-driven and floor-controlled, and it has a capacity of 1 ton. Cast-iron gates are provided in the bunker bottom with a 5-ft. spacing, thus minimizing the amount of dead coal therein. The larry is equipped with a ticket recorder so that accurate records can be kept of the coal consumption as a whole, for the several boilers and, for the several firemen.

The boiler equipment comprises a total capacity of 2100 b.hp. of Stirling-type, water-tube boilers. There are six units, four of 400-hp. capacity each, and one each of 300-hp. and 200-hp. capacity. Two of the large boilers are new. All boilers are equipped with Murphy stokers with both electric and steam drive. Beneath the stokers is a track for ash cars, forming part of a very complete equipment for handling ashes.

Draft for the furnaces is provided by means of a brick chimney 8 ft. in diameter at the top and 150 ft. high, and a steam-driven induced-draft fan. As shown in the general plan, there are three outlets from the main smoke flue, one through an economizer chamber and the fan, one direct through the fan, the other through a by-pass. The economizer is of the Green type and is rated at 2000 hp. Stack, fan-house and economizer are all located out of doors, permitting a simple and economical arrangement of the equipment which was placed inside.

The boiler-room auxiliaries include an open-type Cochrane feed-water heater of 2000-hp. rating, Warren vertical marine-type feed pumps of 350 gal. per minute capacity each, and a water softener to purify make-up

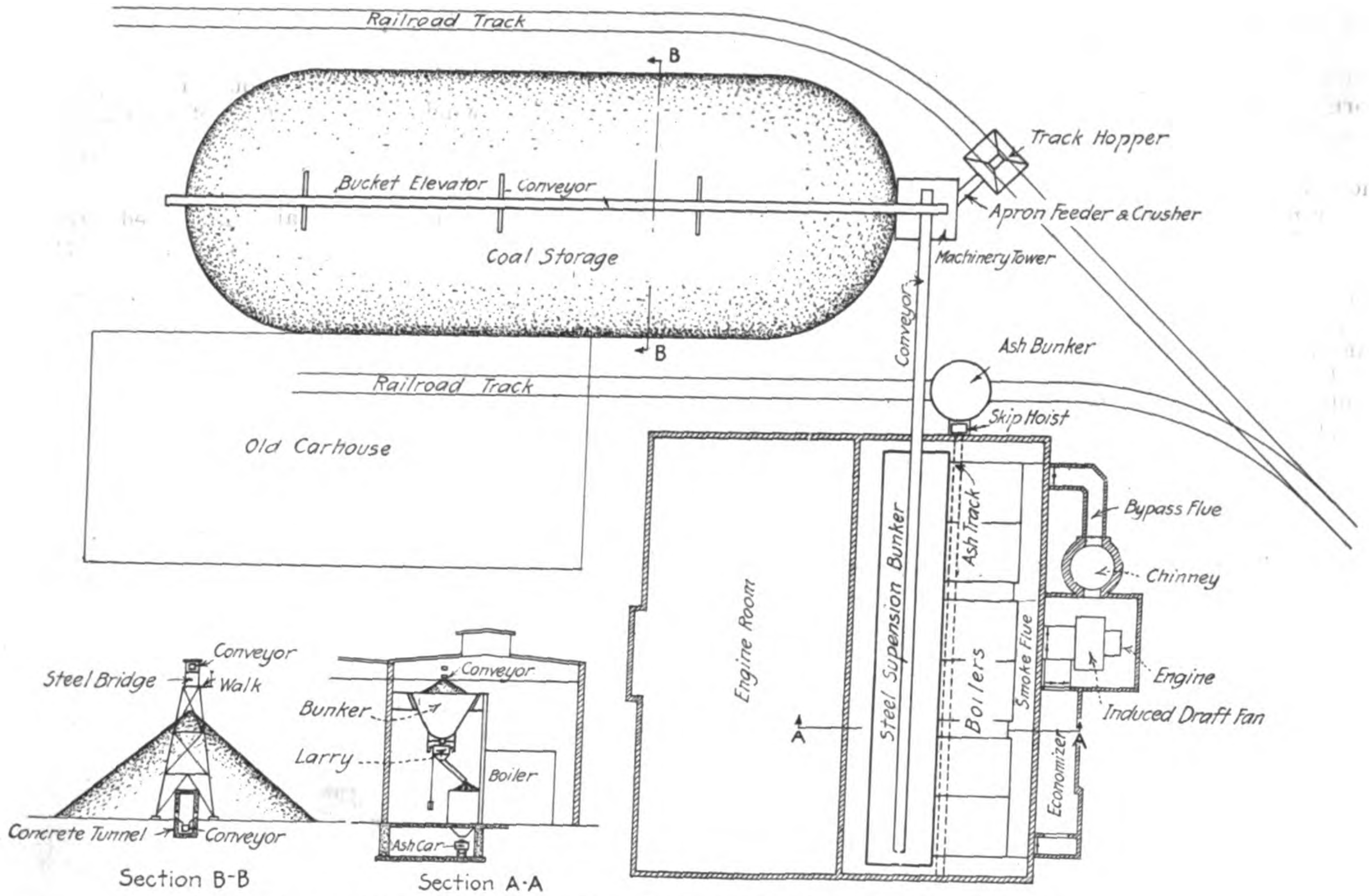


SPRINGFIELD RAILWAY POWER PLANT—THE OLD POWER HOUSE AND THE NEW ONE water. The last-named is necessary because the raw water from the wells is very hard, containing 24 grains of incrusting solids per gallon and this caused much trouble in the old plant.

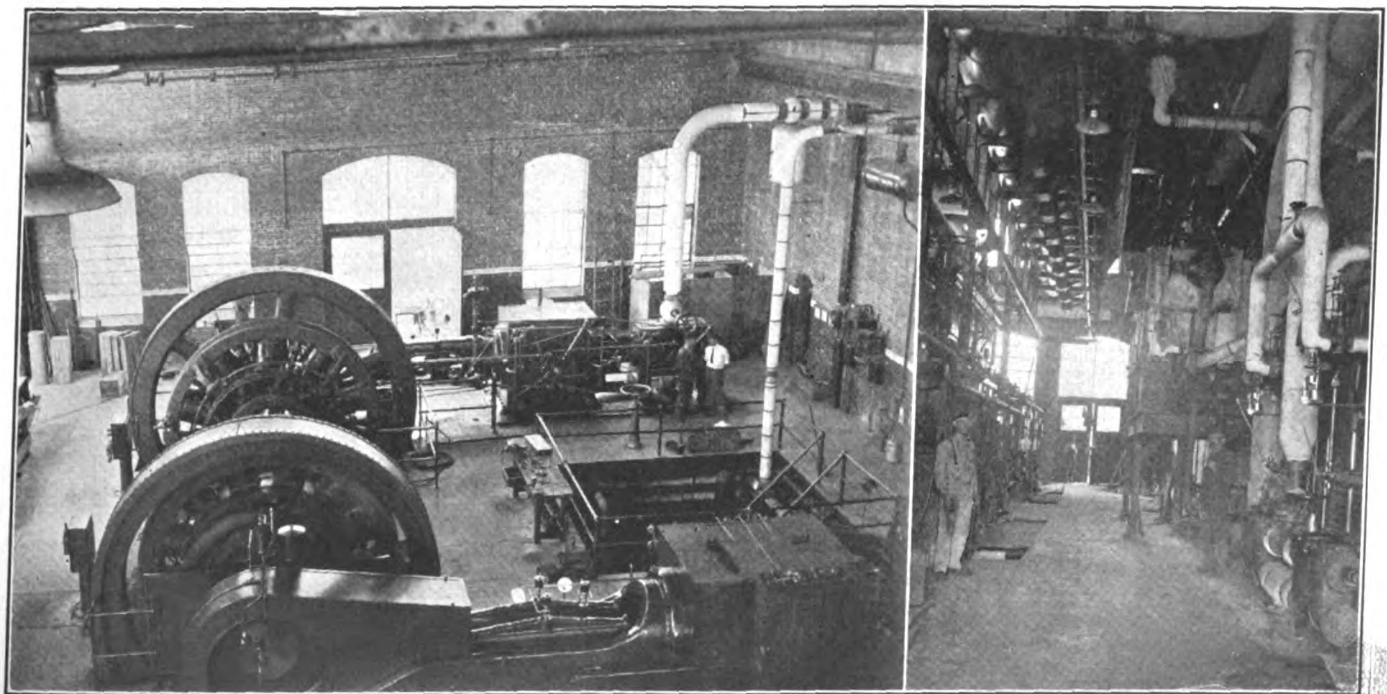
THE ENGINE ROOM

In the engine room four units of a total capacity of 1975 kw. are installed as follows: One 450-kw. McIntosh & Seymour tandem-compound condensing engine with GE generators; one similar 500-kw. unit; a similar 500-kw. engine coupled to a Crocker-Wheeler generator, and a 525-kw. Allis-Chalmers Corliss engine coupled to a GE generator.

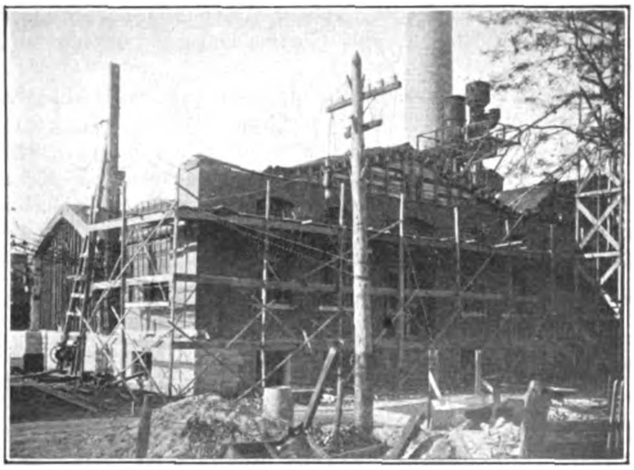
The engines exhaust into one exhaust main which at one end connects with two Kuylenstjerna barometric surface condensers, which are described later in this article. Before it reaches the condensers the steam passes through a Sweets oil separator where the oil is removed to the extent of 99 per cent. This main exhaust line is also provided with automatic free exhaust


Railroad Track
B
Track Hopper
Bucket Elevator
Conveyor
Apron Feeder & Crusher
Coal Storage
Machinery Tower
Conveyor
B
Ash Bunker
Railroad Track
Skip Hoist
Old Carhouse
Bypass Flue
Ash Track
Chimney
Steel Suspension Bunker
Engine Room
Boilers
Smoke Flue
Engine
A
A
Induced Draft Fan
Economizer
Conveyor
Steel Bridge
Walk
Conveyor
Bunker
Larry
Boiler
Concrete Tunnel
Conveyor
Ash Car
Section B-B
Section A-A

SPRINGFIELD RAILWAY POWER PLANT—GENERAL LAYOUT OF PROPERTY



SPRINGFIELD RAILWAY POWER PLANT—ENGINE ROOM INTERIOR—FIRING AISLE OF BOILER ROOM



SPRINGFIELD RAILWAY POWER PLANT—NEW BUILDING INCLOSING OLD ONE

valves in each end so that, if necessary, some of the units can be run non-condensing when the others are in on the condenser.

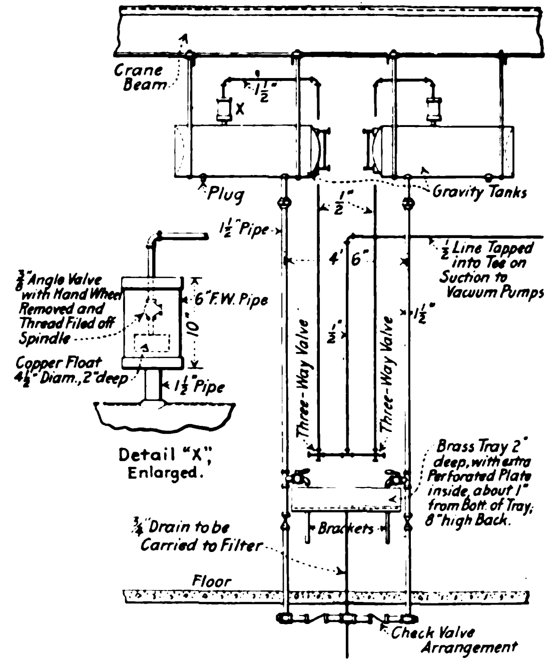
In the engine-room basement are two condenser circulating pumps drawing water from ten 35-ft. driven wells located on the property near the power house. There is also a connection to a near-by creek. Two steam-driven, reciprocating vacuum pumps for the condenser are located on the engine-room floor.

The generator output is controlled through a switchboard of standard GE make, containing four generator, one lighting, one totalizing and six feeder panels, with ample room for expansion. The outgoing feeders inside the station are supported on a steel cable rack mounted on the building wall, and outside they are carried upon angle-iron poles 40 ft. high above ground.

OILING SYSTEM

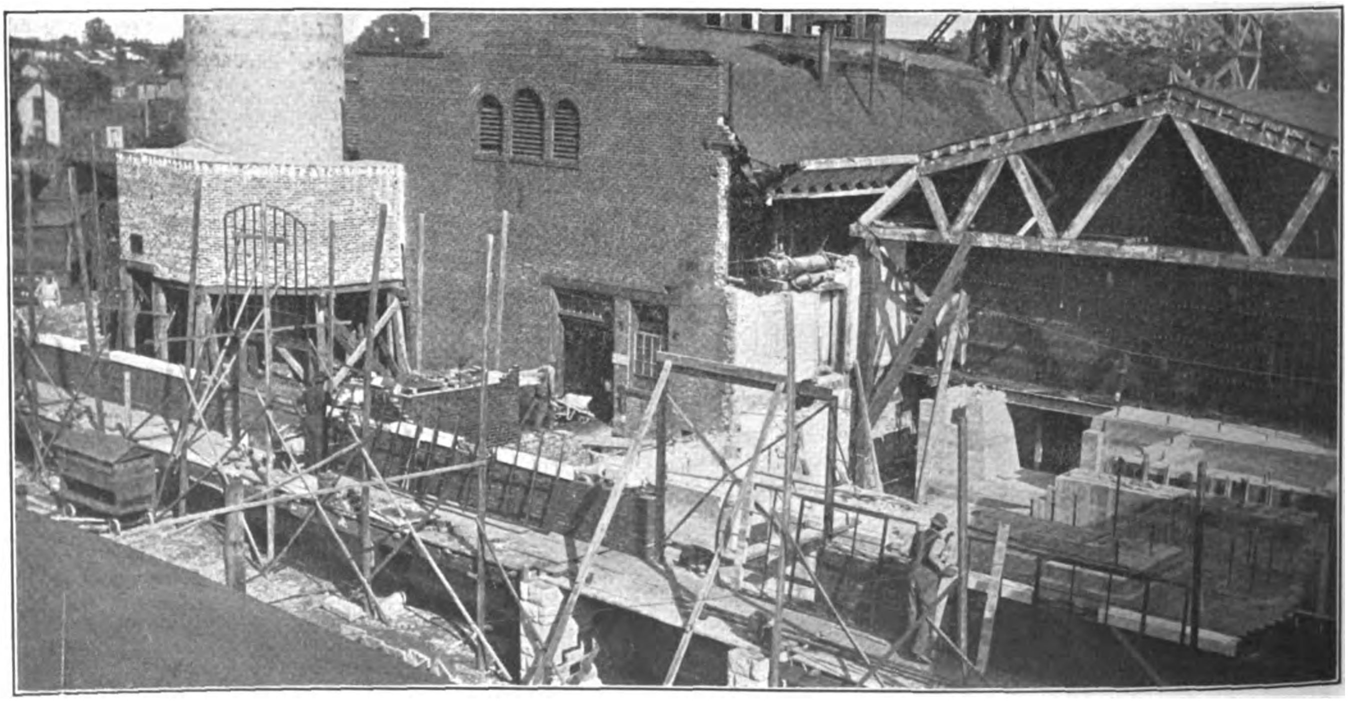
The oiling system differs from the usual type in the use of the vacuum from the condenser, or the condenser vacuum pump, to lift the oil from the filter to the elevated storage tanks. The details of the scheme can be seen in the accompanying diagrams. Three parts of the system are referred to therein, as follows: The elevated storage tanks, two in number, of a capacity of 50 gal. each, together with the accompanying valves, the oil filter and auxiliary storage tank (not shown but indicated by lettering near the pipes leading to them), and a check-valve arrangement in the pipe connecting the elevated and low-level tanks and in the oil feed pipe.

The suction pipes enter the elevated tanks at the top through a home-made check valve consisting of an angle valve operated by a copper float which rises when the tank is filled with oil. In the suction pipe line to each tank is a three-way valve operated by hand during the filling operation. In one position (filling) this valve puts suction on the tank, in the other atmospheric pressure is applied, allowing for gravity feed to the bearing pipe line.


Crane Beam
$1\frac{1}{2}$"
X
Plug
$\frac{1}{2}$"
Gravity Tanks
$1\frac{1}{2}$" Pipe
4'
6"
$\frac{1}{2}$ Line Tapped into Tee on Suction to Vacuum Pumps
$\frac{3}{8}$" Angle Valve with Hand Wheel Removed and Thread Filed off Spindle
6" F.W. Pipe
10"
Copper Float $4\frac{1}{2}$" Diam., 2" deep
$1\frac{1}{2}$" Pipe
Three-Way Valve
$\frac{1}{2}$"
Three-Way Valve
$1\frac{1}{2}$"
Detail "X", Enlarged.
Brass Tray 2" deep, with extra Perforated Plate inside, about 1" from Bott. of Tray; 8" high Back.
$\frac{3}{4}$" Drain to be Carried to Filter
Brackets
Floor
Check Valve Arrangement

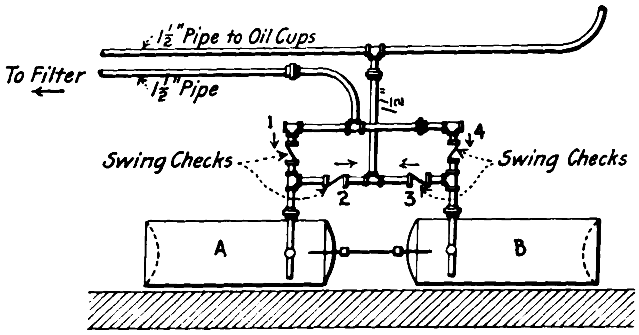
SPRINGFIELD RAILWAY POWER PLANT—STORAGE TANKS AND PIPING OF OILING SYSTEM

As stated, there is a check-valve system in the feed



SPRINGFIELD RAILWAY POWER PLANT—TEMPORARY CONSTRUCTION DURING REBUILDING line. This is shown diagrammatically herewith. It consists of four swing check valves, 1, 2, 3 and 4, which allow oil to flow in the directions shown by the arrows. When tank *A* is under suction, *B* is under atmospheric pressure. Then oil flows through valve 1 into tank *A*, and out of tank *B* through valve 3 to the oil cups, and vice versa.

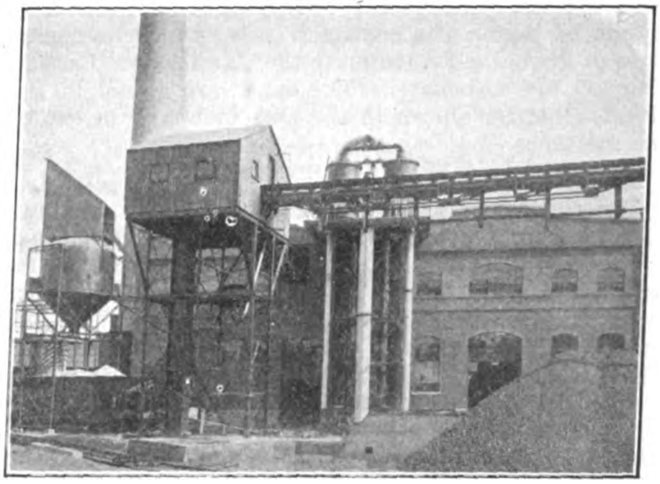
With this arrangement it generally takes about five minutes to put a barrel of oil from the basement to the elevated tanks. If the condensers do not happen to be in operation when the tanks are to be filled the air pump can be started up for a few minutes. The suction pipe is tapped into the vacuum line near the air pump for this purpose. The operation of the system is very satisfactory to the attendants and there is no sticking of the valves as they all work in oil. The system was designed by Adolph Kuylenstjerna, mechanical engineer of the company.



SPRINGFIELD RAILWAY POWER PLANT—CHECK VALVES IN OIL-FEED SYSTEM

APPARATUS FOR HANDLING COAL AND ASHES

Coal is brought into the yard in the railroad cars, from which it is dumped into a steel track hopper. Through this it falls upon an apron feeder which delivers it to a two-roll crusher. The crushed coal is distributed upon the storage pile by a V-bucket conveyor onto the vertical run of which the crusher discharges. For direct filling of the boiler-room bunker a cross-conveyor is provided, connecting with the upper run of the storage-pile conveyor. The horizontal run of the latter is carried on a trestle, the return run being through a concrete tunnel. Coal to be reclaimed from storage is admitted to the conveyor through gates.

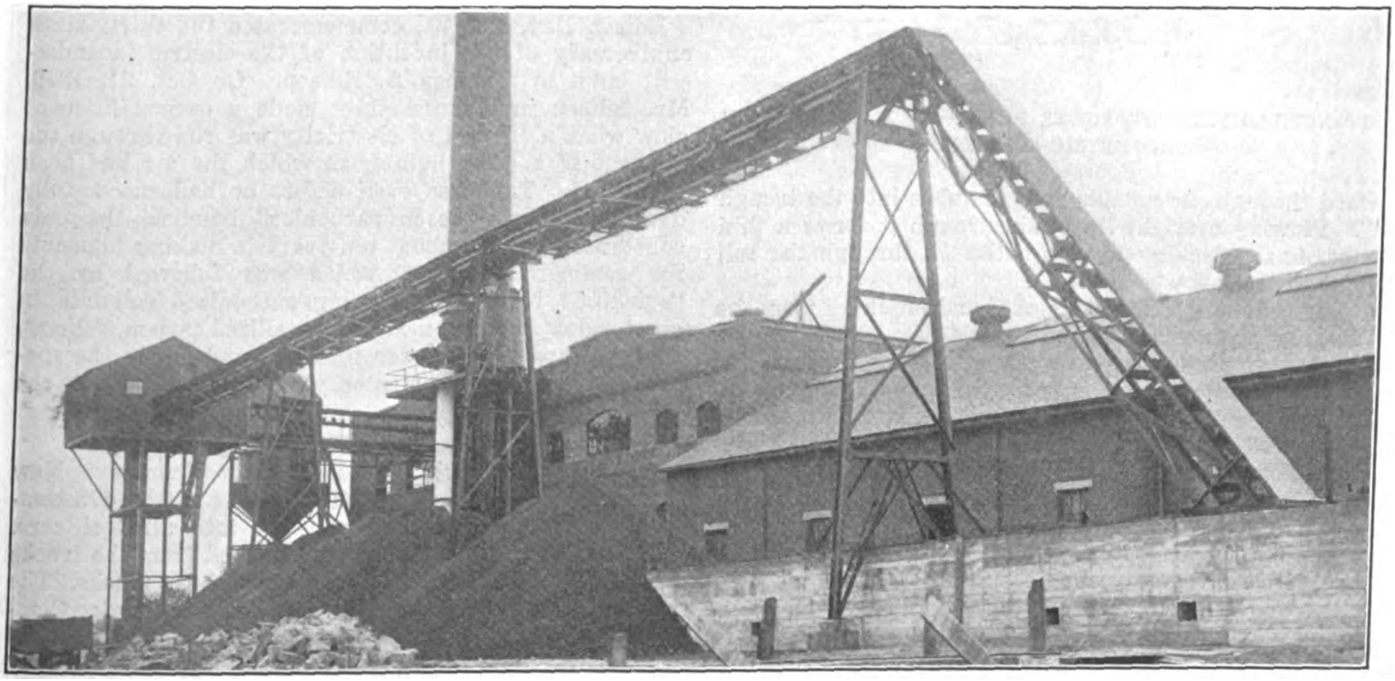


SPRINGFIELD RAILWAY POWER PLANT—CONVEYOR HOUSE, CONDENSERS AND ASH BIN

At the junction of the yard conveyor and the boiler-room conveyor is a tower which contains all of the driving machinery, suitably surrounded with guards.

The storage space has a capacity of 3000 tons of crushed coal. The experience of the American Railways with storage of crushed coal indicated that there was not an undue fire risk incurred thereby, while this practice permitted the use of simple machinery, cheap to install and easy to operate.

The ashes are handled entirely separate from the coal so that the two equipments can be operated according to their own requirements. Ashes are collected in pits under the stokers, whence they are drawn into a push car. This car has roller bearings, and its capacity is such that when fully loaded it can be easily pushed by one man. The car dumps into a skip hoist located at one end of the building, the skip bucket having a capacity 10 per cent greater than the car and a width 1 ft. greater to prevent spilling during filling.



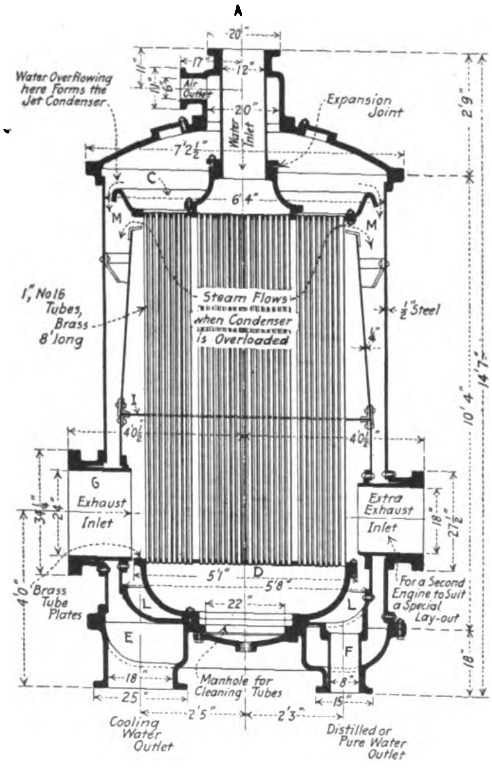
SPRINGFIELD RAILWAY POWER PLANT—COAL CONVEYING AND STORING EQUIPMENT

The operator starts the hoist, which is electrically driven, by means of a controller, after which its operations of dumping, returning to the starting position and stopping are automatic. The ashes are stored in the elevated bunker shown in the plan view and in one of the halftones.

THE CONDENSERS

The condensers are mounted upon a steel tower outside the building with a hot well below. The hot well is in two compartments, one for the circulating water and one for the condensate. The compartment which holds the condensate is equipped with an oil-filter bed intended to remove any trace of oil still remaining in the water coming from the condensers.

The condenser itself, also the invention of Mr. Kuylenstjerna, is of the surface type but combining with this an auxiliary jet-condenser feature. By referring to the cross-section shown herewith it will be noted that the circulating water enters at the top and passes downward through the central group of tubes and upward through the outside ring of tubes into the trough *C*. Flowing over the lip of the trough it forms a thin tube, finally leaving by the outlet *E*, through the tail pipe, to the hot well below.



SPRINGFIELD RAILWAY POWER PLANT—CROSS-SECTION OF BAROMETRIC CONDENSER

The exhaust steam enters at *G* and impinges upon the tubes, being forced between the tubes by a baffle ring, *I*. Any steam remaining uncondensed flows through the opening *M* into the outer space in the shell, there coming into contact with the falling sheet of circulating water and being quickly condensed. The steam condensed on the tubes falls into the chamber *L* and thence flows out through outlet nozzle *F* into the tail pipe and into a separate hot well.

The air is pumped out of the condenser at the nozzle located close to the cooling water inlet. This arrangement was adopted to secure the reduction in volume of the outgoing air which accompanies the lowering of its temperature. Otherwise an extra air cooler would have been necessary.

Mr. Kuylenstjerna mentions as some of the design features of this condenser the following: As the upper tube plate is free to rise and fall with the expansion and contraction of the tubes it was possible to expand the tubes into the sheet. As the tubes are open at one end, tube leaks do not affect the vacuum and at the same time the vacuum assists in lifting the water from the pump into the condenser. The hot steam meets the hottest water, thus minimizing tube strains. The vertical position of the tubes enables each to carry off its own condensate. The absence of baffles in the tubes allows free circulation. The jet-condenser feature provides for peak loads, permitting the capacity to be figured for average load. There is no need for a wet-vacuum pump as the barometric feature takes care of the condensate. The arrangement provides for easy cleaning and draining. The surface-condenser feature provides for freedom from scale and yet many of the jet-condenser features are retained. The tube surface in the condenser is about 2000 sq. ft., which at the nominal rating indicates a capacity of 2000 hp. The condenser of the size shown has handled as high as 3000 hp.

As stated, the hot well has two compartments, one for the circulating water and one for the condensate. They are side by side and both deep enough to thoroughly seal the condenser tail pipes immersed in them. Between the two chambers is an outside pipe connection with a swing check valve permitting make-up water to flow into the condensate chamber when the level falls sufficiently.

ADMINISTRATION AND MANAGEMENT

The power plant remodeling described above is part of a rehabilitation scheme of which another section, comprising new shops and carhouse, was described in the issue of the ELECTRIC RAILWAY JOURNAL for March 20, 1915, page 556. The power plant work has been carried out under the direction of the American Railways Company, of which H. J. Crowley is general manager, and A. Kuylenstjerna is mechanical engineer. Adolph Schmittauer was superintendent of construction in direct charge of the work. The Springfield property is under the management of George C. Towle, general manager of the People's Railway, Dayton, Ohio.

Anniversary of Incandescent Lamp Invention

Edison Day, Oct. 21, commemorated the thirty-sixth anniversary of the invention of the electric incandescent lamp by Thomas A. Edison. On Oct. 21, 1879, Mr. Edison first successfully made a carbon filament glow when a current of electricity was run through the filament in a glass bulb from which the air had been exhausted. This was even before he had successfully determined and chosen carbonized bamboo, the only substance used for about ten years in making filaments for commercial lamps, which was followed by the "squirted" filament employing carbonized cellulose in one form or another, next the metallized carbon filament, then the pressed tungsten filament, and finally the special form of drawn tungsten wire which is used in the modern Mazda lamps.

The Interborough Rapid Transit Company, New York, N. Y., has already converted six of the 478 composite cars, used in the subway, into all-steel cars. The composite car bodies were removed from the trucks and new all-steel bodies placed upon those trucks. The company has notified the New York Public Service Commission for the First District that already 184 steel car bodies have been received and that the work of converting the composite cars is progressing at the rate of thirty-one cars per week.

Rhode Island Wage Arbitration

Company's Brief Shows that During the Past Few Years Wages for Railway Employees Have Advanced Much More Rapidly than Those in Other Industries and Cost of Living—An Urgent Plea Is Made for a Substantial Reduction from the Present Scale

The Rhode Island Company presented its argument in the pending wage arbitration at Providence on Oct. 25, through James M. Swift of its counsel. James H. Vahey of Boston, Mass., submitted an argument on behalf of the union, and the case then went to the board for adjudication within thirty days. The company's point of view was presented in a printed brief of 168 pages, abstracted below.

The Rhode Island Company, incorporated in 1902, is the result of several operating consolidations comprising to-day 398 miles of track and furnishing transportation to about 90 per cent of the population of the State. It is at present operated by the federal government through a board of trustees holding the company's securities. If no purchaser for the company is found by 1919, the company, if in existence, is to be sold at auction. The trustees are charged with the double responsibility of providing efficient transportation service and of preserving the integrity of the system itself, which centers in the city of Providence.

The local division of the Amalgamated Association began its activities in 1912, and in July, 1913, a working agreement was effected covering thirty sections bearing upon wages, hours and conditions of labor. At the recent hearings Secretary Daniels of the union testified that since the organization of the union the men have more favorable conditions of working and higher pay than ever before, justifying the inference that in negotiating the 1913 agreement the union was fully conversant with the needs of its members and that the agreement fully satisfied those needs. So satisfactory was the agreement that when the company and the union met in conferences this year at its expiration to consider whether its terms should be changed it was agreed that, except as to wages and guaranteed hours to spare men, no alteration should be made. No agreement as to wages and hours could be reached, and arbitration was agreed upon. Because the company would not consent to let the union name all three arbitrators, a strike resulted in July, 1915, resulting in disorder, serious inconvenience to the public and heavy additional loss to the company, already staggering under an acute falling off in its earnings. Public opinion, however, forced the union to a realization of the unfairness of its attitude, with the result that conferences were resumed, and the present board of arbitration was selected.

Points at Issue

The subject-matter to be determined by arbitration is: 1. The rate of wages to be paid by the company to members of the union. 2. The number of hours, if any, to be guaranteed extra men for a minimum day's work.

The board of arbitration has no right to fix any scale of wages made conditional upon any co-operative plan or any scheme based upon the future earnings of the company. The award is to date back to June 1, 1915, and the agreement is to continue in force until June 1, 1917.

The arbitration board consists of Mayor Joseph H. Gainer of Providence, chairman; Henry F. Baldwin, representing the union, and Michael J. Houlihan, representing the company.

The company estimates that the demands of the union, based on the normal working year and excluding overtime or bonus time wages, correspond to a total increase of $567,479 per annum, classified as follows:

Seven-hour guaranteed day for extra men, $108,085.

Motormen and conductors (including all blue-uniformed employees), based on minimum of 30 cents and maximum of 35 cents per hour, under four-year graduated scale, $292,298 per annum. The present weighted average hourly rate is 27.85 cents; that demanded is 34.85 cents, an average weighted increase of 6.99 cents per hour, or 25.12 per cent.

Increase of 10 cents per hour for repair shop employees, $43,624.
Increase for carhouse employees, $23,342.
Increase for employees of power department, $9,589.
Increase for employees in line department, $8,379.
Increase for employees of freight department, $20,792.
Increase for regular employees of track department, $33,163.
Increase for irregular employees of track department, $25,218.
Increase for employees of stores department, $2,999.

Company's Contentions

The company contends that in view of the fact that the union has failed to prove either an increase in work or an increase in the cost of living sufficient to justify an increase in the present wage, and in view of the financial condition of the company, these demands are absolutely unjust and impossible. The company has requested the board to reduce the present scale of wages to that in force prior to the working agreement of July, 1913, viz., for blue-uniformed men, 22 cents to 27.5 cents per hour, with corresponding decreases in the wages of employees in miscellaneous departments. In considering this request, it is urged that the original offer of the company in conference to increase the pay of blue-uniformed employees contingent upon an increase in revenue, its offer of a six-hour guaranteed day to such spare men as were required to report and its failure in the early conferences to request a reduction in the wages of employees of the miscellaneous departments were in lieu of arbitration, it being distinctly stated that if arbitration became necessary the company would insist upon the requests now submitted to the board.

The company maintains: First, that all its employees now receive a wage sufficient to support an ordinary family in health and reasonable comfort; second, that the increase in wages of a great majority of the employees since the last fixation and before has been greater than the increased cost of living and that there has been no such increase in the responsibility and difficulty of the work as would justify an increase in wages; third, that the work performed by its employees is peculiar to a unique employment and does not severely tax the endurance of the men, in most departments calls for something less than ordinary skill, knowledge and intelligence, and involves comparatively little danger to life, limb and health; fourth, that the wages received by other workmen are not material in this case, and do not afford a safe basis of comparison in determining the wage in this occupation; fifth, that the wages demanded by the union are unreasonable, both from the standpoint of the company's financial condition and of local needs; sixth, that the issue is purely local, and that in its decision the board may not safely consider wages or working conditions of other street car companies or of other employments in other localities; seventh, that such evidence as has been introduced is material solely on the issues of wages and guaranteed hours, and that the board is limited to considering such evidence as indicates a change in conditions since July, 1913; eighth, that the union has shown no sound reason for instituting a guaranteed number of hours for spare men, the company's experience showing with a similar guaranty that under local conditions it is impractical; ninth, that the financial condition of the company renders it not only unable to pay any increase in wages, but obliges it, if it is to continue to exist, to reduce its wages.

The argument sets forth in considerable detail the position that comparative evidence from other companies, as attempted by the union, is inconclusive in view of the entire insufficiency of data upon which to base parallels. Fred Fay, executive board member of the Amalgamated Association, stated in the Boston Elevated arbitration that the union has always contended that the wages paid in other cities was no criterion in determining what wage should be paid in any immediate locality requiring arbitration. International President Mahon stated at Rochester, N. Y., in an interview last month that what can be paid in one place cannot be standardized by what some other traction company pays somewhere else and that wages must be determined upon local conditions. By abandoning its former contentions and principles, states the brief, the association confesses its inability to establish its case in accordance with the principles on which other increases have been secured.

This cardinal principle of arbitration is recognized and followed by Justice Higgins, president of the Commonwealth Arbitration Court of Australia (Australian Builders' and Laborers' Federation v. Archer and 569 Others). In the controversy between the Pittsburgh Railways and the Amalgamated Association, Chairman Buffington found that there is no general standard of wages for street car men, but that each of our large cities has made such fixation on the basis of local conditions. Wages paid in one city afford little light on what should be done in detail in another. This finding was made without objection by either side to the introduction of comparative evidence.

Discussion of Wage Situation

So far as motormen and conductors are concerned, the union evidence showing the wages of outside trades is immaterial. There is no similarity of work established, and the unit of comparison is the hour, day or week and not the yearly wage, which takes into account the most important element of constancy of employment. For these reasons the testimony of taxicab drivers is of little value. As to these it appeared also that their responsibility and skill are considered greater than the motorman's, because a license to operate is required. In the shop and miscellaneous departments, street railway service is peculiar to itself, by no means qualifying men to do general work of the same name outside.

Since 1907 union wages in the building trades have increased but 11.1 per cent, only 0.5 per cent faster than the cost of living for the period; and the wages of employees in the metal trades have increased 13 per cent, but 2.4 per cent faster than the cost of living. During the same time, the maximum rate per hour for motormen and conductors has increased 12 per cent, the minimum rate 12.5 per cent, the weighted average rate 13.9 per cent, the average rate per car-hour 20 per cent and the average wage per year 17.6 per cent, each unit of comparison being materially higher than the cost of living increase. The increase in the average wage per year, which is the proper measure of the living wage, shows an increase 7 per cent greater than the increase in the cost of living, an increase 4.6 per cent greater than the metal trades, and an increase 6.5 per cent greater than the building trades.

Since 1912 the average weekly wage of power-house men has been increased 7.7 per cent; of linemen, 23.8 per cent; of freight department employees, 7.5 per cent; of carhouse and repair-shop men, 13.3 per cent, and of trackmen, 25.1 per cent.

Cost of Living

The increase in the cost of living has been only 12.1 per cent since 1907. This increase now shows a break in its general trend since 1907 and indicates a gradual though as yet unascertainable decrease since 1914. As the average wage per year tends to increase because of the graduated scale and because the cost of living now tends to decrease, the margin between the two for 1915 will undoubtedly be substantially larger.

The company's argument contains an exhaustive refutation of the contentions of the union relative to the rate of increase in the cost of living since 1900. Only 319 of the present 2469 employees were in the company's or its constituent company's service at that date, less than 13 per cent of the present employment. The remaining 87 per cent have no right to ask that their wage be now increased because of a change in the cost of living from a time before they were employed by the company. At that period many of them were but children, supported by their parents, and others employed in occupations which they later chose to desert for this. In the union figures, the period selected for a cost of living basis was admittedly the lowest-price era during all the time for which price records are now available. Using the union's own figures, the increase in food cost at Providence since 1899 is found, on careful analysis, to be only about 75 per cent of that claimed.

The company's brief states that the increase in prices arrived at by the union is fallacious. Food increases were derived from either old figures discredited as being of no present value by the government department which compiled them, so carefully selected that they are not representative, or spurious. Fuel costs were taken from wholesale figures; clothing figures employed were vague estimates, with limited items, while rent was largely a matter of guesswork. The union weighting of items does not agree with the weighting of the authorities referred to, and the new method of weighted index numbers standardized in government economic calculations was insufficiently utilized. Full particulars are given in the brief of the company's methods of calculating the cost of living increase.

Working Conditions

The company contends that the work of its employees is virtually no harder than at the last fixation of wages and cites extended figures bearing upon traffic conditions, car service, etc., to prove this point. Compared with other companies cited by the union, the work of motormen and conductors, so far as affected by speed, density of population, annual car-miles operated per crew, revenue per mile of track, annual receipts per conductor, proportion of air-brake equipment, length of graduated scale, season peaks, transfers, etc., is in general easier on the Rhode Island system. It was shown that could the company place in effect its so-called "efficiency timetable," both regular and spare men would earn substantially more than at present, increasing the actual average of all men from $729 to between $791 and $839 per year. The fact that some spare men have refused opportunities to go on the regular list indicates that there are some advantages in remaining a spare man, whether in pay, hours, or working conditions, and without a guaranteed number of extra hours. The amount for bonus time actually paid is $9,090 per year more than the total for reporting time and accident reports. The percentage of inoperative Rooke fare registers per year is only 0.68 per cent per conductor, or approximately one per conductor in each 1.5 years. During the fiscal year 1915 2,774,000 signal hours were operated. In this period there were 3312 signal-hours' failure, or 0.84 inoperative signal-hours for every 1000 signal-hours operated. This is less than one inoperative signal per motorman per year and shows the falsity of the motormen's contention that their work has increased because of the number of inoperative signals. Since 1913 the work performed by the blue-uniformed department has decreased between 3 and 4 per cent, as determined from passenger revenue per car-hour and from passengers per car-hour. The company claims that the occupation of motorman and of conductor is not a skilled occupation in the sense that the union defines the term.

FINANCIAL CONDITION OF COMPANY

Wholly irrespective of dividend requirements, the company contends that no increase in wages is possible, but that a reduction should be ordered. Its borrowing capacity is exhausted; the city of Providence has so far failed to relieve the road of any of its franchise obligations; there is no market for its stock; the lessor companies have the right to require the company to keep up maintenance under penalty of forfeiture of the lease; business depression, ruinous competition of jitneys and diminished growth of population, not anticipated—all these render it impossible for the road to increase wages under present conditions. No commission with authority to grant fare increases exists in Rhode Island. Before any change can be accomplished, it would be necessary for the city of Providence and other municipalities to forego their contractual rights under franchise agreements and for the Legislature to grant an amendment to the company's charter. As to the possibility of such an outcome, the members of the board are as well able to judge as counsel. Closing, the company holds that it has been shown that the men are receiving substantially more than a living wage and that the question is whether the men are entitled to more than their present adequate wage before the company is to be allowed to earn its necessary going expenses; "that is, whether the men are to be allowed to commit financial murder of the Rhode Island Company." The irresistible conclusion is that wages should be reduced.

Kansas Association Meets

The Kansas Gas, Water, Electric Light & Street Railway Association, at its annual convention in Topeka, on Oct 21, 22 and 23, changed its name, which had been somewhat of a misnomer, to the "Kansas Public Service Association." A committee on constitution was appointed, of which A. M. Patten, assistant general superintendent of the Illinois Traction Company, is chairman. The revised constitution will be submitted to a vote of the members within the next two months. The questions to be voted on will include a graduation of the fees in the manner similar to that of the N. E. L. A., the employment of a paid secretary, the establishment of permanent headquarters at Topeka and the making of Topeka the permanent convention city. One feature of the new constitution, which has already been practically determined, will be the elimination of the water and gas departments, which have heretofore taken little part in the association work and have been represented by a very small number of members. The program of the convention was very largely confined to subjects pertaining to commercial aspects of central-station operation.

The officers elected on Oct. 24 were: President, A. H. Purdy, Topeka; first vice-president, W. R. Wagoner, Salina; second vice-president, R. G. La Fite, Eureka; third vice-president, W. J. Welfelt, Winfield; secretary, E. A. Wright, Manhattan; treasurer, J. D. Nicholson, Newton.

Fourth Congress of National Safety Council

The fourth annual safety congress of the National Safety Council was held at the Bellevue-Stratford Hotel, Philadelphia, Pa., on Oct. 19, 20 and 21. A general session of the association was held on Oct. 19. This was followed on Oct. 20 and 21 by sectional round-table meetings covering various branches of industrial activity. Of greatest interest to the readers of the ELECTRIC RAILWAY JOURNAL were the public utilities round-table sectional meeting and the railroad sectional meeting, both held on Oct. 20. At the public utilities meeting E. C. Spring, assistant to the president Lehigh Valley Transit Company, Allentown, Pa., gave an extemporaneous talk on "Hazards of Street Work," and F. J. Warnock, claim agent Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, discussed "Education of Street Car Platform Men." At the railroad sectional meeting C. W. Wilson, claims attorney Delaware, Lackawanna & Western Railroad, discussed "Public Safety and the Railroads," and J. C. Ross, chief claim agent Pennsylvania Railroad, considered the subject of "Automobile Grade Crossing Accidents."

More than 2000 delegates attended the sessions. Forty-seven railroads were represented. In connection with the congress there was a display of safety-first posters, showing virtually every type of industrial danger point and how to avoid it. This included a photographic collection portraying hundreds of appliances for guarding against injury to the worker from machinery.

One of the most important things accomplished at the congress was another step forward in the plan to establish permanent sections in the organization. These would include representatives of allied industries with special problems and hazards. The railroads had accomplished this prior to the congress just ended, and it is expected that other industries will perfect plans before the next annual meeting. The railroad organization originally started was known as the American Railway Safety Association. It is now affiliated with the National Safety Council, making up the steam railroad section. R. W. Campbell, the retiring president, said in his opening address at the congress that an invitation had been issued to the Safety First Federation, then in convention at Detroit, to join the council. The invitation was not accepted, the federation limiting its field to that of public safety. Hope for a union later was held out by Mr. Campbell. In the meantime a public safety section has been organized by the council.

The new officers of the council are Arthur T. Morey, assistant to the president Commonwealth Steel Company of Illinois, president; L. R. Palmer, Harrisburg, first vice-president; C. W. Price, Madison, Wis., second vice-president; E. R. Wright, Chicago, third vice-president; W. H. Cameron, Chicago, secretary-treasurer; Marcus A. Dow, New York, general safety agent New York Central Lines, director of exhibits.

The new members elected to the board of directors follow: H. A. Bullock, George T. Fond, C. H. Howard, L. A. Larsen, H. W. Moses, E. K. Prichett, S. F. Shattuck, J. C. Smith, L. B. Somerby, L. A. DeBlois, Dean Clifford B. Connelley of the Carnegie Institute of Technology; Dean L. E. Reber of the University of Wisconsin; J. M. Guild and Sidney A. Johnston. The new members of the executive committee are Dean Connelley, Mr. Prichett, Mr. Shattuck, Mr. Moses, Stephen W. Tener and Mr. Dow.

Efficiency in the Stores Department

The Writer Discusses the Best Location of Main and Auxiliary Stores, the Advantages of a Mnemonic System for Layout, the Use of Non-Rigid Bins and Stores Accounting in General

BY WILFRED G. ASTLE, STOREKEEPER TORONTO ELECTRIC LIGHT COMPANY, FORMERLY WITH THE DOMINION POWER & TRANSMISSION COMPANY, HAMILTON, ONT., AND THE CANADIAN PACIFIC RAILWAY

The handling and care of material and supplies in stores have become a matter of very great importance for it is now being realized that material is nothing else but a direct representation of cash and should be treated and handled as carefully as if it were actual cash.

If one has no orderly method of looking after material in stock there will always be danger of serious and costly losses, duplication of material ordered and the tying up of unnecessary capital. An efficient method, therefore, means the elimination of needless waste of material and time and the adoption of methods for quick handling and accounting of stock. This type of system has been the means of making great savings wherever it has been intelligently used.

The objects and purpose of a stores system are always to have on hand the proper amount of materials to meet the regular requirements, while keeping the stock as low as is consistent with the time and cost of replacement, to care properly for the materials so that they can be given out promptly with a minimum cost for distribution, to know what materials are required to keep work going in the most efficient manner, and to determine what kinds and quantities of materials are on hand at the time that work is put in process.

PHYSICAL ARRANGEMENT

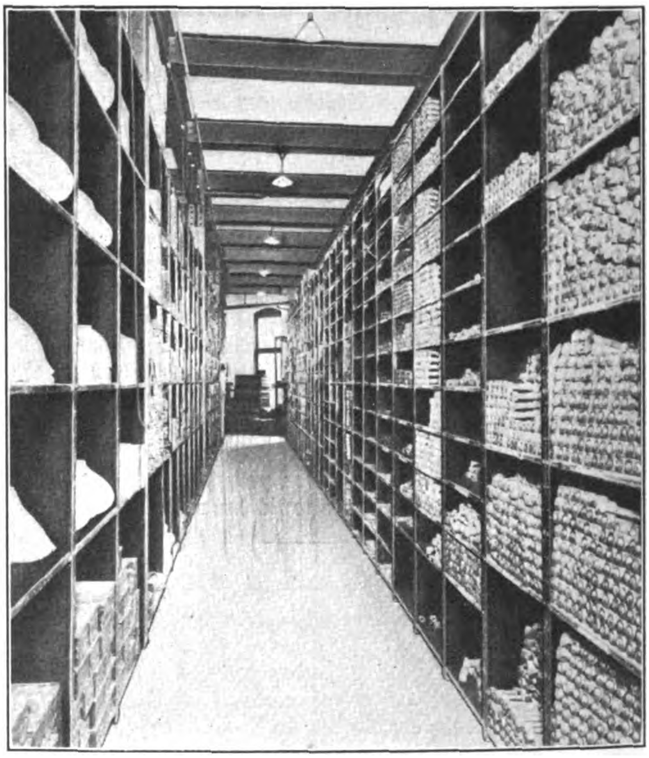
The physical arrangement should be such that all material can be easily received and distributed when required. It should also have the proper facilities for preserving the condition of the material and be kept safe from disturbance by outside parties.

A space should be laid out near the entrance of the storeroom for receiving materials, and also for sorting and checking before they are placed in the bins or racks. A space in which outgoing material may be temporarily placed should also be laid out. These two spaces should be separated so that it will be impossible to make mistakes as far as incoming and outgoing material is concerned. The provision of these two spaces will facilitate the work and allow the material called for by stores requisition to be made ready in advance of the time that it is actually required.

In laying out the space required for any particular kind of material, the needs of each department should be studied, and standards of maximum and minimum quantities established. The space should be arranged according to the kind of classification used, so that all of one kind will be together and those of similar kinds next to one another.

The most satisfactory arrangement of storage racks or bins is that where the standard size steel equipment is used, which is provided with means for subdividing and resubdividing on the unit principle (see illustrations). Thus a small bin can be had simply by slipping into a large bin one or more smaller units, whereas if more space is required for a particular material it is necessary merely to remove the unit subdivision. If the materials are arranged according to some type of mnemonic classification, it will not be necessary to number the bins in any way. If the material is of a class that does not permit this arrangement to be satisfactorily used, it will be necessary to number the bins and sections and to maintain a bin index.

The location of the material in the storeroom should be arranged with regard to the nature and the frequency with which it will be handled. If it is handled many times it should be stored near the department where it is to be used. If it is handled only occasionally it can be stored in the basement or a shed outside of the regular storeroom building. Consideration should be given to such features as protection from the weather, theft, fires, dampness, unusual dryness, etc. The location and arrangement should be further governed by the fragility, value, weight and the bulk of the material. Consideration of these features will determine what facilities should be provided for handling, sorting and arranging the materials and just what provisions for light and heat will be required.

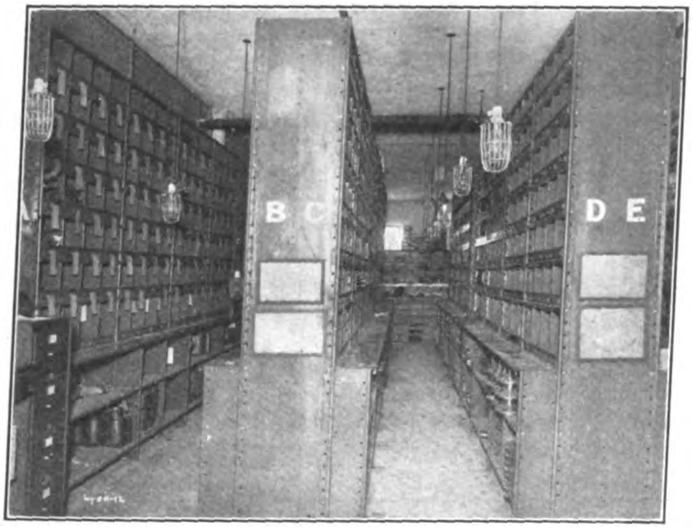


STORES DEPARTMENT—STEEL SHELVING OF ADJUSTABLE TYPE

Small materials of great value should be stored in an especially safe place, such as a vault, where protection against fire and theft will be absolute. Materials of a delicate nature should be protected from dampness, and materials that suffer from unusual dryness should be stored in a properly humidified room. Stock such as oils, paints or others of an inflammable nature, should be stored so as to be protected from danger of igniting themselves, and also so as to avoid adding any undue risk to the remainder of the plant. Fragile material should be stored so that it will not come in contact with heavier or coarser materials. Unusual weight either of the individual parts or of the great quantity of material stored will necessitate the location of the storeroom upon the ground floor in order that ample support may be provided without any undue expense for strengthening the floors and walls of the building. If the materials are light and easily handled and are kept in relatively small quantities, they can be stored in almost any convenient location.

MNEMONIC SYMBOLIZING OF THE MATERIALS

The operation of any storeroom as well as the entire system will be simplified if some form of mnemonic classification is used. The object of a symbol system in the classification of the material is to furnish a shorthand method of designation. The symbols should contain suggestions and aids to remembering the names of the articles, so as to make it as easy as possible for a person knowing nothing about the system quickly to locate the material in the classification, after spending a few minutes in receiving explanation or studying the primal elements of such symbolization. This symbol system should be so constructed that it will be complete, simple, flexible, uniform and conform to all other symbol systems used in other parts of the plant. Therefore, it is best when considering the installation of such a system to map out in advance all the general classifications that will be required in order to insure a uniform system.



STORES DEPARTMENT—STANDARD SHELVING WITH EXTENSION SHELVES

The letters used to denote any particular article or division in the classification should primarily be the initial letter of the name of such article or division, so that in reading the symbol the thought first goes to the letter shown as the initial of the required word. In cases where the initial letter has already been used for another article or division the secondary letter should be used. This secondary letter should be the letter which, aside from the initial letter, has the most prominent sound and consequently would be secondmost prominent in the thought of the person reading the symbol.

The first letter used for all general stores symbols is "S," meaning "Stores," and this letter as the initial letter of a symbol should be omitted from all other classifications so that all symbols beginning with "S" will indicate that it is general stores, or material purchased from outside. The second letter should be the initial letter of the name for the particular work or article that the material is used for, to cover stores used exclusively for that work, as for example:

SA—Stores used for armatures
SB—Stores used for car bodies
SC—Stores used for controllers
SM—Stores used for motors
ST—Stores used for trucks.

Such material which is carried in stores and used for a number of purposes, apart from that which is used for certain specific work only, should be classified under "V"—"SV" meaning "Stores used for various purposes."

The third letter should signify the nature of the material and should be used regardless of whether the second letter is "V" or one of the others, indicating the general classes of work. For example, "STC" would mean "Castings for trucks in stores," and "SVC" would means "Castings for various purposes in stores." The fourth letter of the classification is the general subdivision of the three-letter symbol. For example, under "SVC" would be given:

SVCA—Aluminum castings
SVCB—Brass castings
SVCS—Steel castings

etc., and under "SVB," meaning "Bars for various purposes in stores," would be given:

SVBB—Brass bars
SVBC—Copper bars
SVBM—Machinery steel
SVBP—Pipe, tubing, etc.
SVBR—Cold-rolled and cold-drawn steel
SVBY—Babbitt metal.

The fifth letter of the symbol should be the particular kind of article in the subdivision shown by the fourth letter. For example, "SVB," meaning "Bars for various purposes in stores," in which would be "SVBB," meaning "Brass bars for various purposes in stores," would be given:

SVBBF—Flat or rectangular brass bars
SVBBH—Hexagonal brass bars
SVBBN—Octagonal brass bars
SVBBR—Round brass bars
SVBBS—Square brass bars
SVBBT—Triangular brass bars, etc.

If a further subdivision should be necessary to describe an article fully a sixth letter can be used. This sixth letter should indicate the different makers of the five-letter symbol, and should be if possible the initial of the manufacturer's name or trade name of the article. After the last letter should be given the size of the article. In giving size, absolute uniformity should be followed as to dimensions indicated by the relative position of the figures.

When three figures are used in giving dimensions, they should be given in the order of thickness, breadth and length. When one dimension only is given, it should indicate thickness or diameter. If two figures are given, the thickness should be given first and the breadth last. In the case of cylindrical articles, the first figure should be the diameter and the last figure the length, and with tubing the first figure will be the outside diameter, the second the gage or inside diameter, and the third the length. It does not matter very much whether this or the opposite method of designating dimensions is used, as there are good points in favor of both, but it is most essential that some one method be adopted for general use.

It is better, except possibly in very rare cases, to make the general classification by the shape of the material; for example, as shown in the subdivision of "SV"—all bars are given in one group no matter what the material, whether hollow bars, such as pipe and tubing, or iron bars. The reason for this is that it is most convenient to store all these articles in one section of the storeroom in racks built for bars. This makes it easier to locate the material by the symbol when all such material is stored in one place, the storage properly sectioned off according to subdivisions of the general class, than it would be under the method of keeping all brass and brass products under one general class, copper, steel, wrought iron, etc., and products of same under another general class.

METHOD OF OPERATION AND USE

Materials that are received from outside of the plant should pass through the receiving department, where they should be thoroughly checked. The receiving clerk should then sort the various kinds of material, attach the lot tag showing symbol, quantity and date received, and enter each item on a receiving report, showing symbol, quantity, date, and from whom received. As the materials are received they should be distributed to the proper bins and the quantity and date received entered upon the bin tags.

If the storeroom is operated on the double-bin system, the main bin, assigned for a particular kind of material, should be divided into two parts. In each part should be placed the standard quantity, and the tag attached to the materials by the receiving clerk should be placed on the hook for that section of the bin. Stores requisitions should then be filled from one section of the bin, until that quantity is exhausted, at which time the bin tag for that section should be taken off and sent to the storekeeper as a notice that the quantity on hand has reached the minimum and that an order for the standard ordering quantity should be placed.

Any stores requisitions received after that should be filled from the other division of the bin. The maximum and minimum quantities should be so fixed that there will always be a part of a lot in one section of the bin. It is seldom necessary to carry more than two lots at any one time, that is to say, one complete lot in each section of the bin.

When the materials are such that the amount on hand is subject to great fluctuation in quantity, or is not carried at all during certain periods of the year, it is more economical of space to arrange them in bins that may be available at the time. In such a case it is necessary that the bins should be numbered and a bin index showing location of each kind of material should be maintained.

Under the single-bin system these maximum and minimum quantities are carried on the balance-of-stores sheets, while with the double-bin system, the minimum is one lot, the ordering quantity one lot and the maximum that seldom will be exceeded is two lots.

REQUISITION AND RECEIVING FORMS

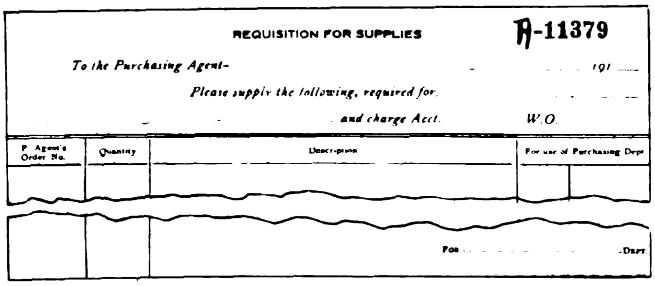
To make intelligent purchases the purchasing agent should be guided and directed by specifications in every instance. The storekeeper should be responsible for the specifications drawn up from which the purchasing agent is to act, because he should be familiar with exactly what is required.

As material of any kind is required it should be indicated to the purchasing agent through the medium of the general requisition for purchasing, as reproduced. No matter by whom these requisitions are made they should first be passed to the storekeeper, who should check them to determine whether he has or has not any or all of the materials required on hand or on order, after which he should pass the original to the purchasing agent and retain the duplicate for his records. This mode of procedure gives the storekeeper absolute control of the amount of materials on hand.

In every case these requisitions should state the purpose for which the materials or supplies are required as well as by whom wanted, and material of two different classes should not be listed on the same requisition.

In the organization of the stores department it is necessary to provide for a record of the receipt of all material and supplies. The system must be so constructed that it will not only insure a record of all material coming into the storeroom, but prevent the acceptance of material which should not be received. This receiving report, as reproduced, should be made out in duplicate, the original to be forwarded to the purchasing agent and the duplicate retained by the storekeeper. Upon receipt of this form the purchasing agent will bring together all papers dealing with the transaction, namely: Original copy of receiving report, copy of purchase order, original copy of requisition, invoice from the dealer.

This will enable the purchasing agent to verify the invoice and approve it for payment. It also enables him to settle all questions of differences as to quantity, price, etc., before entry is made in the stores ledger, and in this way makes the inventory records absolutely relia-



REQUISITION FOR SUPPLIES R-11379

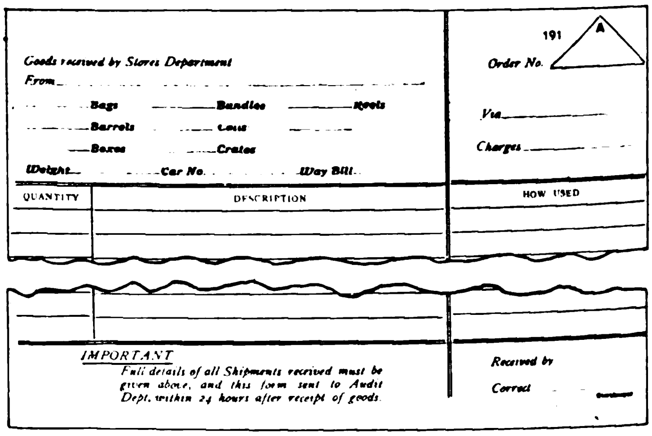
To the Purchasing Agent- 191

Please supply the following, required for

and charge Acct. W.O.

P. Agent's Order No.	Quantity	Description	For use of Purchasing Dept.
		For Dept.	

STORES DEPARTMENT—REQUISITION FOR PURCHASING



191 A

Goods received by Stores Department

From

Bags Bundles Reels

Barrels Cases

Boxes Crates

Weight Car No. Way Bill

Order No.

Via

Charges

QUANTITY	DESCRIPTION	HOW USED

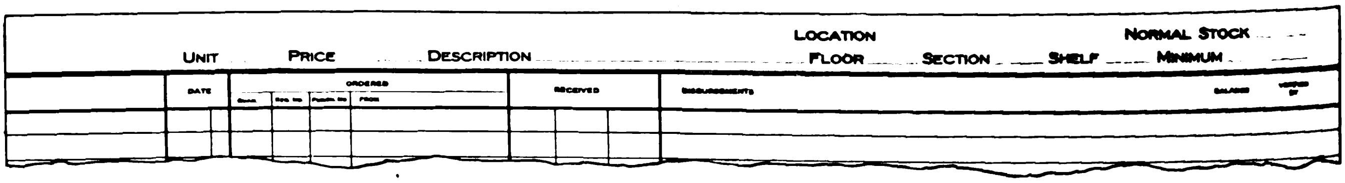
IMPORTANT

Full details of all Shipments received must be given above, and this form sent to Audit Dept. within 24 hours after receipt of goods.

Received by

Correct

STORES DEPARTMENT—RECEIVING REPORT

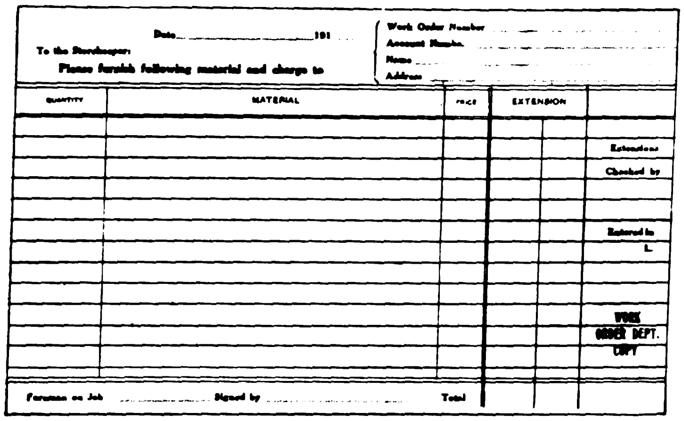


LOCATION NORMAL STOCK

UNIT PRICE DESCRIPTION FLOOR SECTION SHELF MINIMUM

	DATE	ORDERED				RECEIVED	DISBURSEMENTS	BALANCE	VERIFIED BY
		Quan.	Req. No.	Purch. No.	FROM				

STORES DEPARTMENT—STOCK REPORT



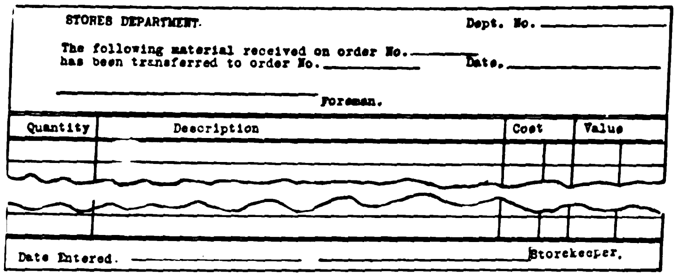
Date ______ 191 __
To the Storekeeper:
Please furnish following material and charge to
Work Order Number ______
Account Number ______
Name ______
Address ______

QUANTITY | MATERIAL | PRICE | EXTENSION

Extensions
Checked by
Entered in
L.
WORK
ORDER DEPT.
COPY

Foreman on Job ______ Signed by ______ Total

STORES DEPARTMENT—STORES REQUISITION



STORES DEPARTMENT.
Dept. No. ______
The following material received on order No. ______
has been transferred to order No. ______ Date. ______
______ Foreman.

Quantity | Description | Cost | Value

Date Entered. ______ ______ Storekeeper.

STORES DEPARTMENT—MATERIAL TRANSFERRED

ble for the items which they cover. No material should go into stock until the invoice is received, so that in case of overage or shortage, or lack of any specified quality, adjustments may be made to cover any consignment before it loses its identity by being absorbed into stock.

METHOD OF FINAL DISPOSITION OF THE PRECEDING FORMS

The storekeeper should hold his copy of the general requisition for purchasing until he receives his copy of the purchase order covering the material, when he should file the two copies, namely, the copy of the general requisition for purchasing according to the kind of material, and the copy of the purchase order according to the name of the dealer. This will enable him to have a cross index to these orders.

As soon as the original invoice for such material has been checked, and entry made on the stores ledger, the storekeeper should file under "Orders Filled" all papers pertaining to the transaction in his department under the proper purchase order number and should keep a record of the names of the dealers to whom the orders have been given.

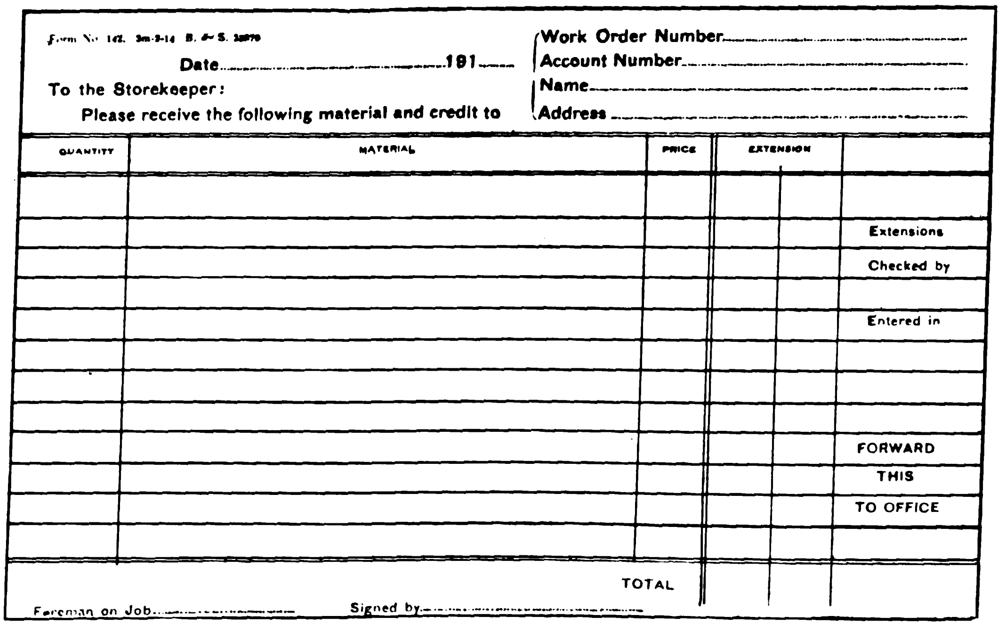
STOCK RECORDS, REQUISITION, RETURNED MATERIAL, ETC.

The stock record form reproduced is provided to show the complete status from a storekeeping point of view of every kind of material bought from the outside for use in the manufacture of any product and the upkeep of the plant. A separate sheet should be provided for each different kind of material, and should show the full description of the article and where located, as well as the established maximum and minimum quantities. It should also provide a record to enable the storekeeper to know not only the material he has on hand, but what he has on order, so that he can intelligently forecast his future requirements at any time and issue the necessary requisition on the purchasing agent to keep up his stock.

No material should ever be given out without a stores requisition, like that reproduced, showing the symbol of the material, the quantity and any other particulars necessary. After these requisitions have been filled by the stores clerks they should be passed on to the stock record clerk, who should number each requisition consecutively and enter each item on his records, after which he should forward the original to the accounting or cost department and retain the duplicate to be filed under the account chargeable.

When a foreman receives an order to do certain work, he estimates the quantity of material required and draws it from the stores. He does not always estimate the exact quantity; he may be short or have material left when the job is completed. Unless this material can be used immediately on another job, it should be returned to stock with a report to the storekeeper, like that reproduced, showing the job or work order number for which the material was drawn. When the storekeeper receives unused material and this report, he will enter the quantity on the stock record sheets under the head of receipts, and then forward the report to the accounting or cost department.

When a foreman has left over material which can be used on another job, a report is necessary to insure credit to the job for which it was drawn and a charge to the job on which it was used. This form, which is reproduced, should show the numbers of the jobs for which the material was drawn and to which it was transferred. After entering the correct quantities on his stock records, the storekeeper should forward this report to the accounting or cost department. If it is not considered necessary for the storekeeper to make these corrections in his records, the report may be sent direct by the foreman.



Form No. 142. 3m-3-14 B. & S. 38970
Date ______ 191 __
To the Storekeeper:
Please receive the following material and credit to
Work Order Number ______
Account Number ______
Name ______
Address ______

QUANTITY | MATERIAL | PRICE | EXTENSION

Extensions
Checked by
Entered in
FORWARD
THIS
TO OFFICE

TOTAL
Foreman on Job ______ Signed by ______

STORES DEPARTMENT—MATERIAL RETURNED TO STOCK

If the stores department is properly maintained, the following results will be obtained which will more than pay for the operation of the storeroom and give facts and information which cannot be obtained in any other way:

The elimination of waste due to improper care, and to carrying over from year to year stock which has become obsolete, instead of disposing of it or using it at a time when it is of value.

Materials will be ready when wanted and will be available in such quantities as are needed.

Ability to fix responsibility for errors.

The prevention of tying up material and labor in process on account of the shortage of some article which has not been provided.

Ordering and purchasing material become a matter of routine nature.

The amount of space required for storage will be less under a proper stores system because the amount carried will be smaller and the arrangement more economical, and the consequent overhead charge for floor space will be reduced accordingly.

The better care of materials of all kinds.

Ability to replenish stock automatically without unnecessary delay when it is getting low.

The prevention of tying up material in excessive quantities and a consequent saving in the money invested in the material and in the interest charge on this money.

The maintenance of a balance sheet which shows not only the amount on hand in the storeroom, but the amount ordered, the amount available for future orders and the amount which has been drawn out for use during any period.

Simplicity of control with less labor to operate and a consequent smaller cost for handling the same amount of material.

If the system is properly maintained with competent help, the taking of the annual inventory becomes an easy and also an accurate matter. It consists simply of transferring from the balance sheets to the inventory sheets, the quantities in the storeroom, the quantities in process and the cost or value. This method is perfectly practicable, but in order to obtain accuracy the help in the storeroom must be competent and all work should be checked and inspected in a routine manner. A schedule should also be drawn up whereby the number of items in stock is verified every day.

Bonus Earned in Manila

Based on the saving in coal, the plan of a bonus system of wages, which was established on June 1 for the power plant employees of the Manila Electric Railroad & Light Corporation, Manila, P. I., has proved satisfactory to both the company and the participating power plant employees. The total amount of bonus earned by eighty-two employees during June was $209, which is at the rate of approximately $2,500 per year and equivalent to a 10 per cent increase in the wages of the employees. The value of the coal saved to the company was $417, representing 3.3 per cent of saving effected over the prescribed standard.

In the operation of this bonus plan the standard basis of coal consumption per kilowatt-hour at the switchboard is 3.5 lb. A total of 50 per cent of the value of the coal saved on the basis of 3.5 lb. consumed, based on 11,715 B.t.u. per pound of coal or 41,000 B.t.u. per kilowatt-hour at the switchboard, is distributed to certain participating power plant employees. In figuring the coal consumption the actual weight of the coal consumed is taken, and 1 per cent is added to cover possible errors or omissions in weighing and possible losses of coal consumed in the pile by reason of spontaneous combustion.

In distributing the bonus, a system of points is used. The chief engineer of the power plant, who does not participate, determines the schedule of points to be allowed the different occupations of the different employees, based on the relative value of their services. He also establishes a schedule of penalties to be applied to the schedule of points. The point arrangement as now constituted is as follows for each day's work: Superintendence: assistant chief engineer, 40; foreman, 20; chief coal checker, 5; assistant coal checkers, 3; clerk, 5; engineers, 20; oilers, 3. Switchboard tenders: tenders, 5; helpers, 3; firemen, 6; coal passers, 3; water tenders, 10; watchmen, 2; other labor, 2. Mechanics and helpers: foremen, 15; mechanics, 5; helpers, 3; laborers, 2; construction and reconstruction, 2. Total, 154 points.

Attractive Street Railway Shelter in Worcester, Mass.

An unusually attractive shelter for street railway passengers has been erected by local real estate interests at Chamberlin Parkway, in the Lenox district of Worcester, Mass. This section of the city is one of the latest and best residential areas undergoing development, and the shelter, while distinctly of the open-air type, lends considerable architectural value to the neighborhood. It is a concrete structure having a timber roof with copper flashing and it contains two seats 9 ft. 6 in. long, 18 in. wide and 16 in. high. The roof is supported by six concrete pillars, and the ceiling consists of concrete panels molded between wooden beams. Flower beds and shrubbery, together with a curved stone coping and neat wall, complete the structure, which, however, is supplemented by two open concrete seats on either side of the parkway as shown in the accompanying illustration.

STREET RAILWAY SHELTER IN WORCESTER, MASS.

Primary Mercurial Resistance Standards

The bureau of standards of the Department of Commerce has recently issued scientific paper No. 256 dealing with the construction of four standard ohms. The work consisted in the construction of mercury columns in glass tubes, the columns being constructed to have a constant cross-section, a mass of 14.4521 grams and a length of 106.3 cm. at the temperature of melting ice. Such a column has a resistance of 1 ohm as defined by the International Congress on Electrical Units and Standards held in London in 1908, and since internationally adopted. So accurate was the work of construction of the four standards that the average deviation of their individual values from their mean value is less than 0.00001 ohm.

B. J. Arnold Restates His Views on Municipal Ownership

He Says Its Disadvantages Are Too Obvious to Require Reiteration

In some of the reports in the daily papers of the address by B. J. Arnold at the San Francisco convention the statement was made that Mr. Arnold approved the policy of municipal ownership of electric railways. Such an idea could have been obtained only by taking a very distorted view of what Mr. Arnold said. To clear up the situation, however, Mr. Arnold, while in Los Angeles, was interviewed by a representative of the Los Angeles *Times*. In this interview, which appeared in the issue of that paper for Oct. 15, Mr. Arnold is quoted as having stated as follows:

"The reports which made me say in an address before the American Electric Railway Association at San Francisco that municipal ownership of utilities is inevitable are incorrect. What I did say was: 'Let us spend no more time worrying about whether immediate municipal ownership or ultimate municipal ownership is the thing the people want. Chicago once tried to get municipal ownership, but failed because the city could not raise the money, and a study of the indebtedness and bond limits of other cities present like conditions.

" 'Time will therefore settle whether the immediate municipal ownership or the ultimate municipal ownership plank, or neither, is to go into municipal platforms. The point I want to make is that we cease wasting our energies in opposing a public movement that will surely come, in spite of opposition, if it is economically sound, and direct our energies toward the terms of the purchase clause and the conditions of a resettlement franchise.

" 'It is time for us to prove to the courts and commissions that railway investment can be made practically as sound as what are termed savings bank investments. Several plans have been worked out, notably those which are included in my reports on Chicago, Kansas City and San Francisco. They differ somewhat in franchise conditions, but the central idea is to put tangible property behind intangible values, so that if ultimate municipal ownership should prove to be the policy of the country, it will come without destroying investment values, or curtailing service to the public during the time of its coming.' "

Speaking further on the same subject, Mr. Arnold said: "The only advantage of municipal ownership and operation over private ownership, from a financial standpoint, is the ability of a municipality, in most cases, to borrow money at a lower rate of interest than private corporations or individuals are willing to accept for their money when it is to be invested in public utilities.

"Therefore, if the municipality will operate an electric railway as efficiently and as economically as a private corporation, the municipally-owned and operated railway will be the cheaper to the community.

"But the question is: Will the municipality so manage the property? Inasmuch as the margin is only the difference in the cost of money, it may easily be absorbed by inefficient management, through the loading of the municipally-operated road with excessive operating expenses in the way of labor and other considerable items that may enter into the management.

"The San Francisco experiment is being watched closely and up to date it has been conducted and operated efficiently and honestly, although there has already been a tendency toward the construction of unprofitable extensions and toward a reduction of the fare. The question is whether the municipality will continue to manage the property as well as it has in the past.

"The advantages that I have pointed out above are purely theoretical advantages. I cannot emphasize this too strongly. In many cases they have proved to be no advantages at all in actual practice. The disadvantages of municipal ownership are too obvious and too well known to require reiteration."

Power Station Organization on Bay State Street Railway

An interesting feature of the Bay State Street Railway wage arbitration was the testimony of C. F. Bancroft, superintendent of motive power and machinery, relative to the administration of the company's great system of power plants. The power for 941 miles of this company's track, for the carhouses and shops and for the commercial electric lighting systems of Newport, R. I., and Portsmouth, R. I., is furnished by fifteen generating stations and six substations. In these plants are sixty-three main generators of 44,855-kw. capacity and thirty-three rotary converters of 16,450-kw. capacity, ninety-three boilers of 33,215 hp., and sixty engines and turbines of 66,325 hp. combined rating. These generating stations annually consume about 151,000 tons of coal, and 405,000,000 gal. of feed water and their output is 121,397,000 kw.-hr. About 240 men are employed, the fifteen generating stations being operated by crews of from six to forty-five men under the supervision of a chief engineer. The six substations are operated by crews of three or four men, including a foreman.

The operation and maintenance of all power stations and substations are in direct charge of a superintendent of power stations, with the exception of central stations at Newport and Portsmouth, which report to the superintendent of motive power and machinery through another channel. The superintendent of power stations supervises the installation of all new power plant machinery and makes yearly recommendations for additional requirements. All repair work, including labor and material, except ordinary routine maintenance, is authorized and supervised by this officer. He makes a monthly report to the superintendent of motive power and machinery covering the operations of each plant, and makes special reports of all accidents and abnormal occurrences.

The assistant superintendent of power stations for the southern division has charge of five substations, directing the work of each through its foreman. He is in charge of the installation of all new substation machinery and repairs and takes charge of all plants on the southern lines in the absence of the superintendent of power stations, with the exception of the two stations in Rhode Island which have been previously mentioned.

On the northern lines, where practically all the plants are of the d.c. type, the assistant superintendent of power stations is chiefly occupied in directing and supervising new plant construction, testing machinery, supervising draftsmen and making special reports in relation to equipment.

Thirteen chief engineers are employed on the system, each in charge of a plant and reporting directly to the superintendent. With this officer's approval they employ and discharge all help at their respective stations; make all requisitions for materials and are responsible for the proper care, use and accounting for material. All routine repairs are directly supervised by the chief engineers, and at the Quincy and Chelsea power stations, where coal is discharged, the chief engineers also supervise the discharging and storage of coal.

The Graded Wage Scale

BY W. J. SHERWOOD, SUPERINTENDENT OF TRANSPORTATION MOBILE LIGHT & RAILROAD COMPANY

The question as to the length of service on the wage scale of trainmen has been in frequent evidence of late. Some representatives of labor organizations have made the claim that at the end of his first year of service a motorman is as fully qualified in the work of running a car as he ever will be and that commencing with the end of that period he should receive maximum pay per hour worked. Such contention being contrary to my experience led to a further study of the question, and, in the course of it, a statement was compiled of accidents that occurred on this system during the years of 1913 and 1914, account of which settlements had been made to June 30, 1915. The costs of these settlements were then grouped according to the grades of service of the trainmen concerned.

An abstract of the complete report is given below, and an examination of it will, I think, conclusively show that so far as this company is concerned the men in the second year of service were considerably below the full qualifications for their work and were not entitled to the same rate of pay as apportioned to men longer in the service.

PERCENTAGE STATEMENT OF SETTLEMENTS MADE ACCOUNT OF ACCIDENTS THAT OCCURRED IN 1913 AND 1914, MOBILE LIGHT & RAILROAD COMPANY

	Percentage of—				Average Cost of Settlements per Car-Hour per Man	
	Total Trainmen		Cost of Settlements			
Grade of Service of Trainmen	1913 Per Cent	1914 Per Cent	1913 Per Cent	1914 Per Cent	1913 Cents	1914 Cents
First year	43.6	37.3	57.25	75.73	0.0447	0.0446
Second year	16.0	17.6	29.18	15.11	0.0621	0.0189
Third year	11.1	12.8	3.74	0.48	0.0114	0.00083
Fourth year	8.0	9.5	4.26	1.89	0.0139	0.00433
Fifth year	4.1	4.7	1.67	0.15	0.0139	0.000719
Over five years	17.2	18.1	3.90	6.64	0.0077	0.0081

There is a wide variance in the time required between the minority class of men who become proficient early and the majority class of men who slowly obtain from constant instruction and experience the ability to perform their work with reasonable care and safety, and the variations found make it difficult to determine the time when trainmen attain maximum efficiency.

If a complete record could be maintained and the grades of wage scale established upon the basis of individual performance a more equable adjustment of the question would result, but a plan of the kind would require prohibitive supervisory cost and is therefore economically impossible. The general practice of graded wage scale according to the years of service is the most practical one at hand, and that it contains the essentials of equity has been recognized many times by various boards of arbitration.

Protection of Steel Against Rust

At the recent convention of the Master Painters' Association P. J. Burns, foreman painter at the Hoboken shops of the Pennsylvania Railroad, stated that the initial rusting of steel invariably begins on the sharp edges and minute projects existing on the surface. This proves that it is practically impossible to obtain a uniform protection when a brush is used in applying paint to the surface. However, the lasting qualities of "smalted" signs indicate that by substituting a very fine sawdust for the sand used in that process, applying this in the same manner, and then painting over the sawdust, a very much better metal protective coating can be secured than by the direct application of paint. This scheme might be carried further by applying with a coating of fresh paint a substance that will completely cover the metal and fill up all the small holes and cracks, forming a ground for the subsequent paint coatings. A large variety of materials may be used, such as abestine, cement or any inert pigment. The finishing coating can be made very heavy and applied freely so as completely to cover the surface that is being painted.

New York Railways Closes Power House

According to the annual report of President Shonts the Ninety-sixth Street power plant of the New York Railways will be closed for the present, except in rush hours during the winter months, owing to the fact that it can no longer compete in economy of energy production with the great power plants of the Interborough Rapid Transit Company from which the New York Railways now purchases its power.

The power plant was built by the Metropolitan Street Railway, the predecessor of the New York Railways, in 1898 and 1899. It was a famous plant in its day, the home of the General Electric generator of 3500-kw. capacity which in some quarters became known as the "Metropolitan" alternator. The power house is a handsome brick structure 201 ft. x 279 ft., containing eleven vertical, cross-compound Allis engines of 4500-i.hp. nominal and 7000-i.hp. maximum rating. These were the largest engines which had been constructed in the United States up to their time. The chimney also was a record breaker in its day, being the largest in the world and the tallest in the country. It contains 3,600,000 bricks and weighs 8540 tons. There are eighty-seven B. & W. boilers in three tiers in the plant, and above the boiler section are coal bunkers with a combined capacity of 9000 tons.

Three-phase alternating current at 6400 volts was furnished by the station, but, as M. G. Starrett, chief engineer of the company, said at the time, this kind of current was not decided upon without due consideration of the merits of the direct-current system. The station was designed for operation with a force of 180 men. The water required per kilowatt-hour at the switchboard was somewhat over 22 lb., including all auxiliaries and coal hoisting and stoking. The cost of the power station, including real estate, was nearly $4,500,000, or about $90 per indicated horsepower of capacity.

New York Railways and the Workmen's Compensation Law

On the subject of the New York workmen's compensation law the New York (N. Y.) Railways said in its pamphlet report for the year ended June 30, 1915: "The law has not been in operation long enough to form a basis upon which to calculate with exactness its annual burden upon the revenues, but it is apparent that our course in assuming as self-insurers the responsibility imposed by the law was wiser than to insure in the State insurance fund or with insurance companies. It is believed that our relations with our employees have been more satisfactory than they would have been had the matter of their disabilities been turned over to outside agencies. A competent and efficient medical staff was organized and in readiness when the law went into effect on July 1, 1914, to furnish every possible attention promptly to injured employees. Every effort has been made to prevent minor injuries becoming serious through neglect or improper treatment. The very best hospital and other facilities have been provided in all cases. While this has been expensive it is believed that it has been appreciated by our employees and that in the long run it will be found to have been justified."

American Association News

Public Service Section Hears Instructive Address by Noted Valuation Expert, Elects Officers and Reports Successful Year's Work—Denver Section Also Elects Officers—Milwaukee Section Had Excellent Program for This Week's Meeting

DENVER TRAMWAY COMPANY SECTION ELECTS OFFICERS

As announced last week, the regular meeting of the Denver Tramway Company section was held on Oct. 21. President C. B. Wells called upon R. W. Toll, chairman of the nominating committee, for nominations of officers for the ensuing year. The following were nominated and elected: President, W. G. Matthews, superintendent of overhead lines; vice-president, W. H. Seip, superintendent central division; secretary-treasurer, H. G. Mundhenk, transportation department; director for two years to take the place of W. G. Matthews, who was elected to the presidency, W. E. Casey, chief electrician. F. W. Hild became a director ex officio as he had recently become general manager of the company. A. M. Evans, engineering department, is the remaining director, whose term expires on Oct. 30, 1916.

Mr. Hild was called upon for a few informal remarks, and he delivered a very energetic and interesting address which was enthusiastically received by the audience of 700. Mr. Hild in turn introduced Dr. George B. Vosburgh of the University of Denver, who gave a beautifully illustrated lecture on "The Tramway and the Modern City."

PUBLIC SERVICE COMPANY SECTION

A meeting of company section No. 2 was held on Oct. 28 in Newark. Dean Mortimer E. Cooley of the University of Michigan addressed the section on the subject, "Fundamentals of Appraisal and Valuation." After the address H. D. Briggs, assistant general claim agent Public Service Railway, gave some interesting reminiscences of the San Francisco convention, at which he was one of four representatives of the company.

Secretary A. T. Warner gave a brief annual report containing the following data: The membership in good standing at this time is 290 as compared with 249 a year ago. The average attendance at meetings during the 1914-1915 season was 184 as compared with 128 for the preceding season. The present membership is divided among the departments thus: transportation, 90; maintenance of way and engineering, 49; mechanical, 37; auditing, 20; claims, 20; distribution, 16, and general, 58.

The election of officers resulted as follows: President, W. B. Graham, division superintendent; vice-president, R. H. Harrison, mechanical department; treasurer, T. J. Manning, accounting department; secretary (re-elected), A. T. Warner, cadet engineer, and trustee to serve for three years, H. H. George, assistant engineer maintenance of way. After the election the retiring and incoming officers made brief addresses, and resolutions of thanks to the former and expressing a spirit of co-operation with the latter were passed.

Dean Cooley began by explaining the difference between an appraisal and a valuation, the former being simply a priced inventory of a property. The latter may include the former but may include other items as well. The first appraisals were made to determine sale prices, particularly of water works. Another purpose of early appraisals was in connection with taxation, an example being furnished by Michigan where, in 1900, the railroad property was appraised in order that taxation might be put upon an ad valorem basis. More recently appraisals have been made to justify or serve as a basis for the issuance of securities and as a basis of determining rates.

In appraising a property two elements are involved; first, the determination of the cost of reproduction new, that is at present prices of materials and labor, and, second, the determination of the physical condition of the property.

Dean Cooley then explained in detail the elements which go to make up the value of the property emphasizing the importance of the intangible elements. He said that the intangible elements may include items very difficult to determine, such, for example, as the value of a building razed to make way for an improvement. He also urged the keeping up of the property in the most economical condition, which averages about 85 per cent of the condition new.

He gave the following example showing estimated subdivision of the total cost of a mile of track:

Total cost	$100,000
Preliminary expense	750
Physical property, cost	75,000
General contingencies	4,500
General engineering	4,000
Insurance and taxes	1,750
Organization, administration and legal	2,000
Cost of promotion	750
Interest during construction	7,000
Stores and supplies	1,000
Working capital	3,000
Office furniture	250

Dean Cooley stated as the elements of depreciation the following: Wear, decay, obsolescence and inadequacy. Of these the former two are easy to determine, but the latter two are not, as they involve a psychological factor.

MILWAUKEE COMPANY SECTION

The regular meeting of The Milwaukee Electric Railway & Light Company section was held on Oct. 28. Papers were presented on the following subjects: "Standardization and Specifications for Employees," "Standard Rules for Operation of Electric Railways" and "Review of Technical Press." Further details of the meeting will be given in a later issue of the ELECTRIC RAILWAY JOURNAL.

Safety Measures at Way Stations

Possible accidents to passengers at way stations on the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., have been minimized by putting the passenger or unloading platforms, which are rail height, on one side of the track, and the express and milk platforms, which are car-floor height, on the opposite side. At points between Gary, Ind., and Pullman, Ill., however, this arrangement was unnecessary, because all platforms are car-floor height. In case a passenger hurriedly attempts to board or alight from a moving car at a station, this platform arrangement makes it impossible for him to be struck by the elevated platform.

COMMUNICATIONS

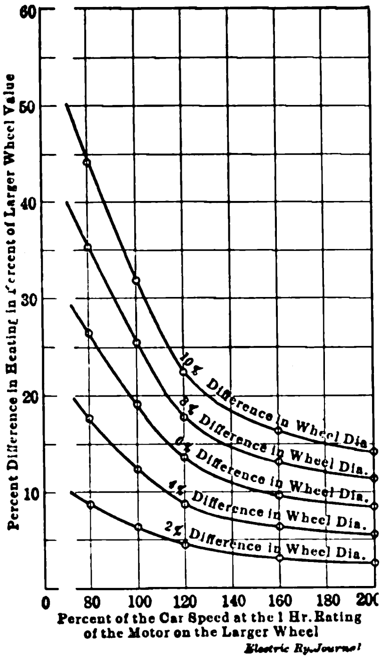
Wheel Diameter and Motor Heating

THE OHIO ELECTRIC RAILWAY COMPANY
COLUMBUS, OHIO, Oct. 18, 1915.

To the Editors:

I wish to congratulate Mr. Broomall on his article on "Effect of Car-Wheel Diameters on Motor Heating," published in the Sept. 11 issue of the ELECTRIC RAILWAY JOURNAL, page 452.

This is the kind of article that I have been looking for for some time. The men in charge of equipment need to know what the heating effect and consequent damage to motors will be if the wheel diameters are allowed to differ by a certain amount, under certain prescribed conditions. These data can now be secured by reference to the accompanying curves which are given in Fig. 3 of Mr. Broomall's article. The fact that all values are worked out in percentages makes them applicable to all classes of motors and to all sizes of wheels, so that by the use of Fig. 3 anyone can work out the allowable limit of difference for any service. For some time the writer has made it the rule not to allow more than 1-in. difference in diameter of wheels on interurban cars. To test the correctness of this ruling he applied the curves to the following case:



DIFFERENCES IN MOTOR HEATING DUE TO DIFFERENCES IN WHEEL DIAMETER

Quadruple equipment of Westinghouse No. 303-A motors, of which the one-hour rating speed at 500 volts is 580 r.p.m.; gear ratio, 25:52; car operated at an average speed of about 28 m.p.h.; average voltage on trolley, 500. On three of the motors the average wheel diameter is 36 in., and on the fourth it is 37 in. As the normal, or one-hour rating speed of the motor is 580 r.p.m. at 500 volts, this will correspond to a car speed of 31 m.p.h. at the one-hour rating for the 37-in. wheel. A difference of 1 in. in wheel diameter is about 2.7 per cent, and 28 m.p.h. is about 90 per cent of the one-hour rating speed. Applying these data to the curves we find that the motor geared to the 37-in. wheels will have about 10 per cent greater heating effect than the average of the other motors. This 10 per cent, unless the motors are already overloaded, will generally do but little harm, therefore the 1-in. difference seems to be a fairly safe one for cases similar to the one cited.

Mr. Broomall's article points out very clearly that the question of difference in wheel diameters is of much greater importance when the car speeds are low than when they are high. One meaning of this is that for cars used for local service the sizes of wheels should be kept nearer together than is necessary on fast or limited service.

In order to see what would be the effect of a difference of 2 in. in wheel diameter at the same speed in the above problem, the curves were again applied and showed an increase of 20 per cent in heating effect for the motor with the large wheels or double the percentage found with 1-in. wheel difference. With an average speed of 42 m.p.h., or about 135 per cent of 1-hr. rating speed, this heating difference falls again to about 10 per cent, so that a difference in diameter of 2 in. at an average speed of 42 m.p.h. in this equipment would be about as safe as a difference of 1 in. at 28 m.p.h.

F. J. FOOTE, Master Mechanic.

Cars at Less than Cost

NEW YORK, Oct. 21, 1915.

To the Editors:

One feature of the recent discussion in the columns of the ELECTRIC RAILWAY JOURNAL concerning the question of "cars at less than cost" should receive additional emphasis. It is the adherence to certain types of cars on the part of individual companies, as mentioned in Mr. Storer's letter, published in your issue of Sept. 25. As has been stated in the JOURNAL before, it is not uncommon for some managers who are asked to give the reason why some progressive step is not taken or some widely adopted standard is not used on their property to take refuge behind the worn-out phrase "local conditions." In most cases it would probably be found that the reason that special types of cars are on individual properties is the personal opinion of some one individual.

There is much truth in the statement made by Mr. Storer, that a large part of the cause for the higher price of rolling stock is to be laid at the doors of the individual managers and operators of railway properties. Is it not possible to substantiate this deduction from the developed experience of the steam railroads? They have practically a standard type of car for general passenger service that is in use all over the country. This particular type of car is not desirable for city electric railways, but some one or two of the several types now being exploited on the streets of different cities could be adopted almost universally for urban use, provided the operators and managers of the companies could be weaned away from their own prejudices and an exaggerated idea of the controlling importance of their "local conditions."

It is not desired nor desirable to destroy initiative, but fads and personal notions can be carried too far, and what may be called "local standardization" can become very expensive to the industry, as has been clearly pointed out in the letter referred to.

Does not this discussion point to a work of great potential value to the electric railway business which the American Electric Railway Association could undertake? The Engineering and Transportation & Traffic Associations might well formulate and develop in conjunction with the manufacturers of cars and car parts a few standard types for general use.

For example: If the center-entrance car is found advantageous on properties having such varied and dissimilar conditions as Brooklyn, Pittsburgh, Cleveland and Denver, and has worked out so successfully in these cities that this type of car has practically been adopted as standard, it would seem that this fact should be a guide to the purchase of new equipment for other good-sized towns and cities. Here, however, the conservatism of the individual manager steps in, and because he has always used an end-entrance type of car with certain particular structural features, the newer type is passed by, and the reason, if you could pin the operating heads down to giving the real one, would often be found to be the alleged local conditions in that particular city.

TRANSPORTATION MAN.

Box-Frame Motors and the Removal of Armatures

EMPIRE UNITED RAILWAYS

SYRACUSE, N. Y., Oct. 2, 1915.

To the Editors:

In connection with the discussion of box-frame motor parts and armature removal, I would say that I have found very interesting both Mr. Potter's article in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 28 and the discussion of Mr. Booth's article in the issue for Sept. 4. I have been using Mr. Potter's method since 1908 on motors weighing 3750 lb. and 4500 lb. complete, with absolute success. I see no reason for the installation of any elaborate devices for removing armatures from motors of this type, as, after observation of various methods in different shops, I came to the conclusion that the simpler method requiring only the service of a hoist is, as is usual with simple methods, the best and most economical.

I believe that the placing of the armature in the motor frame from above has one advantage over the horizontal method in that the workmen are able to see if the armature is bumping the pole pieces as it is lowered. A drop light may be placed in the commutator end of the motor and the man replacing the armature does not have to assume one of the poses of a Jess Willard exercise for the cure of indigestion, as he is able to observe the armature being lowered to its proper bearing while standing in a natural position. The only objection to the method described in Mr. Potter's article is that particles of foreign matter or dirt may drop into the commutator end bearing while the armature is being lowered. This objection is easily overcome by the use of a cardboard shield placed over the commutator end bearing until the armature shaft is low enough to just about enter the bearing.

In the writer's opinion one of the main advantages of the box-frame type motor is that it is necessary to remove the truck to change a motor on the heavier types. This places motor, truck and motor wiring within view, and parts which need replacement or repairs thus call loudly for attention by being brought to light.

While all subjects pertaining to the business are of considerable interest, it seems that a discussion of the removal of armatures from box-frame type motors is really unnecessary, as the method to be employed is so obvious and simple and a discussion of the advantages of the box-frame motor over the split-frame type would seem a waste of breath and paper to anyone who has had experience with both types. I believe that a buyer of ordinary intelligence would no more purchase a split-frame motor to-day, unless for some special work, than he would purchase a GE-800 or a Westinghouse 12-A motor in place of those of the later-developed, efficient, ventilated, light-weight type.

H. C. PRATHER, Assistant General Manager.

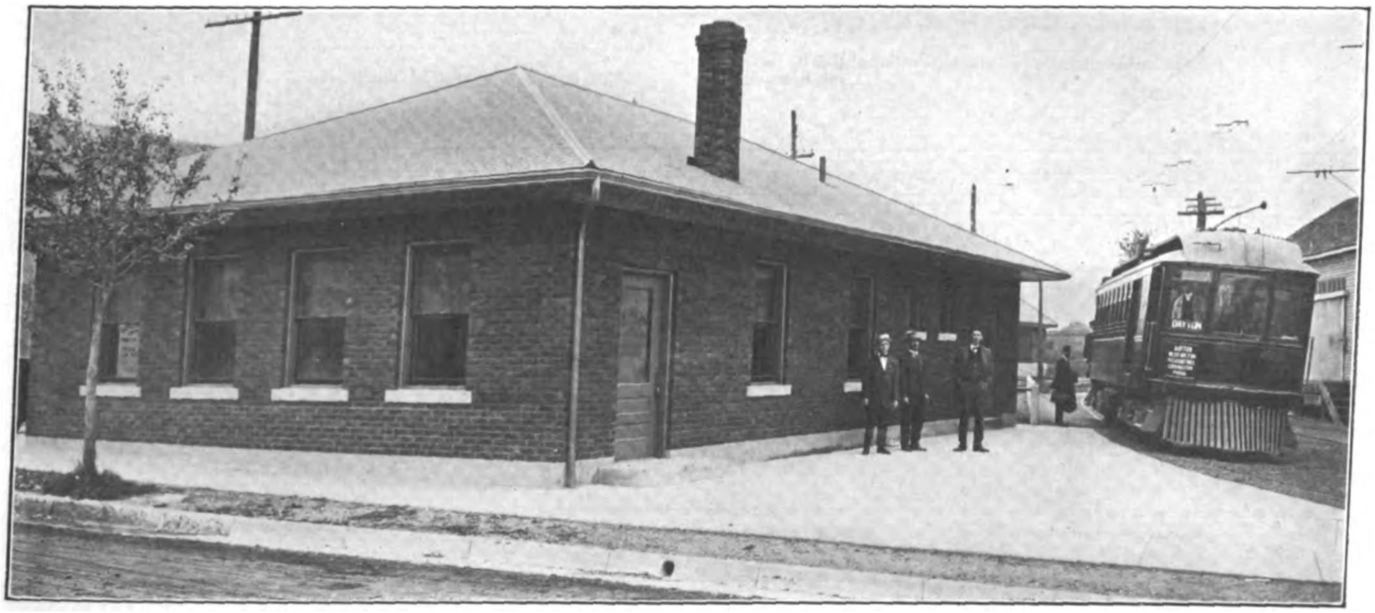
Progress on the Newark Terminal

The $5,000,000 terminal project of the Public Service Railway in Newark is rapidly assuming form. The steel framework of the building is in place and the erection of the walls is keeping pace with the floor work. It is expected that the entire building will be inclosed by Dec. 1 and that it will be entirely completed by May 1, 1916. Illustrated accounts of this important project were given in the issues of the ELECTRIC RAILWAY JOURNAL for Nov. 28, 1914, page 1190, April 24, 1915, page 793, and July 24, 1915, page 151.

New Passenger Station for Dayton, Covington & Piqua Railway

A new passenger station has recently been completed at Covington, Ohio, by the Dayton, Covington & Piqua Traction Company. The building is in accordance with the most modern ideas in interurban passenger station design, being constructed of brick throughout with a low-ridged roof and wide overhanging eaves. A concrete platform extends around all sides of the building. The interior is divided into rooms containing the offices, the baggage department, the lavatories and separate waiting rooms for ladies and gentlemen.

Thomas J. Brennan, general manager Dayton, Covington & Piqua Traction Company, has received a number of compliments on the new station as well as on a number of other improvements made by the company at Covington. At a recent meeting, in fact, the City Council of Covington, with the approval of the Mayor, adopted a resolution thanking the traction company for the addition of such an attractive structure as the new station to the numerous artistic buildings already in the city.



NEW PASSENGER STATION FOR DAYTON, COVINGTON & PIQUA TRACTION COMPANY

RIPPER & SIDE GUIDE

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Detail Cost of Track Work with Steel Twin Ties

BY A. J. WOLFE, FORMERLY CHIEF ENGINEER SCIOTO VALLEY TRACTION COMPANY, NOW WITH COLUMBUS RAILWAY, POWER & LIGHT COMPANY

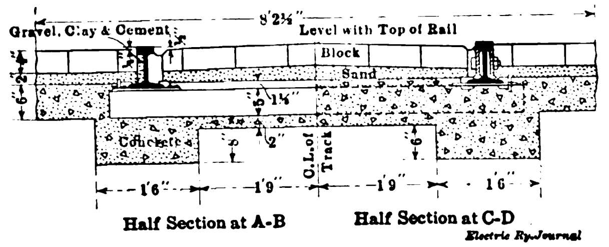
In the summer of 1911 the Scioto Valley Traction Company installed at Circleville, Ohio, under the writer's direction, about 9000 ft. of straight track of the type shown. The 7-in. T-rail was laid in a concrete beam foundation on International twin steel ties in a paved street through which the interurban cars were operated. Of course, the box truss construction and clip fastening of this tie are too well known to require description here.

The most interesting experience with the twin steel tie was acquired at the very beginning of its use. The track was laid during very hot weather, and the following winter was unusually severe. Yet even in zero weather the track was found to stay in perfect condition. In the following years the track continued its good behavior. Up to the time that the writer left the employ of the Scioto Valley Traction Company, September, 1913, not a cent had been spent to maintain this installation; nor has any money been spent upon it since.

For the benefit of other way engineers a detailed cost of this construction is given in the accompanying table. In considering the costs therein it should be noted that the joints were of especially substantial construction. The bonding, too, was unusually expensive, beng practically double as heavy as that ordinarily used, due to municipal requirements based on electrolysis considerations.

As stated before the track had an unusual temperature test; in fact, it was exposed to freezing weather before the paving was laid. Even after this it was impossible to find the joints from the surface of the rail. The anchoring to the substructure due to the distribution of the stresses by the tie clips, and the protection of the joint bolts from shear contributed to this result. These bolts were put in with a driving fit.

I have been informed that there is difficulty now in finding these joints and that in five years of service not a single joint had given trouble. The only work required on the track has been on the paving, as the brick worked up on the outside of the rail due to the use of asphalt filler instead of cement grout. The special work in this construction was put in with Carnegie steel ties and solid concrete foundation and has required no work on it in the five years.

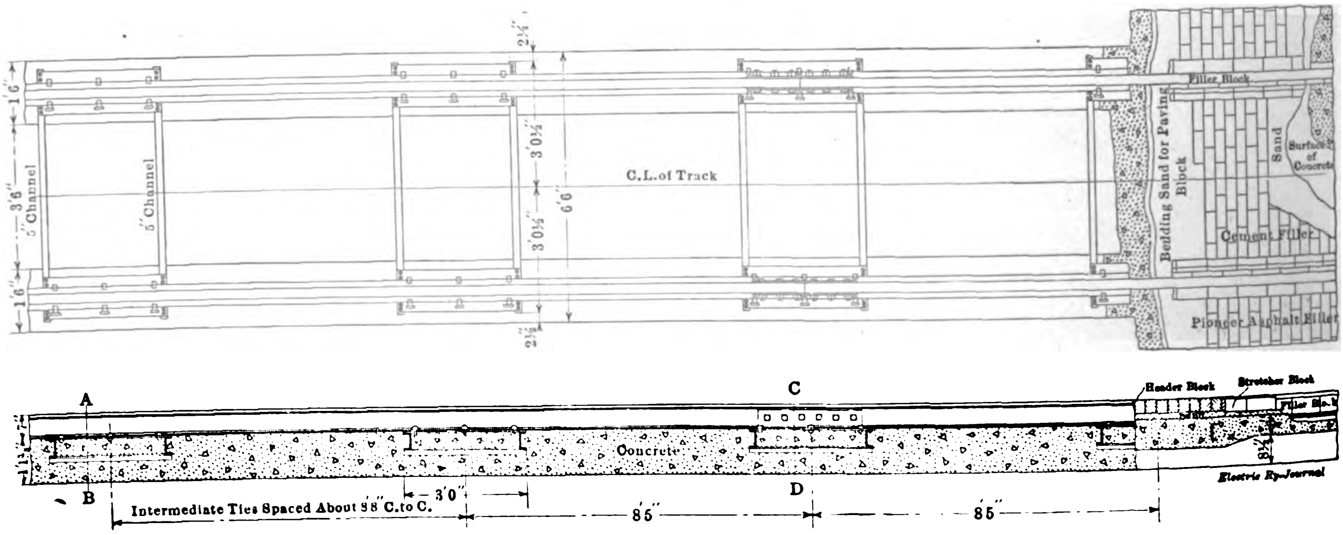


Half Section at A-B

Half Section at C-D

THE SCIOTO VALLEY TRACTION COMPANY—TRACK IN CIRCLEVILLE, OHIO, BUILT WITH INTERNATIONAL TWIN STEEL TIES IN GROUTED CONCRETE, SPRING, 1911

Items (9000 ft. straight track)	Total Cost	Cost per Lineal Foot
Engineering	$509.23	$0.0565
Special work and tie rods	....	.....
Rail	9,679.46	1.0755
Joints and fastenings	993.62	0.1104
Bonding	1,325.30	0.1472
Ties	3,963.48	0.4404
Laying new track	1,532.95	0.1700
Miscellaneous material	238.22	0.0265
Miscellaneous labor	482.64	0.0536
Gravel	611.20	0.0679
Excavation	2,585.39	0.2872
Concreting	1,834.60	0.2038
Cement	3,048.19	0.3397
Paving—outside rails	1,091.01	0.1212
Paving—inside rails	1,930.38	0.2145
Brick—standard	4,866.52	0.5407
Brick—filler	802.35	0.0892
Brick—stretcher	610.65	0.0678
Contractor's extra work	83.20	0.0092
	$36,188.39	$4.0209
Temporary track	2,276.12	0.2528
Handling trolley	351.96	0.0391
Total excepting special work	$38,816.47	$4.3028



CONSTRUCTION DETAILS OF STEEL TWIN-TIE TRACK, CIRCLEVILLE, OHIO

Before entering his present position, the writer also installed for the Lancaster Traction & Power Company, Lancaster, Ohio, nearly 1 mile of twin-tie construction. This was similar to the Circleville work except that the joints were electrically welded both for the bonding effect and for mechanical strength, although the machine-fit bolts were retained. This work cost $3.22 per lineal foot, including sand-filled brick paving.

Preventing Burning of the Top of Brushes

BY R. H. PARSONS, ELECTRICAL FOREMAN

Many otherwise perfectly good carbon brushes are thrown away because they are badly worn and chipped on top, although the commutator bearing surfaces are perfect and give promise of long service. Not only is the destruction of the carbon a serious trouble, but broken pieces of carbon falling upon the commutator become wedged under the brushes and, by injury to the commutator, do damage more costly to repair than the loss of the brushes.

In the older types of motors this difficulty was not so serious for many reasons, among which are the following:

1. The life of the brushes was not long enough to make the defects apparent.
2. The tension of the brush-holder springs was not as carefully attended to as now and was often excessive. While the result was a wearing of the spring and contact into the top of the brush, the brush itself wore out at the bottom before the top wear became troublesome.
3. There was not as much tendency for the spring in the old type motors to destroy the tops of the carbons as there is in many of the modern ones.

The accompanying diagrams show different types of spring contacts resting upon the carbons, drawn especially to show the relative width of contact space and brush space.

Fig. 1 shows the hammer found in a relatively old type of motor, hundreds of examples of which are in service to-day. The wearing of the top of the brush is not a distinctive trouble in this type provided that a proper spring tension and carbons of good quality are used.

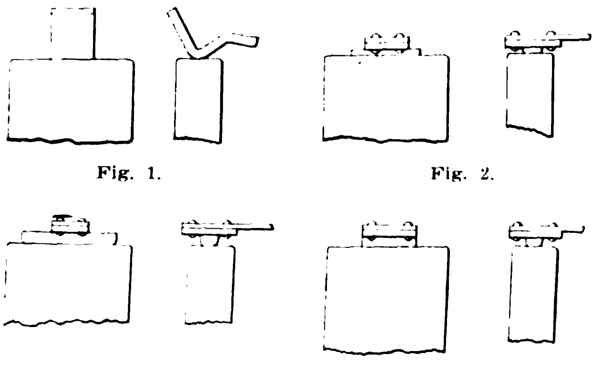


Fig. 1. Fig. 2.

Fig. 3. Fig. 4.

SEVERAL TYPES OF BRUSH-HOLDER HAMMERS, OLD AND NEW

Fig. 2 represents the contact in an early type of a more modern brush-holder. The tip is less than one-half the width of the carbon, and there has been no trouble experienced with this type of hammer in the destruction of the tops of the carbons.

Fig. 3 represents the type of contact used in all modern brush-holders, the one which causes trouble. The tip covers nearly the whole of the top of the carbon, and when it starts to wear into the brush the whole top is soon gone. It is then necessary either to throw away the carbon or to grind it down to a flat surface, wasting 1/4 in. of length.

The remedy for the difficulty is illustrated in Fig. 4. It is to cut off the ends of the tip even with the spring, making the tips cover about one-third of the brush surface rather than nearly all of it. While it may be difficult to believe that this procedure will produce the results as stated, the reader is advised to try it if he is having trouble with worn and chipped brush ends. A brush-holder with the shorter tip will give three times the life of brush as the one with the long tip.

On first thought it might be said that, as the wear in the top of the brush is brought about by burning caused by the very small arcs formed between the tip and the brush, the greater the surface covered by the tip the greater will be the carrying capacity of the contact. Therefore it would appear that with a wide contact there should be less liability of the formation of arcs by vibration and the jumping of the hammers as the trucks pass over rough tracks.

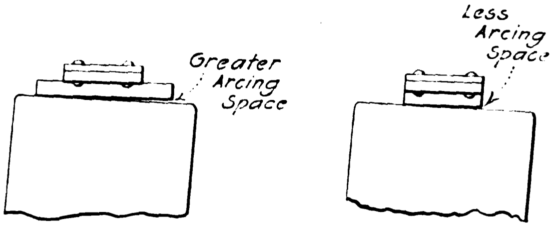


Fig. 5.

SKETCHES TO ILLUSTRATE ONE THEORY OF BRUSH-TOP BURNING

Although this argument sounds plausible it is not borne out by the facts. My conclusions, as stated above, are based on observations of a large number of motors. A certain company put in service 300 or 400 motors with brush-holder tips similar to those shown in Fig. 2. No trouble has ever been experienced with these brushes. Later another lot of 200 motors, and following that a lot of 400 motors, were put into service with brush-holders having wide contact tips. Inside of three months the brushes were found worn at the tops so badly that it was necessary to remove them and to grind off the worn parts. Part of these tips were of copper and part of bronze, and there were two or three different styles of surface contour among them, but no differences could be noted on account of the difference in shape or material.

The superintendent of equipment of the company concluded that, as the brushes were not being destroyed on the motors having the short contact tips it would be well to try a few of the new motors under the same conditions. The motor manufacturers gave their consent to this plan, although the ideas did not impress them strongly enough to influence them to change their designs. The result of the change was entirely satisfactory.

In endeavoring to arrive at an explanation of this result I have come to the conclusion illustrated in Fig. 5. It is that, as the commutator rotates and has lateral motion at the same time, force is exerted on the brush to tilt it. Although the brush is not completely lifted from the commutator it is slightly lifted. Under these conditions the long hammer is raised more than the short one and allows a greater arcing space at one end or the other. It is also raised from the brush end a greater length of time and therefore there is more opportunity and time for arcing. In the figure this condition has been greatly exaggerated in order to illustrate the theory clearly. Again, with the long hammer there is more leverage upon the hammer, tending to twist it. This produces greater wear on the brush-holder pin, allowing the hole in the hammer to become larger and this contributes to the wearing away of the top of the brush.

Whether the above is the correct explanation or not the fact remains that the short tip gives decidedly better service than the long one. Even if the burning and wear with the two types of tip were practically the same, the short tip would make only a small hole and would not destroy the entire top of the brush.

Remodeling Westinghouse No. 49 Motor Armatures

BY E. W. MCPHEETERS, ARMATURE WINDER UNITED RAILWAYS, ST. LOUIS, MO.

As there are many companies having Westinghouse No. 49 motors on hand, it may be of interest to describe a plan for remodeling the armatures. With slight changes and at small cost these can be made to give good service, as they are doing in four-motor equipments.

After the armature is stripped and tested for a sprung shaft, the laminations should be straightened, two core irons being run through the core so that the laminations will line up perfectly. The core slot should then be milled 3/32 in. deeper. The slots should then be braced with hardwood sticks driven the length of the core. These should be about ½ in. deep and forced in as tightly as possible to hold the laminations in place while grooves are being turned for the bands.

One groove should then be turned at each end and one in the center, ¾ in. wide by 3/32 in. deep. The sticks should then be removed and the core should be filed up ready to be wound with three-turn coils, two coils being placed together. These coils should be wound from No. 9 magnet wire and they should be banded down with No. 17 steel-band wire, the surface of the band being somewhat lower than the surface of the core.

Comparative Tests of Chilled-Iron and Steel Wheels

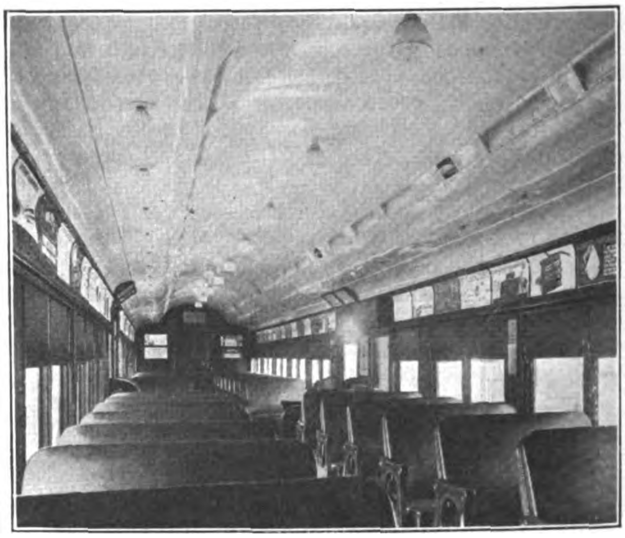
In his presidential address delivered on Oct. 12 before the convention of the Association of Manufacturers of Chilled-Iron Wheels, George W. Lyndon suggested the following comparative tests for chilled-iron and steel wheels.

1. Relative wearing values when rotating on a steel rail under various loads, the tread wear and flange wear being observed separately.
2. Abrasion of the rail under various conditions of loading.
3. Determination of the intensity of heating stresses in all parts of the chilled-iron wheel—namely, single plate, intersection of plate, front plate, back plate, bracket, etc.
4. Analysis of the thermal test. Intensity of the stresses in various parts of the wheel and the effects of thickening the thermal ring, increasing and decreasing the temperature of the iron, etc. The thermal test should be an intelligent one instead of the present crude affair that is supposedly alike for all weights of wheels.
5. Determination of the stresses in the hub and the plates of the chilled-iron wheel due to pressing on axles. Variation in the stresses due to various classes of machining.

Improved Lighting for Westchester Cars

The lighting arrangement for the cars on the New York, Westchester & Boston Railway is being changed over at the present time to a system that includes a small number of large units located along the center line of the car instead of the numerous small lamps that were placed along the sides in the original arrangement. This gives an equal illumination with an expenditure of only 560 watts as opposed to the original power consumption of 966 watts and, in addition, has effected a number of improvements, including a very much better interior appearance.

Some time ago the railway company undertook some experiments for the purpose of selecting a lighting system that would be best adapted to the requirements of fifteen new cars that are being delivered for service on the line. The results obtained were so gratifying that it was decided to change the lighting arrangements on the old cars with which the road is equipped with the idea of providing better illumination, decreasing cost of lamp renewals, improving interior appearance and increasing value of advertising signs, in addition to decreasing lamp wattage by nearly 50 per cent.



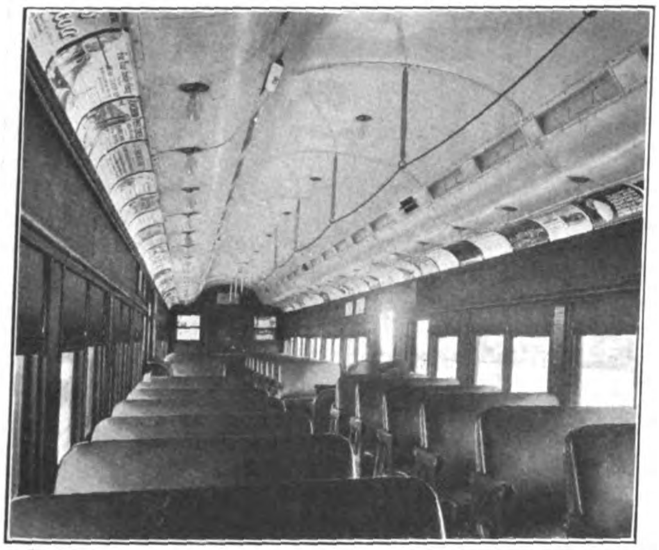
WESTCHESTER LIGHTING—NEW LIGHTING ARRANGEMENT WITH LARGE LAMPS AND REFLECTORS ALONG CENTER LINE OF CAR

Originally the lighting system installed in the cars consisted of forty-two 23-watt Mazda lamps located under the lower decks, twenty-one being placed on each side of the car. The lamps were mounted in flush sockets without reflectors. Ten emergency lights were located on the ceiling along the center line of the car, and these were operated through an automatic relay from a sixteen-cell 32-volt battery. In the new arrangement, however, the main lights are located along the center line of the car. Ten 56-watt Mazda lamps are used, these being fitted with Safety Car Heating & Lighting Company's fixtures and heavy-density opal glass reflectors. These reflectors, it may be said, are held in place by clips over which a collar screws down, and this provides an arrangement that gives perfect security against the shade working loose and falling to the car floor.

The emergency lights, under the new system, are located under the lower decks, five on each side of the car. The illustration shows lamp bulbs in each of the forty-two outlets along the lower deck although only ten emergency lamps are used, but the unused outlets are being covered with white enameled plates in the cars that are now being equipped. On the fifteen new cars that are soon to be placed in service the emergency lights are to alternate with the main lights along the center line of the car, so that only one line of conduit with three circuits is required, whereas with the former system three lines of conduit and six circuits were used.

The change-over of the lighting system on the present cars was accomplished with practically negligible wiring alterations, the most important of which was a reversal of the leads to the jumpers at the ends of the car. The main lights are wired in two circuits, for which the old emergency-light cables along the center line of the car were used. These are of No. 14 wire and are large enough to carry the necessary power for the 56-watt lights. The old main circuits under the decks are used for the emergency lights in their new position.

The new lighting arrangement, together with the use of reflectors for the lamps, has accomplished a reduction in lamp wattage on the main lighting circuit from 966 to 560. This decreased wattage, however, has not reduced the effective illumination but has actually resulted in improved lighting conditions because the maximum of light is reflected from the ceiling to the plane of the car seat where it is most useful. By using only 25 per cent of the original number of lamps, a large saving in lamp renewal cost is obtained.



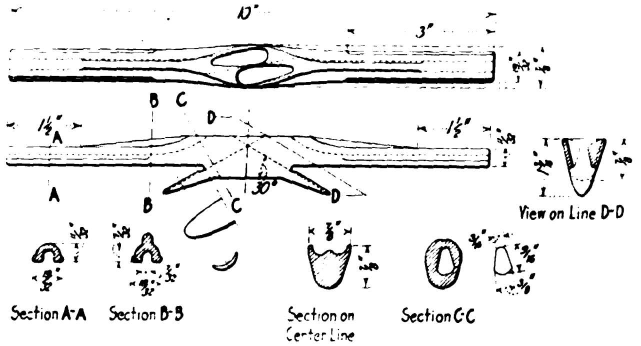
WESTCHESTER LIGHTING—ORIGINAL ARRANGEMENT WITH SMALL LAMPS UNDER DECKS AT EACH SIDE AND EMERGENCY LIGHTS IN THE CENTER

Other noteworthy improvements incidental to the change are better appearance of the car interior and increased advertising value of the signs. If the latter were located along the curve of the ceiling at its junction with the car side, with the main lights located along the center of the car, a partial shadow would be cast across the face of the sign. To overcome this condition the signs were lowered to a position just above the windows, thus eliminating the shadow and bringing the signs down to a position where they are most conveniently seen. At the same time the additional white surface provided in the ceiling aids in reflecting and diffusing the lights thrown downward from the top of the car.

The interior appearance of the cars that are changed over is exceptionally pleasing. The lamp fixtures are of white enameled metal and these, together with the white opal glass reflectors, blend very well with the white ceiling of the car. Also the signal cord has been run along the top of the sign panel or frieze instead of being supported by unsightly hangers along the center line of the car. This gives a clear opening under the ceiling and an exceptionally large white area. All of the changes were made by the railway company's forces.

A Balanced Trolley-Wire Splicer

Stability, light weight and reduced cost have been obtained by substituting an improved trolley-wire splicer for those formerly used by the overhead lines maintenance department of the Twin City Rapid Transit Company, Minneapolis, Minn. Increased stability was obtained, or the tendency of the splicer to overturn when in the line was overcome in the new splicer by minimizing the vertical depth which, as shown in the accompanying illustration, is only ⅞ in. The length of the splicer was reduced to 10 in. by placing the openings through which the wires pass side by side transversely with the long dimension of the splicer. This also permits the trolley wire to be twisted after it is passed through the splicer, thereby the strain is taken by the wires directly rather than through the clamping action of the splicer. A smooth under-running surface is obtained by lips that are bent in to fill the space formed by the bends in the wires where they enter the splicer. The reduction in vertical height as well as length decreased the weight of the splicer, and at the same time reduced the cost.



TWIN CITY TROLLEY-WIRE SPLICER

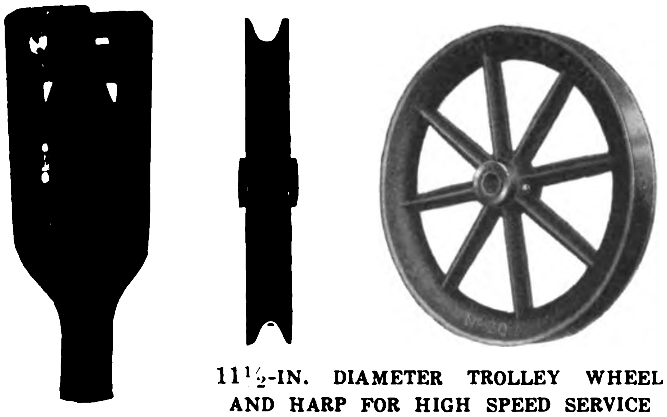
Durable Fiber

A new material, called Whalebone Fiber, has recently been placed on the market by the Diamond State Fiber Company, Bridgeport, Pa., this being an improvement on the ordinary type of vulcanized fiber which has been used in the past for track insulation. The process by which the new material is made gelatinizes cotton cellulose to such a degree that it becomes almost impervious to water, so that when it is immersed in water at a fixed temperature and for a given time it will not absorb nearly as much moisture as ordinary fiber under the same conditions. This in addition to the fact that the new material will stand pounding and rough usage, together with bad climatic conditions, makes it especially suitable for track work. A considerable amount of the new fiber has already been used for insulation at the joints separating track sections for automatic signal systems, and also for rail pads on bridges, for which use the material is manufactured in blocks ½ in. thick.

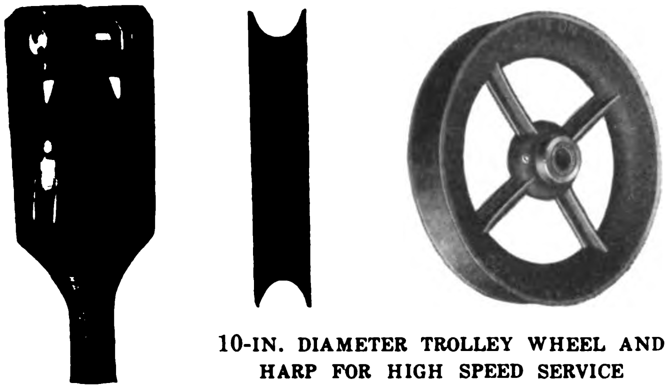
The system of electric railways which is being constructed to connect Rome with surrounding localities is expected to be completed by the end of this year. The electric equipment is being supplied by the Italian Thomson-Houston Company.

Harps and Wheels of High Current-Carrying Capacity

The accompanying illustrations show two types of trolley wheels and harps now being put out by the Star Brass Works, Kalamazoo, Mich., which are designed especially for high speed lines and which have shown less arcing and more mileage than the smaller wheels in the same service. On account of their large diameter there is more bearing surface on the wire and consequently greater contact and current carrying capacity. Wheel No. 20, in the upper illustration, is 11½ in. in diameter, 1½ in. wide, has ¾ in. depth of groove, and 2 in. length of hub. Wheel No. 21, shown in the lower illustration, is 10 in. in diameter, 1⅞ in. wide and has ⅞ in. depth of groove and 2 in. length of hub. Both wheels are furnished with graphite bushing for ⅝-in., ¾-in. or 1-in. pin, as desired. The harps are of the regular "Kalamazoo" patented construction but are made large enough to take these wheels.



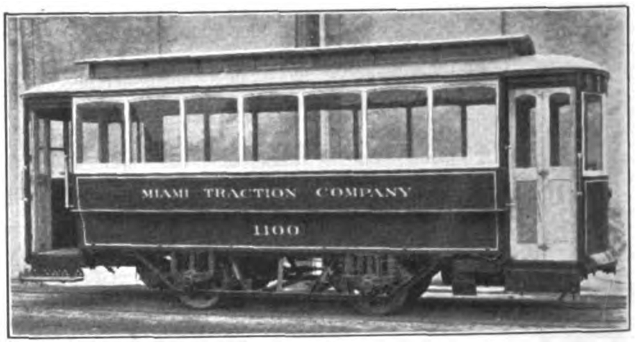
11½-IN. DIAMETER TROLLEY WHEEL AND HARP FOR HIGH SPEED SERVICE



10-IN. DIAMETER TROLLEY WHEEL AND HARP FOR HIGH SPEED SERVICE

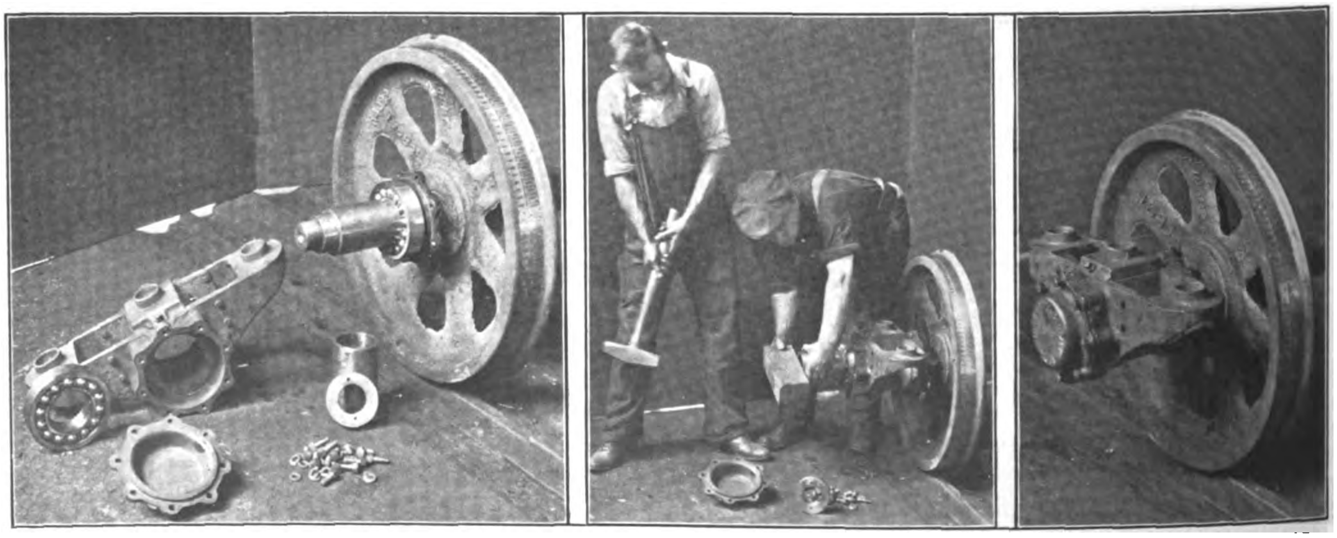
Street Railway Service Being Inaugurated in Miami, Fla., with Storage-Battery Cars

Miami, Fla., is soon to have its first street railway service, as the recently incorporated Miami Traction Company is now receiving from The J. G. Brill Company several small storage-battery cars. This city, one of the southernmost in the country, is below the frost line and is a center for the grape fruit industry. Partly on account of an increased appreciation of its fine climate and partly because it is located on the line of the Florida East Coast Railroad and at the mouth of one of the government canals leading from the Everglades, its population has increased rapidly in recent years. It is of interest, therefore, to note some of the features of the cars with which service is to be inaugurated in this thriving little city.



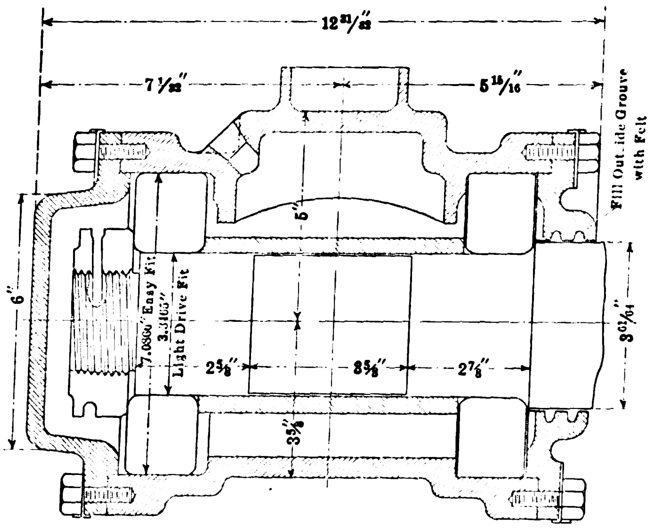
MIAMI CAR—GENERAL VIEW OF STORAGE-BATTERY CAR

The bodies of the Miami cars are not unusual, being 18 ft. long over corner posts, 26 ft. 1½ in. long over bumpers and 7 ft. 6 in. wide at the belt rail. They are fitted with longitudinal seats for twenty-four passengers. The wheelbase is 7 ft. 6 in., the wheels are of 30-in. diameter and there are two GE-1022 motors. The storage-battery equipment comprises fifty-eight MV-29 Hycap Exide cells. The weight of each car, completely equipped, is 10,696 lb. The general appearance of the



MIAMI CAR—PARTS OF BEARING AND HOUSING, OPERATION OF DRIVING BEARING HOME, HOUSING ASSEMBLED IN POSITION ON JOURNAL car is shown in one of the accompanying illustrations on page 920.

The cars are equipped with S.K.F. ball bearings, for which a special housing and spring mounting was designed by the car company's engineers in consultation with those of the bearing company. The details of this housing are shown in the accompanying illustrations. The spring support of the body on the bearings is also of interest as there are three long helical springs in each bearing with no semi-elliptical springs. The truck, therefore, is of the simplest possible construction, and the very considerable vertical play of the bearings in the pedestals provides the necessary cushioning effect to prevent jar on the battery. Obviously this construction also provides comfortable riding for the passengers.

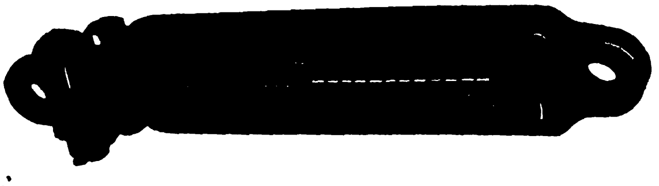


Electric Ry. Journal

MIAMI CAR—CROSS-SECTION OF BEARING HOUSING

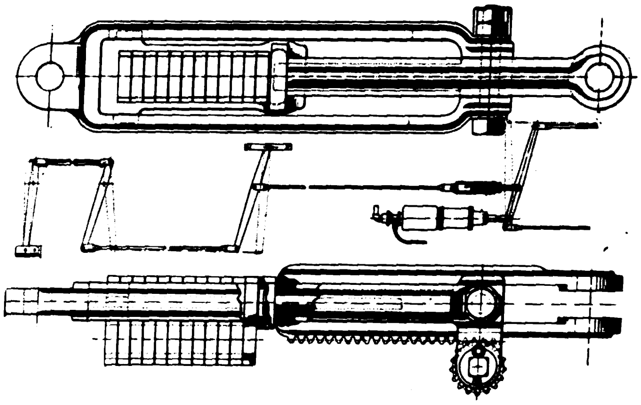
Inexpensive Slack Take-Up for Brake Rigging

A convenient and inexpensive device for adjusting air-brake piston travel without necessity for going under the car has recently been brought out by the Johns-Manville Company, New York City. It is installed as a part of the brake-cylinder tie-rod at a point near the equalizing lever where it is most easy to reach, and it thus becomes an integral part of the foundation brake rigging. Its installation eliminates the necessity for removing cotterpins, drawing out the brake pins and resetting the levers in the dead-lever guides to take up slack in the brakes. The underlying principle is the dropping of metal shims, each ½ in. thick, behind the end of a plunger within a yoke, after moving the shims past the plunger end by rotating a pinion on a rack that is connected to the shim box. A turn of the pinion releases a shim which drops into the space that is thus left at the end of the plunger and this provides the equivalent of a ½-in. shortening of the tie rod, taking up any wear that may have occurred at the brakeshoes. The shims are held in a yoke that travels within the exterior yoke to which the pinion is attached, and each shim has a hole in the lower half that the plunger may slide through when the shim is lifted and the take-up is extended.



VIEW OF UNDERSIDE WITH ALL SHIMS DROPPED INTO LOWEST POSITIONS AND TAKE-UP IN RETRACTED POSITION

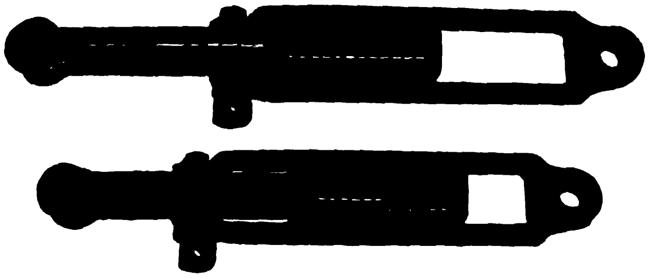
The only labor necessary for the installation is the cutting off of the tie-rod and a rewelding, this being equivalent to the removal of a section of the rod corresponding to the space occupied by the take-up in its extended position. The take-up is furnished with a flat end to fit the jaw end of the cylinder tie-rod, and the other end is a jaw which fits over the equalizing lever. The total weight amounts only to approximately 35 lb., and the length in extended position is 28 in.



PLAN AND ELEVATION OF TAKE-UP IN RETRACTED POSITION AND SKETCH SHOWING METHOD OF APPLICATION

For its operation in case a supply of air for the brake application to test the piston travel is not obtainable, the take-up can be retracted until the brake-cylinder piston is forced against the head of brake cylinder, permitting a number of the shims to drop behind the end of the plunger. When the brakeshoes are pressing hard against the wheels a number of the fallen shims whose combined thickness corresponds to the amount of standard piston travel are lifted in the box or yoke that holds them. The pinion is then released and the plunger is forced inward by the recoil of the brake rigging, passing through the holes in the lifted shims and coming to a bearing against those shims that are not lifted.

This slack take-up is not an automatic brake adjuster, and for this reason the device is stated by the makers not to conflict in any way with existing types of automatic apparatus designed for brake adjustment. It has, however, been manufactured primarily to accomplish the service now performed only by automatic adjusters, providing approximately equivalent results at a materially reduced expense. Therefore, it is especially suitable for equipment other than high-speed passenger cars where the question of first cost is not of primary importance. The device is listed at a price of $6, thus making it available even for installation on freight cars.



TAKE-UP IN EXTENDED AND PARTLY-EXTENDED POSITIONS

News of Electric Railways

PORTLAND VALUATION BRIEF FILED

Company Places Value at $62,000,000—Brief Contains 347 Printed Pages—Cost to Company for Preparation $100,000

The Portland Railway, Light & Power Company, Portland, Ore., has filed its brief in the valuation case initiated by the Public Service Commission of Oregon. The company contends, that a fair and just valuation of its property lies somewhere between $61,795,629 and $62,134,542. The former figure is given as the value of the property as determined by its original cost plus subsequent increments. The latter figure is given as the value of the property as determined by the reproduction analysis, considering the going value of the concern. The brief was filed at the Portland office of the commission. It comprises 347 printed pages. The valuation of the company's properties involved a cost to the company of something like $100,000.

Among other things the company contends that a just and equitable return upon the investments already made must be allowed by the commission if Oregon is to encourage the investment of other capital; that 8 per cent is the minimum rate of return which a public utility should be allowed to earn, not as a matter of abstract justice, but as a business proposition to be decided in view of the demands which the financial structure of the utility make; that utility investments are subjected to the hazards of unregulated competition and to the agitation of municipal ownership; that impairment of the credit of a utility is of more serious consequence than the temporary reduction of rates; that there has been no concerted nor sound demand for the reduction of the company's rates, and that the State should view the problem of regulation purely from a business standpoint.

In its general argument the brief says in part:

"Credit is the life-blood of the industry, and its impairment is of a more serious consequence to the utility than a temporary reduction of rates. Earnings are variable, but the rate base, as once determined, is likely to be permanent. This consideration of the direct result of the commission's finding upon the credit of the company is one of the most important considerations to be kept in mind in the decision of the case, when considered in conjunction with the fact that we are now passing through a time of depression, perhaps more acute in the Pacific Coast States than that of 1893; a time when almost every industry on the coast is subject to serious strains and when the earnings of this utility show a distressing decrease. The effect of the utility show a distressing decrease. The effect of the European war is a source of uncertainty sufficient to unsettle the financial world, and the ultimate effect of which cannot be foreseen. This depression, together with the presence of an unregulated jitney competition combined with the competion of a rival electric company serving only the short haul of the power business makes imperative a careful consideration by the commission of the fact that in the practical regulation of this investment in such times, a state must exercise care, because drastic or careless action will result in damage other than confiscation, and against which the courts provide no protection.

"In this relation there is a similar consideration, the importance of which is increased by the influence which the ultimate finding of fair value by the commission will have upon the securities and credit of the corporation. The utility is not earning and cannot earn under its present rate schedules and the present industrial depression a full 8 per cent upon the value of the property which it devotes to the public service. In this situation the utility will suffer irreparable injury if the commission in determining value and rates, in a circuitous manner, fixes the value of the property at such a point as will apparently justify the rate schedule determined.

"With the present acute depression, accentuated by unregulated and unfair competition, no sound policy of State dictates that the credit of this utility shall be impaired by a finding of a low rate base. This is particularly a fact, when, in its railway lines, the earnings are such and the lengths of haul such that a reduction of rates is clearly impossible, and when in its electric light and power business the rates are clearly reasonable and kept so by free and active competition. This is particularly true, also, in view of what we regard as the most significant feature of this valuation proceeding; that, although the entire State knew of the investigation and all of the municipalities interested were notified, the rates of the company are such and the treatment of its customers such that, excepting in the unimportant and purely preliminary hearing, and excepting for the filing of a seventeen-page brief by the city, setting forth in a general way certain abstract principles of law, no municipality entered an appearance, and that out of the one-third of the population of the State served by the utility, the only person sufficiently interested in this proceeding to appear was one Charles P. Church.

"It cannot be said reasonably that there is a public demand for regulation of the company's rates. None of these appearances were made by persons or municipalities claiming an unreasonableness of rates or service. This is an investigation made by the commission upon its own motion, and properly so made, but in fairness to the utility it cannot be said that its rates are such as to demand, in the present economic situation, interference by public authority which in any way possibly can impair the credit of the enterprise.

"The eyes of the financial world are on the case, and this decision will be taken as a declaration of the policy of Oregon toward such investments. Investment capital is a commodity for which there is the same competition as for wheat and lumber. This competition exists between communities and states. Capital is cowardly. It follows the line of best return and least adversity. In the money market of this country the securities of this company must compete with the 4600 separate and distinct issues of investment bonds of a similar character from all other investment centers of the country."

NEW YORK BUS FRANCHISE OPPOSED

Interborough Rapid Transit Company, to Operate New City-Owned Lines, Surprised at City's Willingness to Compete with Itself

The Board of Estimate of New York City received on Oct. 22 the report of its franchise committee, recommending that the franchise for the new motor bus routes referred to in the ELECTRIC RAILWAY JOURNAL of Oct. 23, page 882, should be awarded to the New York Motor Bus Company. The Interborough Rapid Transit Company, which is interested in the Fifth Avenue Coach Company, entered a protest. It raised the point that as in London and Paris the subway system had been seriously injured by the competition of the motor bus lines, it was extraordinary that the city which was just about to become a partner in the subway system in New York should set up a competitor to itself. J. L. Quackenbush, general attorney of the Interborough Rapid Transit Company, operating the subway and elevated lines in Manhattan and the Bronx, said that the bus matter had seemed so important to the company that it had dispatched two of its chief officials to London and Paris to investigate the experience there, and he thought that what they had ascertained should be considered by the city. Bainbridge Colby, who, with William R. Willcox, appeared for the New York Motor Bus Company, replied that it was for the city to decide the bus question according to the traffic needs of the population. A formal protest to the grant of the franchise to the rival concern was handed in by Richard W. Meade, president of the Fifth Avenue Coach Company, with a request for a rehearing. He contended that the franchise committee had ignored the advantages of one unified bus system throughout the city, and the coach company's offer to give the city one-half of the net profits. The board fixed Nov. 8 as the date for a public hearing on the general question of motor buses and Nov. 19 as the date for a public hearing on the specific application of the New York Motor Bus Company.

DEAN COOLEY'S DETROIT VALUATION FIGURES

$56,184,165 Fixed as Reproduction Value, Including Franchises, of Property in One-Fare Zone

In his appraisal of the properties of the Detroit (Mich.) United Railway and its subsidiary companies, as of Jan. 1, 1915, Prof. M. E. Cooley, dean of the engineering department of the University of Michigan, fixes the reproduction value including franchises at $56,184,165 and the depreciated value at $50,815,063. The appraisal was made for the State Railroad Commission to establish a value upon which the company may be permitted to issue bonds. The appraisal specifically exempts from consideration the value of unified operation, terminal rights, operation on private right-of-way, entity of system, development charges, etc. In this connection Professor Cooley states: "These several items and others have not been considered in this appraisal for the reason and in the belief that the commission would itself wish to pass upon this." The property of the Sandwich, Windsor & Amherstburg Railway, located in Canada, was not included in the appraisal. Subdivided into corporate units, Professor Cooley fixes his values as follows:

	Reproduction	Depreciated
Detroit United Railway	$34,072,511	$30,263,925
Detroit, Jackson & Chicago Railway	3,846,060	3,336,869
Detroit, Monroe & Toledo Railway	3,792,218	3,431,997
Rapid Railway	5,107,038	4,502,446
Supplies, cash, etc	1,582,937	1,496,425
Total	$48,400,764	$43,031,662
Franchises	7,783,401	7,783,401
Grand total	$56,184,165	$50,815,063

The appraisal fixes the reproduction value of the physical property within the one-fare zone at $26,563,435 and the depreciated value at $23,609,765. Franchise values within this area are fixed at $6,105,214, making a total valuation of the one-fare zone property of $29,714,979. This is the property upon which the municipal ownership vote will be held in Detroit on Nov. 2. Since the appraisal was made the company has expended more than $1,000,000 in track improvement within the one-fare zone.

The only comment made by the company in connection with the appraisal appears in its own weekly publication, in which it is stated that the Cooley appraisal justifies the statements of the company that it had a much greater investment than is represented by its stocks and bonds.

OBJECTIONS TO WASHINGTON POWER ORDER

The Public Utilities Commission of the District of Columbia continued on Oct. 25 its inquiry into the intercorporate relations of the Washington Railway & Electric Company and the Potomac Electric Power Company. The hearing was to determine why proposed orders of the commission mentioned briefly in the ELECTRIC RAILWAY JOURNAL of Sept. 18, page 602, should not be issued.

John S. Barbour, attorney for the companies, presented the brief of the companies. This reviewed at length the history of the Washington Railway & Electric Company and its subsidiaries and the developments leading up to the present business practice of both that company and the Potomac Electric Power Company.

Among other things the commission is seeking to require the companies to return to the conditions under which they operated under a contract entered into on June 23, 1906, and subsequently modified. The companies claim that the terms of this contract were altered by mutual consent for a valuable consideration and are no longer in force. Objecting to the requirement of the proposed order that would compel the Potomac Electric Power Company to reduce its rates to consumers to an amount to offset any increased amounts received by it from carrying out the commission's order, the company contended that there would be no increase in revenue if it complied with the order; that the present rates are not unjust or discriminatory; that the commission has not ascertained and determined proper and adequate rates of depreciation as provided in the public utilities law, and that the commission has not yet ascertained the value of the property of the power company in accordance with the public utilities act. The commission expects to hear oral arguments during the week ended Nov. 6.

PROPOSED CHICAGO ELEVATED WAGE SCALE

Negotiations between the elevated railroads of Chicago and an employees' committee which were begun on Oct. 9 have resulted in a proposed contract, the terms of which it was intended to submit to the vote of the employees on Oct. 29. No essential changes were made in the working conditions, but substantial increases in pay were granted to all classes of employees. The graduated scale for regular motormen was wiped out. This required one year at 30½ cents before the maximum of 34 cents was allowed. Regular motormen, under the new contract, will receive 36 cents an hour, which amount will be increased to 38 cents an hour beginning with the second year of the contract. The previously existing minimum for extra motormen was increased from 28 cents to 32 cents an hour, and the maximum which obtained after two years' service was increased from 29½ cents to 34 cents an hour. The existing hourly wage of conductors was increased from 27 cents to 29 cents an hour for the present year, and for the year commencing June 1, 1916, this amount will be further increased to 31 cents an hour. The present minimum for conductors which obtained before the first year of service was 25½ cents. The wages of regular guards, it was decided, should be increased from 24 cents to 26 cents an hour for the present year, and commencing June 1, 1916, this will be further increased to 28 cents an hour. The minimum for extra guards was increased from 21 cents to 23 cents an hour, and the maximum which obtains after three years of service was increased from 24 cents to 26 cents an hour. Wages of switchmen, switch tenders, towermen and bridgemen were generally increased about 2 cents an hour, and the wages of flagmen, ticket agents, shop and roadway employees were also substantially increased.

SENATOR BORAH ON POST-BELLUM ISSUES

He Sees Government Ownership of Public Utilities as the Next Great Political Issue

United States Senator William E. Borah, regarded as one of the ablest Senators in the upper House and an avowed candidate for the Republican Presidential nomination, discussed in an interview in the New York *Sun* of Oct. 25 the post-bellum issues which he regards as likely to be raised. He believes that the message "Prepare for Peace," is the one that should be conveyed with emphasis equal to the movement in favor of military preparedness. The Senator from Idaho predicts that the Republican party in the next national convention will write the most advanced and liberal platform that it has adopted since 1860. He regards the recent action taken by the party in conservative Massachusetts as indicating what may be expected from the next national convention.

In discussing the great national issues Senator Borah is reported to have said:

"In the language of a brilliant editor in the West: 'There has arisen a new conscience in relation to things both governmental and social; new ideas and new standards possess the mind and stand fixed in universal judgment.' The views of the Republicans of the old commonwealth of Massachusetts, as evidenced by the broad and liberal platform adopted, indicate what we may fairly expect at the next national convention. The progressive movement in this country is just as forceful as ever and will not be content with anything on the hitherside of a pronounced declaration of liberal policies. We have moved on and we do not propose to return to the practices and precepts which sprang up under a long lease of power and by reason of the arrogance of continued success.

"The next great political issue in this country is going to be that involving government ownership of public utilities. Regulation in the minds of many people has broken down. It is not satisfactory to the public nor to the owner of the property. Efficiency in this war has come from those most highly and pronouncedly given over to state socialism, and even France and England have made tremendous strides in that direction out of sheer necessity. The question will be asked, If it gives efficiency in war why shall we doubt that it will give efficiency in peace? And we will have the question of public ownership up for consideration."

WILKES-BARRE STRIKE

The striking employees of the Wilkes-Barre (Pa.) Railway have ten days in which to return to work. This was made known by the company officials and in the meantime T. A. Wright, the general manager, declared that no attempt will be made to operate cars.

The sliding scale fixed by the arbitrators in their original award will be paid. The company desires to operate its lines with the men who have been in its employ and no effort has been made to secure men to take the places of the strikers. After announcing its policy, company officials settled down to a condition of watchful waiting.

A notice was posted at the offices of the company to the effect that all men turning in company property such as punches, whistles, etc., for which the men made a deposit with the company upon entering its employ, would receive all money due them. Union officials, learning of this, at once set to work, and in a few hours had sent nearly every union man to the company's office to turn in his property.

A late development of the strike situation is the agreement by Mr. Wright to meet the members of the executive board of the union, provided that they have something new to offer. National board members of the union have left Wilkes-Barre to confer with the president of the international at Detroit and it is probable that nothing will be done until after return.

The latest development in the strike situation has been supplied by the officials of the union in the statement given out as a result of the conference with International President W. D. Mahon, at Detroit, that "we can see no other course than to stick to our present demands and fight it out, unless we get what we believe is due us."

This stand of the union leaders, coupled with the determination of the company officials not to recede from the position they assumed after the strike was called, gives little hope for a peaceful settlement of the strike, particularly as the company is continuing preparations to resume the operation of cars on Nov. 1.

The union has turned a deaf ear to the proposition to refer to the local courts the question of right of the arbitrators to repudiate their award.

FORT WAYNE STRIKE INJUNCTION CASE ACTION

A request for a temporary injunction against Mayor Hosey and other city officials of Fort Wayne, Ind., Joseph C. Colgan, executive officer of the Amalgamated Association, and officers and members of various labor unions has been filed in the federal court at Indianapolis by the United States Mortgage & Trust Company in behalf of the bondholders of the Fort Wayne & Northern Indiana Traction Company. The filing of this suit followed the withdrawal of the former suit for an injunction against Colgan and other Amalgamated Association officials and members for attempting to bring about a strike in Fort Wayne, a permanent restraining order being now unnecessary on account of the company being able to operate all its cars on full schedule with new men. Mayor Hosey and officers of the municipal lighting plant at Fort Wayne are brought into the new suit for an injunction. They are charged with attempting to cripple the electric lighting business of the traction company by trying to induce patrons of the company's lighting plant to violate their contracts and make new contracts with the municipal plant. The bill of complaint asks that other defendants be enjoined from using intimidation, threats and displaying posters and placards to prevent persons from riding on the street cars and also to prevent labor unions from printing notices in newspapers threatening to impose fines on members who ride on the cars. The application for the new restraining order will be argued by attorneys for the plaintiff on Nov. 8.

New Haven Suit Progress.—The testimony introduced by the government in its suit in the Federal District Court in New York against directors of the New York, New Haven & Hartford Railroad has so far all been concerned with the early history of the company and with its operations in the maritime field and with other steam railroads. C. S. Mellen, former president of the company, has been the principal witness.

Holyoke Arbitration Postponed.—Following a recent inspection trip over the property of the Holyoke (Mass.) Street Railway, the arbitration board sitting in the wages dispute between the company and the local branch of the Amalgamated association adjourned sessions until Nov. 3. Efforts are being made to limit the presentation of testimony to three days for each side, with a seventh day for arguments.

Inquiry Into New York Elevated Contracts.—The Thompson legislative committee, which is inquiring at this time into the rapid transit contracts made in New York City, interrogated J. P. Morgan on Oct. 27. The inquiry had to do particularly with the elevated third-tracking awards of the Interborough Rapid Transit Company let originally on the basis of cost plus 15 per cent and subsequently relet to the extent of about 80 per cent on the basis of cost plus 5 per cent.

Chicago Electrification Report to Be Released on Nov. 23.—Nov. 23 has been definitely fixed by the Chicago Chamber of Commerce as the date when the smoke abatement and terminal electrification committee will submit its report to the city. On that day a dinner will be tendered to Mayor Thompson, his cabinet and the members of the City Council. Much importance is attached to the electrification report because of the exhaustive study the engineers have made of the subjects of smoke pollution and terminal electrification.

Salt Lake-Idaho Interurban Opens.—The first through train between Salt Lake and Preston, Idaho, over the interurban lines of the Ogden, Logan & Idaho Railway left Salt Lake on Oct. 14. Simultaneously with the departure of the train a new time-table went into effect, placing in service sixteen trains daily between Salt Lake and Preston and two between Salt Lake and Brigham City. All the north-bound trains are scheduled to make the trip from Salt Lake to Preston in five hours. The south-bound trains cover the distance in four hours and fifty minutes.

Springfield Trolley Pole Removals.—Negotiations are proceeding favorably at Springfield, Mass., between the Springfield Street Railway and the property owners on Main Street for the removal of trolley poles between State Street and the Union Station. Through the efforts of the city planning commission several banks and merchants have agreed to the plan, which contemplates the installation of span suspensions attached to buildings in the zone where the poles now stand. About fifty poles are to be removed and about forty owners are expected to send signed agreements to the commission in the near future.

Cleveland's Municipal Ownership Vote. — In Cleveland, Ohio, the City Council recently turned down an ordinance to hold a special election on Nov. 2 to vote on the city taking over the lines of the Cleveland Railway for approximately $34,700,000, but the Socialists secured enough signatures to petitions to put the proposition on the ballot at the election. Under the law Cleveland could not issue $34,700,000 of bonds in any event as a general obligation of the city, as its limit for additional bonds, even by vote of its people is now about $17,000,000. Under the franchise the city has the right to take over the property on six months' notice under an agreed valuation. There is practically no campaign for the passage of this ordinance.

Oakland Grievance Withdrawn.—In the ELECTRIC RAILWAY JOURNAL of Oct. 23, page 884, brief mention was made of the refusal by the San Francisco-Oakland Terminal Railways, Oakland, Cal., to submit to arbitration representation made in behalf of the employees with respect to working conditions. At 2.30 a. m., on Oct. 10, at a mass meeting of Division 192 of the carmen's union, the Key Division grievance committee presented its report to the division with recommendation that the grievances regarding the reinstatement of the two deckhands and request for arbitration as to interpretation of the contract with the company be withdrawn. This report and recommendation were adopted almost unanimously by members of the division.

Seattle Paving Case Before Corporation Counsel.—The refusal of the Puget Sound Traction, Light & Power Company, Seattle, Wash., to comply with the order of the Board of Public Works to pave its right-of-way in certain streets now being paved by the city has been referred to Corporation Counsel Bradford for such action as may be necessary to force compliance with alleged provisions of the company's franchises, which also require the payment to the city of 2 per cent of the company's gross earnings. The company points out that it has applied to the State Public Service Commission for an order relieving it of certain of its franchise obligations, including the paving of its right-of-way, and that until some disposition is made of the petition, it desires to make temporary improvements by planking that portion of various streets occupied by track. As heretofore reported, the company has offered to advance to the Public Service Commission the sum of $10,000 in order that the valuation of the company's property in Seattle may be determined. This valuation is regarded as necessary before the commission can act upon the application.

Committee on Removal of Brooklyn Elevated Reports.—The committee of five, appointed early this year by the Brooklyn committee of one hundred, to investigate and report upon the possibilities of assessing land values within Brooklyn for the purpose of removing the elevated tracks of the Brooklyn (N. Y.) Rapid Transit Company from Fulton Street and relocating the line in a subway on Livingston Street, has issued a preliminary report. The committee has also presented extensive maps and other details, which are to be first submitted to the property owners within the proposed area of assessment and then reported back to the committee of one hundred. The plan of the committee to relocate the Fulton Street elevated lines in a subway on Livingston Street is intended to prevent the rebuilding and reconstruction of the elevated structure along Fulton Street. The committee in its findings says that the proposed subway beginning at Cumberland Street to Lafayette Avenue to Livingston Street to Clinton Street and the Brooklyn Bridge, with a connection at Ashland Place at Fulton Street with the new subway now being constructed, would cost about $5,500,000, and this could be met in whole or in part by levying an assessment in ten annual installments upon land values in the specified areas set forth.

PROGRAMS OF ASSOCIATION MEETINGS

Public Utilities Association of West Virginia.

The Public Utilities Association of West Virginia will meet at White Sulphur Springs, W. Va., on Nov. 18 and 19.

Railway Development Association

The Railway Development Association will hold its annual convention at the Hotel McAlpin on Nov. 9-11. The afternoon of Nov. 10 will be occupied by a boat trip around New York Harbor and in the evening the annual banquet will take place at the McAlpin. S. C. Mead, secretary of the Merchants' Association of New York, will act as toastmaster at the banquet. The speakers will be Howard Elliott, president of the New York, New Haven & Hartford Railroad, J. W. Weeks, United States Senator from Massachusetts, and Ralph Peters, president of the Long Island Railroad.

Philadelphia Valuation Conference

The program has been announced for the conference on the principles and methods of valuing public utilities, to be held under the auspices of the Utilities Bureau at the Hotel Adelphia, Philadelphia, Pa., on Nov. 10, 11 and 12. The arrangement of the sessions provides for the consideration of the subject "The Reproduction Theory" on Wednesday, Nov. 10, the consideration of the subjects "Original Cost," "Franchise Values" and "Valuing Land" on Thursday, Nov. 11, and the consideration of the subjects "Depreciation," "Going Value" and "Valuation and the Future in Public Utilities" on Friday, Nov. 12.

The session of Nov. 10 will be opened at 8 o'clock in the evening. The presiding officer will be Rudolph Blankenburg, Mayor of Philadelphia. The opening remarks will be made by Morris Llewellyn Cooke, director of public works of Philadelphia and acting director of the Utilities Bureau. The subjects and the speakers at this session follow:

"Criticism of Reproduction Theory of Valuation," by John H. Eshleman, Lieutenant-Governor of California and former president of the California Railroad Commission.

"Reproduction Values vs. Fair Value," by H. Findlay French, attorney-at-law, Baltimore, Md.

The discussion of these subjects will be opened by Prof. Morris Knowles, consulting engineer, Pittsburgh, Pa., director of the course in valuation of public utilities at the University of Pittsburgh.

The second session will be opened at 10 a. m. on Nov. 11. The presiding officer will be C. W. Kutz, chairman of the Public Utilities Commission of the District of Columbia. The subjects and the speakers at this session follow:

"Actual Cost as a Basis for Fair Value," by George W. Anderson, attorney-at-law, Boston, Mass.

"Original Cost as the Chief Basis for Fair Value," by Prof. Edward W. Bemis, Board of Supervising Engineers, Chicago, and member of the advisory board to the division of valuation of the Interstate Commerce Commission.

"The Making and Maintenance of Priced Inventories," by Charles L. Pillsbury, chief engineer, Valuation Bureau of the Public Utilities Commission of the District of Columbia.

The discussion of the first two of these subjects will be opened by Dr. Robert H. Whitten, secretary to the Board of Estimate committee on the city plan, New York; Henry E. Elrod, engineer, Dallas, Tex., and Edward P. Burch, consulting engineer, Detroit, Mich. The discussion of the paper by Mr. Pillsbury will be opened by James W. Phillips, grade crossing division, Bureau of Survey, Philadelphia; F. W. Ballard, commissioner and chief engineer, division of light and heat, City of Cleveland, Ohio, and R. J. Meigs, Western Union Telegraph Company, New York, N. Y.

The third session will be opened at 2.15 p. m. on Nov. 11. The presiding officer will be Dr. L. S. Rowe, president of the American Academy of Political and Social Science. The subjects and the speakers at this session follow:

"Valuation by Approximation," by John G. Morse, appraiser, Associated Factory Mutual Fire Insurance Companies, Boston, Mass.

"Franchise Values," by Dr. Delos F. Wilcox, consulting franchise and public utility expert, New York City, and Deputy Commissioner, Department of Water Supply, Gas & Electricity, New York.

The discussion of "Valuation by Approximation" will be opened by Morris Llewellyn Cooke, director of Public Works of Philadelphia, and John R. Freeman, president of the Manufacturers Mutual Fire Insurance Company, Providence, R. I. The discussion of "Franchise Values" will be opened by Henry De Forest, president and counsel, Queens County Water Company, New York; Chester A. McLain, lecturer, Harvard University, and Alfred Bettman, attorney-at-law, Cincinnati, Ohio.

The fourth session will be opened at 8.15 p. m. on Nov. 11. The subject and the speaker follow:

"Principles to Be Applied to Valuing Land," by Hammond V. Hayes, consulting engineer, Boston, Mass.

The discussion will be opened by Edward W. Doty, of the Columbus Railway, Power & Light Company, and Milo Roy Maltbie, of the advisory board of the division of valuation of the Interstate Commerce Commission.

The fifth session will be opened at 10 a. m. on Nov. 12. The subjects and the speakers follow:

"Court Decisions on Depreciation," by J. H. Goetz, of counsel for the Public Service Commission for the First District of New York.

"Depreciation as a Factor in Fair Value," by Halford Erickson, of the Wisconsin Railroad Commission.

Among those who will open the discussion are Philip J. Kealy, of the board of control of the Kansas City Railways.

The sixth session will be opened at 2.15 on Nov. 12. The subject and the speaker follow:

"Going Value as an Element in Fair Value," by Clifford Thorne, chairman of the Iowa Board of Railroad Commissioners.

Among those who will participate in the discussion are Ray Palmer, Chicago, and William J. Hagenah, Chicago.

A dinner will be held on Friday evening at 6.30 o'clock. The presiding officer will be Dr. Charles R. Van Hise, president of the University of Wisconsin. Addresses will be made by Charles A. Prouty on "The Meaning of the Constitutional Protection in Valuation," by William D. Kerr on "Constitutional Protection in Valuation," by Prof. John H. Gray on "Opinion Testimony," and by Mr. Maltbie on "Valuation and the Future in Public Utilities." All the meeting will be open to the public.

Financial and Corporate

ANNUAL REPORTS

Aurora, Elgin & Chicago Railroad

The statement of income, profit and loss of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., for the year ended June 30, 1915, follows:

Gross earnings and other income:	
Revenue from transportation	$1,632,083
Revenue from operations other than transportation	336,285
Interest	278
Miscellaneous	581
Total gross earnings and other income	$1,969,227
Operating expenses and taxes:	
Maintenance of way and structures	$194,590
Maintenance of equipment	132,555
Power	235,933
Traffic	20,896
Conducting transportation	411,506
Other operations	31,270
General and miscellaneous	295,596
Total	$1,322,346
Less undistributed operating credits	4,955
Remainder	$1,317,391
Taxes	41,956
Total operating expenses and taxes	$1,359,347
Gross income	$609,880
Deductions from income	443,437
Net income	$166,443
Profit and loss surplus at beginning of year	557,718
Adjustment of liability on interchangeable coupons	17,450
Balance in reserve for replacements and renewals, June 30, 1914	24,063
Profit and loss—gross surplus	$765,676
Dividends on preferred stock	186,000
Discount applicable to prior period	591
Profit and loss—surplus at end of year	$579,085

The annual report states that the results of the year's operations were very disappointing to the officers. For the first time in the history of the company its gross income suffered a material decrease. In the absence of jitney or other unusual competition and conditions, the officers have concluded that the loss was caused by the prevailing industrial conditions obtaining in and around Chicago, by the unusually backward summer and by the fact that Saturdays, Sundays and holidays during the last months were almost invariably rainy days. In regard to the first point, a recent detailed analysis of conditions prevailing in the Fox River Valley made by the traffic department indicated a decrease in hours of employment approximating 30 per cent.

Although no comparative figures are published in the report for the last fiscal year, a comparison of this report with that for the preceding year, analyzed in the ELECTRIC RAILWAY JOURNAL of Dec. 19, 1914, shows that the revenue from transportation in the year just ended was $1,632,083 as compared to $1,726,724 for the year previous, a decrease of $94,641 or 5.4 per cent. The total gross earnings and other income dropped from $2,096,183 to $1,969,227, a decrease of $126,956 or 6.0 per cent. The total operating expenses and taxes decreased from $1,396,791 to $1,359,347, an amount of $37,444 or 2.7 per cent.

In thus comparing the two years it should be noted that the company, following the ruling of the Interstate Commerce Commission effective on July 1, 1914, charged during the last year to operating expenses and against income respectively, and credited to reserves: For depreciation of equipment, $31,493, and for amortization of discount on bonds, $10,287. It should also be noted that the inclusion of the new operating expense account "power" for the last year renders a comparison of the various operating expense divisions for the two years useless without an extended analysis of the previous accounting for all power items.

The taxes for the last year decreased $11,984 or 22.2 per cent, and the gross income decreased $89,512 or 12.8 per cent. Deductions from income, however, showed an increase of $24,678 or 5.9 per cent, and the net income decreased $114,190 or 40.7 per cent. Owing largely to certain profit and loss credits, however, as indicated in the foregoing statement, with also a decrease of $93,000 in the debit for dividends, the surplus at the end of the year showed an increase of $21,366.

New South Wales Government Railways & Tramways

The report of the chief commissioner of the New South Wales (Australia) Government Railways & Tramways for the year ended June 30, 1915, shows the following comparative results:

	Tramways		Railways	
	1915	1914	1915	1914
Earnings	£1,986,060	£1,934,164	£7,616,511	£7,742,241
Working expenses	1,611,286	1,669,033	5,311,162	5,409,820
Balance	£374,774	£265,131	£2,305,349	£2,332,421
Interest	284,639	263,451	2,328,680	2,123,054
Surplus	£90,135	£1,680	*£23,331	£209,367

*Deficit.

From the above it will be observed that the railway earnings decreased £125,730 or 1.62 per cent during the last fiscal year, on account of war conditions, while the surplus of £209,367 in 1914 fell off by £232,698 to a deficit of $23,331 in 1915 on account of a smaller decrease in working expenses and an increase in interest. On the other hand, the tramway earnings made a much better showing in the last year than in the one preceding. The earnings increased £51,896 or 2.68 per cent, and the working expenses decreased £57,747 or 3.4 per cent. The net result, after providing for a small increase in interest, was a surplus of £90,135 as compared to the preceding year's surplus of £1,680, an increase of £88,455. This tramway surplus would have been turned into a deficit, however, and the railway deficit would have been greatly increased, had it not been for the increased fares granted late in the preceding year, which added £148,666 to the railway and £155,000 to the tramway earnings during the last year. Without these increases the railways would have shown a decrease in surplus of 0.58 per cent on capital account instead of a decrease of 0.35 per cent, while the tramways would have suffered a decrease of 0.83 per cent on capital account instead of an increase of 1.1 per cent.

During the last year 217 officers and 1805 men joined the expeditionary forces at the front. The list of casualties covered 185 at the end the year. The permanent employees at the front are paid the difference between their wages as employees and the military allowance, which involves a cost of about £46,000 per annum. Furthermore, the positions of the men are to be kept open for them.

SECTION OF ROCK ISLAND LEASED

The receivers of the Rock Island Railroad have ended negotiations for leasing to the newly organized Muscatine & Iowa City Railway, Muscatine, Iowa, 104 miles of the Rock Island lines between Muscatine and Montezuma with branches to Iowa City and What Cheer, Iowa. The new company will substitute gasoline-electric motive power for steam power, and will furnish both a passenger and a freight service to twenty-two cities and villages. Arrangements have been made with the Iowa Railway & Light Company, Cedar Rapids, Iowa, whereby a portion of its line will be used for entrance into the business district of Iowa City. The new organization was formed by business men of Muscatine, Iowa City, Wellman and Montezuma. A. D. Bowen, Muscatine, has been elected president.

Boston (Mass.) Elevated Railway.—Authority to issue $3,286,000 of additional bonds is asked by the Boston Elevated Railway in a petition filed with the Massachusetts Public Service Commission. The bonds are to provide for construction and equipment, floating debt and property.

Boston & Maine Railroad, Boston, Mass.—The annual report of the Boston & Maine Railroad for the year ended June 30, 1915, covers the operations of the two owned electric railway branches, the Portsmouth (N. H.) Electric Railway and the Concord & Manchester (N. H.) Electric Branch, and the one leased line, the Conway (Mass.) Electric Street Railway. The combined operating revenues of these first two lines for the last fiscal year were $250,889, a decrease of $14,930 as compared to $265,819 in the preceding year. The total operating expenses increased from $177,685 to $185,575, an amount of $7,890, so that the net revenue decreased by $22,820 from $88,133 to $65,313. The number of passengers carried decreased from 5,204,740 to 4,916,019, or 288,721, and the number of car miles run from 1,134,386 to 1,090,202, or 44,184. The operating revenue of the Conway Electric Street Railway decreased slightly from $11,346 in 1914 to $11,107 in 1915, but the operating expenses increased from $9,786 to $16,006, resulting in a deficit of $4,899 in net revenue for 1915, as compared to a plus item of $1,560 for 1914.

Chicago & Milwaukee Electric Railroad, Highwood, Ill.—Judge Landis in the United States District Court recently entered an order authorizing W. O. Johnson, receiver Chicago & Milwaukee Electric Railroad, to issue receiver's certificates for the construction of a bridge to cost $40,000. The certificates are to bear interest at the rate of 5½ per cent.

Choctaw Railway & Lighting Company, McAlester, Okla.—L. E. Fischer and Allen Wright have been appointed receivers of the Choctaw Railway & Lighting Company. This act is the result of a suit filed by the Guaranty Trust Company, New York, to foreclose on a mortgage covering $894,000 of outstanding bonds, mentioned in the ELECTRIC RAILWAY JOURNAL of Oct. 9.

Columbia Railway, Gas & Electric Securities Company, Columbia, S. C.—Redmond & Company, New York, are offering at 99½ and interest convertible 6 per cent secured gold coupon notes, series B, of the Columbia Railway, Gas & Electric Securities Company. These notes are dated April 1, 1915, and are due on Oct. 1, 1917. They are convertible at the option of the holder, on any interest date at ten days' notice, into an equal par value of deposited first mortgage bonds and $120 in cash per note, making the net cost of the bond 88 (a 5¾ per cent basis). The notes are secured by the deposit of first mortgage 5 per cent bonds of the Parr Shoals Power Company, guaranteed principal, interest and sinking fund by the Columbia Railway, Gas & Electric Company, each $1,000 note being secured by $1,350 par value of bonds. The Columbia Railway, Gas & Electric Securities Company is a subsidiary of this guarantor company, organized for the purpose of selling securities.

Humboldt Transit Company, Eureka, Cal.—The California Railroad Commission on Oct. 4 issued an order authorizing the Humboldt Transit Company to issue to William Butterworth a one-year promissory note for $4,000 at 5 per cent and to pledge as collateral security therefor $8,000 of first mortgage 5 per cent sinking-fund thirty-year gold bonds.

Long Island Railroad, New York, N. Y.—Because the operating companies (the Interborough Rapid Transit Company and the New York Municipal Railway Corporation) have challenged the right of the Public Service Commission for the First District of New York under the dual system contracts to compel them to operate leased private roads, the commission has asked its counsel to give an opinion relative to the proposition of the Long Island Railroad to lease to the city its Whitestone and Little Neck branches. These lines were to be operated by the two companies as extensions of the Corona elevated line. The commission has also requested the Board of Estimate and Apportionment to take up this matter, to the end that the corporation counsel's opinion can also be obtained. The Long Island Railroad on Sept. 30 offered to rent these branches to the city at $125,000 per annum, plus certain additional charges, for a term of ten years, with the privilege of a ten-year renewal. Previous reference to this matter was made in the ELECTRIC RAILWAY JOURNAL of April 17, May 15 and Oct. 16.

Los Angeles & San Diego Beach Railway, San Diego, Cal.—The Los Angeles & San Diego Beach Railway has received permission from the California Railroad Commission to sell bonds of the par value of $370,000 before Nov. 15, 1916. The company received authority on Nov. 25, 1914, to issue $375,000 of bonds, but it has sold only $5,000 of them.

Memphis (Tenn.) Street Railway.—Transcripts of the records of two big damage suits from the United States District Court at Memphis were filed by the Memphis Street Railway in the United States Circuit Court of Appeals at Cincinnati on Oct. 11. S. C. Moore and E. O. McCoy had brought suits against this company for damages because of injuries received when a street car collided with a train on the Illinois Central Railroad. The jury awarded them $25,000 and $20,000 respectively. Motions for new trials were filed, but the court issued an order overruling them, provided the plaintiffs would accept remititurs to $17,500 and $12,500 respectively, which they did. The company then appealed on error from the judgment of the United States District Court.

Metropolitan Street Railway, Kansas City, Mo.—The receivers of the Metropolitan Street Railway filed in the Federal Court at Kansas City on Oct. 26 a statement including the report of the managers of the reorganization plan, showing that about 98 per cent of the securities holders had agreed to Judge Hook's plan. It is expected that Judge Hook will formally take up within a few days the disposal of the receivership, and the inception of the ownership of the property by the Kansas City Railways, the company provided for in the new franchise. The report of the committee was signed by Kuhn, Loeb & Company, Lee, Higginson & Company and Blair & Company, and by H. L. Stuart representing Judge Hook.

Monongahela Valley Traction Company, Fairmont, W. Va.—The Monongahela Valley Traction Company has declared a quarterly dividend of 1¼ per cent on its preferred stock, payable on Nov. 2 to stock of record on Oct. 27. In the past the company has paid semi-annual dividends of 2½ per cent, but from this time on dividends will be declared quarterly at the regular 5 per cent rate.

New York (N. Y.) Municipal Railway Corporation.—The Public Service Commission for the First District of New York has granted permission to the New York Municipal Railway Corporation to issue $20,000,000 of 5 per cent sinking-fund gold bonds under its $100,000,000 mortgage to the Central Trust Company dated July 1, 1912. The application for this issue was noted in the ELECTRIC RAILWAY JOURNAL of Oct. 23. The bonds will be sold at not less than 97, and will mature on Jan. 1, 1966. They are to be redeemable at 107½ on any semi-annual interest date, and are to be amortized before maturity by the sinking fund provided for in the terms of the mortgage. All the bonds must be sold before Jan. 1, 1916.

Pacific Gas & Electric Company, San Francisco, Cal.—The California Railroad Commission has issued an order authorizing the Pacific Gas & Electric Company to acquire, and the trustees in liquidation of the West Sacramento Electric Company to transfer all the property formerly owned by the latter company. The application for this sale was made by the trustees of the West Sacramento Electric Company, who stated that the Pacific Gas & Electric Company had already acquired and paid for all the capital stock. The authorization for the stock purchase was noted in the ELECTRIC RAILWAY JOURNAL of Aug. 14. The Pacific Gas & Electric Company already owns and operates the electric railway lines in the territory served by the purchased company.

Philadelphia Company, Pittsburgh, Pa—Charles Hayden has been elected a director of the Philadelphia Company and the Duquesne Light Company.

Public Service Corporation of New Jersey, Newark, N. J.—A gain of more than 5 per cent in gross business for September, 1915, over the corresponding month of last year is shown in the financial statement just issued by the Public Service Corporation of New Jersey. The gross figures cover the corporation's railway, gas and electric business. To be exact, the gross increase in total business for last September was $162,430, a percentage of increase of 5.3 per cent over September, 1914. The balance available—after payment of operating expenses, fixed charges, sinking fund requirement, etc.—for amortization, dividends and surplus, was $411,444, and the increase in surplus available for dividends was $48,819. For the nine months ended Sept. 30, 1915, the gross increase in total business was $968,712, a percentage of increase of 3.7 per cent. The balance available for amortization, dividends and surplus was $2,506,391, and the increase in surplus available for dividends was $194,202.

Quebec Railway, Light, Heat & Power Company, Quebec, Que.—The gross earnings from operation of the Quebec Railway, Light, Heat & Power Company for the year ended June 30, 1915, were $1,548,096 as compared with $1,531,221 in 1914, an increase of $16,875. After adding miscellaneous income of $235,978, the total revenue from all sources amounted to $1,784,074, an increase of $17,076. The operating and maintenance expenses were $924,817 as compared to $913,101, an increase of $11,716. The fixed charges and taxes of all kinds totaled $739,482, leaving a net surplus of $119,775. This, added to that of last year, made a total surplus to date of $347,499. The report states that the properties of the company and its various subsidiaries have been maintained on the usual basis, $193,898 having been expended on maintenance account during the year.

Sacramento Valley Electric Railroad, Dixon, Cal.—In the foreclosure suit of S. H. Palmer and A. D. McBride, contractors against the Sacramento Valley Electric Railroad, Judge O'Donnell has rendered judgment for $27,388 in favor of the plaintiffs. Roscoe M. Griffin has been appointed commissioner to sell the property and satisfy the judgment. The line at present consists of a 12-mile unit operated under lease by the Oakland, Antioch & Eastern Railway from Dixon to Dixon Junction. This unit is a part of the electric line planned from Red Bluff, Tehama County, through Willows, Glenn County, and Woodland, Yolo County. Inability to collect on stock subscriptions on account of financial conditions for the last few years is the cause of the non-payment on the cost of contract.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—In addition to the issues noted in the ELECTRIC RAILWAY JOURNAL of Sept. 11 and Oct. 23, the San Francisco-Oakland Terminal Railways is now paying deferred interest on September coupons of the Oakland Transit Company first 6's and the Twenty-third Avenue Electric Railway first 6's and on July coupons of the East Shore & Suburban Railway first 5's.

Scioto Valley Traction Company, Columbus, Ohio.—At the annual meeting of the Scioto Valley Traction Company Sylvio Casparis was elected a director to succeed the late George D. Eustis. The report for the year ended June 30, 1915, showed a decrease of $22,526 in gross earnings, which was offset to some extent by a decrease of $13,000 in operating expenses and taxes. The final net income for the year available for dividends was $97,421, of which $75,000 was paid out in preferred dividends, leaving a balance of $21,446 for the common stock, a decrease of $9,608. The profit and loss surplus on June 30, 1915, aggregated $188,985.

Seattle (Wash.) Municipal Street Railway.—Seattle's municipal lines, Divisions "A" and "C," were operated during September at a loss of $2,977. The revenues of Division "A" amounted to $1,699, while the cost of operation was $1,994. An addition for interest made the total loss for this line $1,918. It cost $2,462 to operate the Lake Burien line, Division "C," while the revenues amounted to $1,403, making a loss of $1,059.

Stockton Terminal & Eastern Railroad, Stockton, Cal.—It is reported that an assessment of $10 a share, delinquent on Nov. 10, has been levied on the stock of the Stockton Terminal & Eastern Railroad.

United Railways Investment Company, San Francisco, Cal.—Benjamin Altheimer, St. Louis, Mo., has been elected a director of the United Railways Investment Company to succeed Emil Loeb, resigned. The committee of directors which was appointed at the annual meeting in 1914 to readjust finances has reported that owing to prevailing conditions it was not able to accomplish anything, and it has been discharged.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—The Wilmington & Philadelphia Traction Company has secured control of the Wilmington, New Castle & Delaware City Railway, which operates a 10.5 mile line between New Castle and Delaware City. This purchase, together with that of the Wilmington Southern Traction Company, noted in the ELECTRIC RAILWAY JOURNAL of Oct. 9, places all the trolley lines south of Wilmington in the hands of the Wilmington & Philadelphia Traction Company. Plans of the incoming management include the general improvement and speeding up of the service. The line from New Castle to Delaware City, heretofore operated on the storage-battery system, will be converted to the overhead type of construction, and the entire line from Wilmington to Delaware City will receive extensive improvements. Under the new plan the system will operate from Darby, along the Delaware River, through Eddystone, Chester, Marcus Hook, Wilmington and New Castle to Delaware City, as well as on the line in Media and the lines connecting Media with Chester and Philadelphia.

DIVIDENDS DECLARED

Bangor Railway & Electric Company, Bangor, Me., quarterly, one-half of 1 per cent, common.

Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont., quarterly, one-half of 1 per cent, ordinary.

Cape Breton Electric Company, Ltd., Sydney, N. S., 3 per cent, preferred; 1½ per cent, common.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, three-fourths of 1 per cent, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., quarterly, 1½ per cent, preferred.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Montreal (Que.) Tramways, quarterly, 2½ per cent, common.

Tampa (Fla.) Electric Company, quarterly, 2½ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.					
1m., Aug., '15	$91,619	*$67,116	$24,503	$16,964	‡$7,680
1 " " '14	100,430	*73,836	26,594	17,185	‡9,694
2 " " '15	182,862	*129,298	53,564	33,986	‡19,839
2 " " '14	198,084	*154,765	43,319	34,106	‡9,608
CITIES SERVICE COMPANY, NEW YORK, N. Y.					
1m., Aug., '15	$312,737	$14,567	$298,170	$40,833	$257,337
1 " " '14	264,881	12,300	252,581	40,833	211,748
12 " " '15	4,051,578	155,846	3,895,732	490,000	3,405,732
12 " " '14	3,671,480	100,015	3,571,465	346,443	3,225,022
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO					
1m., Aug., '15	$43,453	*$20,138	$23,315	$10,974	$12,341
1 " " '14	43,789	*23,374	20,415	11,388	9,027
8 " " '15	267,845	*148,328	119,527	87,784	51,733
8 " " '14	276,140	*147,129	129,011	88,416	40,595
HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.					
1m., Aug., '15	$427,195	*$191,113	$236,082	$212,031	$24,051
1 " " '14	424,660	*184,753	239,907	211,549	28,308
2 " " '15	855,110	*381,045	474,065	423,238	50,827
2 " " '14	863,480	*368,015	495,465	426,824	68,641
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO					
1m., Aug., '15	$144,480	*$81,033	$63,447	$36,209	$27,238
1 " " '14	156,219	*84,494	71,725	35,944	35,781
8 " " '15	906,050	*594,432	311,618	288,706	22,912
8 " " '14	966,324	*595,361	370,963	283,433	87,530
NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.					
1m., Aug., '15	$46,258	*$29,936	$16,322	$8,000	‡$8,391
1 " " '14	52,391	*32,486	19,905	7,876	‡12,080
2 " " '15	96,041	*60,737	35,304	16,000	‡19,444
2 " " '14	102,058	*63,425	38,633	15,751	‡22,999
NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.					
1m., Aug., '15	$50,118	*$38,407	$11,711	$41,521	†‡$1,130
1 " " '14	42,723	*39,878	2,845	40,729	†‡6,657
2 " " '15	99,009	*74,580	24,429	83,042	†‡3,717
2 " " '14	86,150	*83,717	2,433	80,937	†‡12,871
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO					
1m., Aug., '15	$360,055	*$214,559	$145,496	$53,319	$92,177
1 " " '14	343,543	*201,845	141,698	51,136	90,562
8 " " '15	2,488,442	*1,535,909	952,533	413,588	538,945
8 " " '14	2,416,902	*1,467,650	949,252	403,820	545,432
REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.					
1m., Sept., '15	$266,302	*$153,933	$112,369	$58,483	‡$53,999
1 " " '14	244,649	*154,823	89,826	57,250	‡32,997
9 " " '15	2,234,921	*1,372,515	862,406	518,131	‡345,459
9 " " '14	2,248,108	*1,386,729	861,379	507,361	‡355,673
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.					
1m., Aug., '15	$797,662	$496,687	$300,975	$137,751	‡$163,464
1 " " '14	796,204	493,588	302,836	133,494	‡171,498
8 " " '15	6,180,302	4,028,823	2,151,479	1,076,354	‡1,090,757
8 " " '14	6,133,344	3,844,788	2,288,556	1,047,961	‡1,248,437

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*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

JITNEY JOTTINGS

Operators of Jitneys in Brooklyn Required to Apply to Commission—Decision Expected in Philadelphia Case

The Public Service Commission for the First District of New York has notified Marius Jorgenson and the Cook Sight Seeing Company that it will be necessary for them to apply to the commission to continue the operation of jitney lines which they have started in Brooklyn. Mr. Jorgenson is running a line in the Bay Ridge section of Brooklyn, and the Cook Sight Seeing Company is operating a line along Atlantic Avenue, from Nostrand Avenue to Flatbush Avenue. The commisson has already approved the application of one company to operate jitneys in Greater New York. This was the application of the Far Rockaway Transportation Company, Inc., dated July 15, 1915. The company started the operation of three routes in and around Far Rockaway.

The threatened civil proceedings to be brought by the Philadelphia City Solicitor's office to recover the fines and costs imposed by magistrates on drivers of automobiles arrested for violating the jitney ordinance has been stayed by an order made by Judge Patterson, in the Quarter Sessions Court. Harry M. Berkowitz, an attorney, appealed from the summary conviction of Charles Helig before Magistrate Beaton. Helig was arrested on Oct. 4 and fined $5 and costs by the magistrate. He was unable to pay the penalty and the magistrate discharged him, it being stated that civil suits would be begun by the City Solicitor against all individuals arrested under similar circumstances who refused to pay their fines. Judge Patterson decided not to hear the appeal at this time for the reason that he is preparing an opinion in another case which would probably cover all the points to be raised on this appeal. It is expected that the opinion referred to will settle the heretofore confused status of the jitney in Philadelphia.

The Supreme Court of Tennessee has upheld the law passed by the Legislature last winter providing that previous to operation jitney lines must secure a municipal franchise and file indemnity bonds with the state.

The San Joaquin Light & Power Corporation on Oct. 15 put in service a fleet of automobiles to supplement the service of its street car system. The machines are to be replaced later, it is reported, by ten-passenger motor buses. The service is in districts hitherto dependent upon jitneys.

Judge Thornton W. Sargent of the District Court of Sedgwick County, Kan., recently held valid Wichita's ordinance regulating jitneys, and dissolved an order restraining the city officials from enforcing the ordinance. The ordinance requires jitney owners to pay licenses ranging from $25 to $50 a year, according to the capacity of the car. A further provision is that if the jitneys are to operate on streets where there are street car lines, the licenses shall range from $300 to $400 a year. The ordinance was contested on the ground that it was discriminatory because it exacted a greater license for the jitneys on streets where there were car tracks than on streets unoccupied by such tracks. The court held that there was no discrimination among jitney owners, and that the purpose to protect the street car business was laudable and proper.

No decision has been rendered by the Eleventh District Court in the case of the Houston, Tex., jitney ordinance. This ordinance is temporarily restrained by injunction, but 200 operators had paid the yearly license fee of $72 before the injunction was granted. These operators claim that the ordinance is beneficial to the business and should be strictly enforced. Other jitney men who are contesting the ordinance are operating in competition with those who have paid the license fee, claiming that it is impossible to operate under the ordinance at a profit. If the court upholds the ordinance it will doubtless be amended to require an indemnity bond. The City Commission has been advised by an insurance company that a bond protecting both passengers and pedestrains to the extent of $2,500 would be written for $225 a year. For a premium of $150 a year the company will write a bond for pedestrians only.

FIRST JITNEY CASE BEFORE NEW YORK PUBLIC SERVICE COMMISSION

Commission Lays Down the Principles Which Will Govern It in Future Applications

The principles which guided the Public Service Commission of the Second District of New York in granting certificates for four of the six jitney routes provided for in the franchises granted in New Rochelle, to which brief reference was made in the ELECTRIC RAILWAY JOURNAL of Oct. 22, page 890, were as follows:

The duty of the commission to protect already established utilities under its jurisdiction from unnecessary competition is reiterated.

It is held that the commission's duty to the public, entitled at least to some individual liberty in their choice of means of transportation, should come before its duty to protect vested capital except where such choice would lead to competition surely ruinous to interests which the public assumes to regulate.

It is recognized that owing to recent improvements in automobile construction and maintenance of public highways the motor-bus line rather than the trolley will be the relief sought by persons residing away from existing trolley lines who desire transportation facilities.

The four routes authorized run on the same streets with existing trolley lines only for the short distances necessary to reach the New Haven Railroad station, which, due to the commuting nature of New Rochelle's population, is the heart of its urban transit system; with this exception they run on other streets, many of them not parallel to and many some distance away from existing trolley lines. This is held not to be competition which the commission should prevent, but a healthy growth toward the further development of the community tending to aid rather than to hurt the existing transportation agencies. In other words both "convenience" and "necessity" are held to have been proved in the case of these routes.

The two routes for which certificates are refused would have run parallel to and on the same streets with existing trolley lines through their entire route, and through a territory sparsely built up by persons of wealth many of whom maintain their own private means of transportation. While it is held that the contention of the applicant, that the increased facilities provided by his bus lines would help develop this territory and add to the convenience of its inhabitants might have been sustained, no proof was adduced of the "necessity" of these lines and their authorization was refused.

The commission refuses to pass upon the validity of the franchise as it may be affected by the contention of the trolley corporation that it was irregularly advertised or as to the manner in which the action of the commission in approving some and disapproving other routes may affect the validity of the franchise. The opinion confines the decision specifically to the question of the public convenience and necessity of the routes proposed and leaves other questions to "other tribunals."

The provisions of the franchise for these lines which Commissioner Emmet mentions as "designed to be of benefit to the local traveling public" are that the buses shall seat from ten to seventeen persons; that they shall be of the pay-as-you-enter type; that they shall have pneumatic tires; that they shall be kept in good condition and that all passengers shall have seats; that the fare for any continuous ride on any route shall be 5 cents; that children under five and policemen and firemen on duty shall be carried free; that buses shall run on at least a twenty-minute schedule from 6.30 a. m. to 1.30 a. m., that the franchise shall expire in ten years; that 3 per cent of the gross earnings shall be paid quarterly to the city; that a bond shall be given to insure prompt payment of this and other obligations; that the buses shall stop upon signal at the near side of street crossings, and shall be subject to present and future traffic regulations of the city, and that the franchise shall be forfeited in the event of the insolvency of the holder or of failure to operate the system in accordance with the terms of the franchise.

As to the position of the commission with regard to the prevention of undue competition with already established utilities, Mr. Emmet says:

"That it (Westchester Electric Railroad) and all other companies similarly situated, are entitled to such protection up to a certain point is a fact beyond any possible question. It was one of the wise and just provisions of the public service commissions law to vest in the commission requisite authority to prevent wasteful and unprofitable competition between privately-owned enterprises engaged in any public utility field. The reasons for doing this were obvious. The people of New York State in their collective capacity have not as yet seen fit to engage largely in any form of government-operated utility enterprise. Individual courage, energy, foresight and a willingness on the part of private investors to risk large sums in bringing modern conveniences within the reach of all men—these have been the only agencies through which, speaking generally, it has hitherto been possible for the people of the State of New York to enjoy the benefits attaching to such necessaries of modern life as improved transit, lighting, telephonic and telegraphic facilities. Doubtless, therefore, when it passed the public service commissions law, the Legislature included among its provisions the one we are discussing very largely from a sense of fairness to the private interests already engaged in these fields of work."

Speaking of the effect of this case on future applications to the commission, Mr. Emmet's opinion says:

"Broadly speaking what must guide the commission in all such cases is an enlightened view of what will best, in the long run, serve the public at large. In the last analysis, the protection of investments which have already been made in public utility enterprises in good faith, will be seen to harmonize pretty well with the idea that the public ought always get the benefit of the very best there is in the way of transportation and other similar facilities. The best there is, in the most cases, can probably be most certainly achieved through the policy of protecting our well-managed public service corporations from the sort of competition that in the end leads to the bankruptcy of both competitors to the ultimate injury of the public itself."

KEEPING RAILWAY EMPLOYEES ALERT

Reliability of service resulting in practically 100 per cent efficiency in keeping trains on time has been obtained by the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., by frequent checks on the employees' alertness. Subject to the order of the superintendent, power may be cut off the line for a thirty-second interval at any time. The superintendent issues an order to the dispatcher, who in turn promptly transmits it to the chief engineer of the power house. The promptness with which the chief engineer responds to the order is made a matter of record, and all way stations along the line are required to report immediately the exact time power was cut off. If any of these agents fail to report, an explanation is required. This check assures the superintendent that all way-station agents are alert and on duty and that the power-house crew is ready on short notice to meet any emergency.

The automatic block signals between Gary and South Bend, a distance of 59 miles, afford a similar check on the trainmen. These checks are also made by the superintendent, who always carries a device for short-circuiting a signal, thus allowing the blade to drop to the stop position. This check also includes extinguishing the signal lamp, a condition which has been found difficult for motormen to observe at any considerable distance from the signal, and particularly when the roundel is within the range of the headlight. Efficiency of signal observation is tested once each month, and since the first few times the tests were applied and men were reprimanded, the superintendent has found that the percentage of observations is perfect. The signal in the stop position also tests the dispatcher, who under no condition is authorized to issue an order to the crew to disregard the signal. The dispatcher, however, is permitted to authorize the crew to proceed, but in accordance with the rule which provides that when a signal is in the stop position and no regular meet is scheduled nor order issued for a meet at that point and the telephone is out of order, a train may proceed to the next clear signal at a speed not to exceed 15 m.p.h. These checks on the alertness of the employees and their adherence to the rules have served materially to increase the efficiency of the service.

FOUR-CENT TICKETS TO BE DISCONTINUED IN THE CITY OF FORT SMITH

The Fort Smith Light & Traction Company, Fort Smith, Ark., has published over the signature of H. C. Hoagland, general manager, the following statement announcing the decision of the company to discontinue the sale of 4-cent tickets on its lines:

"This company has for many years sold twenty-five street car tickets for $1, or at the rate of 4 cents each. It is necessary to withdraw this privilege, and it is due our patrons that the company give the reasons which have compelled this reluctant decision.

"The principal reason for the sale of tickets at a reduced rate is to increase travel—to induce those who would not otherwise use the cars to do so in order that vacant space be occupied. Railroads on the same principle sell excursion, commutation and 1000-mile tickets at lower rates than their fixed ones.

"The sale of tickets is not increasing the travel on the street cars. Our records show that for the seven months of this year only 15.14 per cent of all pay passengers used tickets, and on the Eleventh Street line only 11.65 per cent used them. If the company was making money under the present rates, it would not withdraw this privilege, but it, like most other business enterprises, is suffering from the general depression, and from other causes.

"The increase in the use of automobiles for pleasure, business and as public utilities, is cutting into street car receipts all over the country. Prohibition has curtailed travel to Fort Smith; it may be argued that it was an undesirable travel, but it did exist, and now it does not exist.

"For two years a 2-cent per mile rate prevailed on the Iron Mountain to and from Van Buren and a 3-cent rate to and from Fort Smith, owing to the trains making an interstate journey to reach and leave the city. To avoid paying the 3-cent rate, the travel on that road largely bought transportation to and from Van Buren and used the street cars between the cities. After this company lost the use of the bridge, the railroad largely retained this travel; and now, should the company again use the bridge, it would only be partially restored, as the railroad has through an injunction secured a restoration of the 3-cent rate.

"The loss of the use of the bridge, and the consequent diversion of much travel over it to railroads, taxis and jitneys, has also cut into the receipts of the company, while not diminishing the expenses.

"Irrespective of this analysis, the figures are the vital facts: The year 1912 was the high tide of the company's business. The gross receipts from the street cars that year were $226,250. In 1914 (notwithstanding the company still had the use of the bridge) they fell to $192,368, while the operating expenses fell only $8,347, a net loss of $25,535. For the first seven months of 1915, the gross receipts were $85,875, or at the rate of $147,212 for the year.

"The operating expenses—and by that is meant bare expenses of operation and taxes (not including fixed charges for interest, dividends on preferred or common stock, or depreciation) did not fall in like proportion because the service maintained and the up-keep of the property, notwithstanding rigid economy, did not permit it.

"For seven months of 1915 the net receipts—only deducting expenses of operation and taxes from its gross receipts—were $4,337, or at the rate of $7,504 for the year—a sum insufficient to meet depreciation alone, to say nothing of interest or return on the investment.

"The company has only once paid a dividend on its common stock, and that was in 1911, and has paid no dividend on its preferred stock since April, 1913. It is apparent that the company must increase its gross receipts as it cannot decrease its expenses without impairment of its service, and it feels that the public is entitled to the best service its resources permit. For these reasons, much to our regret and owing to causes over which we have no control, 4-cent tickets will not be sold hereafter."

WISCONSIN COMMISSION LIKELY TO CALL FOR SUBMISSION OF OPERATING RULES

On Oct. 21 the Railroad Commission of Wisconsin held a formal hearing at the capitol in Madison on the subject of rules for the operation of electric railways and standards for certain features of construction which affect the adequacy and safety of the service rendered. While the commission used as a basis for the discussion the standard city and interurban codes of the American Electric Railway Association, Commissioner Walter Alexander indicated that the commission probably would not enter an order establishing any set of rules as standard for all roads in Wisconsin.

Only those rules directly affecting safety and adequacy of service were discussed, and it developed that practically all roads wanted substantial modifications of the rules to fit local conditions. This was particularly true of the smaller roads which operate low-speed interurban service without written train orders or regular dispatchers. Opinion of the Wisconsin operating men on the question of color signals, whistle and bell signals, markers and flags was divided.

The subject of car steps, platforms, doors, etc., was discussed at some length. The tentative suggestion of the commission that the first step should not exceed 15 in. above the rail for both city and interurban cars met considerable opposition. The one-man car was given some prominence by the fact that the commission recognized its use and asked for a full discussion of the subject in view of its probably further use throughout the State.

Commissioner Alexander indicated that the commission would probably enter an order requiring each company to submit its operating rules for approval and requiring each company to submit plans for all new and remodeled cars for approval. In this manner the local conditions could be considered in each case.

TRENTON FARE HEARING BEGUN

Case in Which Trenton & Mercer County Traction Corporation Seeks to Substitute Five-Cent Fare for Six Tickets for a Quarter

The case of the Trenton & Mercer County Traction Corporation, Trenton, N. J., before the State Board of Public Utility Commissioners, in which the company is seeking to abolish the sale of strip tickets at the rate of six for a quarter and to substitute a straight 5-cent fare, was begun before the board at Trenton on Oct. 25. With former Mayor Frank S. Katzenbach as its counsel, the company opened its case by the submission of testimony on the part of Rankin Johnson, the president of the corporation. The city of Trenton is represented by City Counsel Charles E. Bird and George L. Record as special counsel. Frank Sommer appears as counsel for the Public Utility Board. The reasons advanced by Mr. Johnson for the change may be summarized as follows:

1. A 5-cent rate of fare is the customary rate, not only in New Jersey, but elsewhere.
2. The franchises of the company provide for a 5-cent rate of fare, and when the principal franchise was granted in 1894 the company assumed many additional obligations.
3. The gross receipts should be sufficient to meet the requirements of operation, maintenance charges, replacements, return on capital invested, and investments for extensions. The public demand a constantly increasing standard of service.
4. The gross receipts were not sufficient to meet the operating expenses, maintenance and other charges.

Mr. Johnson said that the practice used in securing the basis for fixing the rate was to consider the cost of reproduction with reasonable allowances for charges that do not appear and also the value of the proposition as a going concern.

The company then introduced into the record the report made to the Board of Public Utility Commissioners in 1910 by Inspector Philander Betts of the commission. This report was made at the time the Trenton & Mercer County Traction Corporation applied to the board for the approval of the leases by which it took over the Trenton Street Railway, Trenton, Hamilton & Ewing Traction Company, Mercer County Traction Company and the Trenton, Pennington & Hopewell Railroad. It was upon this report that the utility board approved the leases. The report was admitted as evidence in the case with the distinct understanding that it was accepted merely as the report of Inspector Betts, giving his conclusions as to the valuation of the properties, and was not to be taken in any sense as the finding of the board as to the valuation.

At the continuation of the case on Oct. 26 there were many tilts between counsel as to the details that should be permitted to be entered in the record. Mr. Johnson testified that in 1914 the total receipts of the company were $776,548 and the operating expenses, replacements, taxes and payrolls $523,861. Since 1910 the company had expended $821,833 in improvements.

Prizes Awarded for Illinois Traction Scenarios.—Mrs. Rose Marion Boylan, East St. Louis, Ill., won the first prize of $10 for the best scenario woven about the work of the Illinois Traction System. Mrs. George Alfs, Peoria, Ill., won the second prize of $5. The title of the first scenario was "Interest on a Loan," and the subject of the second prize was "The Elopers."

Chicago Service Order Before Court.—The Corporation Counsel of Chicago, Ill., filed suit on Oct. 28 in the Circuit Court before Judge Baldwin against the Illinois Public Utilities Commission and the Chicago Surface Lines praying for a temporary restraining order to prevent the railway from complying with the service order recently issued by the commission and summarized in the ELECTRIC RAILWAY JOURNAL of Oct. 9, page 775.

Reduction in Round-Trip Fare.—The Puget Sound Electric Company, Tacoma, Wash., has filed an emergency tariff with the Public Service Commission of Washington which reduces the round-trip fare between Tacoma and Puyallup from 40 cents to 25 cents. The 25-cent rate will also apply to any of the midway stations where the round-trip fare now exceeds 25 cents. The reduction will place the fare at the prices of two years ago. The return to the fare previously in force is said to have been made imperative by the competition of the auto bus.

Appeal to I. C. C. in Louisville-Indianapolis Case.—Following the decision of the Interstate Commerce of several months ago by which the commission directed the electric railways operating north into Indiana out of Louisville to divide rates, the Louisville Board of Trade took up the matter of arranging for through shipments of freight north from Indianapolis. Recently it developed that the lines north of Indianapolis and those south of Indianapolis had been unable to agree on the question of divisions of rates. Negotiations between the Louisville Board of Trade and the individual lines north of Indianapolis failed to get results satisfactory to both sides and this question now has been referred to the commission for settlement.

Noon-Day Shop Meetings in New York.—The first of the series of regular Thursday noon-day shop meetings to be held during the forthcoming fall and winter season for the benefit of all employees of the Interborough Rapid Transit Company, New York, N. Y., was held on Sept. 30 in Hedley Hall, attached to the recreation rooms at 240th Street. The meeting was conducted by E. Dana Caulkins, who outlined the plan and scope of the proposed work for the coming year, under which the men themselves will have complete charge of all meetings. The noon-day shop meetings are non-sectarian. Music, short talks on current topics, or advice on matters of health, safety first, economy, food, air, etc., are some of the subjects with which the meetings are concerned.

Reconciling Steam and Electric Freight Rates.—Revision of the rates on heavy freight out of Louisville, Ky., to points on its lines has been begun by the Louisville & Interurban Railway. This is a revision downward, to put these rates on building materials, such as sand and gravel, lumber, concrete blocks and cement and fertilizer, etc., more nearly on a par with the rates of the steam lines for short hauls out of Louisville. As planned, the reduced rates will still remain higher than those of steam lines at competing points. Seventy-five per cent of the freight haul of the Louisville & Interurban Railway, however, is main-line unload, which means service that the steam lines cannot give. Some discussion of industrial trackage is being indulged in by officers of the company.

The Gong As a Time-Killer.—That the gong on the front of a car can be made a time-killer as well as a time-saver was the point made by A. F. Connelly, chief inspector of the Louisville (Ky.) Railway, in an address to the trainmen. Mr. Connelly said that such ringing of a gong as will cause resentment on the part of the man driving a wagon or other vehicle on the tracks ahead is a time-wasting practice. The gong, if sounded only as a signal, is generally enough to cause the average driver to pull out, but if the motorman sounds it imperatively and keeps on sounding it after he knows the driver ahead has heard his signal, he is very likely to lose rather than gain. Not only that, but he is likely to be vexed and an accident may result while he is speeding in an effort to catch up with the schedule.

Additional Transfer Ordered in New York.—On the recommendation of Commissioner William Hayward, the Public Service Commission for the First District has ordered the Belt Line Railway Corporation and the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, New York, N. Y., to exchange transfers in a manner to enable passengers to ride direct through Fifty-ninth Street to and over the Queensboro Bridge to Long Island City. The order is to take effect on Nov. 15. Under the new order it will be possible for a passenger coming south, for instance, on Broadway in a Third Avenue car to transfer at Fifty-ninth Street to the Belt Line car and then retransfer at Third Avenue to the Forty-second Street Manhattanville car, which goes over the bridge. Heretofore this transfer privilege has not been in effect.

Safety on the Chicago Elevated.—*Elevated News* for September, published by the Chicago (Ill.) Elevated Railways for the purpose of acquainting the people of Chicago with their elevated railway system, contains a reprint of the article "Safety of Trains on the Chicago Elevated," which appeared in the ELECTRIC RAILWAY JOURNAL of Aug. 21. Referring to its train accident record the company says: "During the ten-year period ended Dec. 31, 1914, the elevated railroads carried 1,526,632,751 passengers. During this period two passengers met fatal accidents while on trains. This shows the rate of fatal accidents to passengers on trains as one to every 763,316,375 passengers carried. The aggregate number of train trips made per annum is 1,740,416, or a total of 49,015,593 car miles run. This shows the great volume of train movement and compared with the fatal accident record above stated, indicates that elevated service has fewer accidents than any other method of transportation."

Suppressing the Rowdy in New York.—The New York *World* published in its issue of Oct. 24 the second of a series of articles on the suppression of the car rowdy. In introducing the article the *World* said: "The new figures of arrests in car rowdy cases establish the fact of the astounding growth of disorderliness on New York's transit lines. When Sunday rowdyism on subway, elevated and trolleys become so pronounced that 1350 arrests are made for part of a year, as against 622 for the entire year preceding, evidence is not lacking that the special efforts of the police have been made at a time when the conditions were approaching the intolerable. The *World* Sunday, Oct. 17, presented facts showing that thousands of people in New York were forced to remain at home rather than face the dangers incident to travel on the cars when they are commandeered by the rowdy element. It will present further facts bearing on the situation on Sunday, Oct. 31. Police Commissioner Woods, in an authorized statement, tells of the department's efforts to stop the rapidly increasing menace. The number of arrests show that the department is making headway. But before New York's car lines are safe, so that decent citizens may ride to our parks with freedom from insult and attack, further progress must be achieved. 'The police department is after street car rowdyism with all the power at its command,' says the Commissioner."

Personal Mention

Mr. Thomas R. Crumley, who has been superintendent of motive power of the Evansville (Ind.) Railways, has resigned to engage in other work.

Mr. Ira Berry, assistant treasurer of the Galveston (Tex.) Electric Company, has been transferred to the treasurer's department of Stone & Webster at Boston.

Mr. Frank B. Flahive, assistant treasurer of the Paducah Traction & Light Company, Paducah, Ky., has been transferred to the Galveston (Tex.) Electric Company as assistant treasurer of the company to succeed Mr. Ira Berry.

Mr. C. C. Long, electrical engineer of the Reading Transit & Light Company, Reading, Pa., will be relieved of certain duties formerly performed by him by the appointment of Mr. D. S. Miller as manager of power of the company. Mr. Long will continue to report to the president and will devote more of his time to the development of the light and power department. Mr. Long has been with the company twenty-one years.

Mr. W. H. Ogborn has been appointed traffic manager of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., which has announced that it has decided to go into the carload freight business immediately. The line of the company connects with a number of steam railroads in the industrial district bordering on the shores of Lake Michigan southeast of Chicago. Mr. Ogborn will organize a new department to develop the freight business.

Mr. Glen E. Votaw, superintendent of the Superior and Mesaba Division of the Great Northern Railway, with headquarters in Superior, Wis., has been appointed superintendent of the Spokane, Portland & Seattle Railway, Oregon Trunk Railway, Oregon Electric Railway and the Columbia & Astoria River Railway to succeed Mr. A. J. Davidson, who has been appointed to the Spokane & Inland Empire Railroad, as noted elsewhere in this column.

Mr. A. H. Purdy, who was elected president of the Kansas Public Service Association, successor to the Kansas Gas, Water, Electric Light & Street Railway Association, at the annual meeting of the association in Topeka on Oct. 21, 22 and 23, is general superintendent of the Topeka Edison Company. Mr. Purdy has been connected with the company since he was sixteen years old. He was made secretary and assistant treasurer of the company in 1905 and was promoted to the office of general superintendent of the company in 1910.

Mr. A. J. Davidson, superintendent of the Spokane, Portland & Seattle Railway, with headquarters in Portland, Ore., will become superintendent of the Spokane & Inland Empire Railroad and the Spokane (Wash.) Traction Company on Nov. 1 to succeed Mr. E. E. Lillie, who is to be transferred. In addition to being superintendent of the Spokane, Portland & Seattle Railway, Mr. Davidson is superintendent of the Oregon Trunk Railway, Oregon Electric Railway, United Railways, Portland, and the Columbia & Astoria River Railway.

Mr. D. S. Miller has been appointed manager of power and lines covering the properties of the Reading Transit & Light Company, Reading, Pa., and its affiliated companies. Mr. Miller was graduated from the Pennsylvania State College in the class of 1900 as an electrical engineer. He spent a year with the General Electric Company in the testing department and on outside construction work and later on with the Sprague Electric Company, New York, as erecting engineer. For about three years he was with the Boston (Mass.) Elevated Railway as assistant engineer. He has been with electric properties controlled by the New York, New Haven & Hartford Railroad for the last nine years, these lines embracing electric railways in Connecticut, Massachusetts, Rhode Island and part of New York State. During his connection with the New York, New Haven & Hartford Railroad he was for three years assistant superintendent of power and lines, for two years was electrical engineer and was supervisor of power and lines of the company's electric railway properties when leaving New Haven to assume his new work in Reading.

Mr. H. C. Mason, general manager of the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., one of the pioneers in the electric railway and lighting field of the Central West, has resigned, effective on Dec. 1, 1915. Mr. Mason was born in Mason County, Ky., in 1860, and began his street railway career in 1881 as a conductor with the old Newport & Dayton Railway, Dayton, Ky., a horse-car line 3 miles in length. Later he was advanced to superintendent, and on this property he began his business association, with Mr. W. Worth Bean. In 1889 Mr. Bean sold his interest in the Dayton property, now a part of the South Covington & Cincinnati Street Railway, and purchased an old horse-car line in Benton Harbor, Mich., the original Benton Harbor & St. Joe Railway. Soon after taking hold of this property Mr. Mason was made superintendent, and he installed an electric lighting system which since has been extended so that it now supplies electricity to practically all of Berrian County, Mich. In 1892 the horse-car line was electrified under Mr. Mason's supervision and, from time to time, the city lines were extended until they now include 25 miles of track. Later the street railway lines were built beyond the city limits and in time, formed the 50-mile interurban system which now is a part of this property. In 1906 Mr. Bean and Mr. C. B. Holmes, Chicago, sold this lighting and railway property to the C. K. Minary interests. Mr. Mason continued with the property and was made manager. In recent years the Michigan Fruit Belt district has grown rapidly, and a large share of the fruit has been transported over the interurban lines of the Benton Harbor-St. Joe Railway & Light Company to connecting railways and boat lines. Shortly after Mr. Mason's resignation takes effect he will leave for California, where he has a home in Alhambra, and after an extended vacation he will again return to active railway work.

Mr. D. A. Hegarty has resigned as general manager of the Houston Lighting & Power Company 1905, effective on Nov. 1, having been elected president of the Texas Southern Electric Company, Houston, Tex., which operates a number of electric light and power, gas, ice and cold storage plants in Texas. Mr. Hegarty was born in Philadelphia and was educated at the University of Pennsylvania. Leaving the University to become affiliated with the engineering department of the Pennsylvania Railroad, he passed through the various grades of service until he became assistant engineer of construction. He resigned from that position to become associated with Mr. A. Langstaff Johnston in charge of the work of electrifying the railways in Philadelphia. Mr. Hegarty was engineer in charge of construction and became general manager and chief engineer of the Hestonville, Mantua & Fairmount Passenger Railway. When the companies in Philadelphia were merged Mr. Hegarty resigned and accepted a position with the Norfolk (Va.) Railway. He next became manager of the Railways Company General, an operating and construction company with railways, electric light and gas plants in Michigan, New York and Pennsylvania. Resigning from this position Mr. Hegarty became vice-president, treasurer and general manager of the Little Rock Railway & Electric Company, Little Rock, Ark., and was transferred from Little Rock to the management of the railway and lighting department of the New Orleans Railway & Light Company and thence to the general managership of the Houston Lighting & Power Company in 1905. In 1913 he was elected president of the American Electric Railway Transportation & Traffic Association. He is a member of the National Electric Light Association and is a committeeman on the wiring committee of that body. He is also chairman of the illuminaton committee of the No-Tsu-Oh Association of Houston, Tex.

OBITUARY

William C. Hudson, political writer and author, is dead. Governor Cleveland secured his appointment as secretary of the State Board of Railroad Commissioners in 1883. He is said to have been one of the first to urge the theory that competition is not necessarily an advantage to the community; that it needs to be checked as often as it needs to be encouraged, and that a money-making railroad is the only sort that ever gives public satisfaction in its service. Mr. Hudson held his place on the commission from 1883 to 1894.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Patterson & Western Railroad, San Francisco, Cal.**—Incorporated in California to construct a railway in Santa Clara and Stanislaus Counties, R. J. Pratt, 3388 Clay Street, San Francisco, is interested.

FRANCHISES

Anniston, Ala.—The Alabama Power Company has received a thirty-year franchise from the Council to construct an extension of its line from Sixth and Lapsley Streets to the Anniston Country Club.

Montgomery, Ala.—The Montgomery Light & Traction Company has asked the Council for a franchise to extend its line from the Day Street terminus west to the city limits.

Stockton, Cal.—The Tidewater Southern Railway's application for a franchise to construct a line on Sutter Street from Hazelton Avenue to Main Street has been denied by the Council.

Peoria, Ill.—The Illinois Traction System has asked the Council for an extension of time for the laying of tracks at the intersection of Hamilton and Jefferson Avenues and for the construction of the traction terminal building. The company says it has expended $20,000 on the site and has $30,000 worth of steel in storage in Peoria. Unsettled business conditions constitute the reason for asking this extension.

Newton, Kan.—The Arkansas Valley Interurban Railway has asked the Council for a new franchise at Newton. The former franchise was granted to the company as a street railway. The new one recognizes the company as an interurban railway. It will also give the company additional trackage rights on Newton streets.

Mount Clemens, Mich.—The Council has refused to grant the Detroit United Railway an extension of its franchise in Mount Clemens. The Council ordered the city attorney to advise the company that it must fulfill requirements of its present franchise, which has ten years more to run. The company asked for a franchise extension in consideration of rebuilding the Macomb Street bridge at a cost of $17,000. The Council's latest action requires the company to place the bridge in a safe condition for operation of cars or forfeit its franchise. Cars are now operated to either end of the structure and passengers are compelled to walk across the bridge.

St. Louis, Mo. — The United Railways of St. Louis has received permits from the Board of Public Service to construct about thirty loops, curves and extensions to facilitate traffic in the rush hours. The improvements will cost about $125,000. A new system of downtown loops will be installed, car lines will be combined and linked together so transfers may be issued, and the curve at Thirteenth and Locust Streets will be eliminated.

New York, N. Y.—The New York Railways have asked the Board of Estimate of New York for a franchise to construct a double-track line from Central Park through Eighty-sixth Street to Broadway.

Astoria, Ore.—The Pacific Power & Light Company has asked the Council for a thirty-year franchise on Franklin Avenue, Astoria.

Seattle, Wash.—The Puget Sound Traction, Light & Power Company has petitioned the Council for the right to surrender its franchise on Blewett Street, from Fremont Avenue to Albion Place, and on Albion Place, from Blewett Street to Woodland Park Avenue.

Seattle, Wash.—The Council has refused the application of the Seattle, Snohomish & Everett Railway for a two-year extension of time on its franchise to complete its line between Seattle, Snohomish and Everett. David Swank, Seattle, is interested. [Sept. 25, '15.]

TRACK AND ROADWAY

Alabama Power Company, Anniston, Ala.—Work has been begun by this company repairing its tracks on Noble Street at Tenth and Thirteenth Streets. It is estimated that the cost will be about $3,500. Following the completion of this work the company will begin work on the extension of the line to the Anniston Country Club.

Phoenix (Ariz.) Railway.—Operation has been begun on this company's new Fourth Street line. The old line on First Street between Pierce and Roosevelt Streets and on Roosevelt Street between First and Fourth Streets has been abandoned.

Northern Electric Railway, Chico, Cal.—This company's bridge across the Sacramento River, which was washed out by a flood last February, has been opened for traffic. Train service over the Marysville and Colusa branch of the road, which had been suspended for eight months, has been resumed. The reconstruction of the bridge and its approaches cost about $50,000, and $40,000 more was expended in repairing washouts in the roadbed. The cost was apportioned among the counties of Sutter and Colusa, which maintain a highway across the bridge, and the Northern Electric Railway.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—This company has secured control of the Wilmington, New Castle & Delaware City Railway operating between New Castle and Delaware City. This purchase, together with that of the Wilmington Southern Traction Company, places all the trolley lines south of Wilmington in the hands of the Wilmington & Philadelphia Traction Company. Plans of the incoming management include the general improvement and speeding up of the service. The line from New Castle to Delaware City, heretofore operated on the electric storage-battery system, will be converted to the overhead type of construction, and the entire line from Wilmington to Delaware City will be subjected to extensive improvements. Under the new plan the system will operate from Darby, along the Delaware River, through Eddystone, Chester, Marcus Hook, Wilmington and New Castle to Delaware City, as well as on the line in Media and the lines connecting Media with Chester and Philadelphia.

Jacksonville (Fla.) Traction Company.—Work will soon be begun by this company on the construction of double track through Springfield Park from Pearl to Hogan Street.

Waycross Street & Suburban Railway, Waycross, Ga.—Material will soon be received by this company for the completion of its Washington Avenue extension and for extending its Hebardville line through the suburbs northwest of Waycross.

Chicago & Interurban Traction Company, Chicago, Ill.—This company is improving its roadbed at Crete, Ill., the track to be resurfaced with crushed rock.

Chicago & Milwaukee Electric Railroad, Highwood, Ill.—W. O. Johnson, receiver for this company, was recently authorized by Judge Landis of the United States District Court to issue receiver's certificates for the construction of a bridge to cost $40,000. The certificates are to bear interest at 5½ per cent.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company on Nov. 1 will begin to lay track on its extension between Ludlow and Paxton. Grading has been completed to the stream 3½ miles north of Ludlow. Work on the bridge across the stream will be rapidly pushed, and it is believed that cars will be running into Paxton by Jan. 1.

Fort Wayne, Decatur & Southern Traction Company, Decatur, Ind.—This company, which has recently taken over the Fort Wayne & Springfield Railway, plans to build an extension from Decatur to Berne, 12 miles.

Evansville, Chrisney & Eastern Railway, Evansville, Ind.—A report from this company states that construction will be begun about Jan. 1, 1916. Work has been delayed on account of litigation which has been decided in the company's favor. It is proposed to build a line from Boonville to Chrisney, 13 miles, and a line from Boonville to Lynnville, 11 miles. Surveys have been made of the proposed route. J. P. Chrisney, Chrisney, president. [March 13, '15.]

Tri-City Railway Company of Iowa, Davenport, Iowa.—This company's lease on the skating rink at Watch Tower, Moline, Ill., has expired, and the work of wrecking the rink has been begun. Plans are being considered for a new inn and for the rearrangement of the entire park. Cars will enter the grounds proper instead of following the ravine to the north of the park. The ground now covered by the skating rink will be used for a loop.

Inter-Urban Railway, Des Moines, Iowa.—Plans are being made by this company to build an extension of its line from Colfax to Newton via Metz, 12 miles. Surveys are being made from Colfax east and options for right-of-way are being secured. All materials are to be contracted for winter delivery and the heavier grading will be done through the winter with the view of having the extension ready for operation in July. An extension from Colfax to Jefferson and one from Woodward northwest are also to be begun within the next two years.

Hutchinson (Kan.) Interurban Railway.—This company will begin work at once on the construction of a loop beginning at Main and Carpenter Streets, extending east on Carpenter Street to Elm Street, north on Elm Street to Avenue F, and on Avenue F to Main Street.

Newton, Kansas & Nebraska Railway, Newton, Kan.—A contract has been awarded to the Newton (Kan.) Construction Company for the construction of this company's line through Harvey, McPherson, Dickinson, Saline, Clay and Washington Counties. S. O. Waddell, Newton, chief engineer. [Sept. 25, '15.]

Cumberland Traction Company, Edmonton, Ky.—The capital stock of this company, which proposes to build a line between Edmonton and Elizabethtown, has been increased from $50,000 to $250,000. H. P. Rogers, Elizabethtown, has been retained to dispose of the new stock issue. L. J. Metcalfe, Elizabethtown, president. [Sept. 4, '15.]

St. Tammany & New Orleans Railway & Ferry Company, Mandeville, La.—This company has been awarded a five-year contract by the Council for the lighting of streets in Mandeville.

South Boston, Mass.—Bids will be received by the Boston Transit Commission until Nov. 11 for the construction of Section G, Dorchester Tunnel, on Dorchester Avenue between West Fourth Street and Old Colony Avenue, South Boston, about 1200 ft. The structure will be mainly of reinforced concrete. The work includes a pump well with an emergency exit, a ventilating chamber with an emergency exit, an open incline for surface cars, a 6 ft., 6 in., tide-gate chamber on the B Street outfall sewer and sewer changes. Specifications and forms of contract may be obtained at 15 Beacon Street.

Worcester (Mass.) Consolidated Street Railway.—Installation of new block signals and improvements on some of the block signal systems on suburban lines of the Worcester Consolidated Street Railway are under way by men in the employ of the wire and track departments of the company. The most important work is to be done on the Worcester and Clinton lines. Several new signals are to be installed between Woods switch, near the city line, to the Lancaster mills. Other signals are to be installed on the Holden and Northboro lines.

Duluth (Minn.) Street Railway.—Work has been begun by this company on an extension of its lines to Morgan Park. It is expected that the line will be in operation by Dec. 15.

International Railway, Buffalo, N. Y.—Work will be begun between Nov. 1 and Nov. 10 on the extension of this company's line on Eleventh Street to College Avenue, Niagara Falls.

Long Island Railroad, New York, N. Y.—It is reported that this company has ordered 3000 tons of bridge steel from the American Bridge Company.

Hiawassee Valley Railway, Andrews, N. C.—It is reported that grading will be completed within thirty days on this company's line from Andrews to Hayesville. The maximum grades will be 2.5 per cent and the maximum curvature 16 deg. Two steel bridges will be built on the line. S. E. Cover, Andrews, president. [Oct. 9, '15.]

Piedmont & Northern Railway, Charlotte, N. C.—Work has been begun by this company on the construction of an extension from Belmont Junction to Belmont, 4 miles. A contract with the Charlotte Construction Company provides for the completion of this track within forty-five days from Oct. 22. Freight and passenger service will be inaugurated within fifteen days thereafter.

Sapulpa & Oil Field Railway, Sapulpa, Okla.—This company plans to build an electric line from Drumright to Depew or Stroud. J. A. Frates, general superintendent of the first district of the St. Louis & San Francisco Railroad, St. Louis, Mo., has been elected president of the company. C. F. Hopkins, superintendent of the western division of the St. Louis & San Francisco Railroad, Sapulpa, is vice-president and general manager.

Rhode Island Company, Providence, R. I.—Repairs have been begun by this company on its track on Elmwood Avenue, between Harrington and Third Avenues, Norwood.

South Carolina Light, Power & Railways Company, Spartanburg, S. C.—The subject of extensions into property to be selected by the city as a public park is now under consideration by officials of the South Carolina Light, Power & Railways Company. Four sites have been offered the city without price for use as a park with the understanding that the street car lines will be extended into the property so as to make it easily accessible to the entire public.

Chicago & Wisconsin Valley Railroad, Madison, Wis.—Herbert Green & Company, who will finance this company's line, as announced in the last issue of the ELECTRIC RAILWAY JOURNAL, state that arrangements have been made with the Illinois Steel Company, Chicago, for 5000 tons of rail to be delivered in February and March. In a letter to the Council of Madison, the company states that, if desired, the work can be begun on Nov. 20, but the company asks that permission be granted to delay the construction work until next spring. [Oct. 23, '15.]

SHOPS AND BUILDINGS

New York Municipal Railway, Brooklyn, N. Y.—The date for the reception of bids for the construction of station finish work on the New Utrecht Avenue elevated line in Brooklyn has been postponed from Oct. 26 to Nov. 5 by the Public Service Commission for the First District of New York. The postponement was made to allow for a change in the form of contract. As the contract first stood, all work was to be completed within six months. Under the new form all stations as far south as Sixty-second Street must be completed within three months. This will allow the operation of the Fourth Avenue subway trains through the Thirty-eighth Street cut and along New Utretcht Avenue to Sixty-second Street, where transfer can be made with the Sea Beach line much earlier than would have been possible under the first form of contract.

Piedmont & Northern Railway, Charlotte, N. C.—This company has purchased property in the heart of Belmont upon which a freight and passenger station of standard design will be erected at once, to be completed by Dec. 21.

Ogden, Logan & Idaho Railway, Ogden, Utah.—This company has awarded a $125,000 contract to C. F. Dinsmore, Ogden, for the construction of its repair shops and carhouses at Ogden.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—Plans to erect a $250,000 terminal station in Salt Lake City for the joint use of the Salt Lake & Ogden Railway and the Salt Lake & Utah Railroad are complete. Negotiations for a terminal site on the northwest corner of South Temple and West Temple Streets have been broken off, and unless officials of the railway and the Mormon Church, which owns the property, can get together on the matter, another site must be obtained. As soon as the site is secured, contracts will be let and work rushed.

POWER HOUSES AND SUBSTATIONS

Duluth (Minn.) Street Railway.—Work has been begun by this company on the construction of a new substation at Ninety-second Avenue West and Grand Avenue, Duluth. The station will furnish power for the new extension being built to Morgan Park. It is estimated that the structure and equipment will cost $25,000.

Manufactures and Supplies

ROLLING STOCK

Des Moines (Ia.) City Railway will order, upon the acceptance of its new franchise, fifty new center-entrance motor cars, instead of twenty-five, as reported in the ELECTRIC RAILWAY JOURNAL of Oct. 23.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, is having four freight cars constructed in its shops at Elyria. The cars are 52 ft. in length and constructed on the regular standard adopted some time ago by the company.

Muscatine & Iowa City Railway, Muscatine, Iowa, which has acquired a section of the Rock Island lines, as noted in the Financial and Corporate news of this issue, will substitute gasoline-electric motive power for steam power. Negotiations for gas-electric passenger cars and freight locomotives are under way.

Southern Public Utilities Company, Charlotte, N. C., has ordered from the Southern Car Company five one-man arch-roof cars for the street railway system at Anderson, S. C. Three of these cars will be equipped with GE-219-B motors and the other two with Westinghouse "Wee" motors. Taylor trucks with 7-ft. 6-in. wheelbase and 30-in. wheels, will be furnished. The length of these cars is to be 26 ft. They will be all-steel, having steel framing and steel siding. The doors are to be operated by the motorman, and will be folding with a folding step on Southern Car Company's door and step ball-bearing mechanism. Fare boxes are to be located in each end of the car. Ohmer fare registers, Peacock adjustable brakes of the McWhirter type and the Railway Utilities Company's exhaust type ventilators are also specified. This railway company is also having constructed by the Southern Car Company, a one-man car for operation between Belmont and Belmont Junction.

TRADE NOTES

James M. Brown, formerly of the Lorain Steel Company, has been appointed as Western sales manager of the Electric Cable Company, Chicago, Ill., with headquarters in Chicago.

James W. White, formerly manager of the Western sales office of the Electric Cable Company, Chicago, Ill., has resigned and accepted a position with the General Railway Signal Company, as assistant to the vice-president in charge of sales.

General Electric Company, Schenectady, N. Y., has received an order to equip with GE-247 two-motor equipment and K controllers the ten city cars which were recently ordered by the Buffalo & Lake Erie Traction Company from the Southern Car Company.

Carbo Steel Post Company, Chicago, Ill., has changed its name to the Carbo Corporation. No change in the personnel of the organization has been made. Extension of the company's business from its primary trade in the manufacture of fence posts into the manufacture of fence supporting systems, power transmission poles, lighting systems and various types of utilities made of steel for use in the construction of small buildings, has been the cause for the change of the company's name.

N. A. Christensen, Milwaukee, Wis., has received a favorable decision in the United States Circuit Court of Appeals for the Seventh Circuit in the suit brought by him against the National Brake & Electric Company of Milwaukee for infringement of his patent No. 621,324, issued March 21, 1899. The Court held that the combination, covered by Mr. Christensen's patent of "(a) oil-holding, gear-inclosing case, in which the one end of the crankshaft terminated and by which it was protected, dispensing with the undesirable stuffing box, and (b) the compressor case with its parts so arranged as to utilize the oil for both lubricating and cooling purposes, if the motor should be attached to the pump as stated in the other claims," showed more than mere mechanical skill and was a real invention. The decision also discusses the method in which the patent was issued and declared it to have been valid. The attorneys for the National Brake & Electric Company state that they are going to take up the case to the United States Supreme Court in an application for a writ of certiorari. It is understood that the form of motor compressor on which this suit against the National Brake & Electric Company was brought is not employed by the Westinghouse Company or the General Electric Company in the manufacture of their motor compressors.

ADVERTISING LITERATURE

Roller-Smith Company, New York, N. Y., has issued a catalog describing and illustrating its "Junior Imps," small ammeters and voltmeters for battery charging outfits, small switchboards and similar applications.

Carbo Corporation, Chicago, Ill., formerly known as the Carbo Steel Post Company, has issued a catalog describing its system for supporting right-of-way fencing by means of rigid terminals and earth-cushioned spring supports.

General Electric Company, Schenectady, N. Y., has issued a bulletin describing and illustrating in detail its standard unit d.c. switch panels for railway service, for 600 to 1500-volt operation, which are of single polarity, and of the three-section type, 90 in. or 99 in. high.

Ohmer Fare Register Company, Dayton, Ohio, has issued a pamphlet entitled, "Your Business and Ours." The bulletin quotes testimonial letters in regard to the successful operation of the fare register system of this company by the Pacific Electric Railway, Lehigh Valley Transit Company, Peoples Railway, Denver Tramway, and Southern Public Utilities Company.

Carnegie Steel Company, Pittsburgh, Pa., has issued a catalog containing illustrations of its various types and sizes of bulb angles and bulb beams. The catalog shows a number of sizes of the bulb angle sections particularly designed for strengthening the tops of all-steel gondola freight cars, for which purpose they have now come into use. The pamphlet also contains tables and data on all the profiles of bulb sections at present rolled by this company.

Fadgl Auto Train, Inc., San Francisco, Cal., has issued reprints of illustrated descriptions published in *Leslie's Weekly, California Motor Driver, Exhibitor's Weekly Bulletin, Automobile Topics, San Francisco Examiner* and *San Francisco Hotel Journal* of the Fadgl auto trains, which are in operation at the Panama-Pacific International Exposition at San Francisco, and which are suitable for handling transportation in expositions, parks or other similar places. The company has also issued reprints of a number of complimentary letters on the valuable service performed by these trains at the San Francisco exposition.

A. H. Bickmore & Company, New York, N. Y., have issued an eighteen-page booklet describing the United Light & Railways Company, Grand Rapids, Mich. This contains a description of the properties, a statement of capitalization and securities owned, a general financial statement, a description of its bonds and preferred stock, general information regarding its management, etc., a list of officers and directors, a map of territory served, a map of the Tri-City Railway & Light Company system, a map of the Grand Rapids, Grand Haven & Muskegon Railway, and a chart showing the inter-corporate relation between the United Light & Railways Company and its subsidiary companies. The publication is a praiseworthy example of this company's policy of "complete information for the investor."

Searchlight Company, Chicago, Ill., has issued a booklet containing specific information on the welding and cutting of metals by the oxy-acetylene process, together with a catalog of the equipment necessary for such work. The basis of the oxy-acetylene process is the fact that oxygen and acetylene when burned together at the mouth of a blow pipe torch will produce a temperature of 6300 deg. Fahr., which is twice as great as the melting point of steel. In welding the process consists of applying this intense heat to two pieces of the metal so that their melting edges fuse into one piece. In cutting practically the same process is followed, except that a special cutting torch is employed which uses an extra jet of oxygen. This process has done away largely with the necessity of discarding broken or worn parts and has made the cutting of iron and steel as rapid as the cutting of wood. All that is necessary for welding operations are a cylinder of oxygen, a cylinder of acetylene, a Searchlight torch, and the necessary pressure regulators with gages. Other useful features have been added, such as extra welding tips for different kinds of work and extra torches for different purposes. For cutting, the only necessary extra outfit is a special cutting torch.

NEW PUBLICATIONS

Accounts—Their Construction and Interpretation. By William Morse Cole. Houghton Mifflin Company, Boston, Mass. 445 pages. Cloth, $2.25 net.

This revised and enlarged work by Mr. Cole, who is associate professor of accounting in Harvard University, doubtless needs no introduction to electric railway accountants, for this writer is widely known as an unquestioned authority on accounting. The new edition takes up various accounting problems that have lately arisen, adds series of transactions for the visualization of principles and offers rewritten comments on such important topics as depreciation. The first general and non-professional treatise in the accounting field, this book has survived the test of years. It is in no sense an accounting primer, but by virtue of its lucid discussion of accounting principles and its clear-cut analysis of fundamentals, it occupies a place by itself in accounting literature for business men and investors who desire a not too technical but thoroughly sound and modern treatment of corporation accounting.

Financing an Enterprise. By Francis Cooper. The Ronald Press, New York. 524 pages. Cloth, $3.

The general purpose of this "manual of information and suggestion for promoters, investors and business men generally" is to assist in honest promoting. Hence its scope takes in the investigation of an enterprise, its protection, its capitalization, the presentation to investors and the public, and special features of promotion. The author keeps in view at all times the two parties concerned—the man with the enterprise and the man with the money. One especially valuable feature is the appendix of comprehensive and pertinent questions that will occur to the investor. A careful study of all the points brought out here cannot fail to have a deterrent effect upon expensive and often disastrous mistakes of financing new enterprises. The book has no specific application to electric railway operation, but the principles evolved are basic and as applicable to this as to any industry. The general investor can find in it a wealth of facts he should know about promotion work.

Railroad Accounting. By William E. Hooper. D. Appleton & Company, New York. 461 pages. Cloth, $2.

This publication is apparently designed for steam railroad investors and students as well as for steam railroad accountants, but only the last-named class will be appreciably aided by the book. The first part, dealing with the forms of accounts and methods of accounting prescribed by the Interstate Commerce Commission, purports to show the "why" involved, but it does little more than show the "what" of the accounts, with infrequent and inconclusive excursions into the critical on points already much mooted. In short, this portion of the book is simply a technical abstract of existing commission classifications for steam railroads, containing for its real substance the complete official text of such classifications. Investors and students who desire a comprehensive and critical analysis of steam railroad accounting can find greater satisfaction in other books previously published.

Nor will the latter portion of the book, dealing with departmental organization and concrete accounting practices, be of interest to the average investor. Yet students of steam railroad accounting practice and accountants in this and allied fields will here find much to interest them. The elaborate system and routine methods that are necessary in railroad accounting and auditing are difficult to describe, and little literature can be found on this general topic. Hence in concretely and lucidly describing the organizations and practices of some of the largest railroads, Mr. Hooper has performed a real service to the profession and atoned as far as possible for the shortcomings of his preceding analytical efforts. Of particularly absorbing interest is the up-to-the-minute concluding chapter on the allocation of revenues and expenses between freight and passenger service. This and the other descriptive chapters will undoubtedly prove instructive and broadening to many accountants in the electric railway field.

Electric Railway Journal

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THE PERENNIAL FUEL-SAVING HOAX

At almost regular intervals there come before us circulars descriptive of fuel-saving schemes of one kind or another which seem to be designed solely for testing the credulity of a trusting public. Some few years ago we were advised that a pinch of powder scattered over the ash pile would convert it into fuel with a thermal value rivaling the pick of the Pocahontas field, and now comes a statement that the introduction of a tube directing a stream of cold air downward along one side of the stack will secure from the fuel all the heat units that are in it, saving from 10 per cent to 35 per cent of the coal bill. The alleged principle by which the latter result is accomplished is that the stream of air is separated into its two constituent gases, the heavier oxygen falling upon the burning fuel, and thus producing perfect combustion, while the lighter nitrogen rises up the stack, which is thus kept cool and free from fire hazard. This might be a first-rate explanation of the action of the apparatus were it not for the beneficent law of nature which makes the separation of diffused gases by mechanical means as impossible as "settling out" the salt in sea-water, and which thus provides humanity with an atmosphere that is breathable. Nevertheless, the explanation sounds well, and in all likelihood a part of the public will fall for it, conscientiously proclaiming, because of the power of imagination, the savings that the device has effected. The electric railways, it is to be hoped, will not be afflicted with any efforts that may be made to exploit the apparatus, but if they are we offer a reminder of the great ash-burning hoax that was exposed less than ten years back.

MOUNTAIN RAILWAY ELECTRIFICATION

One of our correspondents, in commenting upon the article by F. Castiglioni printed in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 23, calls attention to the danger of considering the electrification problem without taking into account all of the factors involved in steam railroad operation. He mentions the matter of train tonnage as having an all-important bearing upon consideration of grade reduction and as leading to a conclusion different from that reached in the article in question. Another correspondent, William Arthur of New Haven, Conn., criticises the method that was used in estimating the tractive effort available for regeneration, namely, the assumption that this is 80 per cent of the grade resistance. While it would be interesting to bring out a discussion on these and other points, the subject is too large for the space limitations of a technical journal. We understand, however, as far as the first point is concerned that, in writing the article, as indicated by the modest title "Notes on Railway Mountain Electrification," the author did not intend to consider electrification as a whole but only to present some phases which, from observation of three-phase Italian railways, he thought had not been sufficiently emphasized in this country. On the second point, we understand that the approximation used was intended merely as a general guide to the power available for regeneration, the actual power available being dependent upon several factors not discussed in the article but covered by the figure of 80 per cent taken in the article as the regeneration efficiency.

BROADENING A CORRESPONDENCE COURSE

Facilities for collateral reading are widely used in university work for emphasizing the points made by the instructor and for broadening the student's knowledge of the subject. Indeed, it is recognized that the student's acquaintance with the literature of the subject and the sources where any desired information can be found is more important than the exact information that can be memorized only in limited form from the lectures. It is in connection with this fundamental precept that correspondence courses often prove unprofitable, for even when those in charge are sufficiently conversant with sound educational theory to devote careful and extended study to the presentation of a proper course of collateral reading, many and probably most correspondence students are unable to do the outlined reading on account of the unavailability or expensiveness of the suggested books. In cases, therefore, where employees desire to become better educated through a correspondence course along the line of their corporate duties, a corporation can, at comparatively small cost to itself, perform a real educational service by establishing a company library of all required books. We observe with pleasure that The Connecticut Company has shown its firm belief in this policy by establishing an accounting library to be used in connection with the correspondence accounting course. Only a cursory glance at the list of books already purchased, as noted elsewhere in this issue, will suffice to show the value of the authoritative library placed at the employees' disposal. The result is bound to be not only a more substantial interest in the course itself, but also much more permanent results in the way of wider knowledge and increased efficiency in the accounting department. The act might well be emulated by other companies, for it involves only a small investment with a large return.

COMPETITION FROM THE PRIVATE AUTOMOBILE

We have referred in several recent issues of this paper to the competition and consequent loss of revenue which the electric railways have suffered from the private automobile. The electric railways, however, are not the only sufferers among the transportation companies from this cause. During the past summer, as everybody knows, a very large number of persons who formerly visited the mountains or seashore by train for their vacations took an automobile trip instead, often to the same places to which formerly they would have traveled by train. The splendid roads which have been built in all sections of the country, coupled with the large number of automobiles now owned by those who formerly took railroad trips, have made the automobile tour very popular but to the manifest disadvantage of the railroad receipts. No part of the country has been exempt in this particular. Even the Southern Pacific Company, whose lines stretch over the vast expanses of the Far West, has felt the effect to such an extent that this competition is mentioned particularly by Chairman Kruttschnitt in the last annual report of the company.

To the steam railroads the question is probably not as serious as to the electric railways. The inroads of the pleasure automobile have been entirely in the direction of passenger traffic, and this the steam railroad companies have always declared has been the least profitable part of their business. Many of them have even declared that it has been conducted at a loss. On the other hand, automobile trips of the kind to which we refer do not decrease the amount of freight which the steam railroads have to haul. The consumption per capita is just as great as it was before this new means of transportation was introduced. Indeed, the freight business may be more, if a general ownership of automobiles tends to distribute the population and encourages many people, who would otherwise live in the city, to take up residence in the country.

But with the electric roads the situation is different. Their principal business is the transportation of passengers, and the question arises, what can be done in regard to it? Admittedly the matter is discouraging, but it is by no means hopeless.

In the first place, we must admit that the competition cannot be eliminated although we believe that it may be reduced. The automobile manufacturer has added an important, valuable and permanent means to our methods of transportation. At the same time there are certain things which can be done and which in the interest of the public as a whole should be done. There is no doubt that the automobile, with all its benefits, has brought certain evils, and the electric railway official as a citizen and the electric railway company as a taxpayer, in common with other citizens and taxpayers, have a right to protest that their interests should not be subordinated to those of the automobile owner.

Thus it ought to be possible to do a great deal in showing the public that the interests of the community as a whole will suffer if private automobile traffic takes so large an amount of business from the local railway company that the local railway service has to be curtailed. This point was brought out very clearly in an article by John A. Beeler, published on pages 590 and 591 of our issue of Sept. 18, 1915. This article, which was prepared for general circulation in Denver, declared that after all the only permanent and continuous means of city transportation was the local electric railway. But, as the article then very clearly explained, "the less the patronage, the less frequent the service. The auto owner who picks up a stranger waiting for a street car and transports him, gratis, to or from the residence district, may labor under the delusion that he is doing a kindly act. But the apparent favor is in fact no favor at all but a detriment to all concerned if the reduced patronage to the railway results in reduced car service, with consequent reduced realty values and curtailment of the ability of the company to make extensions." The injury, therefore, is not confined to the local transportation company, but extends to the community as a whole. The man whose neighbors generally use their own cars in going to and from business can hardly expect that the railway company can give as frequent service on the line which he patronizes as if all the residents on that route patronized the trolley line, nor can the real estate owner, who is anxious to have the railway company make extensions to bring his property within the reach of car lines, expect that it will be in a position to do so when the "rides per capita" of the community have been lessened by the general use of automobiles. These are economic facts which deserve more general recognition than they receive.

Another move which the railway company and its officials can make is to advocate a higher license fee for automobiles. This ought to be done in fairness to the community at large. The automobile is the most destructive agent known to-day to road pavement of the "semi-permanent" class and, in consequence, has probably done more to raise the general tax rate during the last ten years than any other one agency. We realize that from time immemorial it has been customary for the man who walks to pay a larger proportion of the taxes than the man who rides. The latter has nearly always been successful in transferring a large part of his taxes to the former. Nevertheless the proportion of taxes which the owner of the automobile pays as an owner of an automobile, in proportion to the direct damage which his car inflicts upon the roadways, is ridiculously small. Usually it is but a small license fee of say $10 or $15, whereas, if he paid his fair proportion of the cost of maintaining the roads the license fee would probably be more than $100 a year. This cost of maintaining the roads in every community is becoming a very serious problem. None of the comparatively inexpensive methods of road paving, which were formerly adequate, now seems to last long under the tire suction of high-speed automobiles. Engineers of country roads especially are in a quandary as to what to do, and, in the meanwhile, automobile associations are continually lobbying for greater and greater expenditures for roads by city, county and State. If the automobile owners desire and require these large expenditures for road making, they should pay the costs or the greater part of them, as they are the principal beneficiaries, and they should not attempt to saddle the expense upon that part of the community which does not directly benefit from these improvements. This is a matter in which the electric railway company, as a taxpayer, has a vital interest and in which it should receive the cordial support of those in the community who are not owners of buzz-wagons.

HOW RAILWAY ISSUES FARED

Election day this week brought answers to a number of pending electric railway questions in various places, chiefly in New York State, Philadelphia, Cleveland, Detroit and Toledo. In New York State the commendable section of the new constitution providing for making public service commissions constitutional bodies was literally buried under the avalanche of opposition created by other clauses in the proposed fundamental law of the State. In Philadelphia the constitutional amendment giving the city the right to increase its borrowing capacity for the purpose of raising funds for its transit and other permanent developments, was ratified by a large majority, but the placing of another party in municipal office would seem to reopen the whole transportation program adopted by the outgoing administration. The city is, of course, committed by the approval of the citizens to an elaborate subway construction plan, but no definite arrangement was made with the Philadelphia Rapid Transit Company for subway operation by the Blankenburg administration. The rise of local utility stocks on the Philadelphia Stock Exchange the day after election apparently indicates that the outlook for successful adjustment is good.

Perhaps the greatest interest in election results, as far as public utility matters are concerned, centers in Cleveland, Detroit and Toledo. In Cleveland the ill-advised ordinance initiated by the Socialists and providing for city purchase of the street railway lines was lost. In Detroit the municipal ownership proposal was also soundly beaten, while in Toledo a franchise favorable to the city, drafted by municipal representatives and indorsed by representative business organizations in the hope of removing the franchise question from politics, was rejected. Judging by the vote, it appears to us that the Detroit electorate would gladly have adopted what Toledo citizens defeated. We rejoice to see the turning-down of the costly and inefficient municipal ownership proposition in Detroit, and we trust that the same calm good judgment will be exercised by the citizens in handling subsequent questions involving the operation of the city lines. The Detroit United Railway kept strictly out of the election fight, and as a reward to it for this action as well as in the interests of the city itself, some sane and fair plan of settling the franchise question in Detroit should be adopted. The citizens there evidently do not consider municipal ownership the proper solution.

The rejection of the Toledo franchise is lamentable from the viewpoint of the city. Here was an earnest effort on the part of the city franchise committee to settle a question which had long been an impediment to the city's growth. Eighteen months had been spent in drafting the franchise, and while it would not be considered elsewhere favorable to the utility, the latter had agreed to accept it. Yet through confusing and frightening the voters by misinterpretations of the terms, certain elements brought defeat to the measure, although no word of constructive criticism was offered by them when the instrument was being formulated. Mr. Doherty said before the election that if the measure did not pass the company would do the best it could and it would not sulk. But, naturally, it will not be able to secure the money needed to put the system in first-class shape until some definite agreement is reached. Months and months of progress have undoubtedly been lost, but nobody is at fault except the people of Toledo.

THE PASSING OF A GREAT POWER PLANT

The shutting down of the Ninety-sixth Street power plant of the New York Railways Company is the most striking recent illustration of the operation of the laws of power generation economics. Here is a once world-famous plant, still in its prime as far as physical condition is concerned, put out of commission because it has been out-distanced in the race for low energy-generation cost. The New York Railways load, superimposed upon that of the Interborough Rapid Transit Company, can be carried for a much lower cost by the great plants of the latter than in a separate power plant. The saving is in fuel, labor, maintenance, water, administration; in fact, in all elements of cost. While this is the most conspicuous instance of the practical abandonment of a large plant in favor of purchased power the same principle has been in process of application for a long time in various power systems. The gradual absorption of railway power business by the Commonwealth Edison Company of Chicago is a matter of contemporary history.

We have recently directed attention to the tendency toward the purchase of power, particularly where large plants are involved. A recent example is furnished by the New Haven Railroad, which now receives power for the New York, Westchester & Boston Railway and for part of the electrified steam road from the United Electric Light & Power Company. If we accept as a general principle the assumption that one plant can generate energy more cheaply than two, then it follows that economy results from combining the loads of two plants serving the same territory, provided reliability is not sacrificed by consolidation. Events seem to justify the above assumption. We anticipate, therefore, that in the largest cities particularly there will be larger and fewer power plants. At the same time, as we pointed out editorially last week, the small plant still has a large field in the railway industry. Its probems come nearer to the every-day life of the large number of railway engineers than do those referred to above. There is, however, a great deal that these men can learn from the experience of the large plants which are doing the sensational things in the power field to-day.

Seven Years of Operating Experience of a Single-Phase Interurban Railway

Chicago, Lake Shore & South Bend Railway Has Fine Record for Reliability of Service and Has Greatly Reduced Maintenance Costs and Equipment Failures—Operating Methods and General Results Obtained are Described

On the Chicago, Lake Shore & South Bend Railway, the headquarters of which are at Michigan City, Ind., single-phase equipment has been in service for more than seven years under unusually severe operating conditions. Cars weighing 55 tons frequently attain speeds as high as 68½ m.p.h., 60 and 65 m.p.h being regularly reached on certain sections of the road. Multiple-unit trains of from two to seven cars, built up on a moment's notice, are operated daily, and enviable results have been obtained both as regards low operating costs and reliability of service.

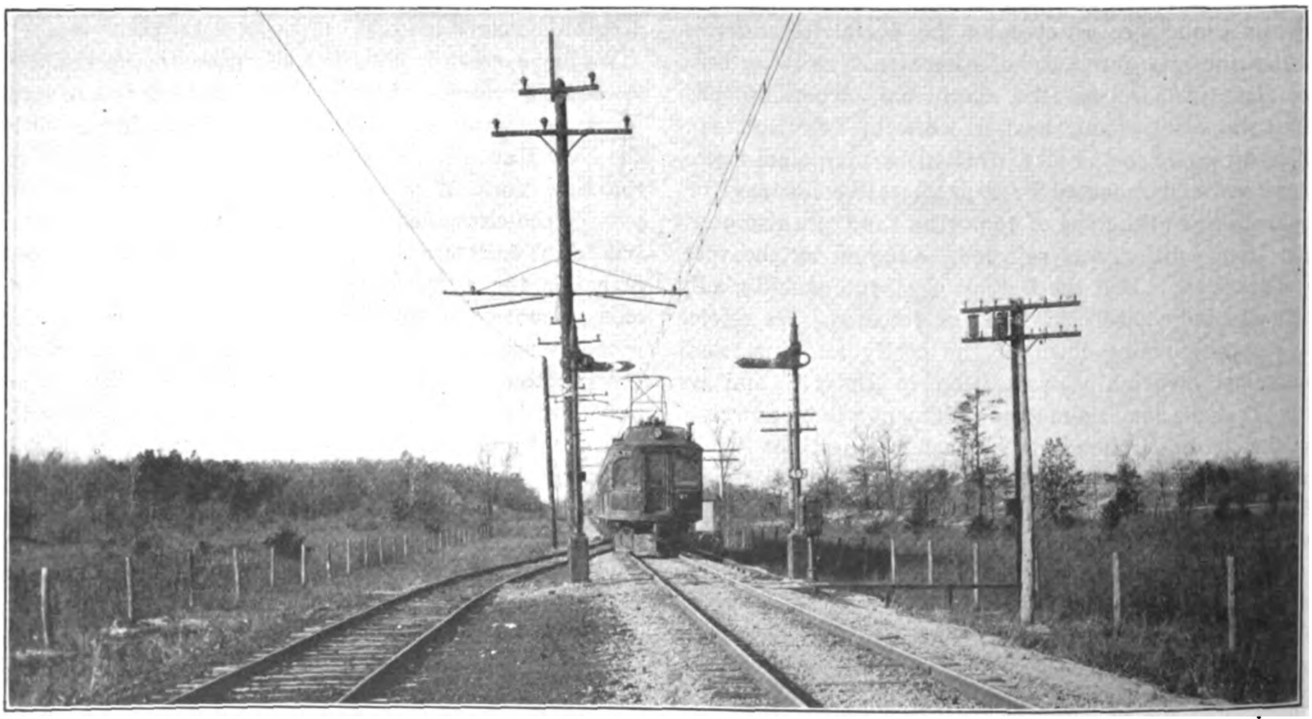
At the time the Chicago, Lake Shore & South Bend Railway was built it was the most important single-phase installation in this country. It extends along the southern shore of Lake Michigan from Pullman, a suburb 14 miles south of the Chicago loop district, to South Bend, Ind., a distance of 76 miles. In the beginning the cars of the electric line connected with those of the Illinois Central Railroad, a steam road, at Pullman, Ill. About two and one-half years ago, however, a traffic arrangement was made whereby through trains or cars were operated between Gary, Ind., and the Randolph Street station of the Illinois Central Railroad in Chicago. Electric motor cars pull these Chicago coaches or trailers from Gary to Kensington, Ill., where they are coupled to a suburban-type steam locomotive for the trip to Chicago's downtown district.

That portion of the single-phase line between Pullman and Gary is built through the densely-populated industrial district requiring numerous station and railroad crossing stops, as well as relatively low speeds, because at many points the tracks are laid in the streets. The road from Gary to Pullman is double tracked and 17 miles long, while that from Gary to South Bend, the eastern terminus of the road, is single track and 59 miles long. Between Gary and South Bend there are relatively few stops, and on this section of the line the maximum speeds are attained. At no point on the line is a curvature greater than 10 deg. encountered, and the maximum gradient of approximately 2 per cent obtains only at one or two overhead crossings.

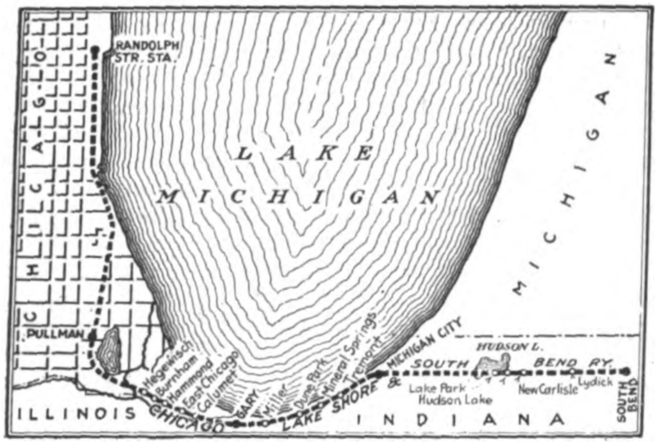
Track is laid with 70-lb. and 85-lb. A.S.C.E. rail and creosoted ties on crushed stone and gravel ballast. The overhead construction consists of No. 0000 grooved, copper trolley wire with a steel contact wire of the same section supported from a catenary messenger wire hung from 9-ft. mast-arms. Poles are 45 ft. long, of longleaf pine creosoted throughout, including the cross-arms, and set in concrete. Track, overhead construction, bridges and other structures are maintained in first-class condition.

METHODS OF HANDLING TRAFFIC

Traffic is confined largely to the passenger business, exclusive of package express handled by one of the standard express companies, milk shipments and passengers' baggage. Beginning Nov. 1, 1915, however, the company began to take on a car-load freight business, for which the line offers great possibilities. Between Gary and Pullman the passenger business is largely local, with morning and evening peaks. During the spring, summer and fall months numerous special parties are handled, and many of these arrive at Gary and Pullman unannounced, making it necessary for the transportation department to be prepared at both these points for any emergency. A passenger



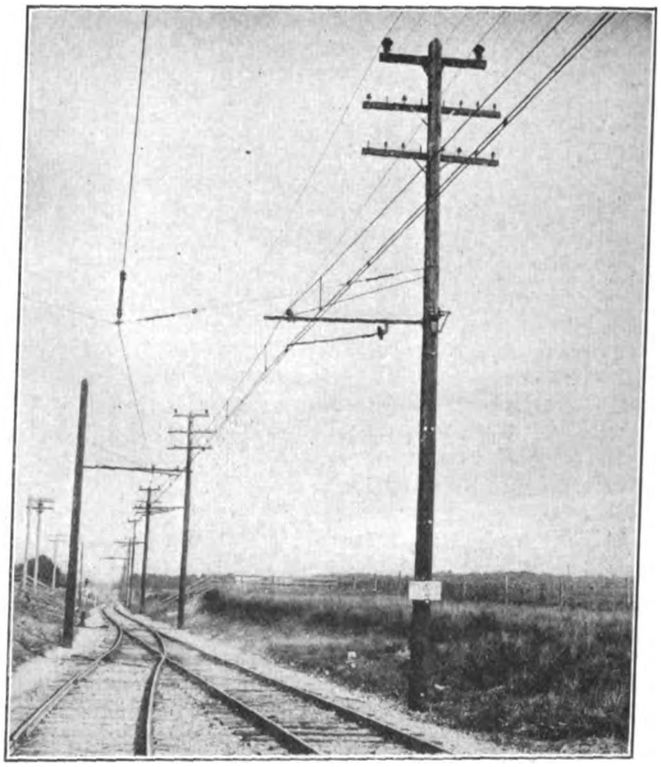
SINGLE-PHASE OPERATION—SINGLE TRACK EAST OF GARY


RANDOLPH STR. STA.
CHICAGO
PULLMAN
LAKE MICHIGAN
MICHIGAN
Hegewisch
Burnham
Hammond
East Chicago
Calumet
GARY
Miller
Dune Park
Mineral Springs
Tremont
MICHIGAN CITY
HUDSON L.
CHICAGO LAKE SHORE & SOUTH BEND RY.
Lake Park
Hudson Lake
New Carlisle
Lydick
SOUTH BEND
ILLINOIS
INDIANA

SINGLE-PHASE OPERATION—MAP SHOWING PART OF CITY OF CHICAGO ON ENLARGED SCALE

coach yard at each of these stations, with plenty of extra cars, enables the transportation department to cope with these instantaneous rushes. Trains to meet these emergencies vary in size up to seven cars each.

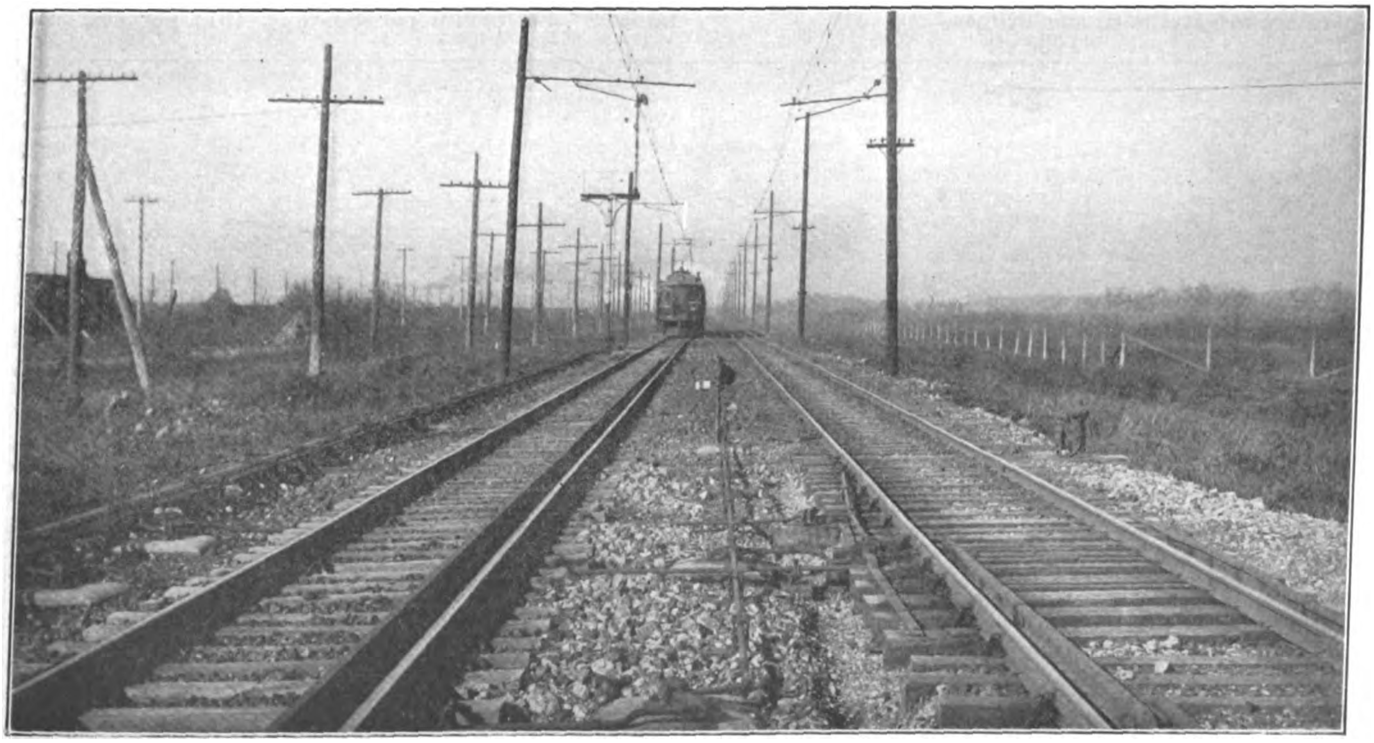
Limited trains between South Bend and Gary average about 5 miles between stops, while between Gary and Pullman the average is sixteen stops in 16 miles. This service is performed with a three-car train made up of one motor car and two trail cars. Local trains average about 1 mile between stops during the rush period. When local traffic is heaviest, frequently trailers are handled between South Bend and Gary, and on the remaining trip to Pullman this local train usually hauls two trailers. The ratio of trailers to motor cars operated on a maximum day averages 45 per cent to 50 per cent, and for a normal day from 30 per cent to 35 per cent. Trailers or coaches are added to trains to take care of increased traffic with the following average results: Seat increase, 150 per cent; tonnage increase, 128 per cent, representing a saving in weight per train of 22 per cent. On the normal day 23 per cent of the seats furnished are in trailers and 77 per cent are in motor cars, and on a maximum day the percentages are 44 and 56 respectively.



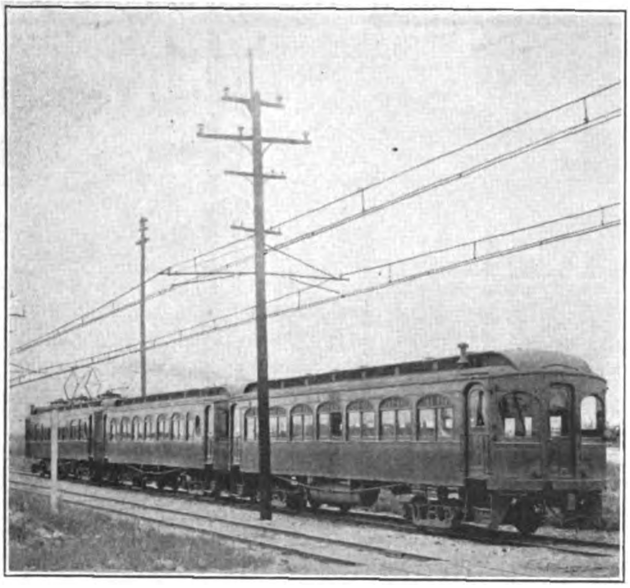
SINGLE-PHASE OPERATION—OVERHEAD CONSTRUCTION AT SIDING

Regular schedules require twenty-three trains, usually consisting of three or four cars each, between Gary and Pullman, and eleven trains each way consisting of one or two cars each between Gary and South Bend. Local trains make the 76-mile run between South Bend and Pullman in two hours and fifty-two minutes and express trains make the same run in two hours and thirty minutes. The express trains between South Bend and Gary make the 59-mile trip in one hour and forty-two minutes and between Gary and Kensington, a distance of 17 miles, in forty-three minutes.

As an example of the regular morning schedule out



SINGLE-PHASE OPERATION—DOUBLE TRACK BETWEEN GARY AND PULLMAN



SINGLE-PHASE OPERATION—REGULAR CHICAGO-GARY TRAIN

of Pullman, the 6.18 a. m. train is made up of two motor cars and two trailers. One motor car and one trailer are set out at Gary, one trailer at Michigan City and the motor car continues the trip to South Bend. On this trip an average of 685 passengers are handled daily, seventy-two stops are made, and 102 milk cans, ten pieces of baggage and sixty-seven pieces of express are picked up and delivered.

To maintain regular schedules twenty-two main-line crews, eight collectors and four flagmen are required, in addition to four crews for the city-line service between East Chicago and Indiana Harbor. The conductors on excursion trains of three or more cars are held responsible only for the safety of the train while the collectors take up all fares. Between Gary and Pullman each train also carries a flagman who operates all derails and flags trains across the railroad crossings.

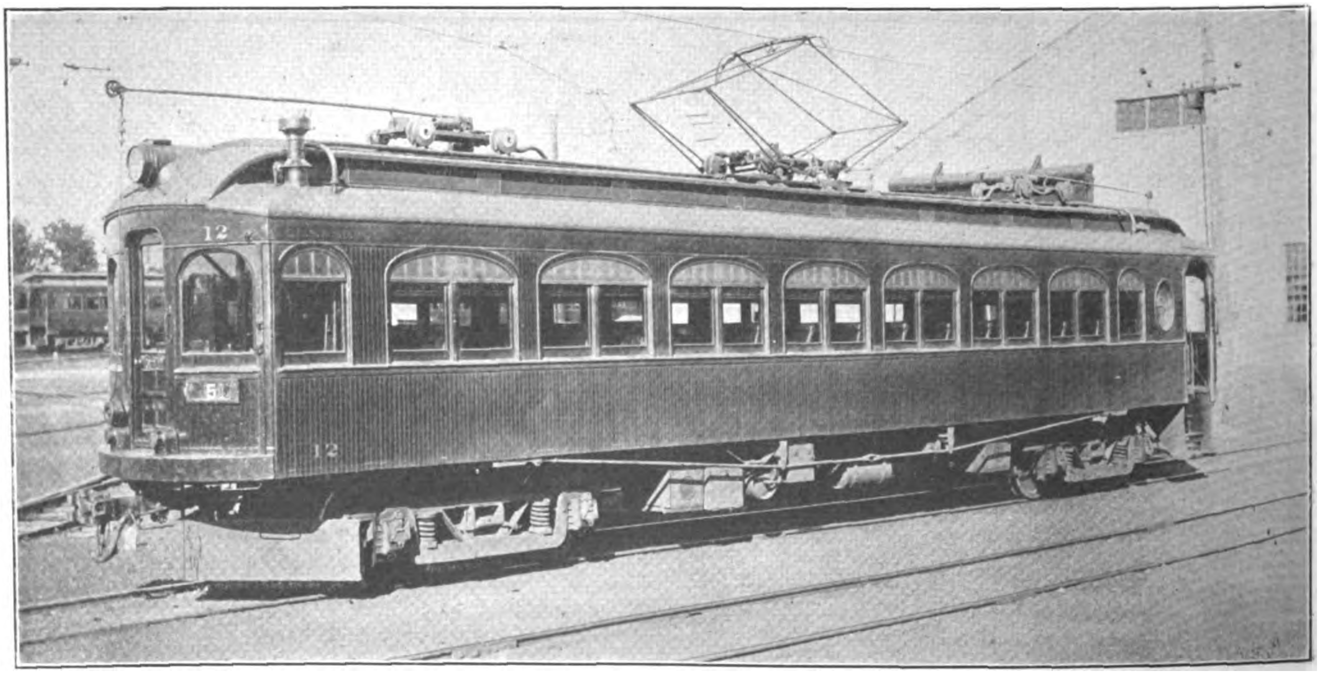
Between these two points there are eleven steam railroad crossings, involving the crossing of twenty-five tracks, and three of these crossings are interlocked. The line is also intercepted by one drawbridge, where operators are stationed at all times.

All prospective motormen, upon breaking in, are required to spend four weeks in the shops with the regular repair force. During this time they are paid 17½ cents an hour, and the master mechanic sees that they are made familiar with various defects in the car equipment in the different shop departments. This training, to a certain extent, accounts for the relatively few car failures attributable to the motormen's abuse of equipment. All motormen are examined once a year to refresh their memories concerning the equipment as well as the rules. Upon taking charge of trains all motormen are required to test the brakes and the pantographs as a safety precaution. If additional motor cars are added to multiple-unit trains the brakes and pantographs are again tested.

ROLLING STOCK

The passenger equipment includes eleven passenger motor cars and eight combination motor and baggage cars weighing 55 tons each. There are also ten 50-ft. trail cars weighing 27½ tons each and four 60-ft. trail cars of about the same weight. The passenger cars in single units and in trains are provided with motor capacity as follows: Single motor cars, 9.1 hp. per ton; motor car and one trailer, 6.1 hp. per ton, and motor car and two trailers, 4.6 hp. per ton. These cars are mounted on Baldwin class 90-35 M.C.B. trucks with 7-ft. 6-in. wheelbase. The trucks are fitted with 38-in. rolled-steel wheels mounted on axles 6½ in. in diameter at the center, 7½ in. at the gear seat and 7 in. at the wheel seat. The journals are 5½ in. x 10 in. inclosed in Symington journal boxes and fitted with M.C.B. brasses. All trucks have ball-bearing center bearings designed for a center-plate load of 35,000 lb. The body and electrical equipment on the motor car weighs 59,750 lb. and the trucks and motors 51,600 lb., making the total weight 111,350 lb.

The electrical equipment on the motor cars includes four Westinghouse No. 148 single-phase motors rated at 125 hp. and equipped with multiple-unit control. With this equipment the average energy consumption at the power plant is 5.75-kw.-hr. per car-mile. Considering cars with a seating capacity of sixty-two and a gross weight of 57 tons, the following results are obtained: Watt-hours per ton-mile, 101; per seat-mile,



SINGLE-PHASE OPERATION—STANDARD PASSENGER CAR

Total number of trains scheduled	19,829
Total number of trains operated	19,761
Total number of trains operated on time	18,924
Total number of trains operated late	804
Total number of minutes detention trains operated	21,884
Per cent of scheduled trains on time	95.34
Per cent of scheduled trains late	4.66
Average delay of each train late (minutes)	27.21
Trains annulled between given points	134

Numbers and Causes of Train Delays

Car failures	123	Trains 5 to 10 minutes late	50
Heavy traffic and opposing trains	131	Trains 10 to 20 minutes late	329
Power troubles	270	Trains 20 to 60 minutes late	344
At steam railroad crossings	32	Trains 60 or more minutes late	81
Waiting for interconnecting connections	50		
Line trouble	27	Total	804
Accidents	29		
Wells-Fargo express	9		
Miscellaneous	82		
Snow storms	31		
Damaged pantographs	12		
Derailments	8		
Total	804		

Total number of days on which there was power trouble	38
Total number of accidents reported	38
Total number of pantographs damaged	20

Car Mileage		Total Car-Hours	
Passenger cars	982,306	Passenger cars	54,131
Trailers	126,916	Line cars	2,630
Line cars	18,284	Work trains	1,693
Work trains	13,191		
Gondolas, box and flat cars	46,991	Total	58,454
Snow plow	129		
Total	1,187,817		

City Line

A total of 105 trips were lost. Nine accidents were reported.

Total car mileage	144,441	Total car-hours	14,879

SINGLE-PHASE OPERATION—TRANSPORTATION REPORT FOR 1915

Total number of trains scheduled	16,918
Total number of trains operated	16,910
Total number of trains operated on time	16,634
Total number of trains operated late	276
Total number of minutes detention trains operated	5,696
Per cent of operated trains on time	98.37
Per cent of operated trains late	1.63
Number of trains annulled between certain points	1
Average delay of each train late (minutes)	20.5
Number of trains annulled between terminals	8

Numbers and Causes of Train Delays

	Minutes		No.-Min.
75 on account of heavy travel	1295	5 to 10 minutes late	35- 245
43 on account of car or equipment	1009	10 to 20 minutes late	137-1728
10 on account of pantograph	178	20 to 60 minutes late	96-2880
20 on account of railroad crossings	254	60 or more minutes late	8- 843
38 on account of power off	1377		
25 on account of interconnecting connections	408	Totals	276-5696
6 on account of automatic blocks	60		
2 on account of drawbridge open	13		
8 on account of overhead trouble	320		
6 on account of accidents	60		
5 on account of transferring at canal	87		
9 on account of derailments	203		
29 on account of miscellaneous	432		
276	5696		

Total number of days on which there was power trouble	9
Total number of days on which there was overhead trouble	15
Total number of days on which there were accidents reported	61
Total number of days on which there were pantographs damaged	23
Total number of days on which there were derailments	4

Total Car Mileage		Total Car-Hours	
Passenger	831,127	Passenger	46,171
Trailer	288,371	Work train	1,142
Line car	10,232	Line car	1,479
Work train	11,754		
Flat car	7,708	Total	48,792
Gondolas	5,657		
Box cars	8,891		
Snow plow	67		
Total	1,163,807		

City Line

A total of fifty-two round trips were lost. One derailment and twelve accidents were reported.

Car mileage	145,956	Car-hours	13,880

SINGLE-PHASE OPERATION—TRANSPORTATION REPORT FOR 1912

93, both at the power plant. In comparing these figures with the results obtained on other properties, it must be borne in mind that the cars of the Chicago, Lake Shore & South Bend Railway are of the Pullman type with a 10-ft. over-all width, a 24-in. aisle, and passenger seats with dimensions and spacing the same as the standard for steam railroads.

EQUIPMENT INSPECTION AND MAINTENANCE

All equipment is thoroughly inspected daily at the terminals and is turned into the general repair shops at Michigan City for general inspection on a 1000-mile basis, or once each week for the motor cars. Owing to the fact that much of the line from Michigan City to Pullman was built through sand dunes, thorough overhauling of the equipment is necessary twice a year. At that time all commutators are turned and slotted and all parts of the equipment thoroughly cleaned and put in first-class running order. Maintenance costs for passenger car bodies and trucks during the year 1914 averaged 1.03 cents per car-mile, and during the year 1915 the average was 1.18 cents per car-mile. Maintenance of the electrical equipment on these cars during 1914 was 1.52 cents per car-mile and during 1915 it was 1.41 cents per car-mile. In other words, the total cost of equipment maintenance, including bodies, trucks and electrical equipment for 1914, was 2.55 cents per car-mile and in 1915 it was 2.59 cents per car-mile.

Equipment failures classified and credited to the various months of the year indicate that during the period prior to Dec. 31, 1913, there was no perceptible improvement in the number or character of failures. Records for six months in 1910, the years 1911, 1913, 1914 and 1915 are shown. During the last two years it will be noted that the total number of failures dropped from an average of around 300 to less than 200. This result was largely attributed to a change in gear ratio from 25:66 with a 2½ pitch, to a 21:70 gear ratio. This change necessitated a reduction in the maximum schedule speeds to 58 miles per hour, but the reduction

	YEAR ENDING DEC. 31, 1913													YEAR ENDING DEC. 31, 1914													SIX MONTHS TO JUNE 30, 1915						
	January	February	March	April	May	June	July	August	September	October	November	December	Totals	January	February	March	Apr	May	June	July	August	September	October	November	December	Totals	January	February	March	April	May	June	Totals
Armatures rewound	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1	..	..	..	..	1	1	..	5	1	1	1	1	2	2	8
Armature trouble	1	2	2	..	1	..	..	2	3	3	2	2	18	4	4	4	3	2	..	1	1	2	1	3	4	29	3	2	1	3	..	1	10
Motor field trouble	1	4	4	2	3	1	7	1	..	4	5	3	33	1	6	4	3	3	4	..	4	2	2	5	..	34	2	2	1	..	..	..	5
Brush-holders broken	1	3	3	1	..	1	..	1	9	4	..	..	21	..	1	1	1	..	..	3	1	..	2	1	1	11	3	1	..	1	1	..	6
Transformers and wiring	1	..	..	1	..	2	1	1	..	..	..	1	7	..	..	..	..	1	2	..	..	..	..	..	1	4	..	..	..	..	..	..	..
High-tension cable	1	..	..	2	1	..	..	..	..	..	..	2	6	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
Pantograph and trolley insulation	..	..	..	..	3	9	5	2	2	4	3	3	31	..	..	3	1	4	3	9	1	1	..	..	..	22	1	1	1	7	8	4	22
Reversers and wiring	..	2	..	..	..	..	5	3	3	1	..	1	15	..	..	1	..	..	..	1	..	..	..	..	..	2	..	..	..	1	..	1	2
Switch group	3	..	1	2	1	5	10	5	2	3	2	4	38	2	..	1	1	3	..	1	1	..	..	1	1	11	3	2	1	2	..	2	10
Line switch	..	..	..	..	..	..	..	..	2	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Air compressors	1	..	..	..	1	2	1	..	1	..	..	1	7	..	1	..	1	2	..	..	..	1	1	..	2	8	1	..	1	1	..	1	4
Hot bearings	2	2	1	..	2	1	..	1	..	..	1	1	11	..	..	1	1	1	1	2	1	1	..	..	1	9	1	..	1	..	3	1	6
Headlight	..	1	1	..	..	..	..	..	..	..	..	..	2	1	..	..	..	1	..	..	..	..	..	..	..	2	2	..	..	..	1	..	3
Broken gears and pinions	..	1	..	..	..	1	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Car bodies damaged	1	..	1	..	..	1	..	..	..	4	6	5	18	2	1	1	2	1	1	1	..	..	2	1	..	12	2	1	2	1	..	1	7
Motor truck trouble	..	..	..	..	..	1	..	2	1	2	4	1	11	..	..	1	..	..	..	2	..	1	..	..	..	4	..	..	1	..	1	..	2
Speed relay	..	1	1	..	..	1	..	..	1	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	2
Preventive coil	1	1	1	..	4	1	..	1	..	1	..	1	11	..	..	..	..	2	..	..	..	..	1	..	..	3	..	..	..	..	..	..	..
Control wiring	..	..	..	..	1	..	2	..	..	..	2	1	6	2	..	1	3	..	..	1	..	1	..	1	..	9	1	..	..	..	..	..	1
Pantograph trouble	1	2	10	8	6	10	11	8	10	4	..	4	74	6	3	4	1	2	3	10	..	2	..	2	2	35	..	3	1	2	2	2	10
Flat wheels	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	2	..	..	..	..	..	..	..
Totals	14	19	21	16	23	36	42	27	34	30	25	30	317	18	17	23	17	22	14	31	9	11	9	14	13	198	21	14	11	19	18	15	98

SINGLE-PHASE OPERATION—EQUIPMENT FAILURES JANUARY, 1913, TO JUNE, 1915

Comparative Statement of Car Equipment Failures or Troubles

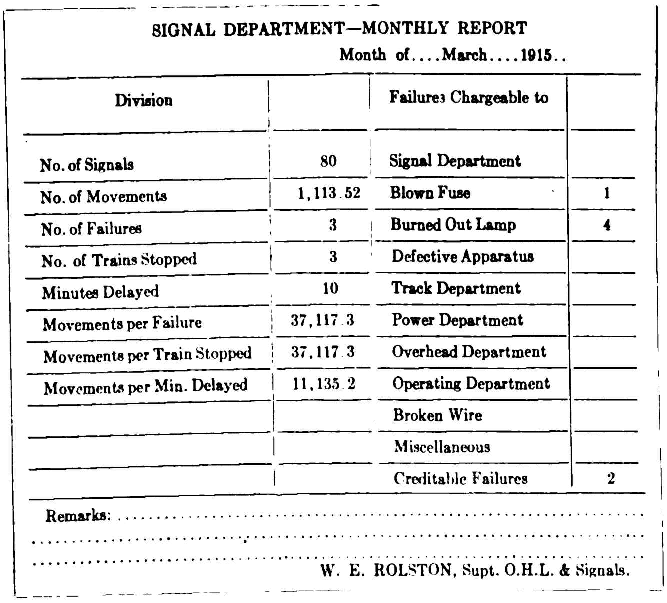
	Broken Air Pipes	Switch Group	High-Tension Cable	Armature Trouble	Car Body Damaged	Motor Trouble	Hot Axle	Air Compressor	Pantograph Insulation	Pantograph Lock	Line Switch	Low Bearings	Field Troubles	Hot Journals	Pantograph Off	Headlight	Triple Valve	Reverser Wires	Broken Gear	Flat Wheels	Total Failures
1910																					
July	2	5	1	6	6	1	...	2	4	...	4	2	1	7	7	2	1	...	...	...	51
August	..	5	5	1	6	3	2	3	6	...	1	1	2	3	4	...	1	1	...	...	44
September	2	1	2	4	3	2	2	2	4	3	2	2	...	1	6	3	...	1	2	...	42
October	1	3	..	1	3	3	2	1	3	2	1	1	...	3	4	5	...	1	...	1	35
November	1	2	4	..	1	..	...	...	1	...	...	1	1	2	1	...	...	1	1	...	16
December	1	8	5	1	..	1	2	1	...	1	...	...	1	5	7	3	...	...	1	...	37
1911																					
January	..	2	4	3	2	4	1	1	...	...	...	1	1	2	4	...	...	...	1	1	27
February	..	1	3	..	1	..	...	...	1	1	...	1	1	...	2	2	1	...	...	...	14
March	..	2	3	1	2	1	...	...	4	...	1	3	1	2	4	...	...	1	1	...	26
April	..	1	1	1	..	1	...	1	3	...	...	1	...	...	4	...	...	1	1	...	15
May	..	4	5	3	2	2	...	2	13	...	1	...	...	2	11	...	...	2	5	...	51
June	4	3	2	1	..	5	1	2	6	...	...	1	2	1	10	...	...	1	2	...	40
July	2	2	1	3	..	1	2	...	6	...	1	...	2	1	13	...	...	...	...	...	34
August	1	6	..	..	2	..	...	...	...	...	...	...	...	...	2	...	...	1	...	...	12
September	..	2	1	..	2	2	3	...	3	...	2	...	...	3	2	...	...	...	...	...	20
October	1	3	1	2	..	6	...	3	2	...	...	...	...	...	6	3	...	...	...	...	27
November	..	4	..	1	..	4	...	...	3	...	...	...	1	1	...	1	...	...	1	...	16
December	..	..	..	..	..	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
																					282

SINGLE-PHASE OPERATION—EQUIPMENT FAILURES FOR 1910-1911

only affected two trains on the regular schedules. Another improvement which materially reduced the number of equipment defects was the introduction of a steel slipper wire suspended beneath the copper trolley wire. This decreased the number of pantograph failures which were principally due to broken trolley wire. A change in the style of pantograph insulator also aided in reducing difficulties in this part of the equipment. Brush-holder failures were decreased by the introduction of an improved brush-holder, and failures in the motor fields, reversers and switch groups, as well as the preventive coils were materially minimized by the lower starting torque obtained with the lower gear ratio.

From the preceding paragraph it might appear that equipment failures were numerous and serious, but that never has been the case. Few electric interurban properties can boast of a more reliable service even when the difference in operating conditions are taken into account. As evidence the service records for the years ending June, 1912, and June, 1915, are shown. These records are typical of all those for the past five years. Calculations made from these show that although the per cent of trains on time has changed only a few per cent, a marked reduction in the number and time of detentions has been made. Against 804 delayed in 1912, only 276 were recorded in 1915. This represents an improvement of from 8798 miles per detention to 21,958 miles per detention. This is also most compelling evidence that single-phase equipment has attained a high degree of reliability. In another tabulation the exact amounts of money spent and the quantities and materials used for the first eight months during the present year in the maintenance of equipment are shown. All of these data are totaled and reduced to a cost per 1000 car-miles.

Single-phase electrical equipment, like any d.c. equipment, had to pass through a period of service tests. Surprising as it may seem, however, at no time have defects in the equipment seriously affected the reliability of the service. As shown in the transportation records, the yearly average of trains on time has seldom, if ever, been below 95 per cent during the eight years of operation, and for the year just closed, June 30, 1915, an enviable record of 98.37 per cent of trains on time was made. Records of this kind could not obtain if equipment defects were numerous or serious. In another article to be published soon these defects will be taken up in detail and the methods by which they have been eliminated will be described. The article will also tell how other operating economies have been developed. Enough has already been given to show that, after making allowances for differences in the operating conditions, the character of service and the schedule speeds, the Chicago, Lake Shore & South Bend



SIGNAL DEPARTMENT—MONTHLY REPORT

Month of....March....1915..

Division		Failures Chargeable to	
No. of Signals	80	Signal Department	
No. of Movements	1,113.52	Blown Fuse	1
No. of Failures	3	Burned Out Lamp	4
No. of Trains Stopped	3	Defective Apparatus	
Minutes Delayed	10	Track Department	
Movements per Failure	37,117.3	Power Department	
Movements per Train Stopped	37,117.3	Overhead Department	
Movements per Min. Delayed	11,135.2	Operating Department	
		Broken Wire	
		Miscellaneous	
		Creditable Failures	2

Remarks: ....

....

....

W. E. ROLSTON, Supt. O.H.L. & Signals.

SINGLE-PHASE OPERATION—TYPICAL MONTHLY SIGNAL OPERATION REPORT

Maintenance Cost of Cars, 1915

Items	Average for Eight Months			Average Mileage for Eight Months
	Total Amount	Total Cost	Cost per 1000 Miles	
Whee's, 39 in.	26	$714.37	$0.838	....
Axles, 6½ in.	....	....	....	....
Brakeshoes	926	796.99	0.935	....
Car-mi es per shoe	61,298 miles	....	....	7,649
Brakeshoe heads	56	22.23	0.026	....
Brakeshoe-head cones	179	2.68	0.00315	....
Brakeshoe-head bolts	54	18.90	0.022	....
Brake levers	7	21.00	0.024	....
Swing links	8	20.00	0.023	....
Springs	8½	....	....	....
Gear pans	2	30.00	0.035	....
Motor oil	1484½ gal.	....	....	....
Compressor oil	199 gal.	....	....	....
Gear grease	2,391 lb.	....	....	....
Total lubrication cost	....	412.37	0.483	....
Pantograph material	....	110.69	0.129	....
Pantograph and trolley insulators	24	87.60	0.127	....
Motor brushes in cars	4,255	261.30	0.306	....
Car-miles per brush	140,368 miles	....	....	17,546
Brush-holders in motors	57	760.95	0.892	....
Brush-holder parts	....	223.04	0.206	....
Brush-holders for air motors	4	9.32	0.0109	....
Brushes for air motors	157	9.42	0.011	....
Compressor governor parts	....	15.80	0.0185	....
Compressor check valves	7	10.68	0.0125	....
Air hose	65	44.52	0.0523	....
Switch-group material	....	56.89	0.0666	....
Preventive coils	....	....	....	....
Total cost of repairs	....	....	....	....
Line-switch material	....	6.08	0.0071	....
Reverser material	....	4.82	0.0056	....
Headlight material	....	22.89	0.0267	....
"Mazda" lamps	692	139.78	0.163	....
Armature babbitt metal	624 lb.	321.36	0.378	....
Antimonious lead	1,243 lb.	118.08	0.1385	....
Armature bearings	4	38.00	0.0445	....
Motor bearings	42	29.82	0.0349	....
Bearing housings	3	93.45	0.0108	....
Armatures rewound	8	....	....	....
Armatures repaired	10	....	....	....
Armature material	....	1,026.68	1.20	....
Glass	88	....	....	....
Glass, total cost	....	100.32	0.118	....
Car bodies damaged	19	....	....	....
Car bodies repaired, total	....	121.25	0.142	....
Car bodies repainted	14	....	....	....
Total cost of painting	....	1,866.49	2.19	....
Total mileage	....	....	....	852,406

SINGLE-PHASE OPERATION—DETAILED TABULATION OF MAINTENANCE MATERIALS AND COSTS

Railway has made a fine record for reliability of service and low operating costs. The present condition of the physical property shows the results of permanent construction and careful maintenance. The management can point with pride to a record of 99.3 per cent of trains on time for an entire year, a maintenance cost of 2.55 cents per car-mile on equipment, and 0.854 cent on overhead and signal lines. During the past five years the percentage of trains on time has never been less than 95 per cent, and in the same period equipment failures were reduced from more than 300 to less than 200 per year, representing an improvement from 8798 miles per detention to 21,958 miles per detention. For these excellent results credit must be given to C. N. Wilcoxon, president and general manager, assisted by his able department heads, J. K. Gray, superintendent; J. E. Rolston, chief engineer, and C. E. Heslett, master mechanic.

Utilizing the County Fair in Publicity Work

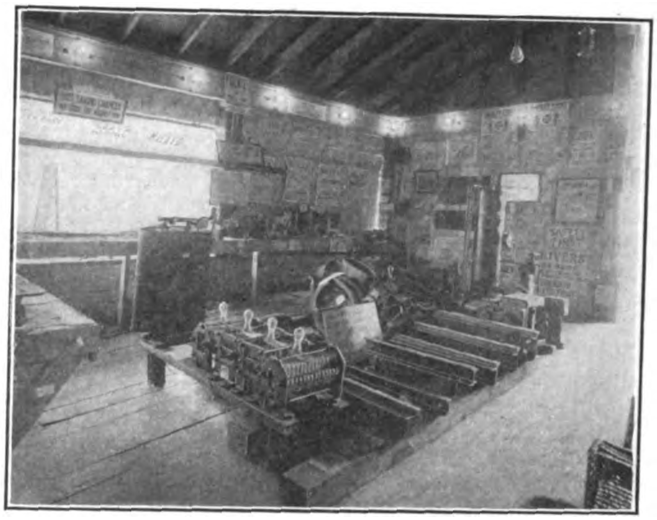
How An Enterprising Interurban Railway Identified Itself with Its Constituency by Exhibiting at the County Fair

BY W. H. BOYCE, SUPERINTENDENT BEAVER VALLEY TRACTION COMPANY, NEW BRIGHTON, PA.

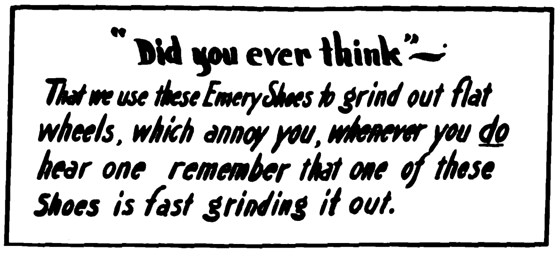
How many times during county fair days and holidays have we heard the "bromide" exclaim, "I surely would like to have the traction company's receipts to-day!" We have never heard one say, on a winter's night, between 9 and 11 o'clock, "I certainly would like to have what the company earned to-day."

The Beaver Valley Traction Company recently conducted a novel exhibit at the Beaver County Fair for the purpose of demonstrating to the people of the vicinity that all of the nickels garnered by us during those days of the fair were not "velvet," and of impressing upon the public the great variety of ways in which we have appealed to them during our educational campaign for the prevention of accidents. We believe that we made the public think during that week. L. F. Coffin, our master mechanic, was in charge of the booth and explained the operation of the various mechanical and electrical devices. A complete straight air-brake equipment was in operation so that the intermittent pumping of the air compressor and the occasional shrieks of the air whistle attracted crowds as well as demonstrated some of the inner workings of a street car.

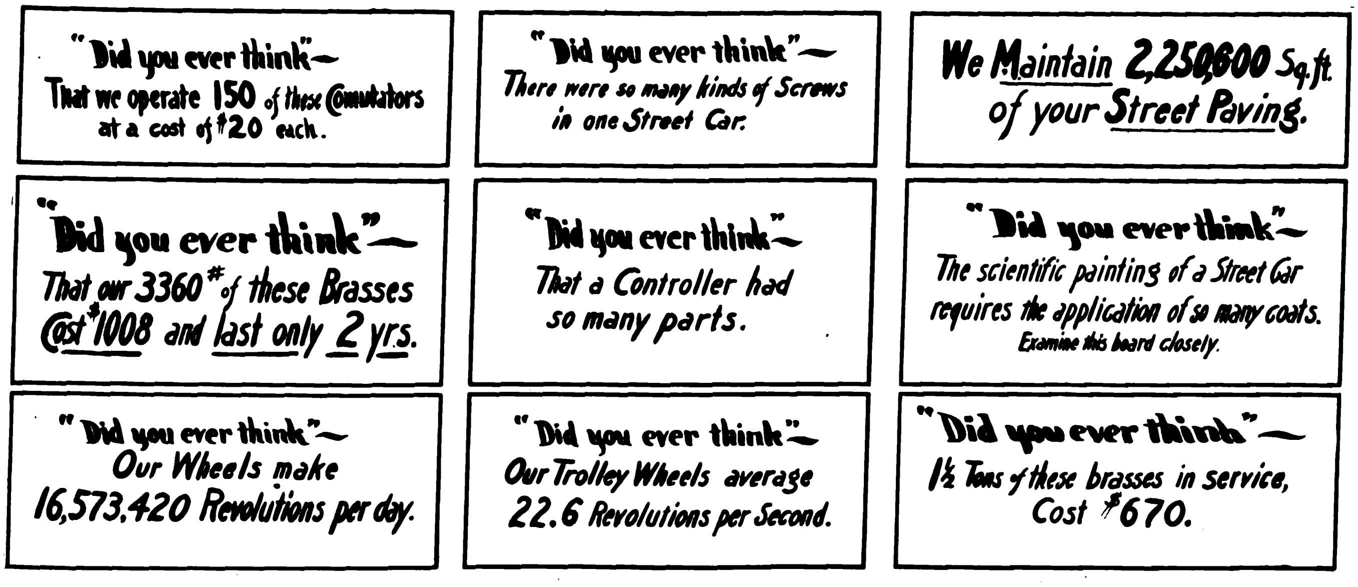
For our exhibit we had prepared a panel appearing near the center of the partition above, which showed the sixteen operations necessary in removing old paint from a car exterior and in applying the successive coats of primer, surfacing, sanding, applying color, and striping and varnishing. On the floor space we had arranged a platform-type controller, grid resistance boxes, motor frame mounted on a 4¼-in. axle, as shown herewith. We had the whole so wired with carbon lamps as to show clearly the path of the current on different points of the controller. We thus called attention to the large current waste in starting a car so as to give it a comfortable rate of acceleration. The controller, the cover of which was open, showed also the multiplicity of fingers, segments, screws and lock nuts, all of which we used to emphasize the need of continual inspection and renewal.



BEAVER VALLEY TRACTION COMPANY'S BOOTH AT BEAVER COUNTY FAIR



"Did you ever think"—
That we use these Emery Shoes to grind out flat wheels, which annoy you, whenever you do hear one remember that one of these Shoes is fast grinding it out.



"Did you ever think"—
That we operate 150 of these Commutators at a cost of $20 each.

"Did you ever think"—
There were so many kinds of Screws in one Street Car.

We Maintain 2,250,600 Sq. ft. of your Street Paving.

"Did you ever think"—
That our 3360# of these Brasses Cost $1008 and last only 2 yrs.

"Did you ever think"—
That a Controller had so many parts.

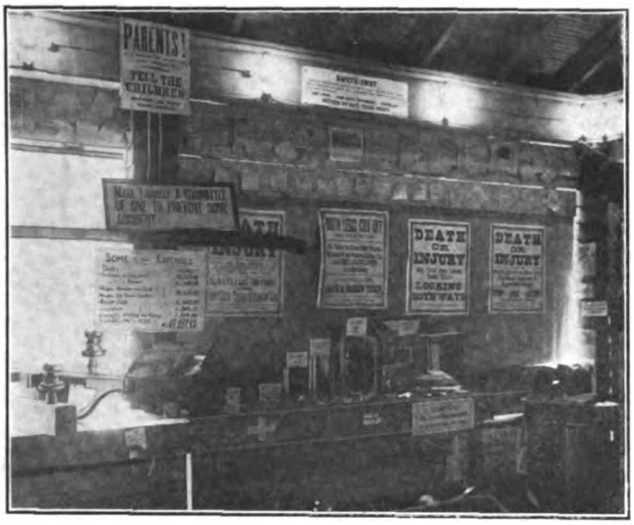
"Did you ever think"—
The scientific painting of a Street Car requires the application of so many coats.
Examine this board closely.

"Did you ever think"—
Our Wheels make 16,573,420 Revolutions per day.

"Did you ever think"—
Our Trolley Wheels average 22.6 Revolutions per Second.

"Did you ever think"—
1½ Tons of these brasses in service, Cost $670.

POSTERS USED BY BEAVER VALLEY TRACTION COMPANY IN GIVING PUBLIC SOME "FOOD FOR THOUGHT"



CENTRAL FEATURES OF BEAVER VALLEY TRACTION COMPANY'S FAIR BOOTH

We demonstrated the construction of an armature, explaining the methods used in building up laminations, pressing in the shaft, assembling the commutator and placing and connecting the armature coils. The boiler tube, some types of overhead line material, car trimmings, the different and latest types of lighting arresters, which we have installed in our efforts to reduce car failures and delays to the minimum and thus better the service, the daily and yearly coal consumption record painted in yellow on a large block of coal, also shown herewith, all were used to call attention to the variety of our problems.

As a necessary adjunct to the solution of these problems of maintenance and renewal we explained the operation of our modern storeroom and, that we might bring home a little more forcibly the extent of our stock, had arranged a board showing types of screws carried and labelled it—"Did you ever think there were so many kinds of screws in one street car?" We further emphasized our storeroom movements by the sign hung over a journal brass—"Did you ever think—1½ tons of these brasses in service, length of life only one year?"

An excellent water color of the "Capture of the Essex," one of the commerce raiders of the War of 1812, bearing the legend, "Yes, our painter did it," was a tip as to the ability and type of workmen we employ. In this connection a single photograph showing the assemblage at our last Christmas tree and a group of employees' field meet photographs gave the public an insight into our employees' welfare work.

That we might also present the financial problems involved in street railway operation we had arranged a series of rails mounted on two cross-ties and used them to illustrate the difference in cost of construction twenty-five years ago and to-day.

Another sign read as follows:

"Your fare has not increased but—
"Operating expenses 1906 = ▬▬▬▬"
"Operating expenses 1914 = ▬▬▬▬▬▬▬▬"

We went even further and presented a portion of our 1914 expense account, showing cost of maintenance of equipment, of production of power, trainmen and carhouse employees' wages, bridge tolls, insurance premiums, maintenance of way costs, etc. We gave this cost to demonstrate that our tax burden, both state and county, was high—not low, as is so commonly the impression.

The last and one of the most important phases of our activities as they are related to the public, that of "safety first," was brought clearly to the attention of all who visited our both. These give a fair idea of the accident-prevention advertising matter used and show safety-first matter as it formed a background and border for the exhibits and a covering for the walls. We distributed at the booth the following:

1000 safety-first cards for teamsters bearing at the top a large horse blanket pin.

2500 boxes of safety matches, with a warning sticker on one side lettered in red letters on white background: "Safety First Means a Lot to You. The Beaver Valley Traction Company." On the reverse side, in blue letters on white background was: "We Are Doing Everything in Our Power to Prevent Accidents. Will You Do Your Part?"

1000 scratch pads bearing on front cover: "Note Book." "Note Down Safety First for Yourself, Your Relatives and Friends, and The Beaver Valley Traction Company." On the reverse side was a short discourse on "The Perils of the Street."

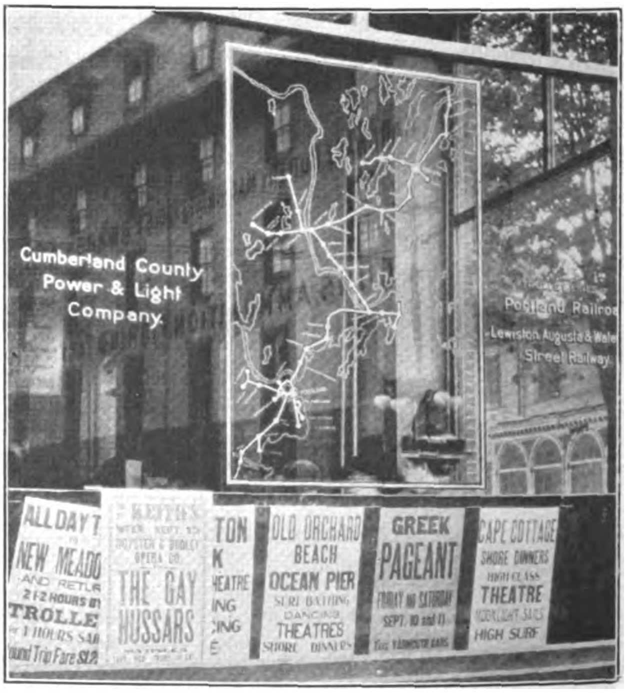
1000 halftone booklets given to mothers, the cover bearing a short appeal for safety and the seven pages of the booklet depicting as many ways in which accidents might happen, and a miscellaneous lot, totaling about 1000, of drinking cups, blotters and cards, which we had formerly used in our accident-prevention campaign.

The cost of preparing, installing and removing the appliances in the booth was $46. The cost of advertising matter was $56.

As to the amount of good derived, it is too bad that we can't tell you in dollars and cents, isn't it?

Mapping the System on a Window

The Cumberland County Power & Light Company, operating the electric railway service of Portland, Me., and vicinity, effectively advertises the layout of the system by a map painted in colors on the plate-glass window of the waiting room in Monument Square, Portland, as shown in the accompanying halftone. The system extends from Saco to Waterville, and the featuring of the map as a transparency attracts much attention from both inside and outside the waiting room.



DISPLAY OF MAP ON WAITING-ROOM WINDOW AT PORTLAND, ME.

Graphics in Maintenance Work

Examples of Graphical Records of Various Kinds Used in Modern Electric Railway Practice, Together with Some Generalizations Based Thereon

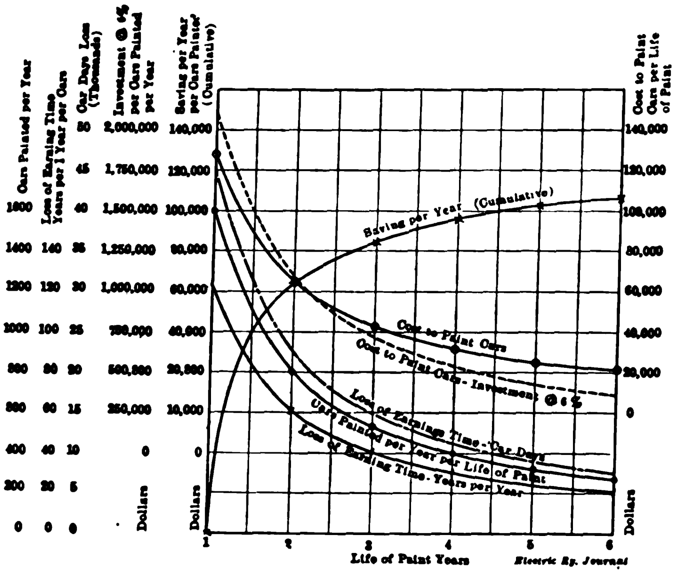
Observation of the practice of electric railway companies in different parts of the country indicates that the use of graphical records in electric railway shops is on the increase. Such records have long been used in the power and distribution, accounting and transportation departments, but are only beginning to be appreciated in the equipment department. Some roads use graphical records on a very large scale, while probably few do not find them helpful in some degree. For the purpose of furnishing an instructive exhibit of the kinds of records that are being found useful a number of typical examples were selected from recent volumes of the ELECTRIC RAILWAY JOURNAL. These were chosen as representing good practice and possessing commendable features, but no attempt has been made to draw general conclusions from them. They will suggest to some companies how greater use might be made of this method of presenting data, while others may see how their practice can be simplified.

To be effective the information to be put in graphical form must be such as can be used in impressing some lesson in the direction of improvement, or such as it is desirable for employees to keep before them, in a comprehensive way. For example, a graphical record of trolley breaks by months and years cannot but lead to study of causes and remedies. Again, an organization chart of a shop maintenance force shows at a glance "who's who" in the company and how the responsibility is subdivided.

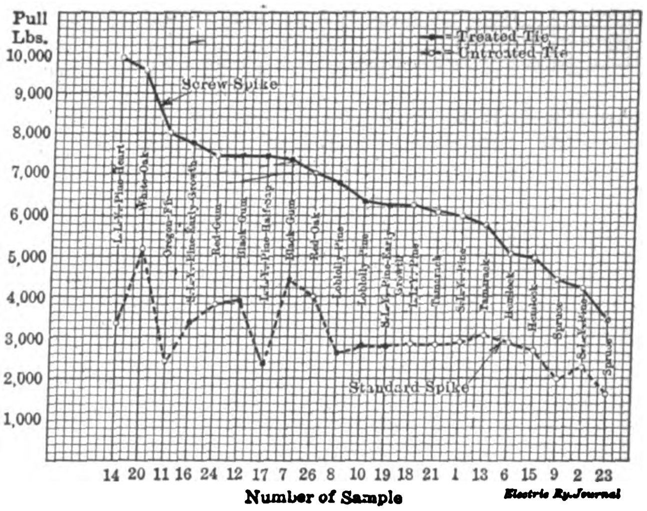
The present practice in graphical records appears to comprehend the following varieties for the purposes indicated:

(1) Curves plotted between variable quantities affecting equipment details, such as the relation between current-carrying capacity of spring contacts and the pressure at the point of contact, or the relation of the life of paint and total cost. Such curves are of great value in determining details of practice on the basis of real information. Manufacturers are in a position to furnish data in this form.

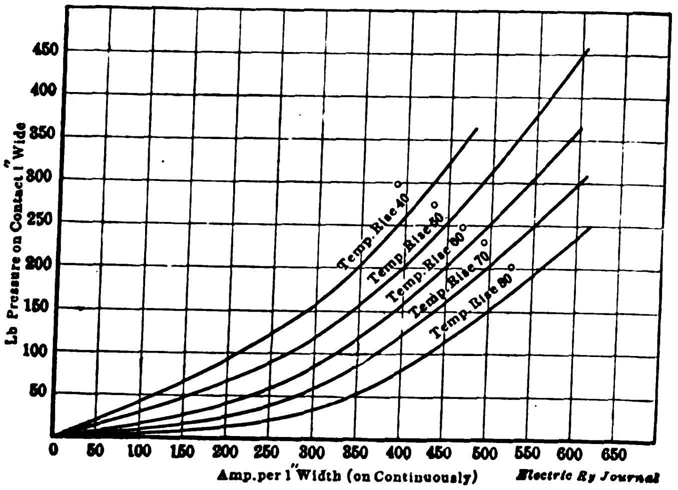
(2) Records of costs plotted, usually, against time for maintenance of detail parts and totals. Such are valuable for the determination of the durability of the individual parts of the equipment and especially as a basis for conference and discussion.



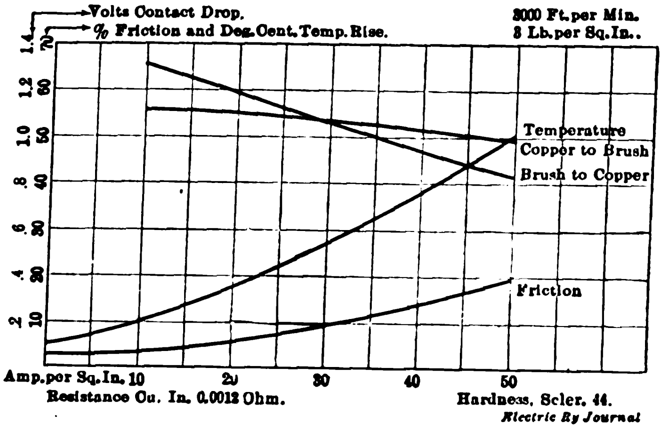
MAINTENANCE GRAPHICS—FIG. 1—LIFE-OF-PAINT CURVES, DETROIT UNITED RAILWAY



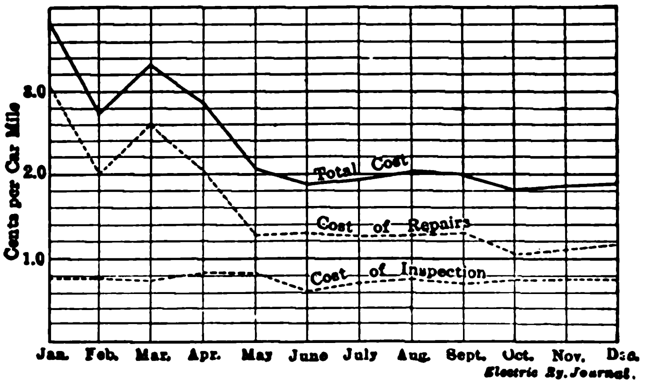
MAINTENANCE GRAPHICS—FIG. 3—HOLDING POWER OF SPIKES



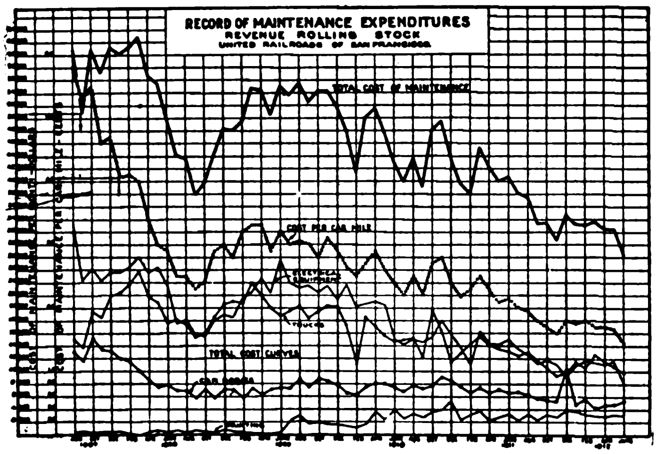
MAINTENANCE GRAPHICS—FIG. 2—SPRING CONTACT PRESSURE CURVES



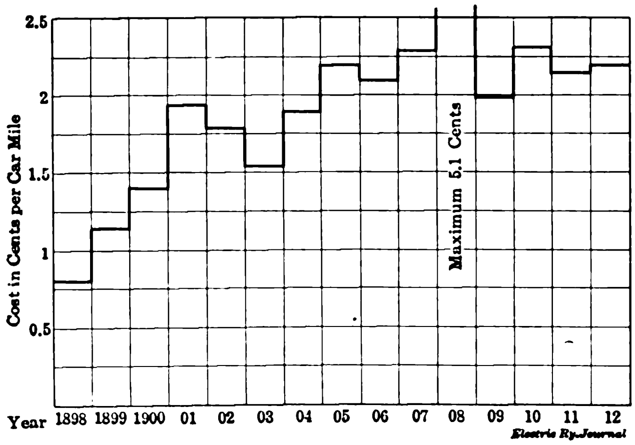
MAINTENANCE GRAPHICS—FIG. 4—CARBON BRUSH CURVES



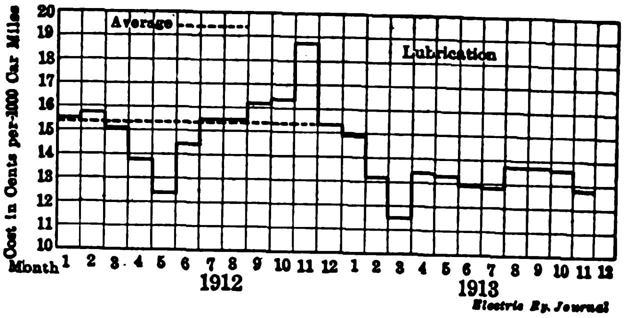
MAINTENANCE GRAPHICS—FIG. 5—CAR MAINTENANCE COST, NEW YORK, WESTCHESTER & BOSTON RAILWAY



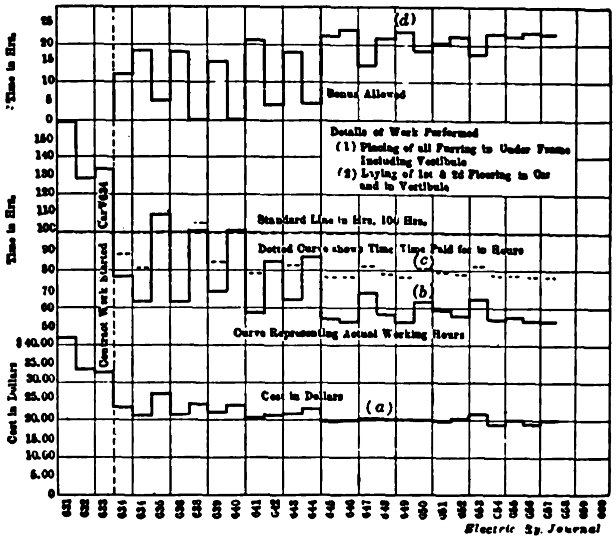
MAINTENANCE GRAPHICS—FIG. 6—CAR MAINTENANCE COST, UNITED RAILROADS OF SAN FRANCISCO



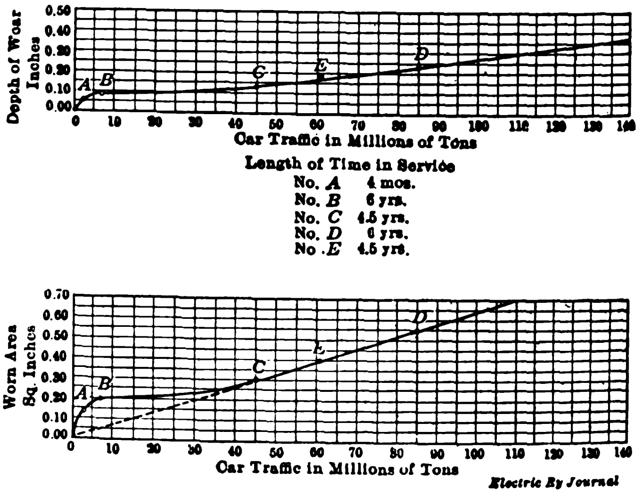
MAINTENANCE GRAPHICS—FIG. 7—CAR MAINTENANCE COST, NEW YORK RAILWAYS



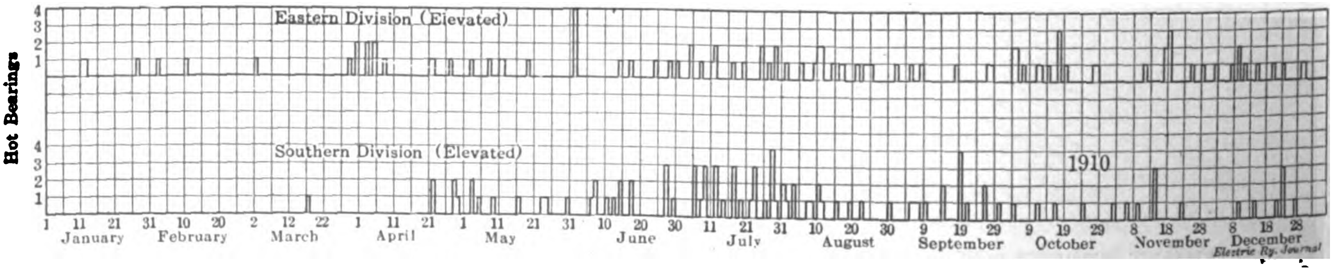
MAINTENANCE GRAPHICS—FIG. 9—LUBRICATION COST, NEW YORK RAILWAYS



MAINTENANCE GRAPHICS—FIG. 10—CAR FLOORING COST, MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY



MAINTENANCE GRAPHICS—FIGS. 11 AND 12—RAIL-WEAR CURVES, UNITED RAILROADS OF SAN FRANCISCO



MAINTENANCE GRAPHICS—FIG. 8—HOT BEARING RECORD, NEW YORK RAILWAYS

(3) Records of performance, usually on a time basis, such as numbers of cars pulled in by months, car-miles per defective car removed from line, hot-bearing records, etc. These are useful for the same purposes as (2).

(4) Construction progress records, partly for the purpose of insuring the delivery of parts at the times they are needed.

(5) Organization and routeing diagrams.

SAMPLES OF SPECIAL STUDIES

As examples of special studies, Figs. 1, 2, 3 and 4 have been selected.

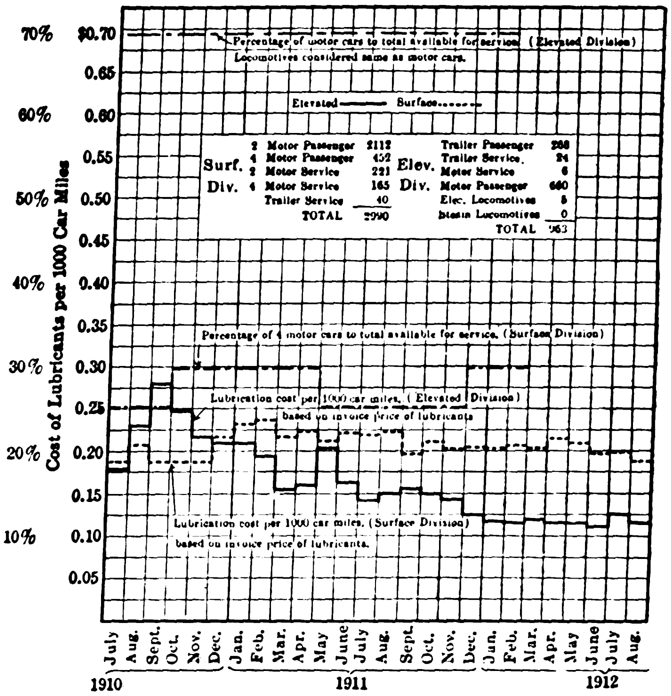
Fig. 1 is a study made by the Detroit United Railway in the process of reducing the cost of car painting by improving washing methods. It shows at a glance the results of increasing the life of car finish and could be used in selecting paint on an economical basis or, as it was, for determining the best methods of washing. Fig. 2 was used by C. W. Squier in his "Equipment Defects" series of articles, printed in this paper, in indicating how circuit-breaker contact pressures affect carrying capacity. Such data for every element of equipment should be in the hands of all equipment men.

Fig. 3 is from a report of the Board of Supervising Engineers, Chicago Traction. It is typical of the kind of information needed in track work in selecting ties and spikes. By the ingenious plan shown a great deal of information is condensed in a small space. This board makes extensive use of graphical presentation of data. Fig. 4 shows curves prepared by a brush manufacturer in the course of improving his product, but they supply exactly the information needed in the shop. Similar curves between brush pressure and voltage drop, pressure and life of brushes, etc., would also be convenient.

While it is true that the handbooks contain a great deal of this sort of information, yet new curves are always turning up and tests are being made for special purposes. Cross-section paper and cloth of letter size, and larger or smaller, are available for records, and a looseleaf binder furnishes a convenient device for filing purposes.

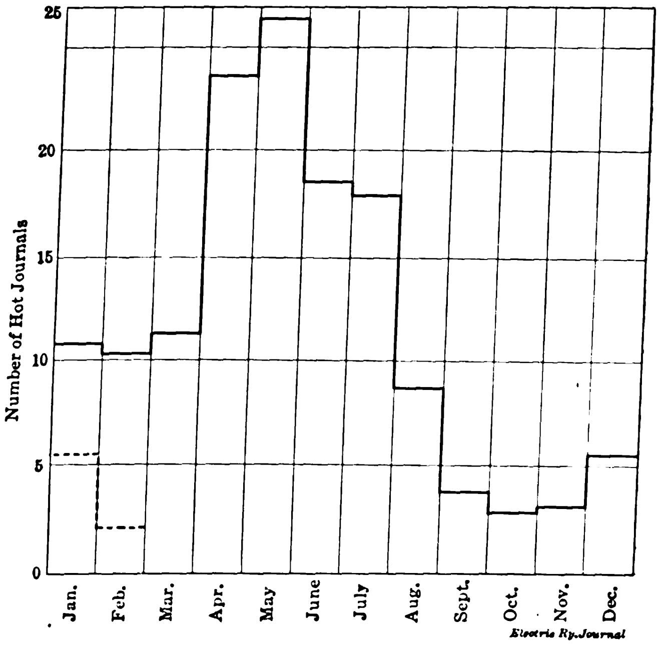
SAMPLES OF CONTINUOUS COST RECORDS

Continuous records of maintenance cost data are easily kept graphically and the advantages of so doing are obvious from an inspection of Figs. 5, 6 and 7. Fig. 5 is from the New York, Westchester & Boston Railway. It serves to show clearly how the cost of repairs was brought down to a reasonable value until it is nearly down to inspection cost. Fig. 6 gives a more elaborate analysis of the United Railroads of San Francisco records prepared by B. J. Arnold. It contains more records in a single sheet than are usually necessary but has the advantage of condensation. In reading diagrams like Figs. 5 and 6 it is necessary to remember that the points represent average values for the period corresponding to the horizontal units and not instantaneous values. The method of plotting shown in Fig. 7 is preferable because it is easier to read except when several lines which intersect are to be plotted on the same sheet. Fig. 7 is a sample diagram from the equipment department of the New York Railways, which employs graphical records on a large scale. This particular chart was prepared for the purpose of showing the change in maintenance costs over a long period, but similar charts, with the month as the time unit, are plotted for all elements of maintenance cost. These are sent monthly to heads of departments and are made the basis of discussion at staff conferences. Obviously discussion with the record of operating results at hand in such tangible form cannot but result in more intelligent shop practice. The advantage of keeping such records in some standard form can be seen from Figs. 8 and 9 from different roads, for if it is profitable to compare performance month by month on one system it is equally so to make intercompany comparisons.

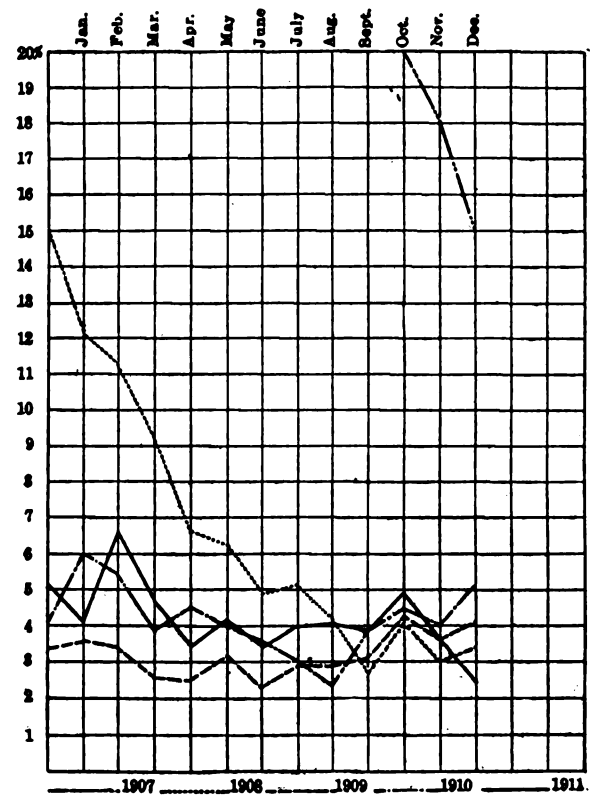


MAINTENANCE GRAPHICS—FIG. 13—LUBRICATION RECORD, BROOKLYN RAPID TRANSIT COMPANY

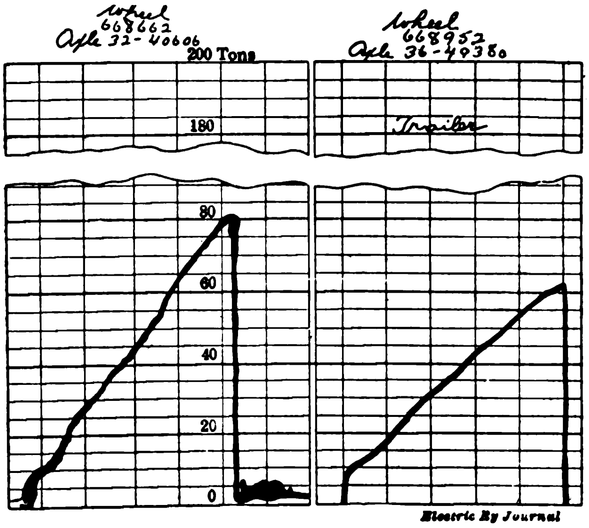
Cost diagrams can often contain other information as to factors affecting cost as, for example, in Fig. 10, which was prepared by the efficiency engineering department of The Milwaukee Railway & Light Company. It shows the effect of introducing a premium system in the flooring of cars. Cars 631 to 633 were framed and floored by day work, cars 634 to 657 under the premium system. Line *d* is the bonus time allowed above a standard of 100 hours set from observation on the first three



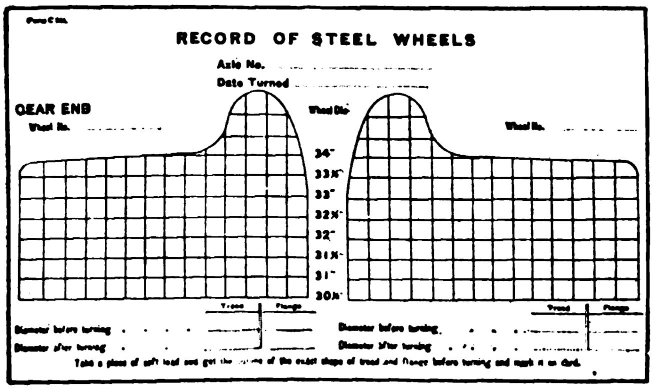
MAINTENANCE GRAPHICS—FIG. 14—HOT JOURNAL RECORD, NEW YORK RAILWAYS



MAINTENANCE GRAPHICS—FIG. 15—RECORD OF CARS PULLED IN, CONNECTICUT COMPANY



MAINTENANCE GRAPHICS—FIG. 16—GRAPHICAL WHEEL-PRESS RECORDS, BOSTON ELEVATED RAILWAY



RECORD OF STEEL WHEELS

Axle No. ....

Date Turned ....

GEAR END

Wheel No. ....

Wheel Dia.

34"
33½"
33"
32½"
32"
31½"
31"
30½"

Wheel No. ....

	Tread	Flange
Diameter before turning		
Diameter after turning		

	Tread	Flange
Diameter before turning		
Diameter after turning		

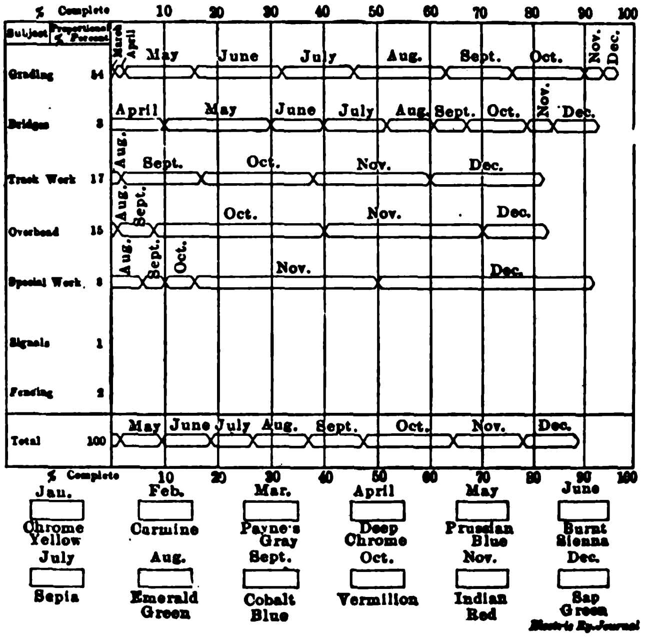
Take a piece of soft lead and get the [illegible] of the exact shape of tread and flange before turning and mark it on card.

MAINTENANCE GRAPHICS—FIG. 19—WHEEL-WEAR RECORD FORM, MASSACHUSETTS ELECTRIC COMPANIES

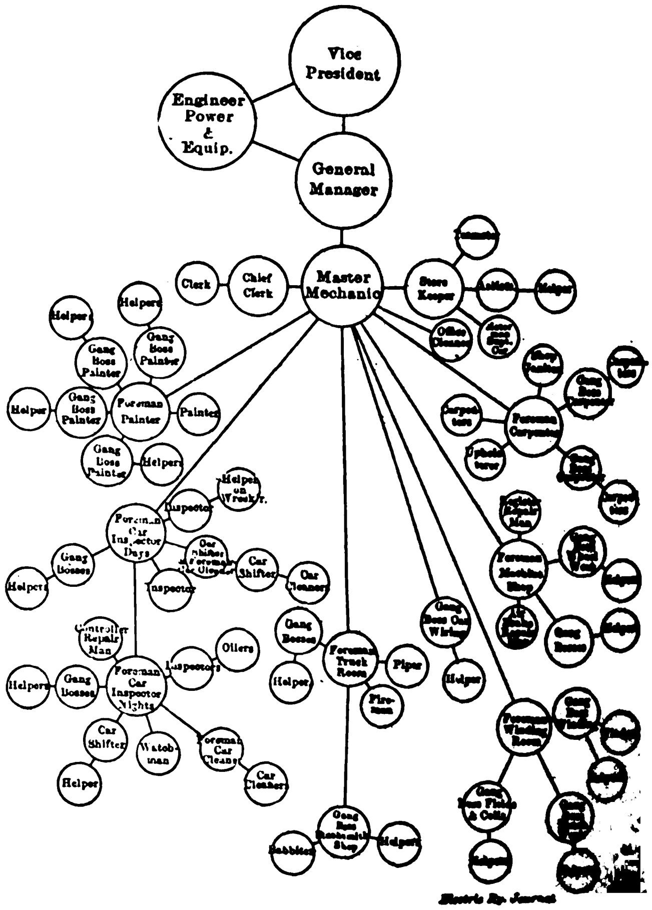
cars. Line *b* is the actual time consumed, in man-hours. Line *c* is the time paid for, and line *a* is the cost to the company for labor on underframe and floor construction.

SAMPLES OF CONTINUOUS PERFORMANCE RECORDS

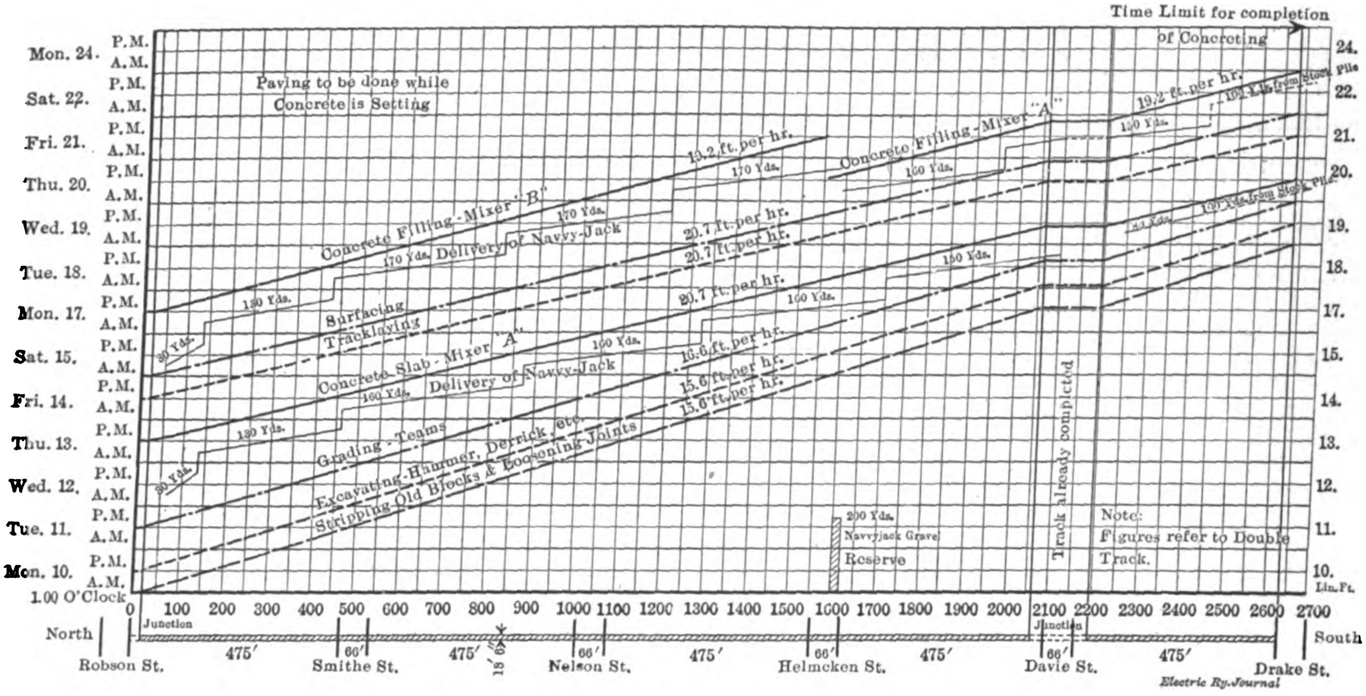
Another class of diagram, typified in Figs. 11 and 12, is of value in keeping track of performance in terms of



MAINTENANCE GRAPHICS—FIG. 17—WAY CONSTRUCTION DIAGRAM, CONNECTICUT COMPANY


Vice President
Engineer Power & Equip.
General Manager
Master Mechanic
Clerk
Chief Clerk
Store Keeper
Helper
Office Cleaner
Helpers
Gang Boss Painter
Foreman Painter
Painter
Helper
Foreman Carpenter
Carpenters
Upholsterer
Inspector
Helper on Wreck'r.
Foreman Car Inspector Days
Gang Bosses
Car Shifter
Car Cleaner
Inspector
Controller Repair Man
Oilers
Inspectors
Foreman Car Inspector Nights
Watchman
Foreman Car Cleaners
Car Cleaners
Car Shifter
Gang Bosses
Foreman Truck Room
Piper
Fire-man
Foreman Machine Shop
Gang Bosses
Foreman Winding Room
Electric Ry. Journal

MAINTENANCE GRAPHICS—FIG. 20—ORGANIZATION DIAGRAM, WORCESTER CONSOLIDATED STREET RAILWAY



MAINTENANCE GRAPHICS—FIG. 18—WAY CONSTRUCTION DIAGRAM, BRITISH COLUMBIA ELECTRIC RAILWAY

traffic or time. These diagrams were made by B. F. Legare, engineer maintenance of way United Railroads of San Francisco. They depict rail-head wear, in terms of both traffic and time, by the simplest expedient of indicating time-points on the wear curves by letters. Fig. 13 shows a Brooklyn Rapid Transit daily hot-bearing record, in which a small rectangle represents one hot bearing.

Fig. 14 is a hot-bearing record from the New York Subway showing averages by months. The record for the succeeding year is placed on the same sheet for comparison of similar months. Generally this would answer the same purpose as the preceding and is much cheaper to produce. In Fig. 15 is given a "cars-pulled-in" record of the Connecticut Company, Hartford shops. This company uses similar diagrams for different car troubles, arranging data for comparison of carhouses with a view to stimulating competition. The lines for the several years are distinguished by their character.

SAMPLES OF OTHER FORMS OF GRAPHICAL PRESENTATION OF MAINTENANCE RECORDS

In addition to the examples already cited, there are many special uses of graphics in maintenance work. For instance, autographic records of wheel press pressure, such as shown in Fig. 16 which is from a car-shop hydraulograph operated by the Boston Elevated Railway. Construction progress diagrams are also very useful. The style shown in Fig. 17, as used by the Connecticut Company, is good for general summaries, but for daily records that shown in Fig. 18 is better. The latter is used by the British Columbia Electric Railway of Vancouver. Other forms were shown in an article by Norman Litchfield, printed in the issue of this paper for Feb. 13, page 339.

A wheel record form that combines simplicity and effectiveness is the card used by the Massachusetts Electric Companies and shown in Fig. 19. A history of each pair of wheels is entered on the back of the card. Fig. 20 is the organization chart of the Worcester, Mass., Consolidated Street Railway Company's equipment maintenance department. It is of the form generally used as the construction is simple and it is easy to revise. Such a diagram is worth many hundreds of words in explaining the subdivision of work and responsibility in the department.

CONCLUSIONS

The foregoing illustrations have been selected from previous issues of this paper to show the usefulness of graphics outside of its original sphere. Drawing is so useful an art in conveying ideas and data regarding construction, and draftsmen, professional or amateur, are so plentiful on any electric railway property that it is but natural that both should be pressed into service in representing more than structural details. The examples indicate a wide variety of novel uses of graphics by a large number of companies.

Foreign Railway Equipment Described

With the object of placing in convenient and accessible form before persons in this country who are interested in railway materials, the United States Bureau of Standards, in connection with its investigation of failures of such material, has obtained, through the courtesy of the State Department, copies of specifications for railway material—rails, axles, wheels, and tires—used in several European countries. These specifications are given in full, together with a digest and discussion, in a forthcoming circular of information from the bureau. Available data concerning the types and weights of foreign railway equipment, together with those concerning derailments and accidents abroad, are included in the circular. Copies of the publication will be furnished on application to the Bureau of Standards, Washington, D. C.

The *Electric Railway and Tramway Journal* states that between 1500 and 1600 motormen and conductors and other employees of the tramways committee in Liverpool, England, have volunteered to give their labor in preparing munitions during their spare time, those most suitable for the work, either by age or training, having been accepted. The offer came spontaneously from the ranks, but the volunteers are paid overtime according to the usual tramway rates, and just now a large number of the men are giving useful service in the turning out of shells.

Illinois Association Meets

The Discussion at Chicago Last Week Was on Interchangeable Mileage, Interurban Rates of Fare, Oxy-Acetylene Welding for Bonds, and First-Aid Work

Experience with interchangeable mileage, electric interurban rates of fare, oxy-acetylene welded bonding and first-aid work on electric railways were the principal topics discussed at the meeting of the Illinois Electric Railway Association held at the Hotel La Salle, Chicago, Ill., on Oct. 29. About seventy-five railway and manufacturers' representatives attended this meeting and President F. E. Fisher presided. The report of the traffic committee called attention to the fact that many Illinois electric interurban lines were not participating in the use of the interchangeable coupon books. Some of the roads have cheaper local books which have reduced or eliminated the sale of the association book and thereby diminished the results which would obtain from its more general use. To improve this situation the committee urged all lines to become members of the agreement and to abolish all other forms of coupon books except those good on their own lines.

The traffic committee also recommended that the executive committee consider the question of interurban railway fares and whether the 5-cent zone system shall be continued, or whether fares shall be figured on a 2-cents-per-mile basis. Another question considered was whether permission should be granted to conductors to cut cash-fare slips for the proper fare except where the amount does not end in zero or five, when they are authorized to collect the next higher amount ending in zero or five. It was suggested that where more than 2 cents a mile was collected by the conductor, a provision should be printed on the cash fare slip that any ticket agent would refund the difference between the amount collected and the correct rate of fare.

Another suggestion by the traffic committee was that the president of the association appoint one man to act as agent and all members of the association give him power of attorney to file joint tariffs with the state and interstate commissions and to issue coupon books as requested by the various member companies. The committee also suggested that the member companies do what they could to encourage the proposed law to permit steam railroads of the State to charge 2½ cents per mile for passenger business. The report was signed by T. W. Gregory, East St. Louis & Suburban Railway; W. M. Brown, Central Illinois Public Service Company; A. M. Farrell, Chicago, Ottawa & Peoria Railway, and Richard Breckinridge, Aurora, Elgin & Chicago Railroad.

In the discussion which followed this report, J. R. Blackhall, Chicago & Joliet Electric Railway, said that he was particularly anxious to have an expression of opinion regarding the proper method of calculating the rates of fare. He said that his company was preparing a new rate schedule and that he would like to see some definite action on the part of the association as to whether the basis should be the 5-cent zone or 2 cents per mile. He said that in Indiana and Ohio interurban lines collected 2 cents per mile, while in Illinois the fares were based on 2 cents per mile, but collections made in multiples of 5 cents. Mr. Blackhall also pointed out that the Chicago & Milwaukee Electric Railroad had received the approval of the Wisconsin commission to increase its fares to approximately 2 cents per mile, whereas a similar increase on the Illinois section of that road had not been granted by the Illinois commission. To set before the commission the views of the electric interurban roads in Illinois, it was important that all should agree to a common basis of calculating fares, and action by the association in this respect was desirable.

C. J. Jones, Aurora, Elgin & Chicago Railroad, and R. E. Dill, Joliet & Eastern Traction Company, also outlined their experience with coupon mileage and expressed the opinion that their companies would be willing to join in the more general use of the association's interchangeable mileage. In closing the discussion President Fisher called attention to the fact that the interchangeable mileage coupon books sold for $8.50, whereas the coupon books generally used by roads to the exclusion of the association book were sold for $5. He said that the higher-priced book was more desirable if all lines would come into the agreement and the cheaper or $5 book if only a few roads were in. He said it was not the purpose to substitute the association mileage books for those used on any one road but only for passenger interchange. If the interchangeable book were sold for less than $8.50, it would be so cheap that anyone would use it in place of paying regular fares. At the suggestion of one of the members, Secretary Griffin was instructed to communicate with all member companies requesting that they withdraw their own interchangeable mileage and substitute the association mileage.

G. T. Seeley, Elevated Railroads of Chicago, chairman of the sub-committee of the engineering committee investigating power economy on the car, reported that good progress had been made and that a report would be forthcoming soon. E. E. Soules, Illinois Traction System, chairman of the publicity committee, reported that the association map had been checked by all companies and when this information was transferred the map would be ready for publication.

At this point President Fisher again took up the question of the proper method of calculating rates of fares. He stated that all members were vitally interested in obtaining more revenue, and all should give serious consideration to increased fares where the fares could legally be raised. He said that his company thought of adding a 5-cent train fare to all cash fares collected on trains. This was to be done to encourage ticket sales and facilitate fare collection. He said that the Joliet & Eastern Traction Company had adopted such a plan and had practically eliminated all cash fares on the train. In connection with this plan, however, it was necessary to authorize conductors to collect the exact fare after certain hours at stations where agents were not on duty after stated hours at night. This was also true of road-crossing stops where no agents were maintained.

J. R. Blackhall favored fixing rates on a 2-cents-per-mile basis and eliminating the 5-cent zone system, because in equalizing the companies could not legitimately collect a fare greater than 2 cents per mile. It was also possible to make a charge of 2½ cents per mile for a train fare.

In closing Mr. Blackhall recommended that a committee be appointed to work out a scheme of calculating fares on interurban roads to be adopted by the association. Accordingly President Fisher appointed Mr. Blackhall, A. M. Farrell, Chicago, Ottawa & Peoria

Railway, and W. C. Potter, general passenger agent Illinois Traction System, on this committee.

FIRST-AID WORK

At this point Mr. Seeley called the attention of the association to the good work being done by the medical department of his company in the operation of a first-aid system, and suggested that it might be well for the association to appoint a committee to investigate and report to the association on medical subjects. He also suggested that each company present its medical adviser as a member and urge him to attend at least one meeting of the year which would be devoted to medical subjects. A standing committee could take up medical subjects and physical requirements of the various classes of employees, first-aid systems and instructions, sanitary inspection and medical work in connection with the claim department. Mr. Seeley stated that a higher standard for employees should obtain on electric railways, particularly in the cities where higher wages are being paid. To put this plan before all member companies, the secretary was instructed to outline the plan suggested by Mr. Seeley, in a communication and submit it to all companies for approval.

OXY-ACETYLENE WELDING FOR BONDS

J. R. Brown, engineer Ohio Brass Company, then addressed the association in an illustrated lecture on oxy-acetylene rail bonding. An abstract of this discussion will be published in a later issue of the ELECTRIC RAILWAY JOURNAL. It considered the welding equipment, welding methods and the effect of welding temperatures on rail steel.

In the discussion which followed it was brought out that one welder should average ten bonds per hour under traffic. As many as twenty-two bonds per hour had been installed, but this was under exceptional conditions. The standard acetylene and oxygen tanks will weld approximately forty bonds, hence the one welding gang would require three sets of tanks per day, if they average 100 bonds per day. It was also brought out that the electric welder had been replaced on a number of electric roads by the oxy-acetylene welding outfits, because the latter was cheaper to move when the bond replacements were scattered. If there are no leaks in the tanks, the quality of the gas does not deteriorate even after being in storage indefinitely. It was also brought out that welds could be made in any plane and that the metal would flow with the flame. Based on the cost of No. 0000 bonds which to-day is 37 cents, Mr. Brown said that the total cost of an oxy-acetylene welded bond was about 60 cents, including interest and depreciation.

OTHER BUSINESS

As a part of the regular program, E. J. Blair, electrical engineer Elevated Railroads of Chicago, outlined to the members the important topics discussed at the San Francisco convention of the American Electric Railway Association, and what action was taken on them. Dr. H. E. Fisher described, with the aid of lantern slides, the first-aid system in effect on the Elevated Railroads of Chicago. At the close of the meeting the members adjourned to the regular association luncheon.

At a meeting of the executive committee after the luncheon, members of the executive committees of the Illinois Gas Association and the Illinois State Electric Association were present and discussed the proposed amalgamation of these two associations with the Illinois Electric Railway Association. No definite decision was reached, but it was decided that at a meeting later in the year a definite plan will be outlined and submitted to each association for approval. None of the Illinois associations mentioned is a member of the national bodies, and the numerous overlappings of membership made a consolidation of all three bodies desirable.

Library for Accounting Employees

In connection with the correspondence course of the American Electric Railway Accountants' Association, the educational committee sent out a pamphlet recommending that companies establish a library which would enable the students to pursue the collateral reading indicated in the lectures. The Connecticut Company, New Haven, Conn., recognizing the value of this suggestion, has purchased a few accounting books as the basis of establishing a more complete library as time goes on for the benefit of its large staff of employees in the accounting department. Following is a list of the books already included and their authors:

Net Worth and the Balance Sheet	Stockwell
Philosophy of Accounts	Sprague
Cost Accounting	Nicholson
Theory of Accounts	Esquerré
Accounting Practice and Procedure	Dickinson
Modern Accounting	Hatfield
Accounts—Their Construction and Interpretation	Cole
Montgomery's Auditing	Montgomery
Getting the Most Out of Business	Lewis
Effective Business Letters	Gardner
American Office	Schulze
Commercial Law	Spencer
Railroad Accounting	Hooper
Modern Corporation	Conyngton
Graphic Methods for Presenting Facts	Brinton
Principles of Depreciation	Saliers
Electric Light Accounts	Edwards
Practical Accounting Methods	Key
Science of Accounts	Bentley

New York Safety Code Conference

Although the conference on the proposed national electrical safety code was not held last week in Washington as scheduled, a very important two-weeks conference under the auspices of the Bureau of Standards is just concluding its work in New York. This represents by far the most important step yet taken in the direction of adapting the code to the requirements of the electrical industry. The representation of the several branches of the industry was complete enough to insure an adequate presentation of the difficulties to be met with in applying a code of this kind.

Of the more than fifty attendants at the meetings several represented electric railway interests directly or indirectly. W. J. Harvie, Syracuse, N. Y., and C. L. Cadle, Rochester, N. Y., officially represented the American Association. There were also present H. A. Barre, Los Angeles, Cal., for the Los Angeles and Pacific Electric Railways; E. R. Hill, New York; E. B. Katté, New York; G. E. Quinnan, Seattle, Wash., representing the Puget Sound Traction, Light & Power Company; Paul Spencer, Philadelphia, Pa., and many others. The Bureau of Standards was represented by Dr. E. B. Rosa, who presided, and W. J. Canada, who has had much to do with the preparation of the rules.

The results of the conference will appear in the form of a revision of the proposed code which will be submitted within a few weeks to the members of the industry taking part in it and to a limited number of others, after which the Bureau of Standards will take up the matter with the public service commissions and municipalities. It is doubtful whether the Bureau of Standards will be able to hold a public conference on the code in Washington until after Jan. 1.

American Association News

Washington Railway & Electric Company Section Received Twenty-six Applications for Membership and Elected New Officers—A Paper on "The Power Plant Department's Part" Was Read by B. H. Blaisdell at the Manila Company Section Meeting on Sept. 7

WASHINGTON SECTION

A meeting of Washington Railway & Electric Company section, No. 4, was held on Nov. 2 with President George G. Whitney in the chair. Twenty-six applications for membership were received, bringing the total membership to 123. The new members included eight conductors and ten motormen.

The result of the election was as follows: President, Charles S. Kimball, engineer maintenance of way; vice-president, J. T. Moffett, superintendent of transportation; secretary-treasurer, R. A. Vetter, legal department; and director for a two-year term, L. B. Schloss, publicity agent. William L. Clarke, assistant secretary, holds over for another year as director, and C. P. King and W. F. Ham, president and vice-president of the company respectively, are ex-officio members of the board.

Robert G. Wall of the Sheldon School of Chicago, then gave a blackboard talk on the science of man building as applied to the science of business building. After the meeting, which was held in the instruction room of the company, tastefully decorated with cornstalks and husks, a buffet luncheon was served under the direction of Mr. Kimball.

MANILA SECTION

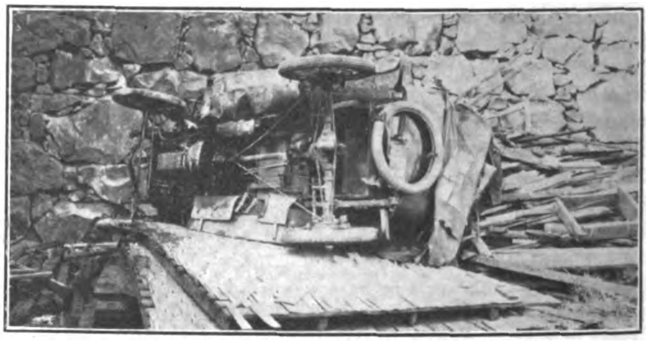
At the ninth monthly meeting of joint company section No. 5, Manila Electric Railroad & Light Company, held on Sept. 7, B. H. Blaisdell, chief engineer of power plant, read a paper on "The Power Plant Department's Part." He defined as the functions of the power plant the following: To produce electrical energy at such times and in such amounts as is demanded; to give uninterrupted service; to preserve satisfactory voltage regulation, and to reduce to a minimum the cost of production. He said that to fulfill its first function the power plant department must impress on the management the necessity of having sufficient generating equipment not only to carry the peak load but to relieve generating units for repair. Accurate records of output are necessary to this end. Continuity of service requires first-class engineering ability, careful and regular inspection, and prompt correction of small defects.

The reduction of energy cost to the minimum is the most important function of the power plant from the investor's standpoint, and is the real test of good engineering. As the cost of fuel is the greatest factor to contend with, every effort should be made to select a grade of coal best suited to the conditions and to the character of equipment, considering the cost of coal on a heat-value basis. Mr. Blaisdell stated that during the past three months the cost of fuel per kilowatt-hour had been reduced in the local plant more than 10 per cent without adding expense for equipment. This was done by showing the employees that savings were possible, by offering a bonus for fuel saving, and by fostering a good-natured rivalry. He gave as the conditions favorable to economy the following: cleanliness of boilers, tightness of boiler settings and baffle walls, good maintenance of grates, correct adjustment of air supply, thorough lagging to prevent heat radiation, dryness of coal, and proper firing. The responsibility for the economical use of fuel rests upon the men higher up than the firemen. The former must determine the proper conditions relative to the supply and distribution of air to the furnaces, the thickness of fire to be carried, the number of boilers to be fired and banked, the proper times for the cutting out of generating units, etc.

Mr. Blaisdell concluded by explaining the sources of loss in a power plant, and outlining the characteristics of employees if the best results are to be secured. The paper was discussed by W. R. McGeachin, manager railway department; J. N. Weaver, superintendent power installations; E. I. Jeffery, assistant chief engineer power plant; J. C. Rockwell, manager electric department; L. L. Vincent, superintendent electrical testing, and C. N. Duffy, vice-president and general manager. Mr. McGeachin explained some of the advantages and disadvantages of the oil engine, the mercury engine and other inventions to reduce fuel consumption. Other speakers elaborated on points touched upon in the paper, all discussions bearing directly upon the subject in hand. In closing the discussion Mr. Duffy paid a tribute to the power plant department of the local company for its work during the night of the great flood in Manila, Sept. 2, 1914. By heroic efforts of the department steam was kept up and current supplied to the lines on that memorable night. After the meeting it was announced that the safety-first films which had been ordered from the United States had been received and would probably be shown at the October meeting.

Accident to Jitney in Spokane

The accompanying illustration shows a jitney after falling over a steep embankment on Sprague Avenue, Spokane, on Oct. 12. The occupants, both women, were reported to be seriously injured. One was the only woman jitney driver in Spokane, Mrs. W. L. Swain. The other was her sister-in-law. The accident was said to have resulted from a defect in the steering gear.



JITNEY ACCIDENT IN SPOKANE

The risks attendant upon the use of the upper deck in double-deck cars was brought out in a recent inquiry held at Hastings, England, where a woman passenger on the local street railway had died following a fall from the stairway of a moving car. It was stated that the victim rang the signal bell on the upper deck to stop the car but descended the stairs while the car was still in motion and fell to the road. Neither the conductor nor the motorman heard the bell ring.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

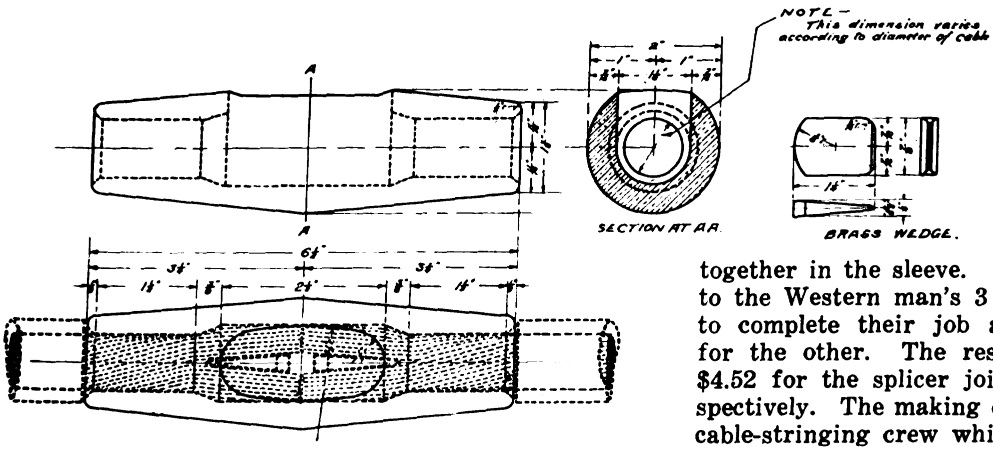
One-Piece Splicer vs. Wrapped Joint in Feeder Cable Splicing Practice

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

In 1895 the illustrated one-piece brass splicer for feeder cables was devised in San Francisco and has been found entirely satisfactory in all subsequent use. The idea came after observation of the mason's device for raising his huge blocks of stone by the insertion of a modest little wedge, called a "lewis," in a tapered hole. It has been stated to be a very old cable-splicing device, having been seen many years before 1895 in the coal mines of Pennsylvania.

This device seems to combine better than any other cable-splicing device the features of full tensile strength, full conductivity, small price, light weight, least requirements as to time, tools, labor and material, entire absence of shortening of conductor involved in completing the splice, freedom from patent claims, freedom from danger of internal corrosion from uncombined soldering chemicals, freedom from catching when pulled over cross-arms, and suitability for repeated use without repairs or waste except that of old tape removed.

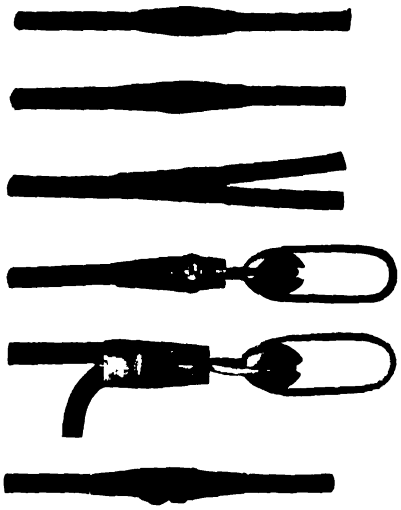
The splicer is a rough, short, tapered, one-piece brass casting. The only finish is given by running a drill through it and tinning the interior. The only preparation required for the cable ends is removing the insulation for a distance equal to half the length of the short splicer, tinning the copper conductor, inserting it in the splicer and splitting the cable end with a screw-driver or chisel to fill half the central pocket in the splicer. The wedge of solder that fills the space in the split-open-cable end of the pocket will insure the joint having a greater tensile strength than the conductor. As malicious or careless workmen have on a few occasions omitted to split open the cable ends and provide this wedge of solder as a key to the device, a tinned brass wedge is now driven in each cable end in the pocket before soldering.



DETAILS OF SPLICER FOR 500,000-CIRC. MIL FEEDER CABLE

When soldered by pouring hot solder in at the center until it runs freely from the ends, this sleeve, when taped and pointed, will readily slide over all cross-arms. When tested in a Riehlé testing machine for tensile strength no results could be obtained, as the copper conductor broke repeatedly in the clamps of the machine. Tests for resistance showed that 12 in. of cable containing the sleeve had but 82 per cent as much resistance as 12 in. of uncut cable.

As the minimum length of any given insulated conductor that it pays to splice up equals the cost of the splice divided by the difference between the cost of a foot of new wire and the net selling price of the scrap copper in a foot of old wire, and as this difference is practically constant, the lower the cost of the splice the shorter the piece of cable that can be economically spliced up and the more desirable becomes the type of splicer described.



Straight 500,000 - circ. mil splicer.

Reducer for 1,000,000 to 500,000-circ. mil cable.

Split from one 1,000,000-circ. mil to two 500,000-circ. mil cables.

Dead-end for 1,000,000-circ. mil cable.

Turn-down for 1,000,000-circ. mil cable at connection to rails from overhead negative feeder.

Take-down for house-movings through feeder lines, partially opened to show key and key way.

CABLE SPLICERS READY FOR SOLDERING AND INSULATION

Some Eastern linemen who were accustomed to make splices in feeders by the usual interlacing and wrapping method were asked to make a 1,000,000-circ. mil splice in their way while the Western man made a joint with the brass sleeve. The Eastern men unlaid their cable ends back 18 in., wasting 3 ft. of cable at once, while the Western man wasted no cable at all, butting the cable ends together in the sleeve. Then they used 6 lb. of solder to the Western man's 3 lb., and took seventy minutes to complete their job as against seventeen minutes for the other. The resulting splices cost $1.89 and $4.52 for the splicer joint and the wrapped joint respectively. The making of the latter delayed the whole cable-stringing crew while the former was done while the men were preparing to pull up the feeder, and the stringing was uninterrupted.

A similar competition on a 500,000-circ. mil cable cost 74½ cents for the sleeve and $2.23 for the wrapped joint. The former took eleven minutes and the latter sixty-eight minutes to complete, while the former added 3.4 lb. to the cable as against 6.2 lb. for the latter.

When a feeder is to be taken down it is cut off in convenient lengths, usually 1000 ft. for a 500,000-circ.

mil cable, pulled off the cross-arms and rapidly reeled up on a motor-driven reeling machine. It is then ready for use at once elsewhere. If a sleeve joint is to be cut out, the conductor is cut off at each end of the sleeve and the short pieces in the sleeve melted out. The sleeve is then ready for use again as good as new. The waste with the sleeve has been 5 in. or 6 in. of cable in the case of 500,000-circ. mil cable, as against about 4 ft. cut out of the cable when a wrapped splice is removed (including the lengths of cable required to make the splice originally).

In the great San Francisco fire of 1906 when copper cables lost their weatherproof covering and in some cases were burned off altogether these sleeve joints lost their solder but the wedges maintained the tensile strength of the joints and the cables remained in place. The linemen came along, put on ropes for safety, resoldered the joints and they were as good as new.

A comparison in 1908 between this sleeve joint and a much advertised unsoldered one on the market showed that in the 500,000-circ. mil size the patented sleeve cost $1.73 and the one-piece sleeve illustrated on page 955 cost 49 cents. The former cost 2.26 times as much in place and had 2.30 times as much resistance as the one illustrated.

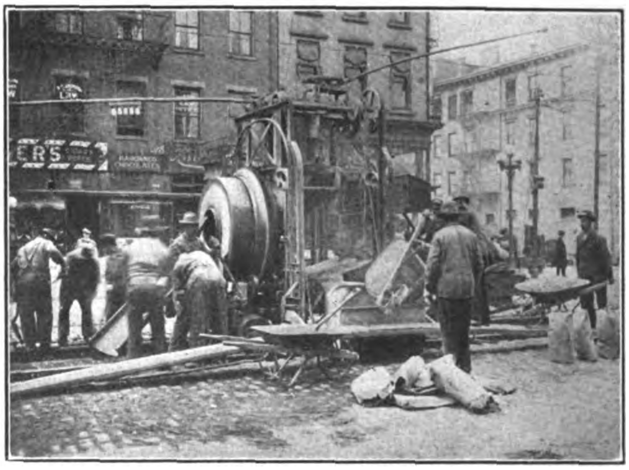
This one-piece splicer is conveniently made in all sizes for cables from No. 0000 to 2,000,000 circ. mils, also in many other forms as a neat reducer from 1,000,000 to 500,000, for example, or for changing from one to two conductors, as from one 1,000,000 to two 500,000-circ. mil conductors, for instance, or for a dead-end or dead-end and turn combined, as shown in the illustration.

Columbus Uses New Joint and Track Foundation

BY E. O. ACKERMAN, ENGINEER OF WAY COLUMBUS RAILWAY, POWER & LIGHT COMPANY

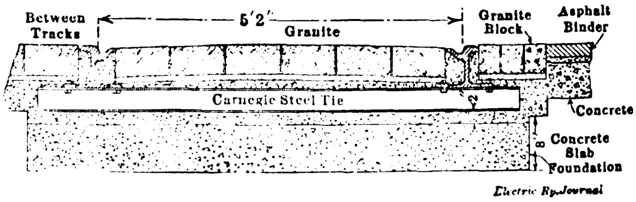
Quite an extensive track construction and extension program is being executed by the way department of the Columbus Railway, Power & Light Company, Columbus, Ohio. The work contemplated for this year includes approximately 9.7 miles of track. This is being laid with A. E. R. A. standard 7-in. grooved girder rail for all straight line construction, and A. E. R. A. standard 7-in. guard girder rail for all special track construction. In a few instances where the old rail is found in good condition, it will be relaid in track where light traffic obtains. On straight line work the rail is being laid on Carnegie ties and supported on a concrete foundation. Special track work is laid on white oak ties and is supported on a concrete slab foundation.

Incorporated in the new work on lines where heavy traffic obtains is a new type of construction. This provides for an 8-in. concrete slab sub-foundation, the top of which is 2 in. below the bottom of the steel ties, which are spaced at 2½-ft. centers. The track structure is assembled on top of this slab and blocked to permanent line and surface. In this position concrete is tamped under the steel ties and carried up to the required height to form the pavement foundation. The details of this type of foundation construction are shown in the track cross-section in one of the accompanying illustrations. This form of steel tie, solid concrete construction, provides rigidity and permanency, and at the same time there is a line of cleavage or a parting between the sub-foundation slab and the concrete incasing the track. In case renewals or repairs are necessary in this type of construction, it is contemplated that the sub-foundation slab may be left intact.

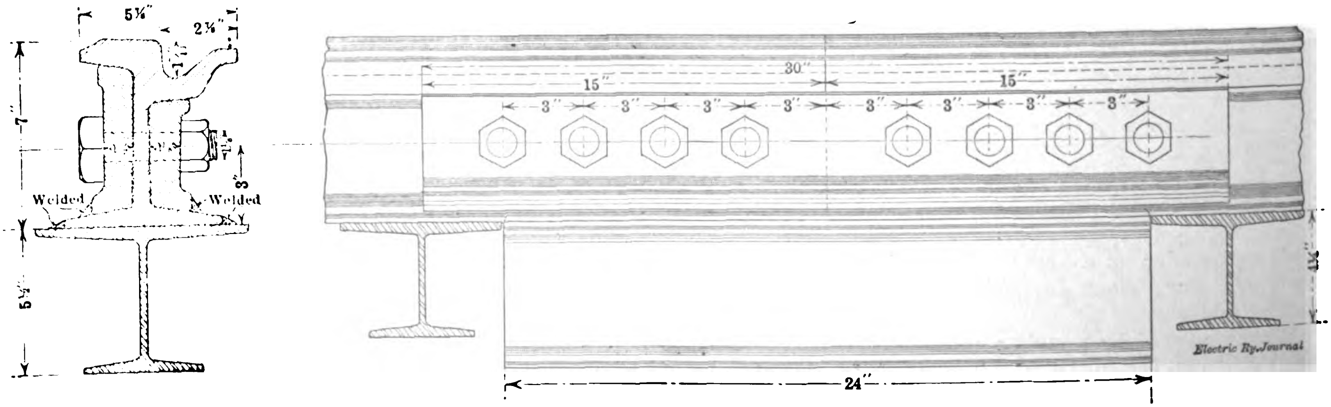


COLUMBUS TRACK—ELECTRICALLY OPERATED CONCRETE MIXER

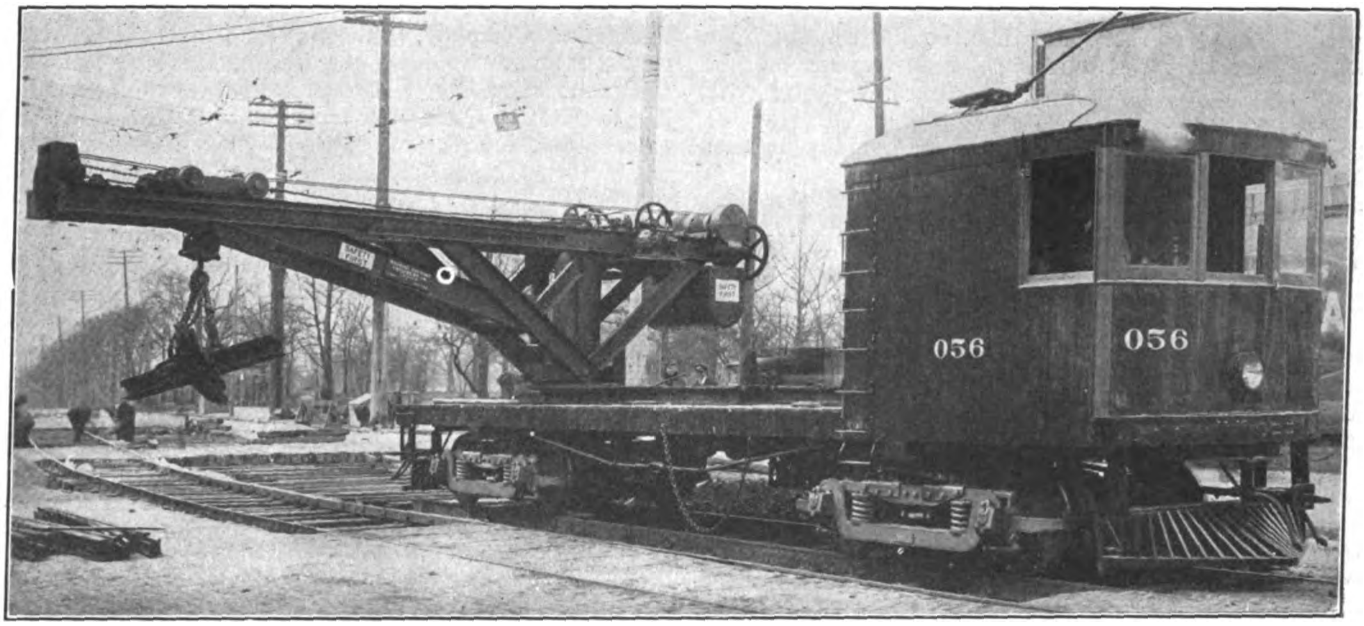
For all special track work there is provided an 8-in. concrete slab sub-foundation. When this has set permanently, the track is laid with white oak ties and tamped to line and surface with ¾-in. screened crushed stone. Over this, concrete is deposited to form the pavement foundation. This type of work provides a more flexible construction, both as to riding qualities and for making repairs and renewals than that used in straight track. Two kinds of unit pavement are being



COLUMBUS TRACK—STANDARD CROSS-SECTION



COLUMBUS TRACK—CROSS-SECTION AND SIDE ELEVATION OF JOINT



COLUMBUS TRACK—ELECTRICALLY OPERATED TRACK CRANE

used in the construction work this year, granite block for the heavy traffic lines and brick for the light traffic lines.

Probably the most unusual feature in connection with this new track construction is the Columbus rail joint, which has been adopted as standard for straight-line track. This joint is the outgrowth of a series of developments in joint construction through which the track and roadway department of this railway has passed. The fundamental feature of the joint was used in Columbus six years ago, and included the combination of the joint reinforcement and the anchor. Added stability is obtained in the joint used this year by resorting to the electric weld. An elevation and cross-section of this joint are shown in one of the accompanying illustrations. In the cross-section it will be noted that there are four lines of welds, one at the base of each joint plate and one at each side of the rail base, and all extend the full length of the joint.

Several years' experience with joints of this type has produced no failures, a record which has not been equaled by any other type of joint used by this company. This result was obtained despite the fact that the cost of the complete joint is relatively low when compared with other good joints. The essential features of the joint are the reinforcement support and anchor, the heavy splice bars with large bearing surfaces and the drive fit bolts. The holes, drilled at the mill, are afterward reamed in the field with power drills so that the bolts may have a drive fit. The bolts are also special, being made of chromium steel and manufactured very closely to a specified diameter. The cost of the joint complete is $4.43, which includes material and labor and 50 cents for power consumed.

The track construction plant employed in connection with this year's work includes a self-contained concrete mixer, having a wheeling platform and concrete chute, all of which are under the control of a single operator. The mixer is motor driven and is mounted on a low steel truck which is self-propelled, energy being supplied through a trolley pole. The compactness of this mixer makes it a particularly valuable machine for track concrete work. The mixer was built by the L. T. Smith Company of Milwaukee, Wis. Another feature of the track-laying equipment is a Whiting electric crane which is used to install special track work. Views of the concrete mixer and the electric crane are shown in two of the accompanying illustrations.

Where Classifying Scrap Paid

BY A. W. REDDERSON, SUPERINTENDENT OF MOTIVE POWER
FORT WAYNE & NORTHERN INDIANA TRACTION
COMPANY, FORT WAYNE, IND.

From time to time articles appear concerning the advantage of classifying railway repair-shop scrap. Only recently the Fort Wayne & Northern Indiana Traction Company had occasion to test this. A number of obsolete Lorain No. 34 motors were retired from service and the mechanical department desired to dispose of them to the best advantage. Accordingly a circular letter describing this equipment and listing it, together with a number of new repair parts which were on hand in the storeroom, was sent to all dealers in second-hand equipment, and in response a number of inquiries were received and several offers to purchase were made. In no case, however, did the company receive an offer of more than $70 per motor, and the majority of the bids were about $50 per motor. The mechanical department believed that these prices were entirely too low, and in order to verify this conclusion decided to dismantle one of the motors and classify the scrap. After this had been done the different materials were weighed separately and the following data were obtained:

Mixed Scrap	
Motor case	933 lb.
Gear case	120 lb.
Gear	220 lb.
Pinion	67 lb.
Armature core	380 lb.
Pole pieces	140 lb.
Total weight	1,860 lb.

Scrap Copper	
Armature coils	81 lb.
Field coils	260 lb.
Commutator	46 lb.
Total weight	387 lb.

To obtain the net weight of the scrap copper the insulation on the armature and field coils was burnt off.

Scrap Brass	
Field frames	56 lb.
Brush-holders	8 lb.
Axle bearings	48 ft.
Total weight	112 lb.

With this metal classified as indicated the 1860 lb. of mixed scrap was sold for $7.50 per ton, a rather low price for scrap of this kind which obtained in the Fort Wayne territory. At this time, however, the market price for scrap copper and brass was very high, the former selling for 17¼ cents per pound and brass for 16¾ cents per pound. From the foregoing market prices it will be noted that the mechanical department realized the following for one motor:

1,860 lb. scrap iron at $7.50 per net ton	$6.98
387 lb. scrap copper at 17¼ cents per pound	69.76
112 lb. scrap brass at 16¾ cents per pound	18.96
Total amount received	$95.70

As a result of the sale of scrap of this one motor, the mechanical department immediately scrapped all the motors removed from service and realized almost twice as much money as was offered by any of the second-hand equipment dealers. From this amount, of course, the labor of scrapping must be deducted, but it was a relatively small item when compared with the total money received from the sale of these old equipments as scrap.

New Manual and Pneumatic Door and Step Control

The widening use of the fully-inclosed car has given increased importance to the mechanisms for controlling the operation of the doors and steps. Since this operation is in the hands of the motorman and conductor respectively, the liability of the railway in cases of accident is greater than when the passenger himself assumes the risk of boarding or leaving a moving car. Aside from this legal consideration modern door and step control must embody such features as these:

Quick operation, so that the stopping time of a car will be the minimum;

Safe operation, so that a passenger cannot possibly be caught by a closing door;

Reliable operation, so that the car will not lose shop-time because of maintenance defects in the mechanism;

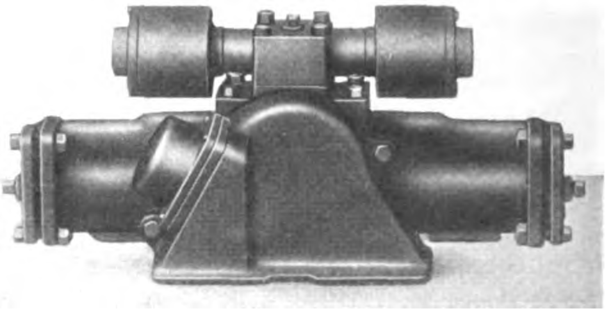
Laborless operation, so that the motorman and conductor can manipulate doors and steps without so tiring themselves that their other work suffers.

So far as the last point is concerned, pneumatic control offers the best solution for heavy service; but for conditions of less congestion, a manual control will answer if it is properly designed.

The features outlined plainly call for highly specialized skill and equipment. This fact will be made clear by the following details relating to the manufacture of new types of door and step control by the National Pneumatic Company, Chicago, for the Interborough Rapid Transit Company, the Boston Elevated Railway Company, the Detroit United Railway, the Cleveland Electric Railway, the New York State Railways—Rochester Lines, the Northwestern Elevated Railways, Chicago, Market Street Elevated Railway, Philadelphia, and others.

MATERIAL

All control parts on which there are heavy strains or excessive wear are made of crucible cast steel instead of ordinary steel. On receipt at the works they are examined for defects, fins or other rough portions being ground off before going into stock. It is customary always to order enough extra castings to permit immediate replacement of any lost or spoilt parts. This surplus is not only large enough to avoid delays in manufacture, but also to ship replacements to the customer at once. Users of standard mechanisms are assured immediate shipment in any event. Another example of attention to detail is that most patterns stay permanently at the foundries to eliminate damage in shipment between founder and manufacturer.

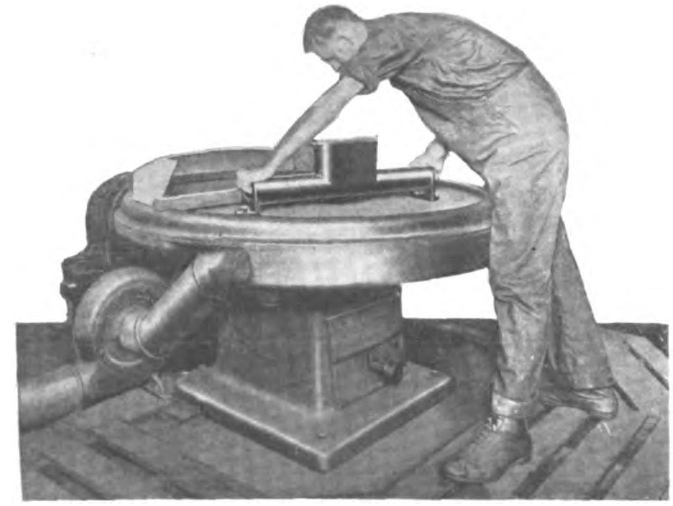


CLEVELAND ENGINE PLACED UNDER CONDUCTOR'S STAND

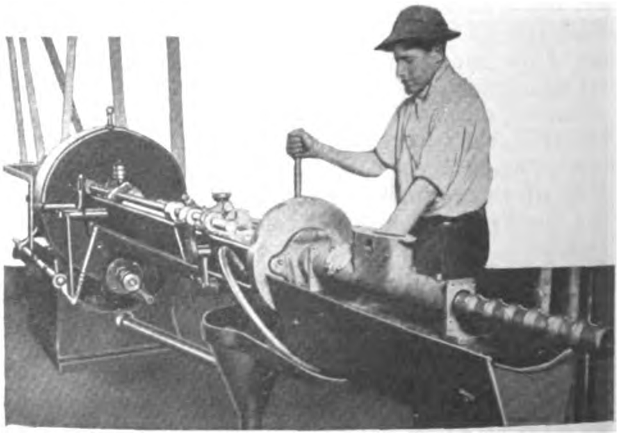
METHODS OF MANUFACTURE

Every detail in National pneumatic mechanisms has been planned to make maintenance by the user inappreciable. Thus the malleable-iron control transmission pipe could be cheaply attached to the levers on each end by means of a pin or set screw. Instead, the costlier but better practice of autogenous welding is applied because sooner or later the pin would shear or the set screw would slip in service. Next, the distance between these end levers is gaged by means of a jig, whereupon the transmission equipment is ready for painting. As with all other castings, the equipment is immersed in a tank of "125 Rubber" paint, then allowed to drip and finally baked for three and one-half hours in a gas furnace kept heated at 340 deg. Fahr.

The bearing wear which the transmission equipment

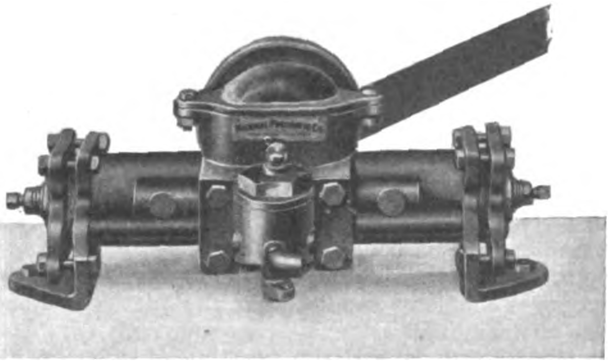


GRINDING OFF THE BEARING PARTS OF THE ENGINE FRAME



BROACHING THE CYLINDER BARREL TO GET PERFECT ALIGNMENT receives is taken up by ball bearings. These bearings cost more than bushings, but they permit easier operation and allow no wear on the ball retainer or on the shaft over which the ball race works.

The faces of the main engine casting are ground off by pressing them against a sheeting of carborundum which is mounted on a horizontal grinder. This method is found more satisfactory than milling. The ends, however, are milled in a jig which can be swiveled around to allow each end to be milled exactly alike. The hole in the end of each foot of the engine casting is also in precisely the same relative position.



TYPE OF PNEUMATIC ENGINE USED IN CLEVELAND

The next step is to broach the interior of the engine with a specially-designed tool to get a finish of gun-barrel accuracy. Upon this the engine casting is drilled with the aid of rigid jigs, after which it is bathed in gasoline to remove all chips and foreign substances.

The last step before assembly is the individual inspection of each casting. Following the assembly, a second inspection is made by another inspector before the equipment is taken from the assembly bench for the final test hereinafter described.

The gears are drop-forgings and therefore are free from blowholes and other defects possible in steel castings. First a square hole is broached and then the gear is turned and cut. The teeth are cut in gangs of eight under conditions which assure absolute alignment of the teeth and a position concentric with the broached hole. The gear shaft is made of crucible steel and is accurately turned and broached to fit tightly the squared hole in the gear. The rack in which the gear works is made of solid rolled steel with cut teeth to insure absolute straightness.

The leather cups against which the compressed air pushes are attached to the ends of the rack. Inside each cup is a phosphor-bronze expansion piece to insure that the cup will always lie so closely against the cylinder wall that leakage of air will be impossible. The leather is the only air-proof material found out of several score tested.

Splash lubrication, so efficient in automobile work, has been adopted for this engine mechanism. All the working parts are subjected to continuous lubrication forced by the exhaust of the engine itself. The course of the oil is such that it returns for reuse after lubricating the valve and other working parts.

Special attention has been given to the design of a valve that would insure against air leakage so that existing airbrake compressors could be used to supply air for pneumatic door and step control. Even where storage air is employed, as at Detroit, this company's engine will be applied without interfering with the air-charging routine.

The valve face is of semi-steel, but the valve itself is made of phosphor bronze cut with a die to insure registration. This combination of semi-steel and phosphor bronze has been found to give the longest possible life.

The valve stem is so milled that it cannot be wrongly installed. Where the stem passes through the semi-steel, it is made of brass to avoid corrosion. As in the rest of the engine, no stuffing boxes are required. The lever for operating the stem is secured by a lock washer and nut instead of pins or set screws which would shear or work loose respectively. The gaskets throughout are of Tennax, a tough, fibrous material which can be used repeatedly instead of requiring replacement, like rubber or paper, at each removal.

The valves are ground in a specially-designed machine which has an oscillatory motion akin to that used in hand grinding. This machine assures a degree of accuracy and uniformity impossible in hand work. Upon completion, each valve is tested under water for assurance against leakage.

In all parts where several holes are to be drilled, even in different planes and angles, multiple-drill jigs are used so that all holes are made accurately at one setting.

The mechanical connections to the door engines depend, of course, upon the distance between the door engines and the operator. These connections are made through malleable iron rods with drop-forged jaws and ¼-in. pipe. The jaws are pulled up tight without the use of lock-nuts, which frequently work loose. After this, the jaws are dipped and baked like other parts.

The control handles are sometimes made with counterweights to hold them positively at "open" or "closed" position. The connection between the valve and the handle is spaced by jig drilling. This spacing between the pins and the center of the gear is varied to take care of predetermined torsion in the transmission pipe and lost motion.

The handle base is made of steel. The pins which go into the base and hold the handles and their counterweights are fitted with a steel sleeve instead of being turned to a step. This sleeve prevents the crystallization from vibration that would otherwise destroy the pin.

The hole for the gear shaft of the engine base casting is made with a concentric reamer so that the two different-sized holes on opposite sides of the engine are in alignment.

All castings are painted before machining them. Consequently no trouble can arise from fouled threads.

ASSEMBLY AND TEST

After the mechanisms have been assembled, they are subjected to a leakage test by means of soap water. They are then attached to test doors which may be weighted to approximate any particular service condition.

The most important feature of the door operation is its positive checking or cushioning. This checking is non-adjustable, being calculated in advance for each specific condition. As the door closes it moves rapidly until within 2 in. or 3 in. of the jamb, whereupon it is automatically checked to complete its motion at a greatly reduced speed. It is often found desirable to supplement this checking device by the use of a collapsible edging or buffer which extends the full height of the door. When this buffer comes into contact with any obstruction during the closing of the door, the compression of the buffer actuates an auxiliary valve which reverses the air in the engine so that the door moves backward until the obstruction is cleared. Thus the tardy passenger cannot possibly be injured.

Another special feature is a ratchet mechanism which allows a station platform man to close the door from outside the car. To prevent him from closing the door violently, a pneumatic stop is provided to check the door momentarily when it is within 3 in. or 4 in. of the jamb. This delay is just enough to avoid the slamming which might injure a passenger, and it prevents unnecessary shocks to the mechanism. It should be added that the last 3 in. or 4 in. of door movement is not manual, but is effected by the admission of air to the engine in the direction of closing. Thereby the door is locked mechanically just as if it had been closed pneumatically throughout the entire operation.

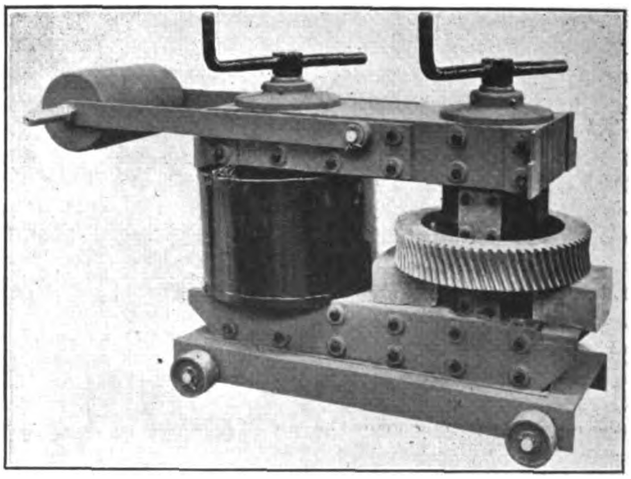
Electric Heater for Shrink Fits

An exceptionally interesting device for heating electrically the steel tires, gears and other features of car equipment that are applied by shrinkage has recently been commercialized by the Maschinenfabrik Oerlikon, Switzerland, and it is said that this not only insures absolutely even heating in a short space of time but also effects the operation at a very low cost for the current consumed. The process is based upon the well-known transformer induction principle that forms the basis of the melting and refining processes used in metallurgy. In effect, the tire or other ring of metal that is to be heated is made to form the short-circuited secondary winding of a transformer, and in this current is induced to an intensity proportional to the number of ampere turns of the primary coil, the induced current generating heat in the ring sufficient for the requisite expansion.

The practical design of the apparatus and its applications are shown in the accompanying illustrations. The device, which consists of a two-core transformer mounted on a suitable channel-iron frame for convenient transport on rollers, has one of its cores wound with tapped coils. The taps are provided to vary the current produced in the transformer secondary and thus to suit the size of the ring that is to be heated, the amount of heat being proportional to the current generated in the ring.

The windings are protected by a mechanically strong insulating cylinder. The secondary core has no windings but may also be protected with an insulating cylinder if desired. The top yoke of the transformer is, as shown in one of the illustrations, so arranged that it can be turned horizontally around one of the two screw spindles which are used for tightening up the members that form the magnetic circuit, thus making good contacts between the yokes and the cores. Both of the spindles must, of course, be loosened and one removed when the tire is being placed in position, the top yoke being swung to one side, so that the ring that is to be heated can be put over one of the vertical transformer cores.

To facilitate this operation and also to prevent damage to the joint between the transformer cores and the yoke, the weight of the yoke is counterbalanced by means of a weight arranged between two flat iron bars.

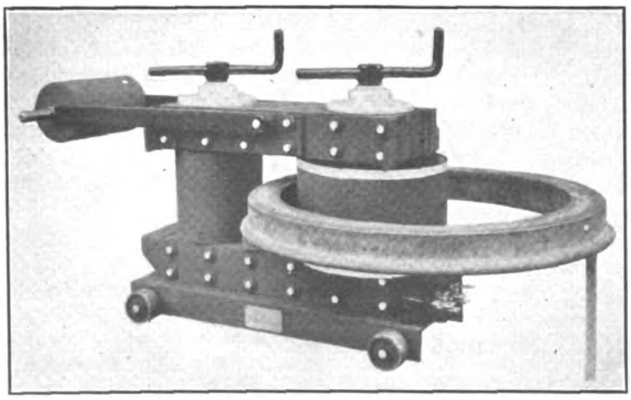


HEATING BRONZE GEAR WITH ELECTRIC HEATER

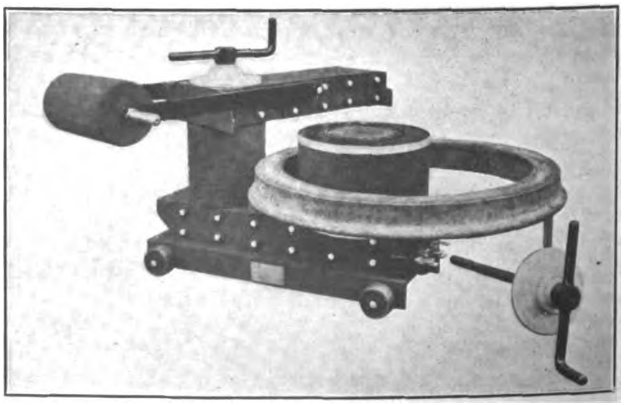
This balance weight can be swung over in a vertical plane around its bearings at the center of the top yoke, so that the apparatus can be used to heat a ring that has an inner diameter smaller than the outside diameter of the primary coil. In this case the ring that is to be heated is put around the free transformer leg, which has no windings, and not around the leg that is fitted with the primary coil, the thermal efficiency being thereby slightly reduced but not to any great extent.

Normally, the device is built for single-phase current at 200 volts or 220 volts and 50 cycles, but it can also be built for any other current condition. Thus far the apparatus has been standardized in two sizes, one of which possesses a coil with a small number of windings which are adjustable to several current steps suitable to the ordinary materials and sizes of rings. The other size is fitted with a primary coil having a larger number of windings and a correspondingly larger number of tappings so as to permit a more elaborate adjustment of the heat that is generated, such as is necessary, for instance, in connection with copper, bronze, or soft-metal rings with relatively low melting points. The increased number of taps permits also a finer adjustment for currents of different frequency.

As a rule the most favorable shrinkage proportion for iron and steel is 1:1000 or 1:1500 in a given length of metal. In practice it has been shown that for a tire having a diameter of, say, 28 in., an expansion in diameter of 1/8 in. is quite sufficient. This corresponds to a maximum temperature of approximately 300 deg. Fahr. at which the metal does not alter either structurally or in the color or in the condition of the surface. In the case illustrated by the accompanying halftone, where car-wheel tires weighing 265 lb. were heated prior to shrinking on the wheel centers, the inner diameter was increased from 26¼ in. to 26⅜ in. with a temperature



ELECTRIC HEATER WITH TIRE IN POSITION



TOP YOKE TURNED ASIDE TO PERMIT PLACING OF TIRE of 300 deg. Fahr., and the following observations were recorded:

Time	Power Consumption	Initial Temperature	Final Temperature
9 minutes	17.2 kw.	59 deg. Fahr.	295 deg. Fahr.
35 minutes	6.2 kw.	59 deg. Fahr.	232 deg. Fahr.
180 minutes	2.2 kw.	59 deg. Fahr.	260 deg. Fahr.

The total weight of the complete electric heating device varies between 885 lb. and 975 lb. The apparatus is solidly built, perfectly safe in working and is easily transportable. It can be used for all kinds of ring and tire sections of various diameters. It works very economically and turns out a cheaper and cleaner job than the customary gasoline tire heater, and, of course, the heating of the rings is perfectly even throughout the metal. The time within which the rings are to be heated up to the requisite temperature can be conveniently and quickly adjusted by means of the taps provided on the primary transformer coil.

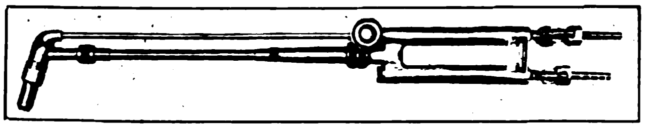
It is of interest to note that the apparatus can also be arranged for loosening rings and tires that are shrunk on to wheel centers or other members, this being accomplished by the provision of special equipment. However, in order to determine the necessary windings and tappings for such operations it is necessary for the manufacturer to know the exact particulars of the cross-section and diameters of the pieces to be heated.

Oxy-Acetylene Welder and Cutter

The oxy-acetylene welding and cutting apparatus that is manufactured by the Modern Engineering Company, St. Louis, Mo., is given exceptional guarantees by its makers. It is the product of exhaustive tests extending through a period of ten years, and the result has been that all parts of the apparatus are correctly proportioned and no weak links exist. Every equipment that leaves the factory is thoroughly tested, and it is warranted absolutely to give satisfactory service.

One of the first considerations in the design is safety, this being considered essential because in many cases in the past operators have been burned by back ignition of the gas in the hose. This has been overcome by the introduction of a special check-valve system in both of the gas conduits, which absolutely prevents either of the gases from flowing into the pipe that contains the other gas. All of the tips that are furnished with the torch are equipped with a special protective seal between the tip and the head, this insuring a perfect union and preventing leakage or breakage if the torch is dropped or handled roughly.

The mixing chamber is especially designed for high efficiency in mixing, and it produces an absolutely neutral flame having a temperature of more than 6300 deg. Fahr. The mixing of the gases is so carried out that it is impossible for combustion to take place in the mixing chamber even when the largest tips are used. A notable feature is the simplicity with which the cutter is attached to the torch, the necessity for removing the hose connection being eliminated. Two operations are involved, the first one being to remove the nut on the oxygen valve and the union nut on the gas conduit. When the cutter has been inserted and the nuts tightened again, the welding torch has been changed to a highly efficient cutting apparatus. The simplicity of this change-over as well as the non-back-firing feature makes the tool especially satisfactory for use by inexperienced workmen.

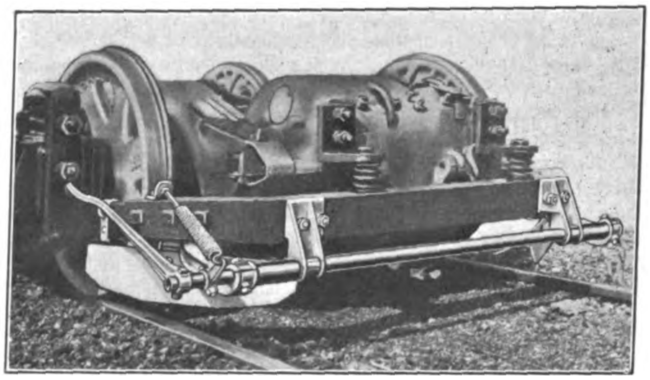


OXY-ACETYLENE TORCH WITH CUTTING ATTACHMENT IN PLACE

Flexible Running Track Scraper

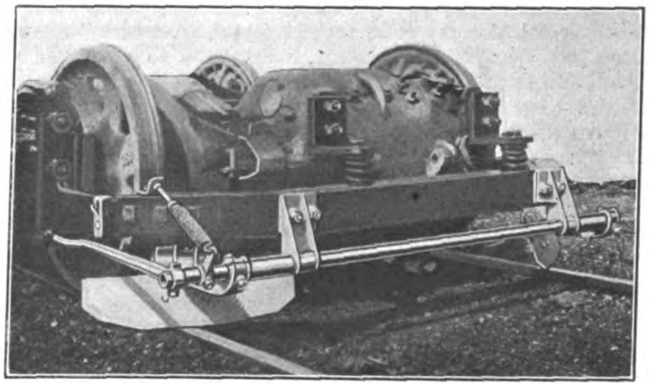
A new flexibly operating track scraper, to be known as the Simplex type, has been placed on the market by the Electric Service Supplies Company, Philadelphia, Pa. This scraper consists essentially of two scraping blades attached to a horizontal shaft, the latter being equipped with necessary hangers, control springs and brackets.

The primary feature of the new scraper is found in the flexibility of the blades, which allows them to swing back and over any obstructions that might be met, with the car running either forward or backward. They need not be raised for switches, crossings or other obstructions in paving, and may be used with any type of rail. When in working position they require no attention.



FLEXIBLE TRACK SCRAPER IN RAISED POSITION

In the accompanying illustrations it will be noted that this equipment is attached directly to the truck proper instead of to the car body, as in the older scheme of attachment. This improved method results in a very strong, simple and rigid mounting, and on account of the scraper being so attached the blades automatically swing with the trucks, thus insuring efficient scraping when the trucks swing in rounding curves.



VIEW SHOWING SCRAPER BLADES LOWERED INTO OPERATING POSITION ON RAILS

Raising and lowering of the blades is controlled by means of a hand lever and a strong helical spring. Hangers for attachment to trucks are adjustable along the main supporting shaft, hence one size of scraper may be fitted to any type of car, whether single or double truck; one type may be used interchangeably on any number of cars. Blades are adjustable to accommodate any standard track gage.

This scraper has been in use for two years on the lines of the Montreal (Que.) Tramways, operating with splendid results through two very severe winters.

LONDON LETTER

Women Conductors for London—Report of Municipal Tramway Conference—New Power Plant for Glasgow

(From Our Regular Correspondent)

London is now to be permitted to use women as conductors. A formal announcement has been issued by the war press bureau to the following effect: "With a view to removing obstacles to the voluntary enlistment of men of military age and suitable physique employed as conductors of stage carriages, the licensing authority for the metropolitan police area is prepared to issue licenses to suitable women to act as conductors of stage carriages. The term 'stage carriage' includes both omnibuses and tramway cars. Delay will be obviated by candidates forwarding their applications in the first instance through the manager of the company with which they seek employment." The use of women conductors in Glasgow, Edinburgh, Leeds, Birmingham, Newcastle and other cities is already an established success, and the experiment might readily have been attempted in London months ago but for the attitude of the London police, and also, it might be added, the attitude of the management of the London County Council Tramways, which was inclined to believe that women were not capable of handling the larger cars in London and the larger volume of traffic at the busy hours. The recruiting possibilities, as far as the Council tramways service is concerned, have to a large extent been discounted, as it will be recalled that, as the result of the recent strike, the services of men of military age were dispensed with, save in some very exceptional cases.

The fourteenth annual conference of the Municipal Tramways Association was held during the past month in London, under the presidency of Alderman H. Linsley of Salford, who has filled the presidential office for two years in succession. The conference was not held last year, owing to the war, and this year, instead of holding the meeting at Salford as would have been the case in ordinary circumstances, it was decided to meet in London and to restrict the business to discussion of various points arising from the war in connection with the conduct of tramways. In his presidential address, Alderman Linsley stated that more than 16,000, or 30 per cent, of the municipal tramway employees had responded to the country's call to join the colors, and he also made the interesting statement that £23,500 had been subscribed by tramcar passengers to numerous charitable funds connected with the war by contributions placed in the various collecting boxes on tramcars on practically all the systems. James Dalrymple, Glasgow, introduced the first subject for discussion, "Tramway Labor Problems as Affected by the War." He stated that owing to the varying conditions in the different tramway undertakings no general experience could be given. Glasgow had not suffered much so far as the general staff of tradesmen and laborers was concerned in the various carhouses, etc. Government work was being done by the Glasgow tramways department, and new tramway work had been stopped, as it was impossible to get more tradesmen. A very warm tribute was paid to the 818 women who are now acting as conductors in Glasgow. It was stated that 12,000 women had applied for situations, and those selected were from twenty-five to thirty-five years of age. About 300 were married women and fifty-five were widows. The women had the same conditions of service as the men, but were not asked to work seven days a week. They were employed on all routes. The only complaint against the women was their inability at first to place a proper value on the question of punctuality, but this was being rapidly overcome. The subject was discussed by Mr. Mallins of Liverpool, who doubted whether women conductors could be used on the Liverpool hilly routes. He said that there was plenty of male labor above military age in that city. He thought a much more important question was the utilization of the resources of the tramways for munition work. Mr. Fell, London, stated that the Metropolitan Commissioner of Police had met them in their efforts to maintain the tramway services by allowing overloading of the cars. He thought it would be inadvisable to employ women on the crowded cars, but that they should be allowed on outlying routes and in special cases. (The action of the London police, as noted herein, had not at that time been taken.) Mr. Fearnley, Sheffield, spoke in favor of the women, and said they were employed on the hilly routes in that city. In the afternoon, Alfred Baker, Birmingham, discussed "Financial Problems as Affecting Tramways During the War." He called attention to the cost of stores and material, which had gone up at least 27 per cent as compared with 1912-1913, while the traffic and permanent-way staff wages showed an increase of 10 per cent. In Birmingham, the net result had been a decrease in the surplus, and the sum of £30,000 had gone to the relief of the rates, which is less than one-half of the amount two years ago. As a remedy it was decided that a new schedule of increased fares should be adopted, and this so far had been quite successful, and they expected to be from £70,000 to £80,000 better off on the year as a result. The following morning, Mr. Fisher, general manager of the Dundee tramways, was elected president of the association and Mr. Mozley, Burnley, vice-president.

A new generating plant is in course of erection at Dalmarnock for the Glasgow Corporation. The first work consists of a water intake from the River Clyde, a screening house, two water culverts—one for the inlet condensing water and the other for the outlet water—a switch house, a turbine room, two boiler houses, workshop and store, and a complete coal-handling plant capable of dealing with 100 tons of coal an hour. The work now proceeding was contracted for prior to the war. The cost includes £50,000 for excavations, etc., and £25,000 for coal-handling plant. It is not proposed to place the contract for the buildings or issue specifications for the first instalment of the machinery until after the war. The first instalment of the machinery will consist of three 15,000 kw. turbines, which will be coupled direct to a.c. generators; also three 1000 kw. turbo sets for driving auxiliary machinery. It is proposed to add plant units of 15,000 kw. as the demand increases, while turbines of 30,000 kw. can be installed if found to be necessary. The ultimate capacity of the Dalmarnock works will be about 150,000 kw. It is intended to transmit electricity at 20,000 volts, three-phase alternating twenty-five periods per second, to distributing centers at Port Dundas, Springburn, Partick, Cathedral Street, Osborne Street, Waterloo Street, Pollokshaws Road, Govan, Linthouse and Dalmarnock.

The Devonport & District Tramway has passed into the possession of the Corporation of Plymouth. The ceremony was quite simple. The tramways manager for the corporation, and the valuer under the arbitration arrangement, met the manager of the Devonport tramways, and two representatives of the company at midnight, and completed the transfer. Between that hour and the time at which the first workman's car left the Devonport sheds, the change was announced on the dash-plates at either end of the thirty-two cars by the lettering "Plymouth Corporation Tramways" and the additional inscription "C. R. Everson, manager," as required by the legal enactments.

The London & South Western Railway announced that on Nov. 1 the first section of the electrified line which serves the district between Waterloo, Putney and Wimbledon would be opened. There is to be a train in each direction every twenty minutes throughout the day, and the journey is to be completed in twenty-four minutes, as compared with thirty minutes by the steam trains. Other important sections of the electrified line, including Richmond, Kingston, Shepperton, Hounslow, Surbiton, Hampton Court, etc., are expected to be ready shortly.

Despite the opposition of the Chief Commissioner of Police, the House of Lord select committee has passed the London County Council tramways and improvements bill. The hostility of the police was manifested against those portions of the bill which provide for new tramways in Hackney and the reconstruction and electrification of the old horse tramways in Bermondsey. At first, the police hostility was against details of the tramways, but later the police took up an attitude of general hostility, going so far as to say that unless their objections were met the tramways should be vetoed by Parliament. The police demands would involve the Council in an expenditure of more than £150,000 for road widening and other improvements. A. C. S.

News of Electric Railways

TUESDAY'S ELECTION RESULTS

Municipal Ownership Defeated in Detroit and Cleveland—Toledo Franchise Rejected—Other Cleveland Issues Successful—Results in Pennsylvania and New York

By a vote of 35,494 to 32,672 the electors of Detroit rejected at the special election on Nov. 2 the proposition to purchase the lines of the Detroit United Railway within the one-fare zone and have the price fixed by the Wayne County Circuit Court. The proposed contract required a three-fifths affirmative vote, but failed to register a majority. The vote was the heaviest of any special election ever held in Detroit and almost approached the vote of the last Presidential election.

The election followed probably the most bitter newspaper battle ever staged in the city, both opponents and proponents using every resource to secure victory. Mayor Marx, the city administration, the Street Railway Commission and the majority of the political leaders of the community favored the purchase plan. Against them were arraigned the Municipal Ownership League, the Federation of Labor and the local street car employees' union, and, of course, the voters who oppose municipal ownership.

Characterization of the proposal as a "blank check plan" and a "pig in the poke" was probably responsible for the action of the electorate. The idea of buying without knowing the price, perhaps more than anything else connected with the proposition, did not appeal to the majority. It was upon this angle that the chief efforts of the opponents of the plan centered.

Following the election the Detroit United Railway issued this statement:

"The people have expressed themselves and we bow to their will. We feel relieved just as we would have felt had the people voted the other way. It is our earnest desire to do as nearly as possible just what the informed public would like us to do. There are those who think we have been waiting for and that we very much desire a term franchise. This is not the case, as we certainly want nothing of the kind. The Detroit United Railway, like any individual or corporation, is subject to the sovereignty of the State. We ask nothing more than that the State shall exercise a benign guardianship over us; and by the State we mean that government which the people erect over themselves and us. Let us have fair play—we would have nothing more.

"In addition to motor cars and trailers ordered some months ago, such as are now being installed on some of the lines, we are to-day placing orders for more cars to be delivered and put into service as soon as possible. We will do everything in our power to provide any facility we may be permitted to provide for the further improvement and extension of the company's plant."

The Municipal Ownership League fought the proposed contract on the ground that the price would be too high for successful operation of the lines by the municipality. The Federation of Labor backed up the street car employees in their opposition because of the contention that the purchase would destroy their union. However, the great bulk of the quiet opposition came from the wards where either the fear of higher fares or increased taxes or the unknown price operated to kill off the rather roseate promises which the supporters of the plan presented.

Just what the effect of the vote will be upon the municipal ownership question cannot be stated at this time. One of the newspapers which has been a steady fighter for municipal ownership but opposed this plan declared an adverse vote would set back municipal ownership for years if not kill it outright. On the other hand there is a feeling that because the street car issue has been such a meaty one for the newspapers and politicians for years it will pop up again in some new form before very long.

The Dotson franchise, under which the Toledo Railways & Light Company was to have the right to operate in the streets of Toledo, Ohio, for twenty-five years, was defeated at the election on Nov. 2 by a plurality estimated the following day at 6273. The campaign indicated that the business men of the city were strongly in favor of the franchise. They were anxious to have the question settled and improvements made in the transportation facilities.

In commenting on the results the Toledo *Times* said:

"Toledo has gone on record on the Dotson ordinance. Inspired opposition to the stand taken by the business interests of the city preyed upon the prejudices of the voter. But this one fact stands out prominent: Before Toledo can go ahead and reach its natural growth the street railway situation must be settled. The Dotson ordinance offered a plan. It is now up to the sources of opposition to this settlement to proffer a plan. Will the interests which have fought the proposition come forward with a solution of the question? It is due to the business interests of the city."

The municipal ownership ordinance in Cleveland was defeated by a large vote. None of the candidates for Mayor espoused its cause, and there was no campaign made for it, except by the Socialists, by whom it was initiated. The ordinance provided for the issue of bonds for the purchase of the property of the Cleveland Railway, the bonds to be a lien against the railway property only.

The Cleveland & Youngstown Railroad, which already had a franchise for an electric line through Kingsbury Run and back on the hill to the southeast of the city, was voted a further franchise for the establishment of a large, high-level freight yard in the Cuyahoga Valley, near the retail business district of the city. This right carries with it the authority to operate steam trains over its right-of-way along Kingsbury Run and erect both freight and passenger depots for steam and electric railways. The company has constructed a portion of its electric track on the hill and expects to complete it to East Ninth Street within another year. This will admit interurban roads from the south and east. The company will serve all roads, both electric and steam, which desire the facilities it offers. The freight yards will be operated with steam until such time as electricity can be practically applied.

The franchise granted the Cleveland, Akron & Canton Terminal Railroad for a four-track, electrically operated subway under East Fifty-fifth Street, was also approved by a heavy vote. This subway will give the railroads from the south and southeast direct admittance to the lake front and paves the way for great docks for the lake boats. Ohio C. Barber, the match king of Barberton, Ohio, is the president of the company and the originator of the idea. It is understood that the contracts for constructing the subway were all made, subject to approval of the franchise at the polls.

Harry L. Davis defeated Peter Witt, Street Railway Commissioner, for Mayor of Cleveland. The construction of the two improvements mentioned and the new union station for the steam roads, also approved by the voters, will come under his administration. Mr. Witt, in all probability, will be succeeded in the office of Street Railway Commissioner by a man from Mr. Davis' own party. William S. Fitzgerald, member of the City Council, has been mentioned for the place. The Council is strongly Democratic, while Mr. Davis is a Republican.

The franchise adopted by the Council of Lakewood, suburb of Cleveland, was approved by a large majority. It provides for a rate of 3 cents within the city of Lakewood and straight 5 cents between Lakewood and points within the city. It also provides for the extension of the Madison Avenue car line to Rocky River. Clayton R. Tyler, an advocate of the franchise, was re-elected Mayor.

The new constitution, voted upon at the election in New York State, was defeated by more than 460,000 votes. The constitutional amendments, among them woman suffrage, were also lost. The outstanding feature of the proposed constitution was its further centralization of power in the executives. It would have made the present Public Service Commissions constitutional bodies, the members to be appointed by the Governor subject to confirmation by the Senate. Likewise the tax commission, the industrial commission and the civil service commission would have become constitutional bodies. Under the defeated constitution the State budget would in the future have been submitted to the Legislature by the Governor instead of being initiated by the Legislature and subject only to a limited veto power by the chief executive. The proposed constitution would have vested with a commission of nine men appointed by the Governor the power of the Legislature to initiate conservation and other legislation. One of the points on which the measure was attacked was that it did not confer on the cities of the State the power to operate or own public utilities. The question of whether there shall be another constitutional convention will be submitted to the people in 1916.

Four amendments to the Pennsylvania constitution, three of importance throughout the State and one affecting Philadelphia only, were voted on in Pennsylvania at the election on Nov. 2, in addition to the numerous local issues. One of the amendments was to give the vote to women. The others were to make workmen's compensation compulsory as of Jan. 1, 1916, to authorize the Legislature to make laws for a new system of registering land titles, and to permit Philadelphia to increase its borrowing capacity 3 per cent in excess of the present limit, 7 per cent of the assessed valuation, the increase to be applied only to public improvements of a self-supporting nature.

The Mayoralty campaign in Philadelphia, however, held the center of the stage in Pennsylvania politics, as the carrying out of certain important improvements begun under Mayor Blankenburg was regarded as dependent for success on the election of George D. Porter. The plans for improvements under Mayor Blankenburg included those for new rapid transit facilities. These had their inception in the appointment of A. Merritt Taylor as City Transit Director by Mayor Blankenburg on May 27, 1912. Mr. Taylor was asked to report on ways and means to secure rapid transit commensurate with present and future needs. On March 8, 1915, Councils approved the holding of a special election to obtain the consent of the electors to an increase in the city's indebtedness of $6,000,000 for starting actual subway construction. The proposition carried at the special election on April 29. Two ordinances subsequently were passed by Councils. One appropriated $3,000,000 for the construction work on the Broad Street subway and one appropriated an equal amount for the Frankford elevated. Both ordinances were approved on July 2, 1915, and some of the contracts have been let. The future of the plans for rapid transit was regarded as hinging largely on the passing of the constitutional amendment, thus releasing the necessary funds. The vote on the amendment was favorable. Many of the adherents of Thomas B. Smith, elected Mayor, are known to be opposed to the rapid transit program of the present administration, at least so far as the proposed down-town delivery loop is concerned. The amendment in regard to workmen's compensation also was passed.

PAVING DISPUTE IN EAST CLEVELAND

Through City Solicitor E. A. Binyun the city of East Cleveland filed suits in the Cuyahoga County Common Pleas Court on Oct. 19 to compel the Cleveland Railway to repave between its tracks in Euclid Avenue, that city. Arrangements have been made to pave the entire length of that thoroughfare in East Cleveland. Aside from the strip between the railroad tracks, the cost is to be divided among the city, county and the citizens. The city claims that the franchise granted to the company in 1896 provides that the company shall pave the strip between its tracks and that it has refused to do so unless its franchise, which expires in 1921, is renewed on a 5-cent basis. City officials claim that the Nickel Plate Railroad will be operating suburban cars or trains before 1921 and that the city will not agree to an increase of fare above that paid by passengers in Cleveland.

The Chamber of Industry, an organization of West Side business men, has announced that plans are on foot for building a rapid transit line along Bulkley Boulevard and through Edgewater Park, primarily for the development of the section of territory west of Rocky River. It will be similar in its plans and purposes to the Cleveland & Youngstown Railroad's line, which is expected to result in the rapid development of the Shaker Heights district in Cleveland.

ELECTRIC RAILWAY SHARE IN STREET MAINTENANCE TO BE INVESTIGATED

The Massachusetts Public Service Commission was to hold a hearing at Boston on Nov. 4 relative to the share taken by electric railways in street maintenance, snow removal and local franchise taxes. At the last session of the Legislature a resolution was passed directing the board to investigate the subjects above mentioned and to report in January, 1916, with a bill revising existing statutes so far as deemed essential. Question blanks have been sent to all the companies in the State asking for data on existing and recent track mileage, amounts expended in highway maintenance, for snow removal, franchise and commutation taxes. The investigation is the outcome of several bills presented at the last session, one of which, brought by petition of the Massachusetts Street Railway Association, sought to reduce the burdens now laid upon operating companies in connection with the maintenance of public ways over and above the natural obligation to restore excavated sections in track construction or repairs to their previous condition.

ELECTRIFICATION AT CHICAGO

Forecasts of Report on Smoke Abatement and Railway Terminal Electrification

It is announced that the report of the Chicago Commission on Smoke Abatement & Railway Terminal Electrification will be made public within the next few weeks. This is the report on which a commission has been engaged since April, 1911, the commission consisting of four men to represent the city, four the railroads and four the Association of Commerce. The railroads terminating in Chicago volunteered to pay the entire expense of the investigation, which is said to have amounted to more than $500,000.

In an article which appeared in the Chicago *Daily Tribune* for Nov. 3, Henry M. Hyde gives what purports to be some advance information in regard to the contents of the report. He says, in part:

"Early in its career the committee divided its work into three classes. It decided to reach a determination as to:

"1. The necessity of changing the motive power of steam railroads to electric or other power.

"2. The mechanical or technical feasibility of such a change.

"3. The financial practicability of such a change.

"As the final result of the investigation made under its direction, the committee finds, as to the first point:

"'That the complete elimination of steam locomotives from the railroad terminals of Chicago, as a means of smoke abatement, is not, under present-day conditions, necessary.'

"As to the technical feasibility of complete electrification of Chicago's railroad terminals, the committee reports:

"'1. The launching of such an undertaking, to be participated in by all the railroads at practically the same time, would involve a large amount of experimentation.

"'2. The problem of contact design when considered in relation to normal railroad operation, presents many difficuties. A limited amount of trackage in the Chicago terminals is so located that it has been found impracticable to equip it with any form of contact system. Operation over such trackage, subsequent to electrification, will need to be conducted by some form of self-propelled unit or there must be some rearrangement of tracks. The difficulties imposed at numerous points by insufficient clearance of overhead structures will, under the plans of the committee, be met by the installation of warning devices or the enforcement of regulations governing the presence of trainmen on tops of cars.

"'3. The technical difficulties to be met and overcome in bringing about the complete electrification of Chicago's terminals will, through the general development of the art, diminish year by year. Therefore, the longer the undertaking can be delayed the more certain will become the procedure by which the electrical establishment can be secured.'

"On the final point the report says:

"'The complete electrification of the railroad terminals of Chicago as a betterment to be brought about by the railroads through the investment of free capital is, under present-day conditions, impracticable.'

"As to the cost of electrification, the report shows that the direct cost, including the extension of electric service to points as far outside the city limits as Waukegan, Desplaines, Elmhurst, Morton Grove, Mannheim, Blue Island, Hawthorne and Hammond would be $188,000,000. To this the sum of $102,000,000 is added to cover the cost of changes and betterments in the existing railroad establishments, which might otherwise be postponed for a long time. It is understood that the sum of $102,000,000 was arrived at as the result of estimates made by the railroads interested."

SERVICE RESTORED IN WILKES-BARRE

As a result of the proposition made by T. A. Wright, general manager of the Wilkes-Barre (Pa.) Railway, to submit to the Luzerne County Courts the question as to the right of the arbitrators to repudiate their own wage award, the employees have made a counter proposition in which the suggestion is advanced that the company name another arbitrator to take the place of S. D. Warriner, Philadelphia, the new man to act with T. D. Shea, the employees' representative, and Dr. John Price Jackson, the umpire of the original arbitration board, and that the three agree upon a flat wage rate.

James A. Steese, a representative of the Pennsylvania State Department of Labor, met the executive committee representing the striking carmen and submitted two propositions for their consideration, the acceptance of either of which might bring about an early resumption of work by the strikers. These propositions follow:

First, it was urged upon the men that inasmuch as the company had agreed to submit the point of the legal right of the arbitrators to repudiate their award to the courts of Luzerne County the question should be referred to the local judges, particularly as Dr. Jackson, the umpire of the board of arbitrators, has made a similar recommendation.

Second, It was urged that the men return to work on the sliding scale basis and that the company and its employees, without any outside interference, get together to fix a flat rate wage rate for all trainmen. This would mean negotiations for a wage scale without national officers of the union taking part.

Rioting occurred in Wilkes-Barre, Pa., on the morning of Nov. 3 when cars of the Wilkes-Barre Railway were run for the first time since the beginning of the strike, three weeks ago. The first car was met by a mob near Ashley, on the outskirts of the city, and bricks were thrown through the windows. About 250 men engaged to take the places of the strikers are quartered in the Wood Street carhouse.

REPORT PRESENTED ON PROPOSED TORONTO-GUELPH RADIAL RAILWAYS

Having heard the report of Sir Adam Beck, chairman of the Ontario Hydro-Electric Power Commission, upon the proposal to construct a hydro-electric radial railway between Toronto and Guelph, the representatives of fifteen municipalities interested passed a resolution indorsing the scheme, and declaring that the electors in each place should be allowed to pronounce upon it by voting upon a by-law in January next.

The Hydro-Electric Power Commission submitted plans for a system of radial railways to connect Toronto, Port Credit, Milton, Guelph, Berlin, New Hamburg, Stratford, St. Mary's, London, Strathroy, Arkona and Sarnia. Sir Adam Beck, chairman of the commission, told the members of the conference that in the opinion of the Provincial Commission the proposed railway between Toronto and London would be a paying one and could be built and equipped for $10,000,000 or $11,000,000. He was not prepared at the moment to divulge the details of the arrangements made with the Toronto Harbor Commission for an entrance to the city of Toronto, but stated that the road would come into Toronto by the water front and would run to the market center. He also intimated that a lake shore line to Hamilton and thence to Niagara Falls was under consideration. He also told a Milton delegate that the commission had had an opportunity to purchase the railway now under construction from Toronto to Guelph via Georgetown, but had done nothing with regard to the offer. He said that the commission had prepared plans for a line by the most feasible and most profitable route and that it would do nothing detrimental to its own interests and the interests of the province. He promised to notify the municipalities of its intention with regard to the road now being built before the time came to vote on the by-laws.

A resolution was adopted approving the route suggested, but authorizing the commission to make any diversion from the general plan which might be considered of benefit to the project and the province as a whole. Another resolution advocated the commencement of a campaign in favor of the construction of the road immediately, and asked the commission to supply each municipality with the data necessary to inform the electors of the details of the project. Representatives of municipalities on the route for the second link of the proposed line conferred with the commission on Oct. 28 and approved plans for the section between Guelph and London. Delegates from places between London and Sarnia, which will be the third link, were to confer with the commission on Nov. 2 and others from points between Toronto and Collingwood on Nov. 3.

Sir Adam pointed out that while the supply of power under present contracts was about exhausted the commission had before the government for approval plans that would allow an ultimate development of 600,000 hp. and an immediate development of 200,000 or twice the amount now used.

ANNUAL REPORT OF BOSTON TRANSIT COMMISSION

The twenty-first annual report of the Boston (Mass.) Transit Commission covers 102 pages, including descriptions of work under way during the year, statistical data regarding the rentals paid by the Boston Elevated Railway for the use of subways and tunnels in Boston proper, construction expenses and legislative matters. The commission, of which Prof. George F. Swain is chairman, states that it hopes to open the Summer Street section of the Dorchester tunnel to traffic by Jan. 1, 1916. The contract for that portion of the tunnel under Fort Point Channel has been let, as has the section in South Boston between Broadway Station and Andrew Square. Important enlargements of the Park Street subway station under Tremont Street took place within the year. Toll receipts from the East Boston tunnel for the year ended June 30, 1915, were $138,314. During the year the Boston Elevated Railway paid as rentals the following: Tremont Street subway, $211,782; Washington Street tunnel. $355,488; Cambridge subway connection in Boston, $70,858; Boylston Street subway, $150,381. Since its organization the commission has expended $29,002,756 on Boston rapid transit subway, tunnel and related work.

In his annual report, Chief Engineer Edmund S. Davis describes the main features of the Dorchester tunnel now building, construction methods, and contract details, and discusses the improvements effected at Park Street subway station, the alterations in the Public Garden section of Boylston Street and the construction methods in the East Boston tunnel extension into the West End. The Dorchester tunnel will be about 12,000 ft. long, of which about 8300 ft. is completed or under contract. An important station in this tunnel will be located at Dewey Square, adjoining the South Terminal Station. This will be a two-story structure, with lobby for ticket offices and general distribution of traffic above, and two side platforms, each 350 ft. long, with tracks below. The lobby will connect with the street by four stairways, and in addition two single-file, cleat-type escalators will connect the lobby with the sidewalk. Two stairways will connect the lobby with each of the train platforms, and two escalators will connect the two train platforms with the sidewalks above.

At the Park Street station, one of the most important points on the Boston Elevated System, the commission executed noteworthy improvements by reducing track curvature and increasing platform areas. The westerly platform was increased in area from 8212 sq. ft. to 14,047 sq. ft., and the easterly platform from 7046 sq. ft. to 9625 sq. ft. The former was lengthened about 118 ft., and its width now averages about 27 ft. It provides berths for eight cars on each southbound track. Eight berths were also provided on each side of the easterly platform, so that thirty-two cars can occupy the station at one time.

Pardon for Columbus Dynamiter Denied.—Governor Frank B. Willis of Ohio has refused to give Alfred Strader, the man who was convicted of dynamiting cars during the Columbus strike in 1910, his liberty, although the board of pardons had recommended such action. Strader was given two sentences of five years each. He has served his first sentence and one year on the second.

Chicago Elevated Employees Accept Offer.—In a referendum the employees of the elevated railroads of Chicago accepted the wage offer of the company by vote of 1836 to 319. The new agreement included no important changes in the working conditions, but did provide substantial increases in the rates of pay as outlined in the ELECTRIC RAILWAY JOURNAL of Oct. 30, page 923. It is estimated that the total increase in wages will amount to about $200,000 a year.

Union Jurisdiction Settled.—The board of arbitration appointed to decide questions between the Amalgamated Association of Street & Electric Railway Employees of America and the Empire United Railways, Syracuse, N. Y., has decided against the Amalgamated's claim to exclusive jurisdiction over employees of the Auburn and Port Byron line of the Empire United Lines. The Amalgamated's claim was disputed by the Brotherhood of Locomotive Engineers and the Order of Railway Trainmen. Arbitration was agreed upon after a strike last summer. All cars on the Auburn-Port Byron division of the Empire United Railways will be operated from Newark hereafter instead of from Auburn.

Boston Elevated Carhouse Burned.—The Eagle Street carhouse of the Boston Elevated Railway in East Boston, Mass., was destroyed by fire in the early evening of Nov. 1, causing an estimated damage of about $250,000. Twenty-two semi-convertible cars were burned. The carhouse was built about eighteen years ago and was a wooden structure, 100 ft. wide and 100 ft. deep. It contained eight tracks. The service in East Boston was maintained without interruption and an adjacent power plant of the company was uninjured. Two snow plows were also destroyed by the flames. The company will probably rebuild with a smaller carhouse of concrete, using open-air storage on the premises as far as possible.

Preparing for the Des Moines Election.—The special election on the granting of a new franchise to the Des Moines (Iowa) City Railway will be held on Nov. 22 as ordered by the City Council. Election notices are now being published. Emil G. Schmidt, president of the company, says no campaign will be made. Mayor Hanna, chief opponent of the franchise grant for years, voted for it upon final adoption by the City Council and there is now no opposition whatever among leaders in public opinion. Mr. Schmidt is busily preparing for improvements to cost $1,500,000 which will be made as soon as the grant is adopted. He is now in the East to make final preparations for ordering new cars.

PROGRAMS OF ASSOCIATION MEETINGS

Central Electric Railway Accountants' Association

The Central Electric Railway Accountants' Association will meet at Detroit, Mich., on Dec. 7 and 8.

Central Electric Traffic Association

The Central Electric Traffic Association will meet in the office of the chairman of the association in Indianapolis, Ind., on Nov. 17.

Central Electric Railway Association

The Central Electric Railway Association will meet at the Claypool Hotel, Indianapolis, Ind., on Thursday and Friday, Nov. 18 and 19.

American Society of Mechanical Engineers

The annual meeting of the A. S. M. E. will be held in New York on Dec. 7-10. The opening session will be on the evening of Dec. 7. Professional sessions will be held on Dec. 8 and Dec. 9 and one industrial safety meeting on Dec. 10. The annual dinner will be held on the evening of Dec. 9.

Financial and Corporate

ANNUAL REPORTS

Albany Southern Railroad

The comparative statement of income, profit and loss of the Albany (N. Y.) Southern Railroad for the years ended June 30, 1914 and 1915, shows that for the latest fiscal year the gross revenue of all departments (railway, electric and gas) was $502,775, a decrease of 0.84 per cent as compared to the preceding year, and the operating expenses including taxes were $366,083, a decrease of 4.16 per cent, leaving net revenue of $136,692, an increase of 9.2 per cent. Deductions of interest on bonds, rentals and reserves amounted to $91,719, a decrease of 6.5 per cent, leaving a net corporate income of $44,972, an increase of 66 per cent.

The following table shows some comparative railway statistics for the last two years:

	1915.	1914.
Revenue passengers carried	1,452,739	1,563,064
Revenue passenger car mileage	706,771	737,877
Gross operating revenue per passenger car mile	$0.461	$0.460
Operating expenses per passenger car mile	$0.314	$0.341
Tons of freight carried	61,211	67,661
Freight train mileage	74,759	75,074

In the railway department the diminishing traffic experienced the previous year continued in even more marked degree, owing to the general business depression. Several of the important mills along the line were shut down, others were worked on short time, and the freight and passenger traffic normally derived from these sources contributed largely to the decrease of $13,849, or 4.1 per cent, in the gross revenue of this department. The company met the situation as much as possible by a rearrangement of its train schedule with due consideration for public welfare. Owing to the unusually large expenditures for maintenance in the preceding two years the cost of maintenance of way and structures showed a decrease of $7,001, or 21.6 per cent, for this year. The expenditures for maintenance of equipment decreased $4,039, or 17.2 per cent. Jitney buses are running in competition with the company between Albany and Nassau, but the traffic has been light and the effect little felt. During the last year the company expended $17,482 on construction and new property.

For the last two years a vigorous effort has been made to obtain more equitable taxes for the company with very good results. While the tax rate each year has increased, the assessed valuations of the company's property in the various towns have been reduced, and the amount of taxes paid in 1913 was $43,535 and in 1914, $42,010. These are the first two years that have shown any decrease in the charges for taxation.

Fonda, Johnstown & Gloversville Railroad

The comparative statement of income, profit and loss of the Fonda, Johnstown & Gloversville Railroad for the years ended June 30, 1914 and 1915, follows:

	1915	1914
Operating revenues	$874,761	$986,877
Operating expenses	467,236	494,771
Net revenue from railway operations	$407,525	$492,106
Railway tax accruals	39,500	45,367
Railway operating income	$368,025	$446,739
Miscellaneous operations (Sacandaga, N. Y., summer resort)—deficit	6,017	7,279
Operating income	$362,008	$439,460
Non-operating income	31,804	33,580
Gross income	$393,812	$473,040
Deductions from gross income	380,549	380,333
Net income (available for dividends)	$13,263	$92,707
Dividends on preferred stock	30,000	30,000
Balance to profit and loss	*$16,737	$62,707

*Deficit.

Business conditions were so unfavorable throughout the year that the result of operations was more unsatisfactory than in any other year in the history of the company. The output of all manufacturing plants in the section served by the company was greatly reduced, and many were shut down or run on short time. A glove cutter's strike, declared in August, continued for five months, during which period the glove industry of Johnstown and Gloversville was practically at a standstill and all other business seriously affected. In the spring months jitney competition with the electric lines in Johnstown and Gloversville cut heavily into earnings, before legislative action for proper regulation and a publicity campaign eliminated this competition in the latter part of June.

Through the combination of such unfavorable conditions in one year, the company suffered a loss in net income of $79,228 as compared with the previous year, and in gross revenues of $112,115, which brought the total gross earnings to a point lower than in any year since 1909. Freight revenue declined only $24,623, however, while passenger earnings decreased $74,342 and express revenue $2,663. The total operating expenditures of $467,236, which included a charge of $4,984 for depreciation of equipment as required by the Interstate Commerce Commission, showed a reduction of only $27,535. The operating payroll, included in the above figures, amounted to $323,083 or about 37 per cent of gross revenues—a decrease of $28,429.

The sum of $76,558 was expended during the year for the improvement and development of existing property. The 2.03 miles of new track in Amsterdam cost $38,868 and 0.72 mile in Johnstown involved an amount of $9,956. Among the other items was the only expenditure for road equipment during the year, amounting to $2,283 for a new track grinder for the electric division and a caboose for the steam division. No securities have been sold since 1911, and all additions to property since then, amounting to $205,961, have been financed from surplus earnings and temporary loans. This amount is subject to addition to the capital accounts.

This company operates 83.91 miles of electric road and 40.60 miles of steam road, a total of 124.51 miles. The following table shows the separate electric and steam revenues and expenses for the year ended June 30, 1915, with the increases or decreases as compared with the preceding year:

	ELECTRIC.		STEAM.	
	1915	Change	1915	Change
Revenue from transportation	$541,779†	— $62,655	$311,134*	— $39,572
Revenue from other railway operations	18,618	— 10,206	3,230	+ 318
Total operating revenues	$560,397	— $72,861	$314,364	— $39,254
Way and structures	$50,309	— $8,332	$24,839	— $2,512
Equipment	31,751	+ 1,777	20,803	+ 4,373
Power	46,578	— 9,325	....	....
Conducting transportation	134,466	— 4,494	86,179	— 4,935
Traffic	3,163	— 213	4,992	+ 38
General and miscellaneous	48,017	— 959	16,138	— 2,953
Total operating expenses	$314,284	— $21,546	$152,951	— $5,989
Net revenues	$246,113	— $51,315	$161,413	— $33,265
Operating ratio	56.08	+ 3.05	48.65	+ 3.70
Passengers carried	5,994,376	— 701,402	211,913	— 46,089

*Freight revenue, $239,574 ($24,623 decrease); passenger revenue, $54,137 ($11,975 decrease).
†Passenger revenue, $536,479 ($62,366 recrease).

Dick, Kerr & Company, Ltd.

Judging from the profit, the year ended June 30, 1915, was a moderately good one for Dick, Kerr & Company, Ltd., London, England. The net revenue was £46,960, an improvement of £2,000 over the previous year and £22,500 over the average of the five years before 1913-1915. From the net revenue the debenture interest and the preference dividend were paid, and a sum of £25,000 was set aside as a reserve against contingencies. To make this appropriation the balance in profit and loss was reduced by more than £7,000 to £18,346.

On June 30 the amount due to the company on contracts was £460,365, more than double the sum due twelve months before. Stocks and work-in-progress, apart from contracts, stood at a figure £34,000 lower than a year ago, but cash and investments were higher. The outlay incurred on contracts was financed by a heavier indebtedness to creditors of £93,000, and by a loan from bankers of £100,000, this loan being secured on a second debenture.

Part of the company's business was doubtless disorganized by the outbreak of war, and though German competition in the manufacture of electrical machinery and apparatus has been eliminated, great difficulties stand in the way of that branch being extended. It is believed that these difficulties will probably continue for some time, but at the close of the war, or in its final stages, it should be possible to make substantial progress.

EXTENSION GRANTED IN KANSAS CITY

City Council Upon Request of Judge Hook Grants Ninety-Day Extension to Complete Details of Reorganization—Judge Hook Takes Full Charge of Railway Matters

The City Council of Kansas City, Mo., on Nov. 1 granted an extension of ninety days to the Kansas City Railways for complying with the conditions of the new franchise granted in July, 1914. This action was taken in response to a request from Judge Hook, who stated that the essentials of the reorganization had been effected and only details remained, which required more time.

Judge Hook on Nov. 1 issued a ruling instructing the receivers and managers of the company to take all necessary steps to secure from the Missouri Public Utilities Commission the orders and approvals that the legal situation demands. This has particular reference to the separation of the railway and light companies. The order included a statement that Judge Hook had taken full charge of the street railway matters, and that no other proceeding would be allowed to interfere with the consummation of the plans now under way and the assumption of control by the new company. It was understood to be the purpose of the court to gather all litigation under one jurisdiction at this time and to prevent any outside interference with reorganization.

Frank Hagerman, attorney for the receivers of the Metropolitan Street Railway, is quoted as follows with reference to the court's order:

"No court, notary public or anybody else, except Judge Hook in the receivership cases, has any right, directly or indirectly, to question in any way the validity of the franchise, or attempt to harass anybody connected therewith, or to use any pretended contest for political or capital purposes."

The particular local application of the order is to the Wilson suit now pending, in which the validity of the franchise is attacked on the ground of conspiracy in its enactment. The taking of testimony in the suit had been temporarily suspended because of a court order quashing a notice to take depositions before a notary. The Kansas City Court of Appeals decided on Nov. 1 that testimony must be taken before a commissioner, who can rule out matters apparently relevant to the election and the franchise, but not bearing directly on the suit.

TAXABLE VALUATIONS IN IOWA

The 1915 taxable valuation of interurban electric railways in Iowa, as fixed by the executive council of the State last July and now published in that body's forty-fourth annual report, amounts to $1,810,491 for 477.80 miles of road. The taxable valuation of the steam railroads in the State is $78,880,376 for 10,016.71 miles of road. Other valuations are as follows: Transmission lines, $117,352; equipment companies, $257,800; sleeping cars, $427,067, and express property, $312,243.

The detailed lengths for the interurban electric railways as on Jan. 1, 1915, and the taxable values thereof are shown in the following table:

	Miles of Road	Taxable Value Per Mile	Total Taxable Value
Cedar Rapids & Marion City Railway	20.97	$8,500	$178,245
Centerville Light & Traction Company	7.84	3,000	23,520
Charles City Western Railway	16.33	2,000	32,660
Davenport & Muscatine Railway	25.27	3,000	75,810
Fort Dodge, Des Moines & Southern Railroad	117.97	3,000	353,910
Inter-Urban Railway	64.18	3,500	224,630
Iowa & Illinois Railway	33.05	3,700	122,285
Iowa Railway & Light Company	54.48	3,700	201,576
Mason City & Clear Lake Railroad	14.62	4,500	65,790
Oskaloosa & Buxton Electric Railway	2.30	3,700	8,510
Southern Iowa Railway & Light Company	10.00	2,500	25,000
Waterloo, Cedar Falls & Northern Railway	110.79	4,500	498,555
Total	477.80	....	$1,810,491

BIG MERGER ARRANGED

American Railways Amalgamates with National Properties Company—Stock of Wilmington & Philadelphia Traction Company to Go to Former for New Stock

The American Railways, Philadelphia, is to be merged with the National Properties Company, New York, according to Newburger, Henderson & Loeb, Philadelphia, the bankers who have directed negotiations to this end. The conditions of the merger have been approved by the managements of both corporations and a majority of the American Railways stockholders. The plan is to become effective on Jan. 1, 1916.

According to the agreement, the entire capital stock of the Wilmington & Philadelphia Traction Company, Wilmington, Del., amounting to $4,060,000, formerly owned by the National Properties Company, is to become the property of the American Railways. In addition, $500,000 cash will be paid into the treasury of the American Railways for purchase at par of a like amount of its preferred stock to be issued and bought by the National Properties Company. By these changes it is said that the equities behind the funded debt of the American Railways will be increased.

The American Railways is to issue additional 7 per cent preferred stock to the amount of $1,500,000 and $2,560,000 of new common stock for the $4,060,000 of Wilmington & Philadelphia Traction Company stock turned over by the National Properties Company. The outstanding common stock of the American Railways will be bought at par, or $50 per share, by the National Properties Company, payment being made in guaranteed collateral trust bonds to be secured by such stock and also by the $2,560,000 of new common stock to be turned over to the National Properties Company.

These collateral trust bonds are not to exceed $7,000,000 and will run for thirty years. Interest on them will be at rates increasing from 4 per cent per annum, the present dividend rate on the American Railways common stock. After two years the rate will become 4½ per cent for two years, and thereafter 5 per cent. To secure further the equity of holders of American Railways common stock, it is stipulated that if at any time the National Properties Company shall pay dividends on its common stock in excess of 5 per cent per annum, an additional amount will be paid as interest on the collateral trust bonds up to a maximum of 6 per cent.

The board of directors of the American Railways will soon issue a notice to stockholders requesting them to deposit their shares with a trust company, which will issue negotiable receipts exchangeable for definite bonds. The plan to be effective requires the deposit of not less than 75 per cent of the stock.

Atlantic Shore Railway, Kennebunk, Me.—The Atlantic Shore Railway has defaulted the initial payment on $641,750 of refunding mortgage thirty-year gold bonds. These bonds, dated 1910, bear interest at 4 per cent, payable for the first five years only if earned. No interest was earned during this period, but the coupon falling due on Oct. 1 was the first of the obligatory ones. It is reported that the company during its year to April 1 secured $361,577 in gross revenues, but had left only $77,329 for taxes and interest. After these payments there was a $25,087 loss to be added to previous losses of $67,155, making a deficit of $92,242 for the five-year period.

Brooklyn (N. Y.) Rapid Transit Company.—The South Brooklyn Railway, one of the subsidiaries of the Brooklyn Rapid Transit Company, has been authorized by the Public Service Commission for the First District of New York to purchase all the outstanding capital stock of the Prospect Park & Coney Island Railroad, namely, 2500 shares, with a par value of $100 each. Of the total amount 1768½ shares are to be acquired immediately, and the remainder from time to time. The commission requires as a condition of the purchase that the offer of the company to pay $200 per share for the stock shall be kept open to Dec. 31, 1915. Within twenty days from date it must notify all stockholders of the Prospect Park company, excepting those whose stock has already been acquired, of its acquisition of a majority of the stock, of the price paid, and of its willingness to acquire the remainder on the same terms on or before Dec. 31, 1915. As noted in the ELECTRIC RAILWAY JOURNAL of Oct. 23, the minority holders opposed the purchase of the 1768½-share block from the Long Island Railroad, which has been leasing the line to the Brooklyn Rapid Transit Company, unless the latter company would make a uniform offer to all stockholders. The rental for the line was said to be its only income.

Cleburne (Tex.) Street Railway.—An offer of $17,000 for the rails and wire of the Cleburne Street Railway has been refused by John W. Floore, Sr., the owner of the line. Mr. Floore said that $16,000 would pay him for the line, which is not being operated at present, but he will sell the property only to some one who will agree to operate it. The sale of this line at foreclosure to Mr. Floore, the mortgagee, was noted in the ELECTRIC RAILWAY JOURNAL of May 15.

Empire United Railways, Inc., Syracuse, N. Y.—The Public Service Commission for the Second District of New York has approved the merger of the Monroe County Electric Belt Line with the Empire United Railways, Inc. Some time ago the commission approved the purchase of all of the outstanding capital stock of the belt line by the latter company, as noted in the ELECTRIC RAILWAY JOURNAL of Sept. 11. The stock has now been all purchased, and the present order approves the merger, the Empire United Railways, Inc., taking over all the assets and assuming all the liabilities of the belt line company.

Groton & Stonington Street Railroad, Mystic, Conn.—The stockholders of the Groton & Stonington Street Railroad voted at the recent annual meeting to reduce the number of directors from nine to seven. The following were then elected to the board: Morton F. Plant, Robert W. Perkins, F. De C. Sullivan, A. E. Locke, H. M. Verrill, C. L. S. Robinson and C. L. Avery.

International Traction Company, Buffalo, N. Y.—The directors of the International Traction Company have declared a dividend of 1½ per cent on the company's 4 per cent cumulative preferred stock, payable on Nov. 15 to stockholders of record on Nov. 5. This payment compares with 2 per cent paid last February and 2 per cent in July, 1914. On Oct. 16 the company filed at Trenton, N. J., an amendment to its charter providing for the retirement of $5,000,000 of 4 per cent cumulative preferred stock, with accumulated dividends thereon, by the issuance of new 7 per cent cumulative first preferred stock, share for share. This plan was described in the ELECTRIC RAILWAY JOURNAL of Aug. 21.

Iowa Railway & Light Company, Cedar Rapids, Iowa.—Miller & George, Providence, R. I., are offering at $100 and dividends a block of the 7 per cent cumulative preferred stock of the Iowa Railway & Light Company.

Lehigh Valley Transit Company, Allentown, Pa.—The directors of the Lehigh Valley Transit Company have declared a semi-annual dividend of 2½ per cent on the company's 5 per cent cumulative preferred stock, payable on Nov. 10 to stockholders of record on Oct. 31. Dividends at the rate of 2 per cent per annum were paid semi-annually from November, 1911, to May, 1915, the accumulation after the present payment amounting to 14½ per cent.

Mississippi Valley Electric Company, Iowa City, Iowa.—It is announced that the Mississippi Valley Electric Company has taken over and is operating the Fort Madison Street Railway. This act followed the approval of a new franchise for the local company by the voters of Fort Madison, this being the condition of purchase, as noted in the ELECTRIC RAILWAY JOURNAL of June 26. The new owner expects to put on four new cars and otherwise improve the line.

Monongahela Valley Traction Company, Fairmont, W. Va.—The shareholders of the Fairmont Gas Company are to vote on Nov. 24 on selling the entire property to the Monongahela Valley Traction Company. It is proposed by the directors that the proceeds of the sale shall be distributed as follows: (a) To the holders of the preferred stock one share ($100 par value) of preferred and one-fourth share ($25 par value) of common stock of the Monongahela Valley Traction Company and $17 in cash for each two shares ($100 par value) of preferred stock of the Fairmont Gas Company. (b) To the holders of the common stock one share ($100) of the common stock of the traction company and $18.75 in cash for each 2½ shares ($125 par value) of common stock of the Fairmont Gas Company. On the completion of the deal the Monongahela Valley Traction Company will have outstanding $5,000,000 of bonds, $2,787,150 of preferred stock and $6,782,037 of common stock. The authorized common stock, it is said, will be increased from $5,000,000 to $9,500,000 and the authorized preferred from $2,500,000 to $3,000,000. The Monongahela Valley Traction Company agrees to begin dividends on its common stock in January at the rate of 4 per cent a year. The payment of this dividend, as well as that of 5 per cent on its preferred stock, will be made in quarterly disbursements from that date. The capitalization of the Fairmont Gas Company is $2,000,000 of common stock and $728,150 of preferred. The last-named stock was recently reduced from $750,000 with earnings.

Muscatine & Iowa City Railway, Muscatine, Iowa.—The Muscatine & Iowa City Railway, organized to provide electric service on a 104-mile leased section of the Rock Island Railroad, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 30, has been granted a charter by W. S. Allen, Secretary of State of Iowa. The authorized capital stock is $400,000, of which $100,000 is common and $300,000 preferred. Headquarters of the company will be at Muscatine. The lease with the Rock Island Railway has been drawn up and will be approved by the new company as soon as the charter is issued. It is for a period of fifty years. The directors of the company are G. M. Titus, E. L. McColm, H. F. Giessler, W. F. Bishop, F. O. Block and A. D. Bowen of Muscatine; William Musser, S. W. Mercer, Ralph Otto, C. W. Schmitt and W. P. Hohenschuh of Iowa City; H. G. Moore of Wellman, and E. D. Rayburn of Montezuma.

North Branch Transit Company, Bloomsburg, Pa.—A. W. Duy, receiver North Branch Transit Company, has applied to the court for permission to issue $62,000 of receiver's certificates to provide for needed improvements to the company's track and equipment. The appointment of the receiver for this company was noted in the ELECTRIC RAILWAY JOURNAL of Oct. 16.

Philadelphia Company, Pittsburgh, Pa.—The stockholders of the Philadelphia Company are to vote on Dec. 28 on the following propositions: (1) An increase in the authorized capital stock from the present $69,433,400 to $71,933,400, such authorized increase to be in the common shares; (2) the sale of $2,500,000 of new common stock to Ladenburg, Thalmann & Company, and Hayden, Stone & Company. The purpose of the increase is to provide funds for paying off all the outstanding floating indebtedness of the company. This sale, together with cash on hand, will clean up the entire floating indebtedness incurred last winter for improvements and betterments when business was slack. The wisdom of the improvements made during the period of inactivity in the Pittsburgh district is said to be now reflected in the company's earnings. It is estimated that earnings this fall will be at least 20 per cent in excess of any previous months in the history of the company. It is reported that none of the new stock, when taken by the bankers mentioned above, will be offered in the market.

Winnipeg, Selkirk & Lake Winnipeg Railway, Winnipeg, Man.—The Dominion Securities Corporation, Ltd., Toronto, Ont., is offering $1,000,000 of 5 per cent ten-year general mortgage and refunding gold bonds of the Winnipeg, Selkirk & Lake Winnipeg Railway. The bonds are dated July 1, 1915, and are due on July 1, 1925, but are callable, as a whole or in part, at 103 and interest. These bonds are part of a closed mortgage issue of $1,400,000, of which $400,000 is reserved to retire an underlying 5 per cent issue of like amount, due in 1933 but now being rapidly exchanged. The principal and interest are unconditionally guaranteed by the indorsement of the Winnipeg Electric Railway.

Youngstown & Ohio River Railroad, Leetonia, Ohio.—Application has been made by the Youngstown & Ohio River Railroad to the Ohio Public Utilities Commission for permission to issue $200,000 of one-year bonds. These would be used in taking up an equal amount of outstanding securities.

DIVIDENDS DECLARED

Boston (Mass.) Elevated Railway, quarterly, 1½ per cent.

Connecticut Railway & Lighting Company, New Haven, Conn., quarterly, 1 per cent, preferred and common.

International Traction Company, Buffalo, N. Y., 1½ per cent, preferred.

Lehigh Valley Transit Company, Allentown, Pa., 2½ per cent, preferred.

Monongahela Valley Traction Company, Fairmont, W. Va., quarterly, 1¼ per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

Washington Railway & Electric Company, Washington, D. C., quarterly, 1¼ per cent, preferred; quarterly, 1¾ per cent, common.

Washington-Virginia Railway, Washington, D. C., 2½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) ELECTRIC COMPANY.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$15,284	*$8,714	$6,570	$3,169	$4,401
1 " "	'14	14,158	*9,423	4,735	2,070	2,665
12 " "	'15	183,355	*109,967	73,388	25,421	47,967
12 " "	'14	177,200	*115,622	61,578	25,222	36,356

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$14,394	*$9,070	$5,324	$1,107	$4,217
1 " "	'14	16,237	*8,249	7,987	1,091	6,896
12 " "	'15	116,776	*99,084	17,692	13,602	4,090
12 " "	'14	119,491	*100,066	19,425	12,809	6,616

BROOKLYN (N. Y.) RAPID TRANSIT SYSTEM

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
3m., Sept.,	'15	$7,301,319	*$4294,099	$3,007,220	$1,162,362	‡$1,974,393
3 " "	'14	7,239,787	*4,272,735	2,967,052	1,162,535	‡1,920,224

CLEVELAND, SOUTHWESTERN & COLUMBUS RALWAY, CLEVELAND, OHIO

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$114,658	*$74,194	$40,464	$27,591	‡$12,969
1 " "	'14	123,058	*70,205	52,853	27,396	‡25,457
8 " "	'15	810,839	*548,453	362,386	220,002	‡43,175
8 " "	'14	837,571	*543,026	294,543	218,634	75,909

DALLAS (TEX.) ELECTRIC COMPANY.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$147,944	*$92,059	$55,885	$28,380	$27,505
1 " "	'14	174,775	*103,473	71,302	30,569	40,733
12 " "	'15	1,906,443	*1,114,880	791,563	362,055	429,508
12 " "	'14	2,277,091	*1,353,852	923,239	307,779	615,460

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$135,757	*$89,610	$46,147	$26,257	$19,890
1 " "	'14	228,733	*109,226	119,507	28,763	90,744
12 " "	'15	2,039,965	*1,216,816	823,149	339,484	483,665
12 " "	'14	2,460,399	*1,357,393	1,103,006	362,235	740,771

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$25,511	*$12,903	$12,608	$4,583	$8,025
1 " "	'14	24,573	*14,183	10,390	4,649	5,741
12 " "	'15	264,104	*163,413	100,691	55,563	45,128
12 " "	'14	284,379	*180,993	103,386	55,602	47,784

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$147,066	*$89,338	$57,728	$24,911	$32,817
1 " "	'14	174,663	*95,120	79,543	23,229	56,314
12 " "	'15	1,755,263	*1,039,550	715,713	294,975	420,738
12 " "	'14	2,158,252	*1,205,238	953,014	277,219	675,795

PENSACOLA (FLA.) ELECTRIC COMPANY.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$22,075	*$12,510	$9,565	$7,090	$2,475
1 " "	'14	22,669	*14,772	7,897	7,188	709
12 " "	'15	245,486	*148,256	97,230	86,849	10,381
12 " "	'14	283,238	*177,469	105,769	86,837	19,532

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$606,229	*$387,166	$219,063	$182,893	$36,170
1 " "	'14	689,028	*404,450	284,578	177,899	106,679
12 " "	'15	7,763,789	*4,787,515	2,976,274	2,160,424	815,850
12 " "	'14	8,657,136	*5,060,019	3,597,117	2,085,359	1,491,758

SAVANNAH (GA.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.,	'15	$65,767	*$44,786	$20,981	$21,608	†$627
1 " "	'14	71,339	*46,517	24,822	21,265	3,557
12 " "	'15	801,161	*520,837	280,324	258,031	22,293
12 " "	'14	851,035	*566,663	284,372	254,090	30,282

TAMPA (FLA.) ELECTRIC COMPANY.

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Aug.	'15	$78,924	*$40,365	$38,559	$3,606	$34,953
1 " "	'14	82,811	*42,522	40,289	3,703	36,586
12 " "	'15	978,209	*502,026	476,183	43,683	432,500
12 " "	'14	957,023	*522,397	434,626	46,676	387,950

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

JITNEY JOTTINGS

Tennessee Bonding Law Upheld—Jitneys a Menace in Atlantic City—Company in Springfield, Ill., Applies for Relief

The Supreme Court of Tennessee has upheld the law that provided for bonding jitney buses. Thirty days are allowed by the decision of the court for the operators of jitneys to obtain permits or franchises to use the streets and to take out bonds. In Memphis, however, the proscription was put into effect immediately by the city authorities, at least pending issuance of temporary permits in the matter. The court considered two cases, one that of the Memphis Street Railway against the Rapid Transit Company and others, and the second that in which the city of Memphis was appellant. The first asked an injunction. The street railway contended that it holds franchise rights from the sovereign power and that to use the streets in a manner not common to the general public the person so using them must first obtain a franchise or permit. The street railway, having a special interest and special property rights under its franchise, was being specially damaged in a manner not common to the public, by the unlawful operation of the jitneys, doing business similar to that of the street railway. The court held that under the act of 1915 it was unlawful to operate jitneys in any city of Tennessee until such city had passed an ordinance authorizing their presence and fixing their routes, and until the jitney owners had procured licenses and executed bonds to cover damages, etc. In Memphis no such ordinance had been passed and no jitney bus operator had given any bond. On the other hand, the street railway company, having complied with the law, was entitled to protection from illegal competition, it was ruled, The other case was that of a jitney operator who had been arrested by the police for operating without bond, the lower court in its finding having held the State law unconstitutional. This finding was reversed.

The Atlantic City & Shore Railway, Atlantic City, N. J., has appealed to city officials, hotel owners and business men for relief from ruinous jitney competition. As a result of a preliminary conference between I. H. Silverman, president of the company, executives of civic organizations and bankers, the Chamber of Commerce, Hotel Men's Association and the Rotary Club appointed committees to meet with officials of the company to discuss the situation and decide what the business community can do to help the company in its emergency. In the absence of any other requirement than a municipal license fee of $25, the competing conveyances grew to more than 400 during the summer rush. William F. Hanstein, president of the Hotel Men's Association, has proposed that the jitneys be excluded altogether from Atlantic Avenue, the principal business thoroughfare of the city, where the Shore Line. before the jitney's advent, derived most of its profitable income. Representatives of the company are said to have declined to consider informal proposals from the joint committees of merchants, hotelmen and bankers that the company establish a 3-cent fare zone for the business district.

A. D. Mackie, vice-president and general manager of the Springfield (Ill.) Consolidated Railway, has filed a petition before the Illinois Public Utilities Commission asking that the jitney men in Springfield be restrained from operating their cars until they have obtained a certificate of necessity and convenience from the commission. The petition contends that the "service" cars operated in Springfield are carrying passengers for hire the same as the street railway and that they are common carriers. In the Jacksonville jitney case, decided by the commission some time ago, the commission held that jitneys are common carriers and subject to the same regulations as other common carriers, and that to obtain the right to operate in a city they must follow specified routes, file adequate bonds and not operate where satisfactory service is being given by street railway. When the City Commissioners of Springfield recently passed an ordinance regulating the jitney buses these features were eliminated by efforts of the jitney men. This ordinance went into effect on Nov. 2. Plans which were being made by Mr. Mackie to start jitney buses in Springfield on Nov. 1 have been abandoned. Mr. Mackie was unable to rent large buses and did not want to buy them.

The People's Motor Club was characterized by Assistant City Solicitor Lowengrund of Philadelphia as a "sham and a fraud," at a hearing on a bill for a preliminary injunction to restrain Director of Public Dripps from interfering with the operation of the automobiles hired by the club to carry its members. The club was organized, according to Paul Randolph, its president, at a meeting of eighteen business men. Its stated purpose is to provide means of transportation to members of the club. To become a member it is only necessary to apply at the club's headquarters or to one of the ten or twelve branch offices in drug stores and cigar stores along Broad Street. There the applicant's name is taken and upon the payment of 25 cents, a membership card and five tickets are handed to him which represent five 3-mile rides in one of the thirty-seven automobiles the club has hired. No money is accepted by the driver. The chauffeurs, every evening, receive 4½ cents in exchange for every ticket received from members during the day. The club retains the other half cent. The active members of the club began suit against Director Dripps following the arrest of several chauffeurs employed to drive the club's automobiles. They aver that the purpose of the club is not to evade the jitney ordinance, but to accommodate members.

The North Corning, Corning and Painted Post jitney bus lines have been required by the Public Service Commission of the Second District of New York to cease operating until they have complied with the law and secured permits from the Corning Common Council and certificates of necessity from the commission itself. The Painted Post line has been operating all summer in competition with the Corning & Painted Post Street Railway.

At the request of Burt C. Hurtgam, who has been operating a motor-bus line between Lockport and Olcott, Public Service Commissioner Hodson has adjourned until Nov. 20, the hearing on his petition to continue to operate the line in competition with the Lockport and Olcott branch of the International Railway. The commission recently forced Hurtgam to discontinue his service. Hurtgam now claims he will operate the line only between Olcott and the Lockport city line and asks if this will be in violation of the commission's order.

A hearing in the matter of the application of about sixty local jitney drivers at Rochester, N. Y., for permission to ask for a certificate of conveniences and necessity from the Public Service Commission will be held on Nov. 9. At a meeting of the Common Council of Rochester on Oct. 26, the finance committee reported a hearing would be necessary and the date was fixed.

The jitney ordinance of Houston, Tex., has been upheld on every count by Judge Charles E. Ashe of the Eleventh District Court in the case of a number of jitney operators who sought to enjoin the city from enforcing the ordinance. The decision was rendered after Judge Ashe had had the case under advisement for three weeks. The ordinance was attacked on the ground that the city had no right to establish classifications in automobiles; that to do so was discrimination; that the license fee of $72 a year was excessive; that the provisions of the ordinance establishing routes and schedules for jitneys were unreasonable; that the jitneys, having paid the old license fee of $1 a year, could not be required to pay the new and higher fee until after the expiration of the old license, and that the license fee of $72 was more than sufficient to reimburse the police department for the additional expense growing out of the police regulation of the jitneys.

The Washington Auto Bus Company, organized in the interest of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has applied to the city comptroller of Bellingham for four jitney bus licenses. According to C. W. Howard, attorney for Stone & Webster in Whatcom County, the company will begin operations shortly after Nov. 1. The buses will operate in conjunction with the Bellingham lines of Stone & Webster. Each car will be bonded under the State law, in the sum of $2,500, and in addition, each car will carry insurance.

CHICAGO QUESTIONS AUTHORITY OF STATE COMMISSION

Suit has been filed in the Circuit Court of Cook County by Corporation Counsel Richard S. Folsom of Chicago for a temporary injunction to restrain the Public Utilities Commission of Illinois from putting into effect its recent service order, as mentioned in the ELECTRIC RAILWAY JOURNAL of Oct. 20, page 931. Up to Nov. 3, the court had taken no action on the prayer of the city, and pending definite action, the Chicago Surface Lines has not complied with the order of the commission requiring it to file certain schedules, plans and specifications on or before Nov. 1. The suit was filed at the direction of the City Council, which is seeking to protect its right to regulate public utilities. Chief among the allegations in the city's bill is one that the State constitution gives the regulation and control of the construction and operation of street railroads to the cities and villages in which they are located. This has been the continuous policy of the general assembly in the enactment of new legislation both before and after the passage of the public utilities act in 1913. The bill further alleges that the public utilities law was not constitutionally passed, as the Senate did not finally act upon the law passed by the lower house, and the final vote was taken after the time set for adjournment. The bill also states that the commission's order is an interference with the contract rights of the city with the surface railways and the property rights of the city looking to future municipal ownership. The suit was directed at both the Public Utilities Commission and the several companies forming the Chicago Surface Lines.

WASHINGTON RELIEF ASSOCIATION REPORT

Association Has 1339 Members, $7,312 Cash, $120,000 Invested, and $4,075 Loaned to Members

The Washington Railway Relief Association, organized in 1900 and composed exclusively of employees of the Washington Railway & Electric Company, Washington, D. C., and subsidiaries, including the Potomac Electric Power Company, now has 1339 members. The report of Sept. 30, 1915, shows $141,772 paid out for health, accident and death benefits since organization.

The object of the association is to provide for members disabled by reason of sickness or injuries received, and at their death for their familes. Sick benefits are allowed at the rate of $1 a day, not exceeding, however, the sum of $200 in any one year. In addition to an accumulated share of the surplus $250 is paid in case of death of a member. In the event of the death of the wife of a member the husband is paid $50, and upon the death of the mother of a single man a like amount is paid the member. Free medical and surgical attendance is provided for all members. Independently, the Washington Railway & Electric Company and allied companies maintain a pension systeem for employees, whether or not they are members of the association.

A board of managers composed of thirty-three, selected from each division and department of the companies, administer the affairs of the association. These men serve without pay and are elected annually by the members. The present officers are Clarence P. King, president; C. E. Brown, treasurer; P. T. Haller, secretary, and Clarence A. Weaver, medical officer. The affairs of the association have been so conservatively and ably managed that with dues of $1 monthly, it has been possible to credit each member's surplus amount $11.26 at the end of the fiscal year, making an actual cost of all benefits derived only 74 cents for the current year, or about 6 cents a month.

The Washington Railway & Electric Company guarantees the accounts of the association, bears a considerable part of the yearly operating expense, pays the rent of and maintains the club rooms and furnishings, in addition to all expense for the several entertainments given in the name of the relief association. The club rooms are centrally located, and contain bowling alleys, pool tables, musical instruments, games and reading rooms. A branch of the Public Library with a circulation of more than 1000 books is also maintained, and nearly 400 members take advantage of the convenience.

The association has a savings department paying 5 per cent per annum, compounded semi-annually. At present $35,000 is on deposit. During the year 1910 a loan department was established. Members pay 6 per cent interest on loans and pledge as security for loans their share of the association surplus fund. The annual excursion for 1915 netted $1,700. This was credited to the individual accounts of members, giving each a credit of $1.37.

After deducting sick and death benefits and miscellaneous expenses of the association, the balance of the dues paid in by members, together with interest on investments and other miscellaneous income constitute a surplus fund, and is periodically credited to the individual accounts of members. In the case of charter members the present value is nearly $100; ten-year men $87; five-year men $51 and two-year men $21. All amounts credited to members are payable upon leaving the service of the company or to the beneficiary upon the death of the member.

The assets of the association total $131,615. They consist of cash on hand and in bank amounting to $7,312, $120,000 in stocks and bonds at present market values, $227 in accounts receivable, and $4075 loans to members.

FRESH-AIR CARS FOR CHICAGO ELEVATED

At the request of Dr. John Dill Robertson, commissioner of health, the elevated railroads of Chicago put in operation on six of its trains what have been popularly termed "fresh-air" cars. Complaints to the health department ranging from too much to too little ventilation had begun to arrive, and in response to these, Dr. Robertson asked the elevated railroads to co-operate with him to the extent of putting on several cars with the windows and doors removed. Trains carrying these "fresh-air" cars were announced in the press as leaving the north and south side terminals at a certain time so that those desiring plenty of ventilation could test the new service. The first cars of this type were put in service on Nov. 1. All windows and doors were fastened in the open position and the "fresh-air" car was coupled in the middle of the train so that in case passengers did not like the innovation they could proceed to the fully-inclosed coaches.

At each end of the "fresh-air" cars white cards furnished by the Chicago health department were posted. Among other statements these cards contain the following concerning fresh air and health: "Dirty air is death," "Good air means good work," "Too much fresh air is just enough," "Fresh air is the best life assurance agency," "Get the fresh-air habit; dress warm enough to enjoy it," "Colds are 'catching,'" "Coddle yourself and you flirt with pneumonia," "Breathe freely and fully; the more you expand your chest the less you will contract cold." These were printed over the signatures of Mayor Thompson and Dr. Robertson. According to the city health department, the service is proving popular and its educational value is deemed immeasurable. "Fresh-air" car service will continue to be furnished until it ceases to be popular.

Car Capacity Order in Effect Again.—The order of the Board of Health of New York limiting the number of passengers on the cars of certain lines of the Brooklyn (N. Y.) Rapid Transit Company has been made effective again after having been suspended during the summer.

Court Decision on Car Tax and Fender Ordinances.—Judge H. M. Waggoner in the Circuit Court of Fulton County, Ill., has declared valid an ordinance of Canton which required a tax of $10 a year on each car operated over the streets of the city. The same jurist declared invalid an ordinance of the city of Canton requiring the use of basket fenders. The Illinois Central Electric Railway operates in Canton.

Successful Train Operation in Buffalo.—Success in the operation of two-car trains during the rush hours in the morning and evening has prompted the International Railway, Buffalo, N. Y., to extend the operation of these trains to almost all lines during the rush hours. The first car of each train is a remodeled rear-entrace car with an exit at the front end, while the second car is a pay-as-you-enter near-side front-entrance trail car with fare box on the front platform.

Relief from Vehicular Obstruction Asked in Chicago.—Leonard A. Busby, president of the Chicago Surface Lines, requested the local transportation committee of the Chicago City Council to recommend an ordinance prohibiting the parking of vehicles in the loop thoroughfares and barring heavy teaming in the loop district during the morning and evening rush-hour periods. Vehicular obstruction has been the subject of much comment by various regulative bodies. Its elimination has been suggested by the Illinois Public Utilities Commission and attention has been directed to it in the advertisements published by the Chicago Surface Lines.

Automobile Parking a Problem.—Louisville's police authorities have taken up in earnest the matter of control of automobile parkings on the down-town streets and are approaching the proposition from the viewpoint of the public. In order to formulate a plan of action the Board of Public Safety has called for an expression on the subject from citizens. Samuel Riddle, superintendent of transportation of the Louisville (Ky.) Railway, in discussing the problem for publication in local papers, declined to submit a plan, but pointed out to the police that the practice of allowing automobiles to stand along Fourth Street made the operation of cars on that thoroughfare exceedingly difficult and dangerous especially during rush hours.

Subjects Discussed in Milwaukee Talks to Patrons.—Up to Oct. 26 The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., had published six advertisements in its series "Plain Talks to Our Street Car Patrons," the first of which, dealing with the need for a readjustment of fare, was reproduced in part in the ELECTRIC RAILWAY JOURNAL of Oct. 23 page 889. The second talk dealt with the size and usefulness of the street railways as a factor in city growth, the third with how Milwaukee's city government broke its 1900 agreement with the company and prevented the earning of a fair return under the conditions agreed upon, the fourth with the decline of the average cash return per passenger from 5 cents to 2.98 cents, and the fifth with the sums spent by the company for paving that owners of abutting property on a few favored street ought to have paid for.

Rehearing Refused in Lockport Interchange Case.—The Public Service Commission for the Second District of New York has refused the application of the New York Central Railroad for a rehearing of the Lockport freight interchange case. The case was deceided on Sept. 21, when the commission directed the New York Central and the International Railway to install in Lockport switch or other track connections and such other track facilities as might be necessary to afford adequate and convenient interchange of freight between the two lines, and requiring the roads to enter into an agreement as to the plans and report to the commission before Oct. 25. Both companies notified the commission that they would appeal the case. As the first step in this proceeding the New York Central applied for a rehearing of the case before the commission on Oct. 25. The commission found the application raised no new question and denied the request in order that final determination in the courts may be reached as speedily as possible. The opinion of the commission in the case was referred to at length in the ELECTRIC RAILWAY JOURNAL of Oct. 9, page 783.

Twenty-three Instances of Careless Driving in a Month.—J. A. McCrea, general manager of the Long Island Railroad, made public a statement on Oct. 30 which shows that in the last month twenty-three persons, while operating automobiles and other vehicles, violated the railroad's mandate to stop before starting over grade crossings. That only three people were injured in these twenty-three instances of careless and reckless driving, Mr. McCrea indicates, was due partly to the vigilance of motormen, engineers and crossing watchmen, but he attributes immunity from serious or fatal accidents in the majority of cases largely to good luck. Twelve automobiles, five motor trucks, five wagons and one motorcycle make up the list of conveyances that were driven across the tracks of the Long Island Railroad during the last thirty days, without regard either for the safety of human lives or the preservation of property. Twelve of these vehicles, mostly automobiles, plunged wildly through lowered crossing gates, breaking eight of them. Four traffic signposts, on crossings, were also damaged and a number of lanterns or lamps were demolished.

Telling the Public About the Disposition of the Nickel.—With a teaser in the way of a yellow card on which is raised in the minds of passengers the question as to what becomes of the nickels they drop in the fare boxes, the Louisville (Ky.) Railway has begun a new educational movement, through which the officials of the company hope to obtain the interest and the co-operation of the public. The first card will be followed by a series, each of which will set forth some piece of information about the company in its relations to the public. The full text of the series of cards has not been worked out as yet, but all of them will be designed to acquaint the passengers that the nickels they pay for rides do more for them than merely to pay their fares. Statements will be made as to the amounts paid out by the company on the payrolls, as to the amounts expended in Louisville for materials, as to the amounts of taxes which are paid into the city treasury by the company, etc. This new series of cards will take the place of the safety-first cards which have held the place of honor at the front of the coaches, though from time to time a safety-first card or suggestion will be inserted in place of the informative cards.

"Near Accidents."—F. H. Miller, superintendent of motive power of the Louisville (Ky.) Railway, advises the men under him that a "near accident" gives just as much reason for study of safety principles as a calamity itself. Mr. Miller says: "Every time an operating man realizes that either he or his machinery has had a close call, conditions are ripe for just the kind of study we have in mind. Such 'near accidents' include occurrences like a narrow escape from injury on account of dropping a heavy pipe wrench into the firing aisle; slight overheating of motors due to excessive speed of a motor; igniton of waste in an open holder by a carelessly thrown match; blowing of a lighting fuse because of careless wrapping of a lamp cord around a metal support; accumulation of condensed steam from a leaky pipe joint in a cable duct line and sluggishness of governor action due to insufficient cleaning and lubrication. On the electrical side of a generating station many occurrences fall within the class of 'near accidents,' especially those due to insufficient care in approaching live circuits and terminals, temporary arcs and flash overs caused by improper handling of switches, regulators, etc., and burnouts of minor character caused by inadequate fusing, poor mechanical contacts, insufficient insulation and the making of wrong connections. By observing the cause of 'near accidents' we are in position to prevent their recurrence. 'Prevention First' means 'Safety First' and 'Never an Accident'."

Results with Railway-Ferry Transfers in New York.—The annual report of the New York (N. Y.) Railways for the year ended June 30, 1915, contains the following reference to the transfer arrangement between the city and the company providing for transfers to the Staten Island municipal ferry line: "Under date of Sept. 9, 1914, an agreement was entered into with the city of New York effective on Sept. 15, 1914, providing for the exchange of transfers between the Staten Island division of the municipal ferries and certain lines operated by this company, viz., the Broadway and Columbus Avenue line, the Sixth Avenue line and the Eighth Avenue line. Out of the 5-cent far in effect under the terms of this agreement the city of New York receives 2 cents for each passenger transferred from our lines, while this company collects 3 cents for each passenger it carries transferred from the ferry lines. During the period Sept. 15, 1914, to June 30, 1915, there were 1,317,135 transfers lifted on our lines, while the municipal ferry lifted 1,185,449 transfers, the average number of passengers per month transferring from the Staten Island ferry to our lines being 138,646, while the number transferred from this company's lines to the municipal ferry averaged 124,784 per month. The total of such passengers carried during this period of nine and one-half months was 2,502,584, an average of 263,430 a month. The amount of gross revenue collected by the city of New York under this transfer arrangement during the period indicated was $50,051.68 and by this company $75,077.52. The receipts during the past few months indicate a growth in this traffic."

Personal Mention

Dr. Charles P. Steinmetz, consulting engineer of the General Electric Company, Schenectady, N. Y., has been elected president of the Common Council of the city as the representative of the Socialists.

Mr. Thomas Cheyne has been elected as an additional vice-president of the Reading Transit & Light Company and Metropolitan Electric Company in Reading, Pa. Mr. Cheyne prior to 1915 was with Haskins & Sells, accountants, New York.

Mr. C. L. Stone, formerly general manager of the Manila Electric Railroad & Light Corporation, Manila, P. I., has been appointed general manager of the Otsego & Herkimer Railroad, Colliers Light, Heat & Power Company and the Hartwick Power Company, Cooperstown, N. Y., to succeed Mr. S. Walter Mower, resigned.

Mr. Frank Harris, who has for the last four and one-half years acted as publicity agent for the British Columbia Electric Railway, Ltd., with offices at Vancouver, B. C., recently presented his resignation and on Nov. 1 he severed his connections with the company. Mr. Harris went to Vancouver from New York in 1904 and served on the Vancouver daily press for several years before taking up the post from which he has just resigned. He will take a much needed rest, after which he will again enter business.

Mr. Chester F. Gailor, assistant chief engineer of the United Railways & Electric Company, Baltimore, Md., since Dec. 15, 1913, has resigned from the company to become chief engineer of the Atlantic Welding Corporation, New York. Mr. Gailor was formerly roadmaster of the Hartford Division of the Connecticut Company. Mr. Gailor is a graduate of Lansingburg Engineering Academy, Lansingburg, N. Y., and began his railway career as a rodman with the Hudson Valley Railway. He has done much inventive work in electric rail welding. A portrait and a biography of Mr. Gailor were published in the ELECTRIC RAILWAY JOURNAL of Dec. 6, 1913.

Mr. F. A. Nichols, vice-president and general manager of the Ottumwa Cold Storage & Ice Company, Ottumwa, Iowa, has disposed of his interest in the company and has resigned, effective on Jan. 1, 1916. On June 1, 1914, Mr. Nichols resigned his position as electrical engineer of the International Railway, Buffalo, N. Y., to become general manager of the East Liverpool Railway & Light Company, East Liverpool, Ohio. He resigned from the company at East Liverpool late in 1914, and early in 1915 became an officer of the Ottumwa Cold Storage & Ice Company. Mr. Nichols is a technical graduate and has had more than ten years' experience in engineering, construction and street railway work. He has not yet made any definite plans for the future.

Mr. Norman McD. Crawford has resigned as president and general manager of the Reading Transit & Light Company. Mr. Crawford succeeded Mr. W. S. Barstow in 1913 in this position. He was formerly president of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio. Mr. Crawford was for several years vice-president of the Ohio Electric Railway, Cincinnati, Ohio, and previously, for a long time, was general manager of the Hartford (Conn.) Street Railway. As a contractor he built the Glastonbury line of the Hartford Street Railway in 1891 and was afterward retained by the company as engineer. In 1894 he was made general manager of the company, which position he held until the Hartford Street Railway was taken over by the Connecticut Company. In December, 1908, Mr. Crawford was elected president of the Mahoning & Shenango Railway & Light Company. While Mr. Crawford has not announced his personal plans for the future, he anticipates continuing his residence in Reading until after the first part of the coming year.

Mr. Erastus L. West has been elected president of the Reading Transit & Light Company, Reading, Pa., and Metropolitan Electric Company to succeed Mr. Norman McD. Crawford, resigned. Mr. West was graduated from Cornell in 1899 and was awarded a fellowship for 1900. He spent the following eight years with J. G. White & Company in New York and London. From 1908 to 1912 he was general manager of the Central Colorado Power Company, Denver, leaving there in March, 1912, to become general manager of the Connecticut Power Company, Worcester, Mass. In September, 1914, he was appointed to make an expert examination of the various properties in which W. P. Bonbright & Company, bankers, New York, are interested. There will be no further change in the management of the company at Reading, which will continue under the ownership of W. P. Bonbright & Company and the supervision of W. S. Barstow & Company, New York. Mr. West's headquarters will be in Reading. The Reading Transit & Light Company is controlled by the Eastern Power & Light Corporation. The system at Reading includes a general light and power business in that city and vicinity and more than 170 miles of electric railway, operating more than 240 motor cars.

S. WALTER MOWER

Mr. S. Walter Mower has resigned as general manager of the Otsego & Herkimer Railroad, Colliers Light, Heat & Power Company and the Hartwick Power Company, Cooperstown, N. Y., following a change in ownership of the properties. Before becoming connected with the Otsego & Herkimer Railway in October, 1912, Mr. Mower was general manager of the London & Lake Erie Railway & Transportation Company, London, Ont. He was born at Grand Haven, Mich., on Aug. 13, 1876. In 1890 he moved to Detroit and in 1900 entered the service of the Detroit (Mich.) United Railway as assistant to Sir Albert Stanley, then general manager of the company. Five years later he was appointed assistant superintendent of the Port Huron division of the Michigan United Railway. In June, 1906, he was appointed general manager of the Southwestern Traction Company, succeeded by the London & Lake Erie Railway & Transportation Company. Mr. Mower was secretary-treasurer of the American Electric Railway Engineering Association from its organization in 1903 until 1908. The Otsego *Farmer*, in expressing its regrets at the retirement of Mr. Mower, said: "There will be a general feeling of regret not only in Cooperstown but throughout Otsego County and among the employees of the local road at the announcement of the resignation of Mr. Mower. Mr. Mower has been in charge of the road for three years, and in that time has won the hearty commendation of the patrons of the line for his untiring efforts to improve the property and give the public the best service possible. The harmonious relations with the local communities served by the railroad and lighting companies are well known and appreciated and must continue to be a source of gratification to Mr. Mower in other fields. This spirit also extends to the employees, a fact which speaks highly of the confidence and mutual esteem between management and men."

OBITUARY

Reagan Houston, for many years attorney for the San Antonio (Tex.) Traction Company and at one time president of the company, died at his home in San Antonio on Oct. 24 at the age of fifty-six, after an illness of about two weeks.

Ralph S. Rowley, general claim agent of the Chicago (Ill.) Surface Lines, died suddenly on Nov. 2, 1915. Mr. Rowley was born at Marshall, Mich., in 1866. He entered the service of the Chicago City Railway's claim department in 1895 as a claim investigator. In 1900 he was made chief clerk to the general claim agent, and in 1905 he was made claim agent. In 1912, upon the resignation of Mr. J. W. Crawford, Mr. Rowley was appointed general claim agent. In January, 1914, when the Chicago City Railway was merged with the Chicago Railways, forming the Chicago Surface Lines, Mr. Rowley was appointed assistant to Mr. Sidney Ossoski, general claim agent. Upon the resignation of Mr. Ossoski in August, 1914, Mr. Rowley was appointed general claim agent. He is survived by a widow and six children.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Muscatine & Iowa City Railway, Muscatine, Iowa.—Incorporated in Iowa to provide electric service on a 104-mile leased section of the Rock Island Railroad, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 30. Capital stock, $400,000, of which $100,000 is common and $300,000 preferred. The headquarters of the company will be at Muscatine. The incorporators consist of business men of Muscatine, Iowa City, Wellman and Montezuma. A. D. Bowen, Muscatine, has been elected president. [Oct. 9, '15.]

***Huntington-Chesapeake Bridge Company, Huntington, W. Va.**—Incorporated in West Virginia to construct a line in Huntington and Chesapeake, Ohio. The company proposes to build a highway bridge with double-track street car line. Incorporators: R. P. Aleshire, Paul Hardy and J. C. Miller.

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has asked the Council for a franchise to construct a line on Front Street, O'Farrell Street, Newport Street and Bay Street. Bids for this franchise will be received by the City Clerk until Nov. 9, 1915. The Pacific Electric Railway has received an ordinance from the Council consenting to and accepting the abandonment of its line on Ninth Street between Tennessee Street and Santa Fé Avenue.

Randolph, Mass.—The Bay State Street Railway has asked the Council for a franchise to lay a double track on South Main Street from its present terminus at the Randolph-Avon line to Central Square.

Pontiac, Mich.—At a recent election residents of Pontiac approved the thirty-year franchise asked for by the Detroit, Pontiac & Owosso Railway. [Oct. 9, '15.]

Salem, N. J.—The Salem-Pennsgrove Traction Company has received a franchise from the Council in Salem. The Board of Chosen Freeholders has also granted the company a fifty-year franchise to operate a line over the county roads and bridges. It is expected that the township committees of Lower and Upper Penn's Neck will shortly take similar action.

Buffalo, N. Y.—Providing the Council grants the application of the International Railway Company at once for a franchise through Bailey Avenue from Clinton Street to Kensington Avenue, about 3 miles, E. G. Connette, president of the company has promised to have the work completed in three years instead of four years, as was proposed. Some opposition developed toward the company's four-year plan and the present three-year proposal is favorable to residents in this section of the city. The company agrees to lay double tracks between Clinton Street and Broadway the first year; between Broadway and East Ferry Street the second year and between Delavan Avenue and Kensington Avenue the third year. It is expected the franchise will be granted at once.

Corvallis, Ore.—The Southern Pacific Company has received a franchise from the Council to construct a double track on Sixth Street. Electrification may now be begun whenever the company is ready.

Linnton, Ore.—O. M. Clark and associates have filed an acceptance of the franchise granted by the Linnton Council. It is proposed to construct a line between Portland and Linnton. [Sept. 4, '15.]

Ogden, Utah.—The Utah Light & Traction Company has filed an acceptance of the franchise granted by the Council on Aug. 26 to construct, maintain and operate an electric heating, lighting and power system in Ogden.

Huntington, W. Va.—The Huntington-Chesapeake Bridge Company will ask the Council for a franchise to construct a line from Fourth Avenue and Sixth Street, Huntington, over the Ohio River to a point in Chesapeake, Ohio.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—This company will construct an elevated track from Sixth and Main Streets to San Pedro Street. The cost is estimated at about $300,000. A contract has been awarded to Robert Sherer & Company, Los Angeles, for grading the roadbed for this company's line between Hawthorne and Iona Avenues on the Redondo via Watts line. It is estimated that the cost will be about $20,000.

Connecticut Company, New Haven, Conn.—Plans are being made by this company to reconstruct its tracks extending through Waterville. It is proposed to construct a double track from Homer Street, where the tracks enter Boyden Street, through Thomaston Avenue.

Georgia Railway & Power Company, Atlanta, Ga.—This company will begin at once the construction of an extension of its line on Lakewood Avenue to the main fair ground entrance.

Lewiston-Clarkston Transit Company, Lewiston, Idaho.—It is reported that this company will construct an extension to the eastern section of Lewiston if local interests warrant such an extension.

Illinois Traction System, Peoria, Ill.—This company has been asked by the village of Oakwood, Ill., to move its track from the south side to the north side of Main Street through that village.

Winnipeg (Man.) Electric Railway.—This company is constructing a double-track line on concrete base on Webb Street, Winnipeg.

Bay State Street Railway, Boston, Mass.—Material has been received and work will be begun at once by this company double-tracking its line on Main Street, Haverhill.

Springfield (Mass.) Street Railway.—This company has begun construction on the extension of its East Street line in Chicopee Falls to the factory of the Westinghouse Electric & Manufacturing Company at East Springfield. The extension has been delayed on account of opposition in Chicopee to the use of T-rails, but last week the local board of aldermen authorized the use of this type of construction, in order to enable the Westinghouse Company to utilize the tracks for war order shipments.

Worcester (Mass.) Consolidated Street Railway.—It is reported that this company may soon extend its Lake View line to Lake Avenue, thence to Sunderland Road to the city line.

***Joplin, Mo.**—A committee consisting of A. S. Wilson, J. F. Lanier and Albert Schmidt has been appointed by the Commercial Club of Joplin to consider the construction of an electric railway out of Joplin.

Trenton, Lakewood & Seacoast Railway, Trenton, N. J.—Construction has been begun on this company's line between Lakewood and Point Pleasant. The roadbed has been graded, poles erected and the supporting standards placed in position. George O. Vanderbilt, Trenton, is interested. [July 17, '15.]

International Railway, Buffalo, N. Y.—The new double-track line between Buffalo and Niagara Falls which is to be built by this company calls for an elevated line through the business and residential sections of North Tonawanda. Some opposition to the elevated tracks has developed in North Tonawanda as the company's franchise calls for tracks at grade through the city except where the line crosses Sweeney and Tremont Streets. The Board of Public Works will convene in special session to consider the project.

Cincinnati (Ohio) Traction Company.—An agreement was closed on Oct. 30 through which the Cincinnati Traction Company will be able to construct tracks to Bond Hill over Paddack Road, Cincinnati. This agreement was signed by the company, City Solicitor Schoenle and the residents of Reading Road who are affected by the line. These residents will be reimbursed by the company for their expenditures in the long fight against the city and the company to prevent the construction of the track, a period of about ten years. Officers of the company state that the line will be in operation in about eighteen months and until that time it will co-operate with the bus line now serving the territory by issuing and receiving transfers.

Steubenville & East Liverpool Railway & Light Company, Steubenville, Ohio.—The Council of Steubenville has awarded a contract to this company for street lighting for a period of ten years. The contract provides for a considerable amount of new construction work in the near future.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company plans to reconstruct its Wilson Avenue and Federal Street lines in the spring. It is expected that the cost will be about $175,000.

Lawton Railway & Lighting Company, Lawton, Okla.—Work has been begun by this company repairing its track on Second Street. A concrete base will be constructed beneath the tracks and new ties will be put in on the line between C and Gore Avenues.

Choctaw Railway & Lighting Company, McAlester, Okla.—Plans are being made by this company to extend its line from the terminus at Hartshorn to Gowen and Wilburton.

Toronto, Ont.—Having heard the report of Sir Adam Beck, chairman of the Ontario Hydro-Electric Power Commission, upon the proposal to construct a hydro-electric radial railway between Toronto and Guelph, representatives of fifteen municipalities interested passed a resolution indorsing the scheme and declaring that the electors in each place should be allowed to pronounce upon it by voting upon a by-law in January. The Hydro-Electric Power Commission submitted plans for a system of radial railways to connect Toronto, Port Credit, Milton, Guelph, Berlin, New Hamburg, Stratford, St. Mary's, London, Strathroy, Arkona and Sarnia.

Lehigh Valley Transit Company, Allentown, Pa.—The Lehigh Valley Transit Company, lessee of the trolley line which is operated between Nazareth and Farmersville Junction, is making an attempt to have this branch abandoned. Insufficient receipts is said to be the reason.

North Branch Transit Company, Bloomsburg, Pa.—A. W. Duy, receiver of this company, has asked the court for permission to issue receiver's certificates to the amount of $62,000, to be expended for needed improvements to the company's road and equipment. The petition set forth that it is necessary to replace the present aqueduct at Rupert with a steel bridge, to replace the present bridge over Boone's race with a steel structure and to replace the present wooden overhead near Willow Springs with a steel structure. It is also necessary to replace 7 miles of ties, to equip the road with continuous joints and to make repairs to the Catawissa bridges.

Milford, Pa.—The project to build a railway from Milford to Port Jervis, about 8 miles, is being revived. It is reported that residents of Milford have guaranteed an amount of $25,000 to aid in the project to construct the line. Gifford Pinchot, Milford, is interested. [June 5, '15.]

Pottsville & St. Clair Electric Railway, Pottsville, Pa.—A contract has been awarded to Smith & Campion, Mahanoy City, Pa., to construct a tunnel under the tracks of the Reading Railway. This tunnel will enable the new line being constructed between Pottsville and Shenandoah to take an easy grade up Broad Mountain. This roadbed has been almost completed to the tunnel.

Philadelphia & West Chester Traction Company, Upper Darby, Pa.—Plans are being made by this company to extend its Collingdale division from its present terminus at Parker Avenue, Collingdale, to the Chester pike, Sharon Hill. The company also plans to double track its Media Short Line division.

Williamsport (Pa.) Passenger Railway.—Plans are being made by this company to begin work at once on the double tracking of its Third Street line from the end of the present double track at Park Street to the west line of Maynard Street.

Dallas (Tex.) Southwestern Traction Company.—Surveys have been completed of this company's line from Glen Rose to Stephenville, 80 miles. E. P. Turner, Gaston Building, Dallas, president. [Oct. 9, '15.]

Southern Traction Company, Dallas, Tex.—At a conference of representative business men of Waco, and E. J. Strickland, president of the Southern Traction Company, plans were made for the establishment of a bus feeder line from Bellemead, a settlement just outside of Waco, to the terminus of the East Waco Street line. This was considered more practicable at present than an extension of the line, as was first suggested.

San Antonio & Austin Interurban Railway, San Antonio, Tex.—The plans of this company to build a line between San Antonio and Austin have been revived and negotiations for financing the project are now in progress. Most of the right-of-way for the line has been secured. The proposed line will extend through New Braunfels, Hunter, San Marcos, Kyle, Buda and Manchaca. V. P. Brown, San Antonio, is interested. [June 5, '15.]

Van Horn Valley Railway, Van Horn, Tex.—It is reported that this company has completed 15 miles of grade for track laying on its proposed 70-mile railway from Lobo to a point in New Mexico. R. H. Owen, 511 Andrus Building, Minneapolis, Minn., president.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—This company's extension to Spanish Fork has been completed, and the line will be extended to Payson. It is expected that the line will be finished by Jan. 1.

Utah Light & Traction Company, Salt Lake City, Utah.—This company will replace its wooden poles on Eleventh East Street between Ninth South Street and Yale Avenue with steel poles.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Plans are being made by this company to extend its electric transmission line to Merton and Lake Five.

SHOPS AND BUILDINGS

Boston (Mass.) Elevated Railway.—The East Boston carhouse of this company, containing twenty-two semi-convertible cars, two snow plows and other valuable equipment, was destroyed by fire on Nov. 1, with a loss of about $240,000. Further reference to the fire is made on page 966 of this issue.

New York Municipal Railway Corporation, Brooklyn, N. Y.—This company has applied to the Public Service Commission for the First District of New York for permission to enter into a contract with the George W. McNulty Company, for the construction of the Coney Island terminal of its elevated railroads. The company, in its application, states that the McNulty Company, in its opinion, is well equipped to do the work, and that the prices which it agrees to perform the work for are reasonable. The McNulty Company is the same concern which constructed the Sea Beach line for the New York Municipal Railway Corporation.

The International Railway, Buffalo, N. Y.—This company has prepared plans and specifications for an enlarged freight and passenger terminal in Lockport, but permission to proceed has been denied by the city. The proposed improvement was to have cost about $9,000. Public Service Commissioner Hodson has directed the city officials and the railway company to arrive at an agreement and present their agreement to the commission for its approval. The city of Lockport recently filed a complaint with the commission against the alleged inadequate terminal facilities in the city.

London & Port Stanley Railway, London, Ont.—Work has been begun by this company on the construction of a carhouse south of Phillips Street, London. The contract was awarded to Hyman & Son, London, for $27,000.

Montreal & Southern Counties Railway, Montreal, Que., Can.—A passenger station is being constructed by this company at Abbotsford.

POWER HOUSES AND SUBSTATIONS

Carbon Transit Company, Mauch Chunk, Pa.—A report from this company states that it will enlarge and concentrate its power plants at once, adding a 250-hp. boiler and a 300-kw., 600-volt d.c. generating unit.

Sherbrooke Railway & Power Company, Sherbrooke, Que.—Plans are being considered by this company to construct a substation at Waterville, Que.

Manufactures and Supplies

ROLLING STOCK

Durham (N. C.) Traction Company will order six new cars.

Toronto (Ont.) Civic Railway contemplates securing thirteen motor cars this winter.

Union Traction Company of Indiana, Anderson, Ind., is rebuilding three cars for winter use at the Anderson shops.

Mississippi Valley Electric Company, Iowa City, Ia., which has taken over the Fort Madison (Ia.) Street Railway, expects to equip its system with four new cars.

Morrison & McCall, St. Louis, Mo., have purchased four cars from the Southern Car Company for their properties, the Laredo Railway & Electric Company, Laredo, Tex., and Walnut Ridge & Hoxie Light, Power & Transit Company, Walnut Ridge, Ariz.

Detroit (Mich.) United Railway has just ordered twenty-five motor and twenty-five trail cars from the G. C. Kuhlman Car Company, in addition to the order for twenty-five motor and fifty trail cars placed with the same company about four months ago.

Interborough Rapid Transit Company, New York, N. Y., has issued requests to car builders for bids on 311 new steel subway cars of practically the same type as those recently ordered by the company for use on its new extensions in the Bronx and Queens. This equipment includes 234 motor cars and 77 trailers. Deliveries on the cars are expected to commence during February, 1916, and end in April.

Boston (Mass.) Elevated Railway has ordered from The J. G. Brill Company twenty-five new trailers of a type now being used on suburban lines of the company. Doors will be equipped with the National Pneumatic Company's air operating device. It is understood that some of the trailers will be used in the Mattapan Square-Dudley Street line and that others may be used on the Jamaica Plain-Dudley Street line, running by way of Center Street. This railway company on Nov. 1 lost twenty-two semi-convertible cars and two snow plows in a fire which destroyed its Eagle Street carhouse.

Wilmington & Philadelphia Traction Company, Philadelphia, Pa., has ordered thirty-one cars from The J. G. Brill Company, instead of twenty-five as previously reported. The new cars will be of the Brill semi-convertible type. They will measure 29 ft. in car body length and 41 ft. over all, with seating capacity for forty-four persons. The cars will have cross-seats and will be equipped with folding doors. Four-motor electrical equipment will be provided by the General Electric Company. Ring curtain fixtures and Rex all-metal rollers will be supplied by the Curtain Supply Company. It is reported that this railway company will completely overhaul the old cars on the recently acquired lines to New Castle and Delaware City.

TRADE NOTES

B. E. Tilden & Company, Chicago, Ill., have been organized to manufacture railway supplies of all kinds. E. A. Biggs, J. E. Early and G. H. Hubbard are interested.

General Electric Company and **Edison Lamp Works** have removed their Los Angeles offices to the twelfth floor of the Corporation Building, 724 South Spring Street.

Nova Scotia Car Works, Ltd., Halifax, N. S., have gone into voluntary liquidation, being unable to effect a compromise at 50 cents on the dollar with its creditors or to secure financial assistance from the city.

Industrial Works, Bay City, Mich., have established a Philadelphia office in the Widener Building, where complete data and information can be obtained regarding this company's line of locomotive, wrecking and freight handling cranes, pile drivers, grab buckets, etc.

Lindsley Brothers, Minneapolis, Minn., have established a southwestern sales office in St. Louis, Mo., in charge of Frank O. Grayson, who will be located at 405 La Salle Building. This territory was formerly handled by the Grayson Railway Supply Company, St. Louis. The new office will cover the States of Missouri, Kansas, Oklahoma, Texas, Louisiana, Arkansas, Tennessee and southern Illinois.

Hess-Bright Manufacturing Company, Philadelphia, Pa., announces that the Standard Roller Bearing Company, Philadelphia, Pa., the New Departure Manufacturing Company, Bristol, Conn., Gurney Ball Bearing Company, Jamestown, N. Y., and the U. S. Ball Bearing Company, Chicago, have arranged for permanent licenses under the Conrad patent and are now fully authorized to manufacture under this patent.

ADVERTISING LITERATURE

Diamond State Fibre Company, Bridgeport, Pa., has issued a catalog describing and illustrating its fibre gears.

MacGovern & Company, New York, N. Y., has issued a catalog, dated Oct. 15, of their electrical and steam machinery, cars, car equipment, etc.

General Electric Company, Schenectady, N. Y., has issued a complete catalog describing and showing numerous illustrations of its line material and rail bonds for the construction of overhead trolley systems and track return for electric haulage in mining and industrial plants.

Mesta Machine Company, Pittsburgh, Pa., has issued a catalog analyzing the savings effected by its barometric condensers by means of vacuum produced, low first cost, low cost of power required by auxiliaries, freedom from shut down and repairs, and other advantages.

NEW PUBLICATIONS

Proceedings of Seventh Annual Convention Pacific Claim Agents' Association.—San Francisco, Cal., June 24, 25 and 26, 1915. 92 pages. Paper. Secretary, H. G. Winsor, general claim agent Tacoma Railway & Power Company.

This publication contains a list of officers and committee members of the Pacific Claim Agents' Association, as well as the complete and indexed proceedings of the convention held in San Francisco last June. This convention was reported in the ELECTRIC RAILWAY JOURNAL of July 3 and 10.

Comparative Railway Statistics—United States and Foreign Countries, 1912. Bureau of Railway Economics, Washington, D. C. 78 pages.

The purpose of this bulletin is to present comparative data regarding the steam railroad situation in the United States and in the principal foreign countries. The year 1912 is made the basis of comparison because it is the latest year affording essentially complete official data. Part I gives consecutively the tabular matter for the thirty-eight countries covered, while Part II brings together in tables the significant averages and ratios pertaining to railroad operation in the different countries. On account of the lack of a sufficiently approximate common basis, no figures for accidents are included.

Principles of Depreciation. By Earl A. Saliers. The Ronald Press Company, New York. 200 pages. Three-quarters leather, $2.50.

The author has endeavored in this volume to discuss fully the subject of depreciation as a factor in valuation and income tax accounting. The theoretical and legal aspects of the subject are considered, for a knowledge of these are held to be necessary in the application of the mathematical formulas used in depreciation calculations. The various methods of determining depreciation are also described, with the algebraic formulas fully explained, specimen problems solved and graphic representations formulated. In an appendix the author presents a depreciation bibliography and an explanation of the use of logarithms.

While the reader may not at all times agree with the writer's theory of depreciation in valuation work, the book is a valuable source of general practical data. Its scope may best be shown by the following list of contents: Part I, Theory: Character of Industrial Plant; Analysis of a Hydroelectric Plant; The Plant Ledger; Depreciation Reserves vs. Depreciation Funds; Depreciation and Efficiency. Part II, Practical Applications; Regulation by Courts and Commissions; The Income Tax; Valuations; Land in Valuations. Part III, Determining the Depreciation Charge; Methods of Depreciation; The Straight-Line Method; The Reducing Balance Method; The Sinking Fund Method; The Annuity Method; The Equal-Annual-Payment Method and The Unit Cost Method.

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SUBSTANTIAL PROGRESS ON SAFETY CODE

After many preliminary conferences held in different parts of the country during the past year the work on the proposed national electrical safety code which is being fathered by the National Bureau of Standards has assumed much greater importance than heretofore through the two-weeks conference held recently in New York. The sessions were marked by earnestness and concentration of purpose and the delegations of the many interests represented contained many of the best-known specialists in the country. Among these interests were the American Electric Railway Association, the American Railway Association, the National Electric Light Association, the National Electrical Contractors' Association, the Association of Edison Illuminating Companies, the Electrical Manufacturers' Club, the Western Association of Electrical Inspectors, the General Electric Company, the Westinghouse Electric & Manufacturing Company, Gibbs & Hill, the Commonwealth Edison Company, and many other associations and commercial organizations. These names are mentioned to indicate the widespread interest in the movement. The proposed code is now being taken seriously by electric power producers, distributors and users. With their co-operation it is being modified to fit the complicated conditions of the business. Unquestionably with the New York conference the code entered upon a new stage in its career. In its revised form it will be much more applicable to commercial conditions than before and should have careful study by every electric railway company.

"RECALLED TO LIFE"—ELECTRIC RAILWAY BUYERS

Our trusty barometer of the industry, the JOURNAL rolling-stock column, like similar columns of our steam railroad contemporaries, seems to be beginning to return to a normal average after a prolonged anemia dating from August, 1914, at the outbreak of the European war. Car orders within the last month have shown a distinct increase both over the same period in 1914 and over any one previous month in 1915, except March, April and May, the regular heavy buying season. The larger passenger car orders recently placed include eighty cars for Cleveland, fifty for Detroit, twenty-five trailers and forty-eight articulated center-sections for the Boston Elevated Railway, thirty-one cars for the Wilmington & Philadelphia Traction Company and ten for the Buffalo & Lake Erie Traction Company. These, with a noticeably high average number of small orders, cannot betoken merely a mushroom activity, especially in view of a correspondingly large number of prospective purchases now current. The most important of the latter include 311 new subway cars for the Interborough Rapid Transit Company, fifty cars for the Des Moines (Iowa) City Railway, fifteen for the United Traction Company of Albany, thirteen for the Toronto Civic Railway, twelve for the San Francisco-Oakland Terminal Railways and ten for the Trenton & Mercer County Traction Corporation. These prospects are all the more encouraging at this time when many other railways have not yet voted on their expenditures for the coming year. In fact, the period is closing wherein the supply man felt it necessary to pack up his traveling bag and rush off at the slightest wild-cat rumor of an up-state one-car purchase.

WHAT IS THE RAIL HEAD?

When ultimate wear limits for various plain-girder and grooved-girder rail sections are considered it is of prime importance to know what fixes the rail head. For plain-girder rail the head has been defined as that portion of the rail section above the intersection of the two lines forming the underside of the head. Some may venture the assertion that this area is not entirely available for wear, hence a horizontal line connecting the points of intersection of the gage and base lines should be used. Similarly there is a difference of opinion regarding the defined head limits of grooved-girder rail, in fact, if the head of this style of rail has ever been defined it is not a matter of record. In the article on girder and high T-rail renewals, printed in the issue of the ELECTRIC RAILWAY JOURNAL for July 31, page 179, the head of a grooved and tram-girder rail was considered as that portion above the rail-head base line extended to the groove. It was found that in many sections this line was tangent to the bottom of the groove. If that portion of the grooved and tram-girder rail head available for wear is limited by wheel flanges riding on the groove floor, then our limit appears logical. If the wheel flanges are permitted to cut into the groove floor until other complications dictate that a rail renewal should be made, then, perhaps, the rail head should be defined as that portion above the base line of the groove extended across the web. However, the amount of vertical head reduction fixes the depth the wheel flanges can cut into the groove floor, hence there does not appear to be any important reason for including more than the rail head proper. In any event a discussion of this subject would be interesting and a decision may only be reached by obtaining a consensus of opinion. If the rail heads for various sections can be defined, it will then be possible to discuss intelligently the ultimate permissible head reduction in definite terms.

ELECTRIFICATION ON THE PENNSYLVANIA

Electric operation of part of the suburban service at Philadelphia has been inaugurated by the Pennsylvania Railroad, as described on another page of this issue, primarily because of the unusual topographical conditions existing in the vicinity of the terminal in that city. Under steam operation the great Broad Street Station had reached the limit of its traffic capacity, not so much on account of an insufficient trackage in the station itself but rather because of extreme congestion of the approach tracks during the rush hours, this being emphasized by the necessity for handling a heavy suburban service in and out of the city. The terminal is of the stub-end type, and steam locomotives have no means of running around the strings of cars that they bring into the station, having to back out behind the trains and thus duplicate train movements over a restricted approach.

Electrically operated multiple-unit cars are, of course, free from any difficulties involved by the necessity for quick "turning" of suburban trains at the end of the run, and the electrification of some of the suburban lines offered an obvious alternative to a costly enlargement and rearrangement of the terminal. Electric operation, of course, has involved a considerable outlay of capital, but it has the advantage of bringing operating economies sufficient to pay a small interest charge on the investment—something that the extension of the station could not do. The relief that has been thus provided is equivalent to a reduction of 8 per cent in the total number of trains using the station, and this may be extended by electrifying other suburban lines from time to time as required, thus taking care of the normal growth of traffic for several years to come. Here, then, is a reason of sufficient importance to warrant the electrification in question, aside from any considerations of future replacements of steam by electricity.

Nevertheless, it is difficult to avoid the thought that the installation constitutes but a preliminary step in plans of vastly greater magnitude. Based upon the number of passenger trains arriving and departing from Broad Street Station in each hour of the day, there is little to choose between the load factors, or "service factors" (if such a term can be coined), of the suburban service and the through service on the main-line division west of Philadelphia. In addition, the daily total of through passenger trains on the main line to the West is nearly two-thirds of the number now operated by electricity, and on the division north of Philadelphia, which extends to New York, the density of the through service is actually greater than that of the suburban service that has just been electrified. Since both terminals of the latter division are now electrically equipped it would seem logical that they, at least, should be linked together eventually.

Of course, the electrification of through service does not result in all the reductions in operating costs and terminal charges that are inherent in the use of multiple-unit cars. But as opposed to this is the possibility, in trunk-line electrification, of economies through the electric operation of freight trains, which may be sandwiched in between the peaks of passenger service to the betterment of the load factor at the power house and the service factor of the expensive distribution and contact system. Theoretically, this advantage should be an ample basis for clinching the argument that, if the suburban service can carry the investment of electrification, a through service of greater density should pay a handsome profit on it, but from the practical standpoint these savings are only a possibility, because their extent has not yet been definitely established.

That such savings are inevitable, of course, cannot be disputed, but until recently the question whether there will be 2 per cent or 20 per cent profit on the investment for an electrification that includes heavy freight service has had to be answered largely by calculations based upon generalities. This, it would seem, should cause hesitancy in undertaking an over-ambitious program in trunk-line electrification, and it is only natural that a thoroughly conservative company like the Pennsylvania Railroad would move with the utmost deliberation in a matter of so large a capital expenditure as that involved by the New York-Philadelphia project. There are, in fact, other divisions on the system where the electric operation of freight trains presents materially greater possibilities for savings, such, for example, as the mountain region of western Pennsylvania. Here the concentration of the large demands for power that are made by the heavy trains on the severe grades works especially to the advantage of electric operation, not only by cutting down transmission distance but also by making full use of the great potential tractive effort of the electric locomotive.

Therefore, it is quite likely that electrification of the through lines on the Atlantic Seaboard will come only after the economy of the electric locomotive in heavy freight service has been demonstrated by an installation on one or more of the grades in the Alleghenies.

ACCOUNTING FOR RENTS

To what extent rental charges should be included in operating expenses or among deductions from income seems to be a perplexing question—one upon which commission classifications show no unanimity of opinion. In general, two distinct methods are followed, as illustrated in the accounting regulations of the Interstate Commerce Commission. For steam railroads only office and minor equipment rents are included in operating expenses, whereas rents for locomotives, cars and other major equipment, trackage rights and leased roads are classed as deductions from income. In the case of electric railways, however, office and other minor rents, charges for joint tracks and facilities, and rents for equipment are deducted as operating expenses, and only rents for leased lines and equipment covered by the leases are charged among the deductions from income. This second method constitutes, we believe, a real advance in utility accounting, secured through the earnest efforts of electric railway accountants, and we do not favor giving it up for the steam-railroad method, as proposed by one speaker before the recent Accountants' Association convention in San Francisco.

When accountant-economists disagree as to the fundamental difference between "operating expenses" and "deductions from income," the only logical course is to forget the hair-splitting of economic thought and to realize that the purpose to be attained by an accounting classification should be the controlling factor in its construction. Now, to our mind, a classification should be so made as to indicate in the clearest and quickest way whether or not a utility is securing a reasonable return on the fair value of its property. By its property we mean all the property that is or would be covered by a valuation in a rate case. The difference between all the direct and indirect revenues from the activities of the company and all the expenses incurred in its maintenance and operation, forms the gross income or actual return upon the fair value of the property. It should be noticed that this term "gross income" is here used in its official technical sense according to the Interstate Commerce Commission classification and not in its somewhat popular sense of total receipts. In order, however, that the gross income figure, as defined, may justly be used to show the real return in comparison with a reasonable return on the fair value, it is necessary as a condition precedent that all rents be classified and accounted for in the income statement in a manner compatible with the way rented property is treated in the valuation total.

While the valuation practices of commissions are not sufficiently standardized to admit of exact generalities, it may be said that usually the valuation of a public utility would include all property that is owned outright or property that is used regularly in connection with the company's own property, of which a long-term lease is usually the concrete evidence, while property whose use is merely temporary or accidental or which is owned and maintained by another corporation primarily for its own purposes, would not be included. For example, rented lines with accompanying equipment held under a long lease would be included in the valuation as the non-owned portion of the operating property, while rented cars and miscellaneous equipment used on a daily basis, lines of other companies used under trackage agreements, office rooms in buildings not owned by the company, etc., would be excluded from the valuation. The difference between included and excluded property items gives the basis for making a distinction in accounting for rents. Rents on items that are excluded from the valuation total must be treated as operating expenses incurred in conducting the company's activities. Rents on items that are included, however, represent a portion of the gross income of the company, a part of the return on its fair value.

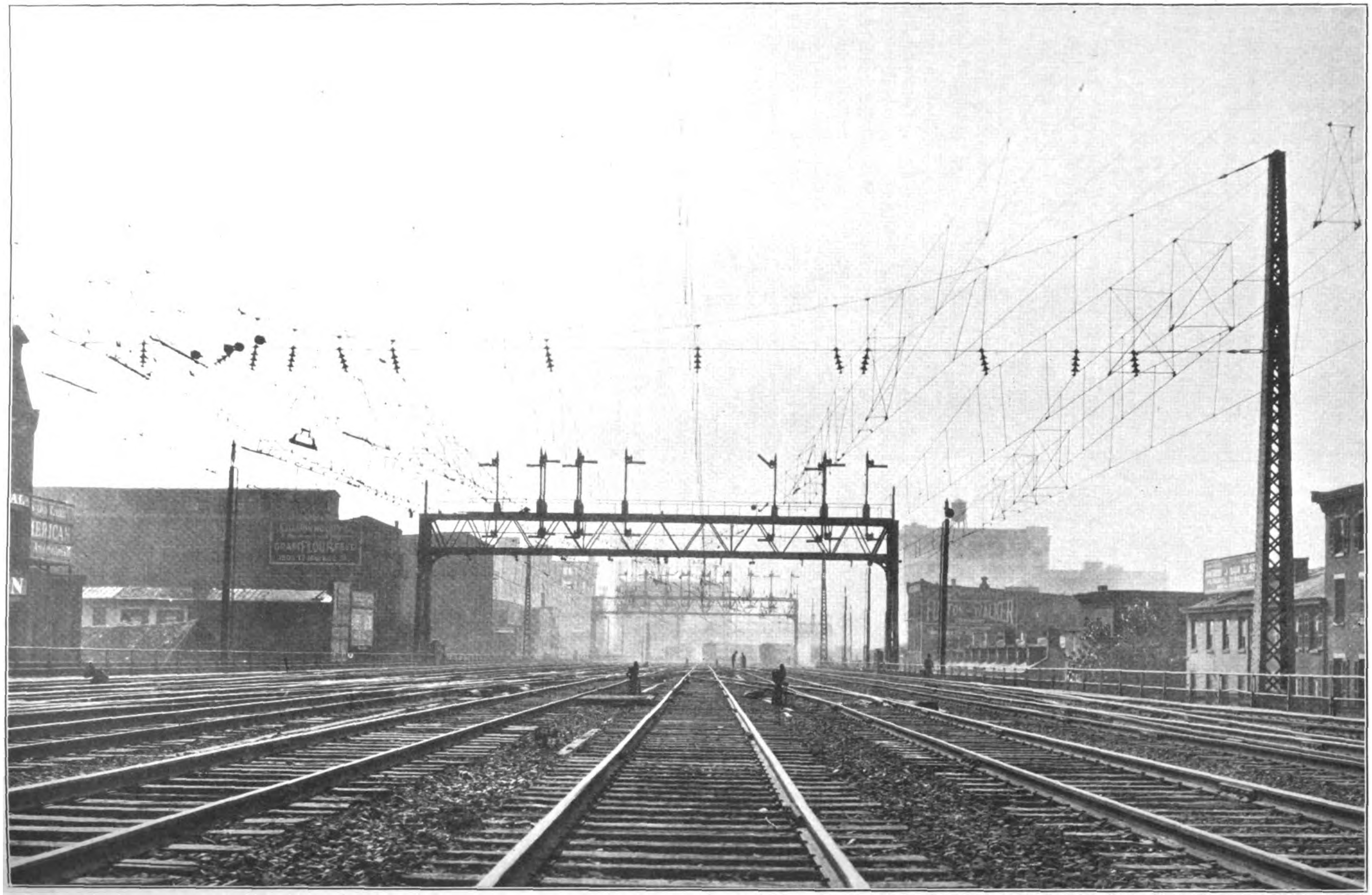
In other words, the gross income of a company with leased property consists of three parts. The first part represents the portion of the return that covers the foreign plant included in the valuation. The second and third parts represent the portion of the return upon the company's own property, part being the interest on the funded debt and the balance the stockholders' equity. If the rents for the valued foreign plant were included in operating expenses, the gross income would not show the real return upon the company's fair value. Nor would such be the case if the various rents on non-valued property were classed as deductions from income. All rent items, therefore, should be treated as operating expenses with the exception of the permanent charges on property held under long leases. This is the present electric railway practice, and we would oppose any reversion to the steam railroad method. If any change is made, it should be by the latter carriers. For those whose economic souls are horrified by classing rents on non-valued property with "true" operating expenses, a concession might be made by combining such items with taxes, etc., as a supplementary group of operating costs, but the main point is to have them deducted before the gross income figure is obtained.

THE AUTOMOBILE NUISANCE

We had occasion last week to refer in these columns to the competition which electric railways suffer from private automobiles, and also to the higher taxes which electric railway companies, in common with all taxpayers, have to pay to provide good roads for pleasure automobile driving. There is another and perhaps an even more serious burden which automobiles are placing upon the public in general and upon the railways in particular which demands radical reform. We refer to the reckless driving of high-powered cars over electric railway crossings and on public highways at speeds which should not be permitted except on a protected right-of-way. This driving is done not only by men who show an utter disregard of even the most elementary safeguards but by minors who would never be permitted in charge of the much more safe operation of an electric car.

If these people who thus run amuck in the public streets risked their own lives only it would not be a matter of such vital importance. But they endanger also, and to a much greater degree, the lives of all other occupants of the streets, and accidents are becoming so common as a result of this practice as to call for stern repressive measures. We have only to instance the testimony given on the recklessness exhibited by automobile drivers at the last two meetings of the Claims Association and the efforts of the Long Island and other railroads to protect their grade crossings from accidents with automobiles to show that a real evil exists. We are glad, therefore, to chronicle this week the fact that the subject is to be taken up seriously under the direction of the Public Service Commission for the Second District, New York, by a committee composed of electric railway managers, representatives of the commission and officials of three of the State automobile associations.

The committee has a task of great magnitude ahead of it. Those whom it will have to control have had freedom so long to do about as they pleased, but we hope that the committee will recommend to the Legislature severe penalties for the misuse of the highways and the neglect of safety precautions at electric railway crossings which has been so common on the part of automobile drivers since the advent of the high-powered car.



PHILADELPHIA-PAOLI ELECTRIFICATION—VIEW OF CROSS-CATENARY OVER NINE TRACKS, SHOWING READY VISIBILITY OF SEMAPHORE SIGNALS NOTWITHSTANDING COMPLICATED OVERHEAD CROSS-OVERS

Philadelphia-Paoli Electrification

Operation of This 20-Mile Suburban Electric Zone Has Been Begun by the Pennsylvania Railroad with Multiple-Unit Cars Having Repulsion-Starting, Series Motors, Single-Phase Power Being Supplied from an 11,000-Volt Catenary Contact System Carried on Cross-Wire Bridges

The recent establishment of regular suburban service over the single-phase electric zone of the Pennsylvania Railroad at Philadelphia marks an important step in the electrification plans of that company and makes a description of the details of the installation particularly timely. At present the electrified tracks extend only from the Broad Street Station in Philadelphia to Paoli, 20 miles to the west on the main line, but work is under way also on the electrification of the Chestnut Hill line, 12 miles northward from Philadelphia. Both of these installations, as outlined in an account that was published exclusively in the ELECTRIC RAILWAY JOURNAL for April 18, 1914, were projected primarily to relieve congestion at Broad Street Station, and it is expected that they will take care of the normal growth of traffic for the next seven or eight years.

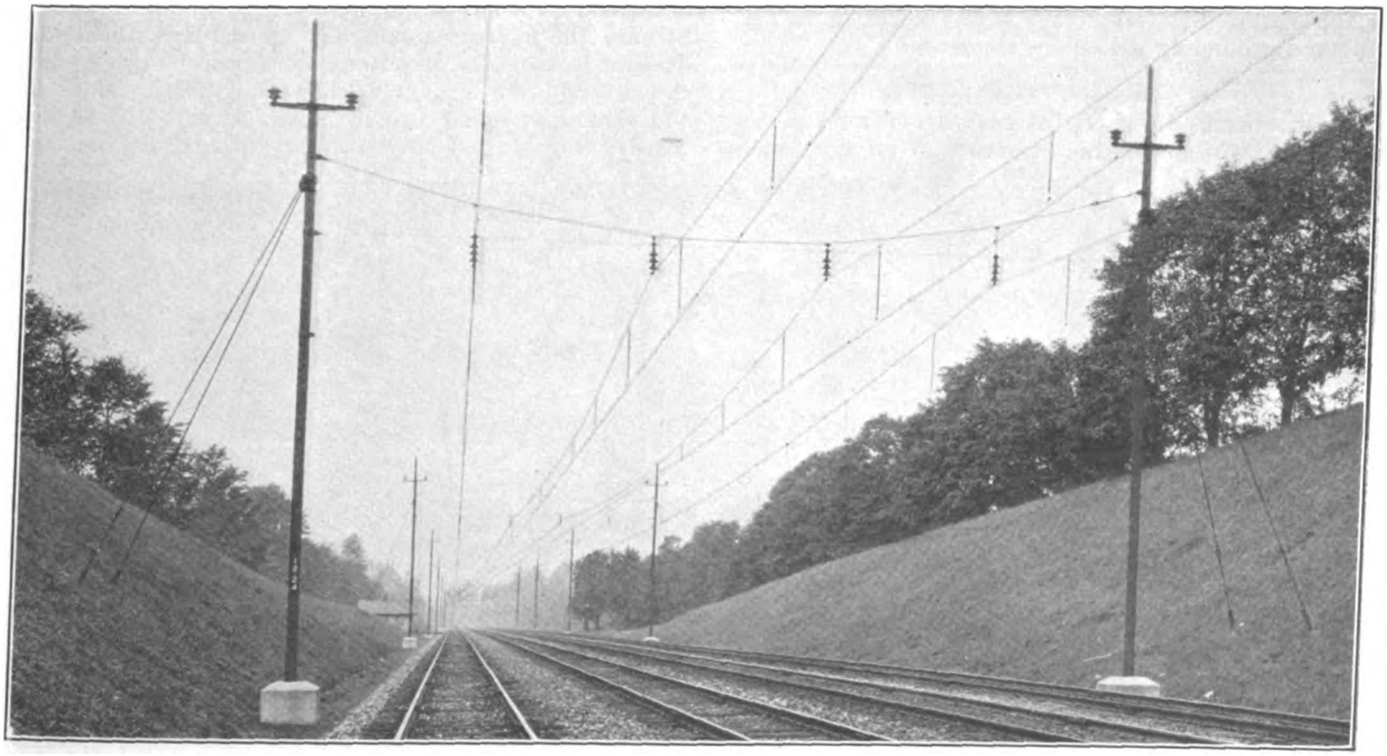
For the Philadelphia-Paoli service the rolling stock consists of ninety-three standard all-steel cars, eighty-two of which are for passenger service, nine for combined passenger and baggage service and two for combined baggage and mail service. All are motor cars, as no trailers are operated on the electrified suburban runs. Trains of from two to seven cars are operated regularly, the average acceleration on a straight level track being approximately 1 m.p.h.p.s. up to 30 m.p.h., with a balanced speed of 60 m.p.h.

ELECTRICAL EQUIPMENT ON CARS

The equipment of each car consists of two 225-hp. Westinghouse single-phase, air-blast-cooled motors mounted on one truck. Automatic acceleration is provided with the control, and automatic multiple-unit electro-pneumatic brake equipment has been installed. All of the main pieces of the electrical apparatus are mounted on one end of the car and the brake equipment is mounted at the other end. This gives an uneven weight distribution on the two trucks, approximately 60 per cent of the total car weight being on the driving wheels. The cars are designed for double-end operation.

The motors, which are connected in series, are started and operated up to approximately 15 m.p.h. as repulsion motors, with the auxiliary or compensating field, the armature and the main field in series. With these series connections the armature is short-circuited through resistance. Resistance is also inserted in series with the motors on the first step and is cut out on the second step. The third step changes the connections to energize the auxiliary field from one portion of the transformer and the armature and main field, connected in series, from another portion of the transformer, thus affording doubly-fed connections. The armature short-circuit is removed when the motors are operating with the double feed. Subsequent steps in the control are obtained by increasing the motor voltages.

Power for the control system is supplied in the usual manner from a motor generator set, which is in parallel with a storage battery, through a control plug, and the movement of the master controller handle to the right or to the left energizes the proper control circuit for forward or for reverse movement of the train. The closing of the unit switches is governed by a current limit switch which has two settings, one for repulsion connections of the main motor and the other for the doubly-fed connection, the change in the limit setting being obtained by energizing a battery coil on the limit switch. All of the switches are interlocked through the No. 9 switch, so that no switches can close until the No. 9 switch is closed. A small knife-switch is placed in the control circuit of the No. 9 switch, and opening this switch cuts off the supply of current to the main



PHILADELPHIA-PAOLI ELECTRIFICATION—STANDARD CATENARY CONSTRUCTION ON TANGENTS motors. Ten control wires between cars are necessary to operate cars in trains, one of these wires performing in the dual function of the third operating wire and the "trolley unlock" wire.

Each motor has a continuous rating of 200 hp. when ventilated with 1200 cu. ft. of air per minute. The armature is of standard construction, the commutator and the laminations being mounted on the spider, the former being undercut 1/16 in. The armature is wave-wound and cross-connected, and no resistance leads are used between the windings and the commutator. The field windings consist of two entirely independent sets of coils, one being the main field circuit for producing the effective magnetic field, and the other the auxiliary or compensating winding which balances the armature reaction on the field. In addition, the latter has a neutralizing effect on the sparking voltage. The field consists of six poles, the coils being of copper bars suitably insulated, connected at the ends by straps.

Flexible gears are used, the gear ratio being 24 : 55. Each gear is made up of a rim on which the teeth are cut, a center, a cover plate and spring details. The rim is spring-mounted on the center, the periphery of the center and the cover plate acting as the bearing surfaces for the rim.

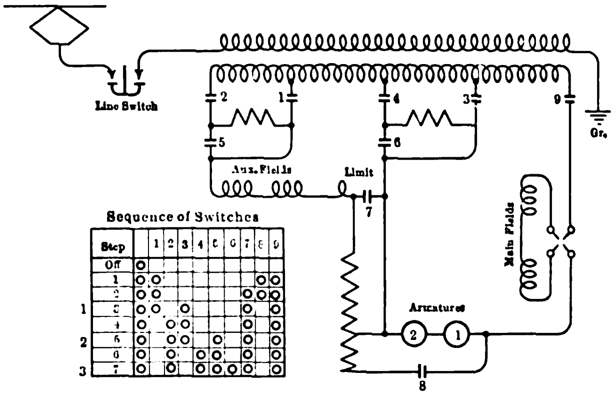
One pantograph of especially light construction is installed on each car. The springs which raise it are designed to give flexibility to the framework, so that in operation a slight dragging of the contact shoe takes place, resulting in its following the wire much closer than with a rigid framework. In addition, the shoe is spring-mounted on the framework. The pantograph is provided with four insulators suitable for 11,000-volt service, and the whole mechanism is mounted on a base provided with insulators similar to those of the pantograph, thus providing double insulation. The pantograph is lowered and unlocked by air at 70-lb. pressure, a small hand pump being provided for unlocking it when no air pressure is available.

The safety-first principle has been carried out in the provision of a grounding device of novel design. Steps for mounting to the roof are provided at one corner of the car only, and a lever is placed on the roof at this corner. When one climbs to the top of the car this lever is thrown up, thus locking the trolley in the down position and grounding the entire framework.

REPULSION MOTOR PRINCIPLES

In American practice it has not been customary heretofore to short-circuit the armature of an a.c. commutator motor, and the adoption of this plan in the Philadelphia-Paoli electrification for even a part of the accelerating period is of more than passing interest.

The invention of the repulsion motor is due to Prof. Elihu Thomson, who more than twenty-five years ago developed the scheme shown diagrammatically at *A* in the diagram on page 983. This diagram represents a two-pole motor having field coils wound on laminated field cores and connected to an a.c. supply line, an armature with brushes and coils connected to the commutator bars as in a d.c. motor, and a connection short-circuiting the brushes. The brushes are shifted from the normal position as shown.

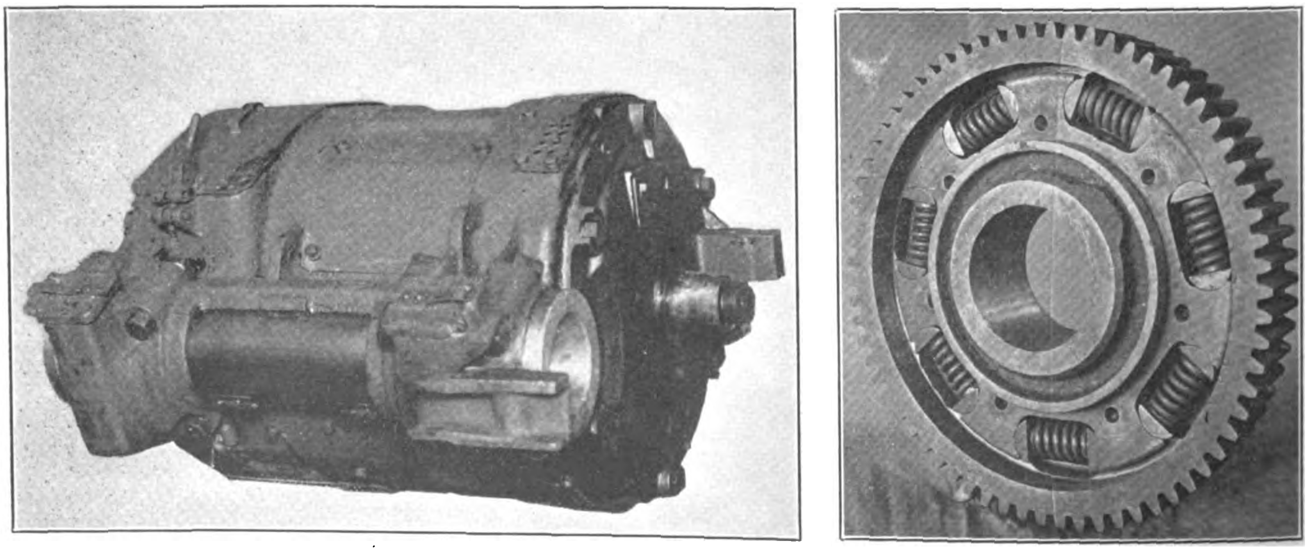


Sequence of Switches

	Step		1	2	3	4	5	6	7	8	9
	Off	O									
	1	O	O							O	O
	2	O	O						O	O	O
1	3	O	O		O				O		O
	4	O		O	O				O		O
2	5	O		O	O		O		O		O
	6	O		O		O	O		O		O
3	7	O		O		O	O	O	O		O

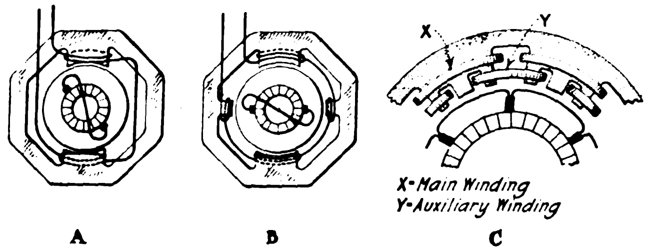
PHILADELPHIA-PAOLI ELECTRIFICATION—SCHEMATIC DIAGRAM OF REPULSION MOTOR CONNECTIONS

If the brushes were placed under the middle of the field poles the magnetic field flux would pass transversely through the spaces inclosed by the armature coils and a current would flow between brushes, because the passage of alternating magnetic flux through a loop of wire sets up current flow in the wire, in accordance with the well-known principle on which a transformer operates. The short-circuiting of the brushes would permit a current that would be limited only by the impedance of the electric circuit. This flow of current in the short-circuited coils would set up torque, because each conductor would be within a magnetic field. No net torque would be produced, however, because the current would flow in the armature conductors in opposite directions on opposite sides of the brushes and the torques produced on the two sides of the armature would balance each other. But if the brushes are shifted as shown in diagram *A*, the bal-



PHILADELPHIA-PAOLI ELECTRIFICATION—VENTILATED REPULSION MOTOR—FLEXIBLE GEAR WITH COVER PLATE REMOVED TO SHOW SPRINGS ance is disturbed and net torque is produced, because the torque of the windings on one side of the brushes overcomes the lesser torque of the windings on the other side.

The principle of the repulsion motor can be explained also by means of the second diagram, shown at *B*. This motor is equivalent in every way to the preceding. Here the winding is represented as divided into two parts, main and auxiliary coils, one furnishing the field for the production of torque and the other inducing the armature current. It is evident that the compensating winding used in the a.c. series motor, shown crudely in principle in *C*, could be used as an auxiliary winding, to produce a shifting of the magnetic field equivalent to a shifting of the brushes. A series motor can therefore be readily adopted to repulsion starting.



PHILADELPHIA-PAOLI ELECTRIFICATION—DIAGRAMS ILLUSTRATING REPULSION MOTOR PRINCIPLES

In the Philadelphia-Paoli motor the original scheme of Professor Thomson is still further modified by the addition of the series connection of armature and field. The armature and field windings are therefore both "conductively" and "inductively" connected. To the extent, however, that current is induced in the short-circuited armature because of the transformer effect of the auxiliary winding it is a repulsion motor. On account of the low resistance of the armature short-circuit the induced current during the starting period has a high value.

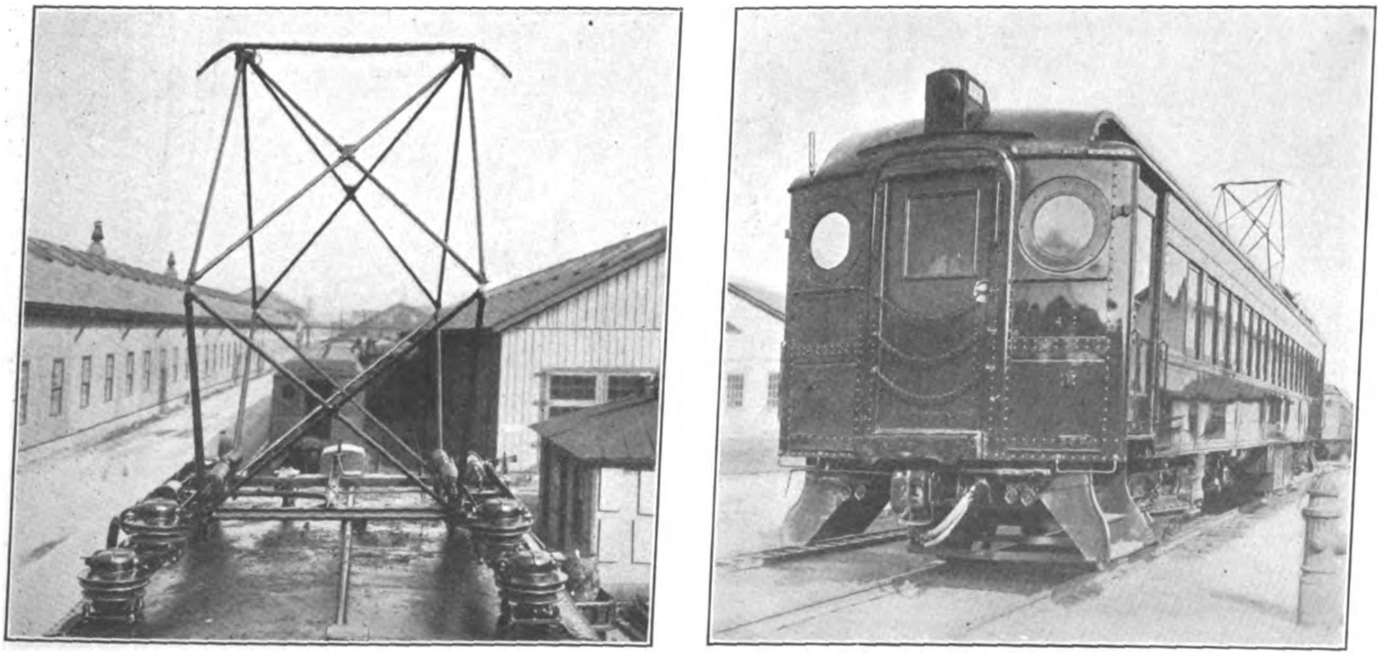
ELECTRO-PNEUMATIC BRAKE

The air-brake equipment on the cars is designed to be used either in steam or electric service, and differs from the ordinary pneumatic brake in that the brake pipe reduction is made on each car by means of electric control instead of being made entirely with the engineer's brake valve. The addition of electric control to the pneumatic brake does not change its function in any way, but shortens the time required to get the brakes applied on all cars.

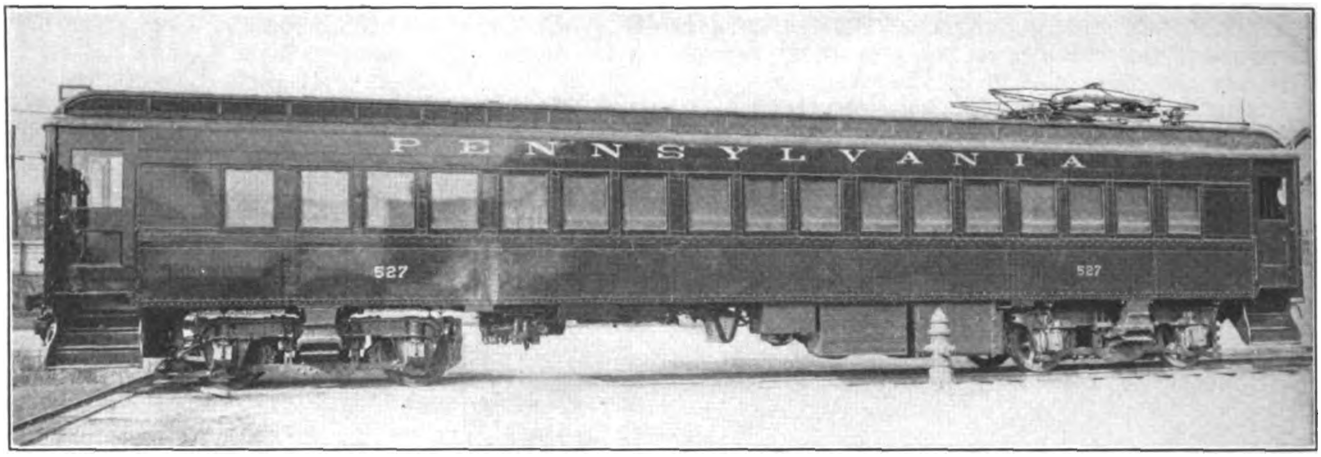
The motorman's brake valve contains both electric contacts and pneumatic parts, the electric portions being mounted above the pneumatic portions. There are six positions: (1) The release and running; (2) the electric holding; (3) the handle off; (4) lap; (5) service, and (6) emergency. The first-named position is to the left and in this position all train brakes are released and the system charged. The "electric holding" position, as the name implies, holds the train brakes through the electric control system, but recharges the system. Pneumatically this position is identical with the release and running position. All ports are closed in the "handle off" position, and the handle may be removed, and in the "lap" position the ports are also closed. The "service" and "emergency" positions are the regular ones for setting in service or emergency applications. For the service application a limiting valve is provided in conjunction with the brake valve, and this allows a maximum reduction of 20 lb. in the brake pipe. A small cut-out plug is provided for cutting out the electric operation when desirable.

The universal valve is built up of five different portions: (1) The pipe bracket, which contains a quick-action chamber and a quick-action closing chamber for use in emergency application; (2) the equalizing portion, which contains the moving parts employed in service and emergency operation; (3) the quick-action portion, which contains the moving parts employed in producing quick action; (4) the high-pressure cap, which contains the parts employed in securing a high cylinder pressure in an emergency application, and (5) the magnet brake portion, which contains the magnet valve for electric control of brake operation, an emergency switch, and a cut-out cock. This universal valve controls the charging of reservoirs, the application of brakes and the release of brakes. It is mounted at the side of the car near the trailer truck.

The main reservoir pressure is 100 lb. and the brake-



PHILADELPHIA-PAOLI ELECTRIFICATION—PANTOGRAPH WITH DOUBLE INSULATION ON CAR ROOF—END VIEW OF STANDARD CAR



PHILADELPHIA-PAOLI ELECTRIFICATION—STANDARD MULTIPLE-UNIT CAR

pipe pressure is 70 lb. To permit the operation of these equipments in steam service, where the brake-pipe pressure is 110 lb., without making adjustment, a main reservoir by-pass and limiting valve is employed. By its use the same cylinder pressure is secured in making an emergency application in either steam or electric service, although the operation of the universal valve is the same for either. In steam operation the pipe line, which is used as a main reservoir line in electric service, is used as a signal line.

Eight wires, including the battery plugs, and ground wires are required for the electric control of the brakes, for governor synchronizing and for train signaling. Since the two battery wires are common to the brake control and the unit switch control, a seven-point receptacle and jumper is used to carry the brake control wires. Two receptacles are mounted on each end of the car and on each side of the coupler, and these are connected in multiple in the same way as the nine-point receptacles for the unit switch control.

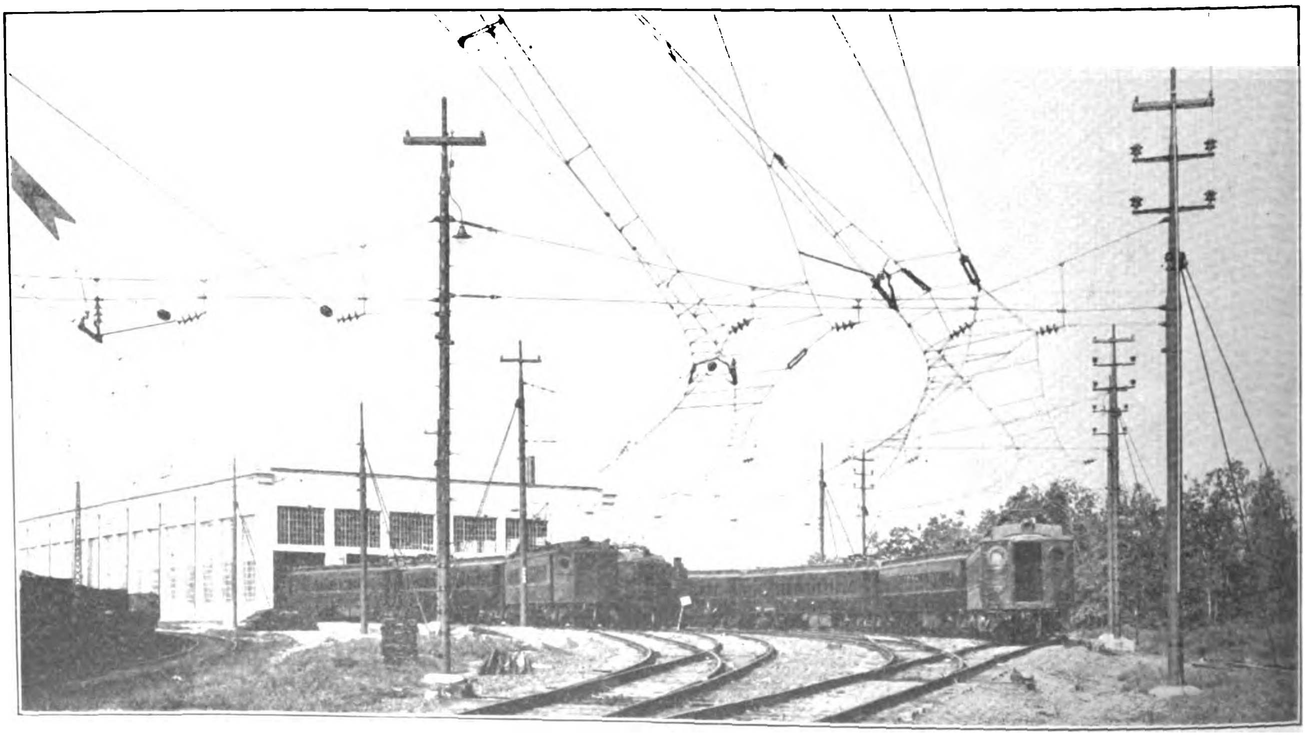
CAR-INSPECTION BUILDING

A very substantial and completely-equipped car-inspection building has been constructed at the Paoli yard. This has been planned to serve not only the cars required for the present electrification, but also for the cars required by other divisions when electrified. Adjacent to the inspection building proper is a small service building, which contains boilers for heating, locker and wash rooms, air compressors and motor generators for supplying power for the tools and signals. Current for the operation of the motor generator sets is obtained from the Paoli substation, in which are located two 11,000/2200-volt transformers.

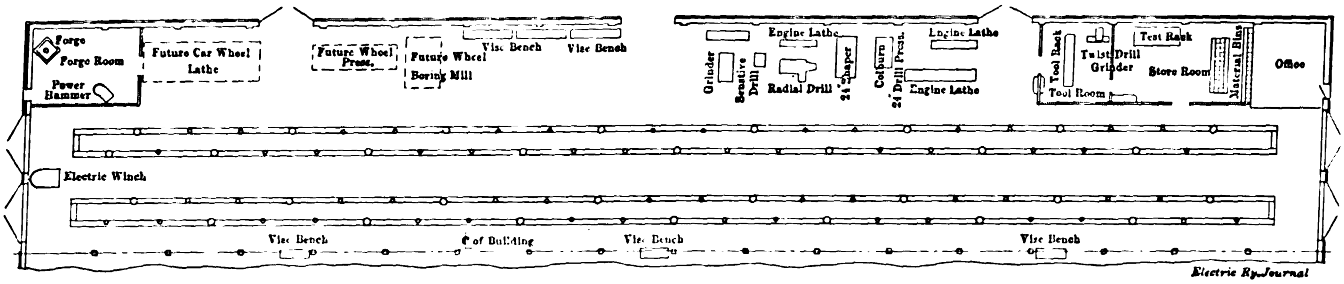
POWER SUPPLY AND TRANSMISSION

Power for traction purposes is purchased from the Philadelphia Electric Company and is generated in its main power station at Christian Street on the easterly bank of the Schuylkill River about 1 mile south of the West Philadelphia passenger station. It is delivered to the railroad company at a substation at Arsenal Bridge, on the westerly bank of the Schuylkill River, opposite the main generating station, the connection between the power house and the substation consisting of armored submarine cables under the river.

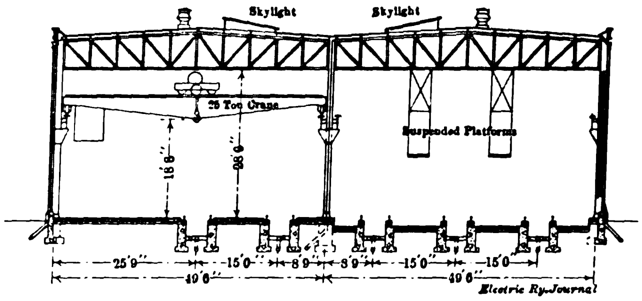
While the present service is on one phase only of the power company's three-phase generating system, the



PHILADELPHIA-PAOLI ELECTRIFICATION—SHOP AND INSPECTION BUILDING AT PAOLI


Forge
Forge Room
Power Hammer
Future Car Wheel Lathe
Future Wheel Press
Future Wheel Boring Mill
Vise Bench
Vise Bench
Engine Lathe
Engine Lathe
Grinder
Sensitive Drill
Radial Drill
24" Shaper
Coburn
24" Drill Press
Engine Lathe
Tool Rack
Twist Drill Grinder
Test Rack
Store Room
Material Bins
Tool Room
Office
Electric Winch
Vise Bench
of Building
Vise Bench
Vise Bench
Electric Ry. Journal

PHILADELPHIA-PAOLI ELECTRIFICATION—HALF PLAN OF INSPECTION BUILDING SHOWING ARRANGEMENT OF SHOP SECTION


Skylight
Skylight
25 Ton Crane
Suspended Platforms
18'6"
28'0"
25'9"
15'0"
8'9"
8'9"
15'0"
15'0"
49'6"
49'6"
Electric Ry. Journal

PHILADELPHIA-PAOLI ELECTRIFICATION—CROSS-SECTION OF INSPECTION BUILDING

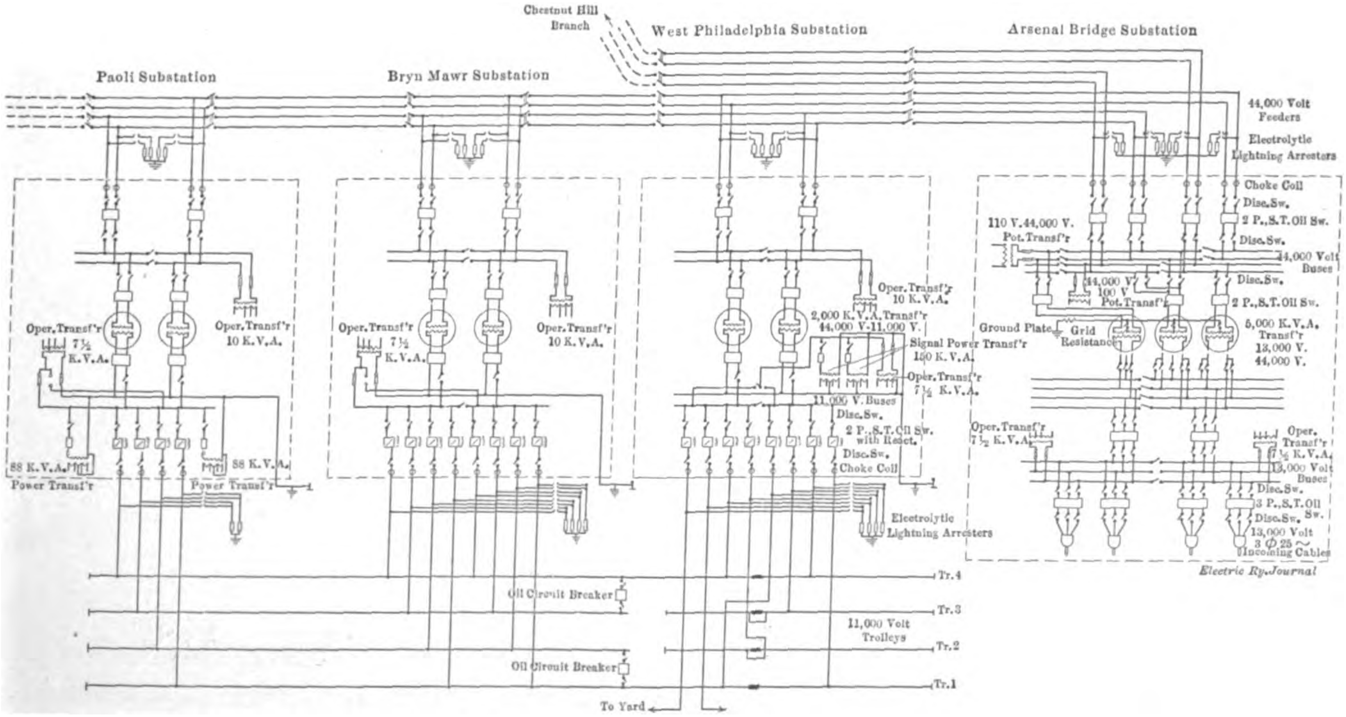
plan is to supply succeeding electrifications from the remaining phases. The power is delivered to the railroad company's substation at 25 cycles and 13,200 volts. Here it is stepped up to 44,000 volts, and by means of duplicate single-phase overhead circuits is transmitted to the step-down substations. Special provisions have been made by the Philadelphia Electric Company to balance this single-phase load as well as to correct for the relatively low power factor in order that the full three-phase capacity of the generating units may be available.

From the Arsenal Bridge substation four 44,000-volt single-phase transmission lines extend to the West Philadelphia substation. These four lines will tee into the West Philadelphia substation and two of them continue on to the Bryn Mawr and Paoli substations. The other two lines will later go to the Chestnut Hill substation. The four transmission lines are carried on brackets on the side of the elevated structure between the Arsenal Bridge substation and the West Philadelphia substation, but beyond the West Philadelphia substation they are carried on the catenary supporting structures. Along the right-of-way the lines are carried on both sides of the tracks.

The transmission lines are No. 00, seven-strand, hard-drawn copper wires. They are spaced 5 ft. apart where the two wires of a single-phase feeder are on the same cross-arm, and where there is more than one circuit on a pole the vertical spacing is 3 ft. 6 in. The lines are protected by a 3/8-in. steel ground wire on the top of the poles. Where the transmission lines pass under highway bridges the ground wire is dead-ended on the bridge structure and the wires carried on post-type insulators.

Where the lines pass under the Belmont and Girard Avenue bridge, which approaches tunnel conditions on account of its width, they are covered with rubber and varnished cambric insulation. The joints between the bare and insulated wire either side of the bridge are made outside of porcelain sleeves filled with compound. The wire is continuous throughout the sleeve, the insulation being tapered off inside the sleeve.

At the Arsenal Bridge substation the lines are protected by relays which operate on overload and on an unbalanced load on either side of the circuit caused by a ground. In the other substations the relays operate only differentially, and in case of a ground between substations, the circuit on which the trouble occurred


Chestnut Hill Branch
West Philadelphia Substation
Arsenal Bridge Substation
Paoli Substation
Bryn Mawr Substation
44,000 Volt Feeders
Electrolytic Lightning Arresters
Choke Coil
Disc.Sw.
2 P.,S.T.Oil Sw.
Disc.Sw.
110 V.44,000 V. Pot.Transf'r
44,000 Volt Buses
Disc.Sw.
44,000 V. 100 V. Pot.Transf'r
2 P.,S.T.Oil Sw.
5,000 K.V.A. Transf'r 13,000 V. 44,000 V.
Ground Plate
Grid Resistance
Ground Power Transf'r
Oper.Transf'r 10 K.V.A.
2,000 K.V.A.Transf'r 44,000 V.-11,000 V.
Signal Power Transf'r 150 K.V.A.
Oper.Transf'r 7½ K.V.A.
11,000 V.Buses
Disc.Sw.
2 P.,S.T.Oil Sw. with Reset.
Disc.Sw.
Choke Coil
Electrolytic Lightning Arresters
Oper.Transf'r 7½ K.V.A.
Oper.Transf'r 7½ K.V.A.
Oper.Transf'r 10 K.V.A.
Oper.Transf'r 7½ K.V.A.
Oper.Transf'r 10 K.V.A.
88 K.V.A. Power Transf'r
88 K.V.A. Power Transf'r
Oper.Transf'r 7½ K.V.A.
Oper. Transf'r 7½ K.V.A. 13,000 Volt Buses
Disc.Sw.
3 P.,S.T.Oil Disc.Sw.
13,000 Volt 3 Φ 25 ~ Incoming Cables
Oil Circuit Breaker
11,000 Volt Trolleys
Oil Circuit Breaker
Tr.4
Tr.3
Tr.2
Tr.1
To Yard
Electric Ry. Journal

PHILADELPHIA-PAOLI ELECTRIFICATION—GENERAL WIRING DIAGRAM FOR SUBSTATIONS AND TRANSMISSION SYSTEM would be cut out first in three of the substations, and finally at the Arsenal Bridge substation. Overload relays are provided in the 13,200-volt lines at the Philadelphia Electric Company's power station, and there are reverse current relays in these feeders in the Arsenal Bridge substation.

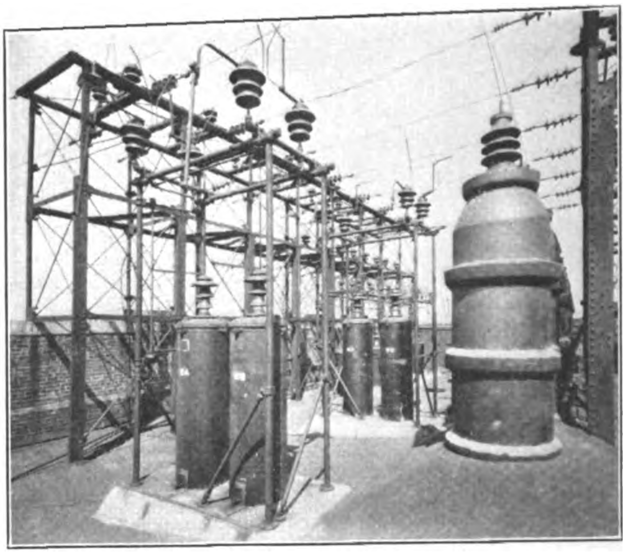
The pin-type porcelain insulators used on the transmission lines are 8 7/16 in. high and 12 in. in diameter, made up of four parts. These insulators withstand tests for dry flashover at 165,000 volts, for wet flashover at 120,000 volts, and for puncture at 250,000 volts. After erection the complete transmission lines were tested out to ground at a potential of 66,000 volts, or far in excess of the working pressure.

SUBSTATIONS

Transformer substations are provided at suitable points along the 93 track-miles of electrified railroad for stepping up the voltage for transmission and for reducing it to that required in the contact conductors. These are substantial fireproof brick buildings adjacent to the tracks. Electrolytic lightning-arrester equipment and high-tension-feeder sectionalizing switches are located on the roof, the busbars and switching equipment on the second floor, and the transformers on the ground floor. Space is provided in all substations for 100 per cent increase in capacity. The installed capacity of the substations are as follows:

Arsenal Bridge	Three 5,000 kva. step-up transformers
West Philadelphia	Two 2,000 kva. step-down transformers
Bryn Mawr	Two 2,000 kva. step-down transformers
Paoli	Two 2,000 kva. step-down transformers

The transformers in all substations are of the 25-cycle, single-phase, oil-insulated, water-cooled type, with the usual voltage taps on the primary and secondary coils. They were furnished, together with the switching equipment, by the Westinghouse Electric & Manufacturing Company. The cases are mounted on wheeled trucks, and in each substation a transformer truck and chain hoist are provided for handling the transformers and cores. Thermostats have been provided to operate an alarm bell in case of high temperature in the transformers. Oil filtering and drying apparatus is located in each substation.

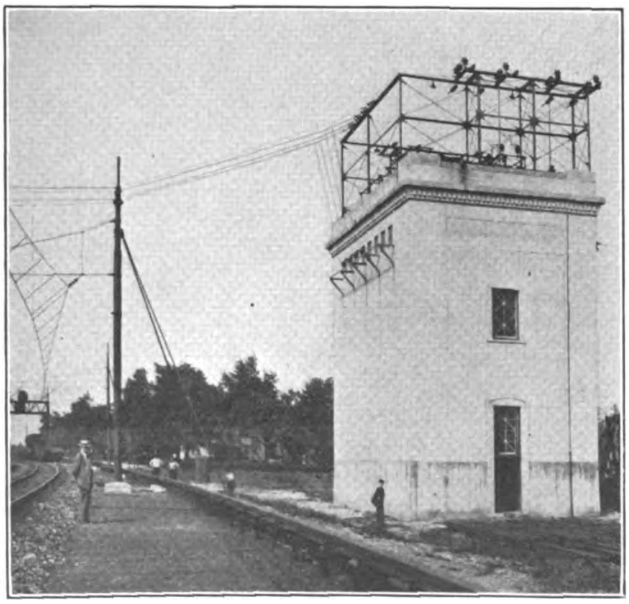


PHILADELPHIA-PAOLI ELECTRIFICATION—LIGHTNING ARRESTERS AND HIGH-TENSION WIRING ON SUBSTATION ROOF

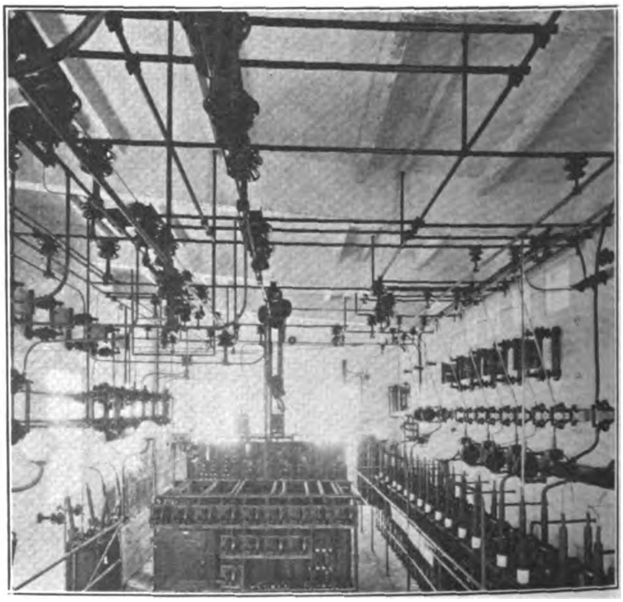
The neutral point of the high-tension winding of the step-up transformers is grounded through a grid resistance, thus limiting the potential to ground from either side of the 44,000-volt transmission lines to 22,000 volts. All 44,000-volt circuits are connected to the buses in the various substations through oil circuit breakers with boiler-plate tanks arranged along the floor without barriers.

The circuit breakers of the 11,000-volt and 13,200-volt circuits are of the oil type, those on the 11,000-volt trolley circuits having two poles with a reactance connected across one pole. The circuit breakers are automatic and remote controlled.

Open buses mounted on insulators and carried by pipe framework are used throughout. In general, all power wiring is bare, and copper tubing or solid wire is used, sufficient clearance having been provided so that no barriers are required between buses or wires except in the case of the incoming cables from the Philadelphia Electric Company in the Arsenal Bridge substation. Control, instrument and lighting wires are rubber insulated and run in conduits. The 44,000-volt and 11,000-volt buses are sectionalized in each station, normal operation being carried on with these bus-disconnecting



PHILADELPHIA-PAOLI ELECTRIFICATION—VIEW OF SUBSTATION SHOWING ARRANGEMENT OF 44,000-VOLT TRANSMISSION CABLES AND 11,000-VOLT FEEDERS



PHILADELPHIA-PAOLI ELECTRIFICATION—INTERIOR VIEW OF SECOND FLOOR OF TYPICAL SUBSTATION SHOWING BUSBAR AND SWITCHING EQUIPMENT switches closed, and in the step-down substations one transformer is connected to each side of the bus. One leg of the 11,000-volt side of all step-down transformers is connected to a bus through a disconnecting switch, this bus being connected to the track rails.

Low-voltage power for the opening and closing of oil circuit breakers is obtained from the 25-cycle buses, but 60-cycle power is also provided in all substations to trip circuit breakers in case of the loss of the 25-cycle traction power.

Except in the West Philadelphia substation, where the power director, or system operator, is located, there are no attendants. A switchboard with the necessary instruments, controllers and indicating lamps is provided in signal towers near the Arsenal Bridge, Bryn Mawr and Paoli substations. This board is connected with the board in the substation through a control cable, and the opening and closing of circuit breakers is done by the interlocking plant operator in the tower. Telephones are provided in all substations and in the signal towers controlling them, so that the power director is in constant touch with all substations and tower men. An alarm bell connected to the thermostat on the transformers is located in each signal tower.

CATENARY SYSTEM

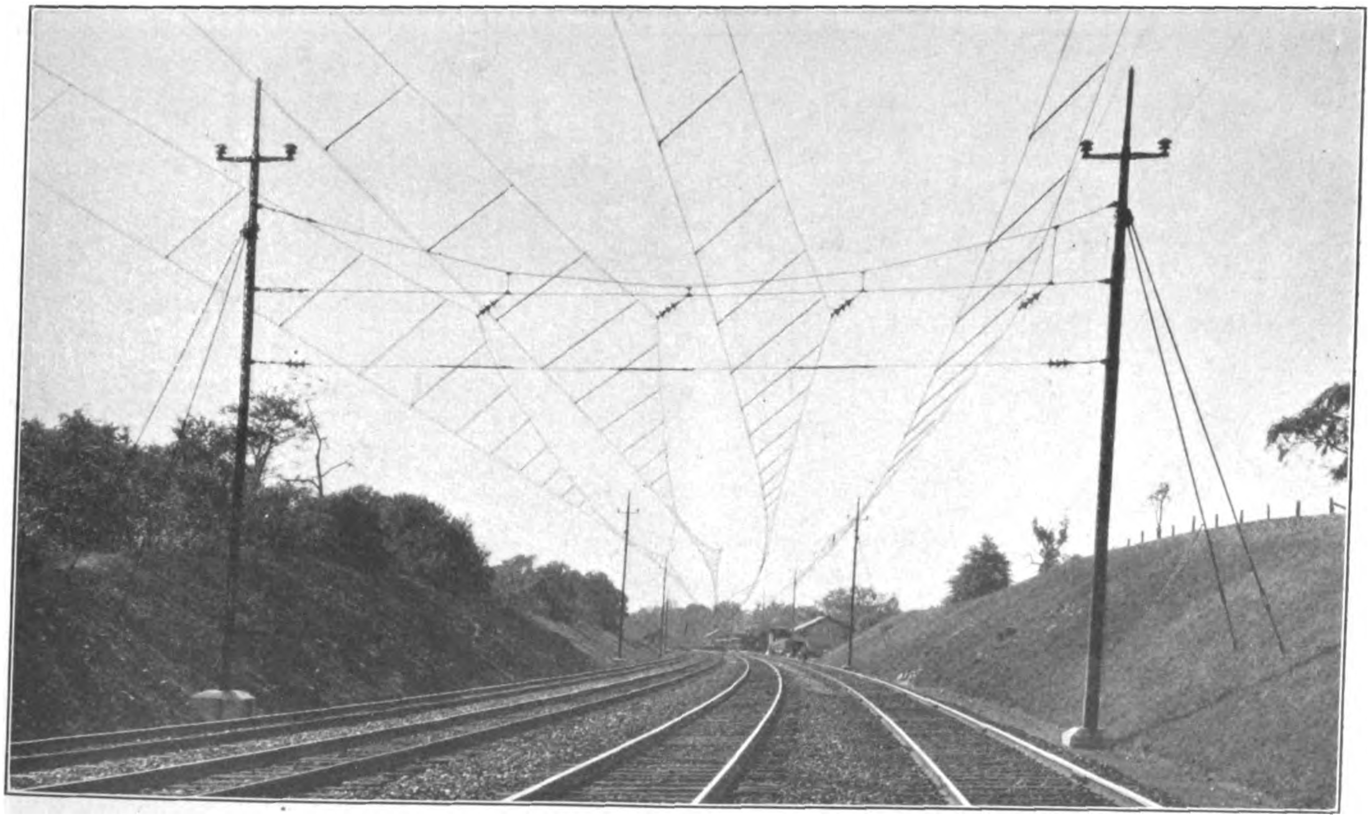
One of the notable features of the installation is the use of what are called the "tubular cross-catenary bridges" for carrying the contact wires. This construction was described in detail in the ELECTRIC RAILWAY JOURNAL for April 18, 1914. In brief, it consists of National tubular steel poles on either side of the tracks grouted into concrete foundations and anchored by double guys that are made of steel rods with turnbuckles. Spanning the tracks between the poles are two cross wires that form a cross-catenary support for the longitudinal wires.

The cross wires are of Roebling's extra-high-tension galvanized-steel strand, the upper strand usually being ¾ in. and the lower one ½ in. in diameter. Both are socketed at each end, and at one side a turnbuckle is installed to permit of adjustment. The top and bottom cross-wires are joined together by means of a vertical ¾-in. rod and suitable malleable iron clamps at the points where insulators carrying the longitudinal wires are located. Each insulator consists of three suspension-type units made by the Locke Insulator Manufacturing Company, the porcelain being 8 in. in diameter and the flashover value of the three being many times that of the line voltage.

The cross-wire bridges are located about 300 ft. apart on tangents, but are closer on curves, the exact spacing depending upon the degree of track curvature. Insulators are suspended over the center of each track, being offset toward the outside of the curves. The main messenger wire, which is strung out and suspended from the insulators, is a ½-in., extra-high-tension, seven-strand, double-galvanized steel cable, having a sag of 5 ft. in a span of 300 ft. At intervals of approximately 1 mile this messenger is socketed and dead-ended on one of the heavy structural signal bridges which are spaced about ½ mile apart. The messenger is insulated from the signal bridge by using two or more sets of three-unit suspension type insulators, these insulators being similar to those used for suspending the messenger from the cross-wire and other bridges.

Every 15 ft. on curved track and 30 ft. on tangent track a hanger supports the lower two wires from the messenger wire. The top one of these two wires, called the auxiliary messenger, is of No. 0 round copper, and its purpose is to give suitable current capacity to the system. The contact or trolley wire is a No. 000 grooved phono-electric conductor furnished by the Bridgeport Brass Company. Both wires are carried in a vertical plane, generally about 22 ft. above top of rail, except where they drop down to pass under an overhead highway bridge having insufficient clearance to permit this height.

In the terminal division, which includes the first 5 miles from Broad Street Station, and where the dense steam locomotive traffic causes a great deal of smoke and corrosive gas, a non-corrodible tube hanger is used.



PHILADELPHIA-PAOLI ELECTRIFICATION—TYPICAL CATENARY CONSTRUCTION ON SHARP CURVE

The hanger tube, which is 9/16 in. outside diameter and made of No. 18-gage metal, is fastened to a casting at each end by rolling or crimping the tube into grooves turned in the shank of the casting. Some of the tubes are of Monel metal, while others are composed of a bronze mixture containing 90 per cent copper.

On the Philadelphia division, where there is relatively less steam traffic, wrought-iron strap hangers 1 in. wide by 3/16 in. thick are used. The main messenger cable at the hanger clip is protected from corrosion by a collar of zinc inside of the annealed brass or Monel metal clip, which is bolted to the hanger strap. The flat-strap hangers, which have a quarter turn in them to minimize the area exposed to the wind in the direction crosswise with the tracks and to resist bending when placed on curves, are bolted to the castings that clamp the auxiliary messenger and trolley wires.

On tangents the castings at the bottom of the hangers hold only the auxiliary messenger, and the trolley wire is, in turn, supported from this auxiliary messenger every 15 ft. at points equidistant from the hanger. This insures a very flexible or smooth riding trolley wire.

On curves the two lower wires do not hang directly beneath the messenger, but the whole system swings into a curved plane until a balance is reached between its weight and the tension in the wires. The tensions in both the auxiliary messenger and trolley wires are selected so that in extreme hot weather there will be enough tension to prevent sagging, and yet in extreme cold weather the contraction will not cause stresses beyond the elastic limit.

The catenary system over each of the four main tracks is separated electrically from those over the other tracks, and trolley sectionalizing points with switches are provided at all cross-overs so that sections of the line may be temporarily cut out of service for repairs. On the main running tracks sectionalizing is of the "air-break" type, wherein the two ends of the trolley wire are spread apart, each end being lifted up at a different point, and an insulator is placed in each wire at a point above that where contact is last made with the pantograph. Thus, while the pantograph is making contact with one wire the other is lifted up and sectionalized.

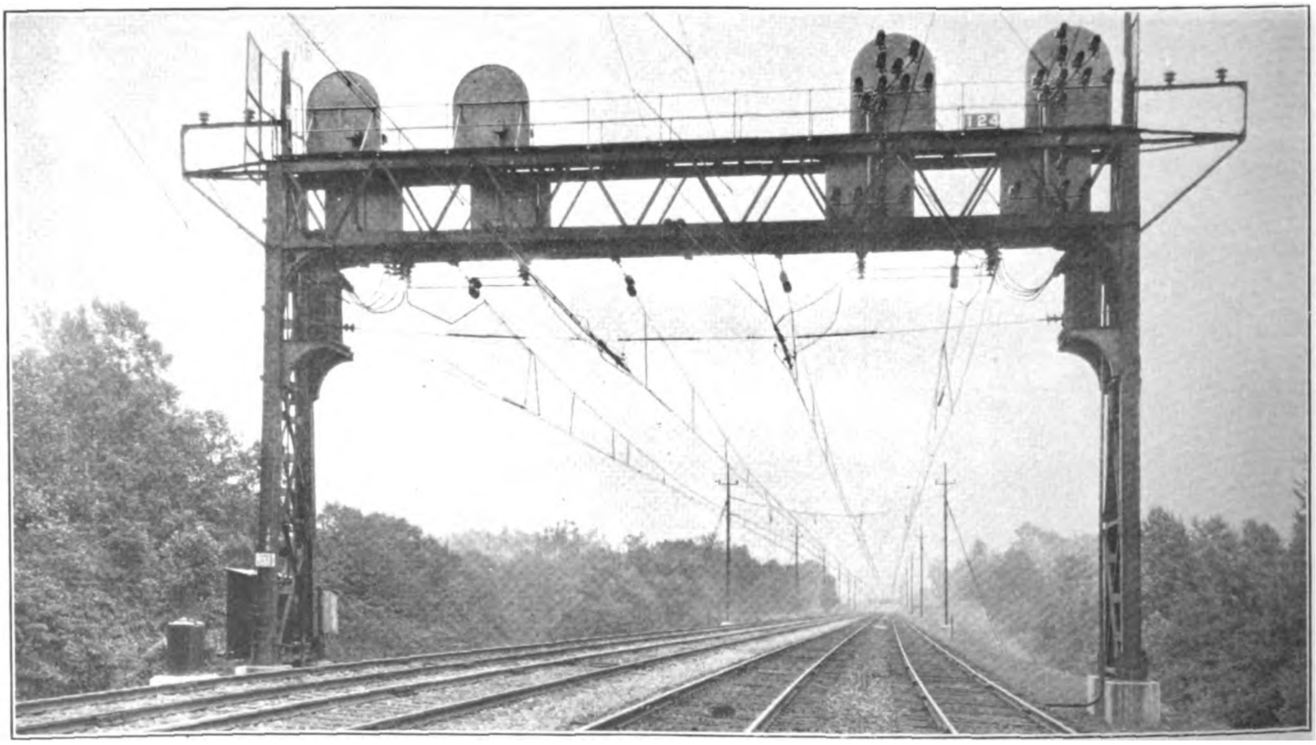
At cross-overs and in yards the trolley wires are sectionalized by means of wood stick insulators that have runners or gliders on each side, these being so arranged that, while the pantograph always makes contact with at least one of the runners, they are separated electrically. The switches are of the disconnecting knife type, mounted on top of the wood section insulators, and are operated from the ground by means of a long impregnated wooden switch stick.

An interesting detail in the erection of this catenary work was the use of cars, the top platforms of which could be readily raised or lowered by means of chain hoists. The cars were also equipped with removable outriggers so that in the four-track section the work could be completely erected over one of a pair of tracks without in any way interfering with the regular steam traffic on this track.

The electrified route is crossed in many places by overhead highway bridges of restricted height, and in such cases, where it was impracticable to raise the highway bridge, the trolley wires had to be carried underneath, each catenary system being steadied by being held with post-type insulators supported by brackets on the bridge structure. The transmission wires on either side of the main line tracks are also carried down underneath the bridge and supported from the bridge structure by insulators, the metallic brackets carrying the insulators being carefully bonded together and earthed by means of ground plates. To prevent pedestrians on the bridges from contact or interference with the wires, there have been erected solid wooden fences, either vertical or inclined, of sufficient height to shut out all view of the wires. To protect the trainmen, general orders have been issued that no employees are allowed on top of any car in the electrified zone.

TRACK-BONDING, SIGNALS AND TELEPHONES

Throughout the electric zone the rails are bonded with pin-type expanded-terminal bonds furnished by the



PHILADELPHIA-PAOLI ELECTRIFICATION—TYPICAL ANCHOR AND SIGNAL BRIDGE LOCATED AT END OF CURVE; TRACK-BOOSTER TRANSFORMERS MOUNTED AT BOTH SIDES

American Steel & Wire Company, the Electric Service Supplies Company and the Ohio Brass Company. One end of the bond has a terminal solidly welded to the bond while the other end has a soldered terminal. This enables the bond to be installed by being slipped back of the splice plate without the necessity of removing the plate. Each rail joint has two No. 0 bonds, but through the interlockings only one rail of each track is bonded, although all of the traction rails are connected together.

To minimize the inductive effect of the traction currents on adjacent telephone and telegraph wires, series or track-booster transformers have been mounted on the signal bridges at approximately 1-mile intervals. Details covering the method of operation of this scheme were published in the ELECTRIC RAILWAY JOURNAL for May 2, 1914. The need for this equipment, however, applies only to commercial circuits in towns along the route, because the railway company has had all wires along the right-of-way installed underground for some time, this action having been taken subsequent to the heavy sleet storm of March, 1914, which did a great deal of damage to overhead wires throughout the Eastern States.

In the electrified portion of the Philadelphia division, about 15 route-miles of four-track line, the old form of semaphore signals have been replaced by position-light signals made by the Union Switch & Signal Company. With these different rows of five lights each indicate the various positions of clear, caution and stop, the mechanical operating device being replaced by relays and Kerite wire. The signals are operated by 60-cycle current track circuits in the usual manner, but to nullify the induction effect of the traction current in the signal circuits of adjacent tracks, resonant shunts have been installed which permit the local induced currents to be shunted around the track relays and thus avoid disturbing the signal circuits.

In addition to the usual telephone facilities between substations and between the electric power director and the train dispatchers, there are permanent telephone boxes located at every signal bridge, approximately ½ mile apart, throughout the electrified zone. In consequence prompt and reliable intercommunication by telephone is possible between any parts of the whole system.

ENGINEERING AND CONSTRUCTION

The design and construction of the electric installation was carried out by Gibbs & Hill, consulting electrical engineers for the railroad company, in co-operation with the engineering department and the officials of the railway. All construction except that of the substation buildings and inspection building, which were covered by outside contracts, was carried out by a specially organized force. The mounting of the multiple-unit car equipment on the cars was carried out by the railroad forces at the Altoona shops under the direction of the motive power department, and the signal equipment and the changes in telegraph and telephone lines were designed and installed under the direction of the signal and telegraph departments respectively.

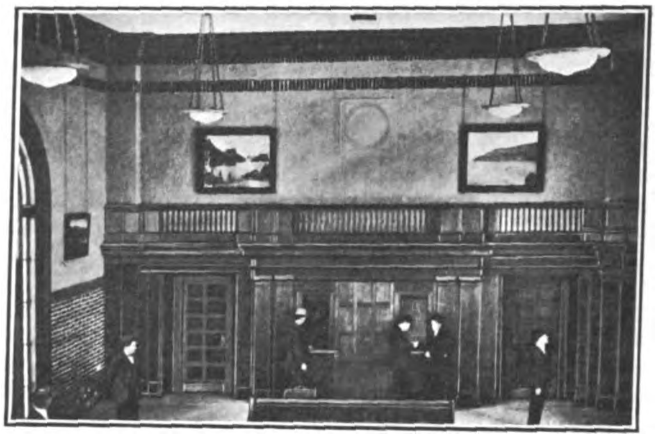
Surprise Tests on the New Haven

During the first six months of 1915 the New York, New Haven & Hartford Railroad made a total of 12,899 surprise tests covering signal observance by trainmen, and these developed a percentage of 99.75 that were perfect. In the period covered by the tests 31 per cent fewer employees were killed on the New Haven Railroad than in the corresponding six months of 1914, twenty-two employees losing their lives in the first six months of 1915, and thirty-two in the first six months of 1914. No passenger was killed by train accidents on the New Haven Railroad during the period covered by the tests.

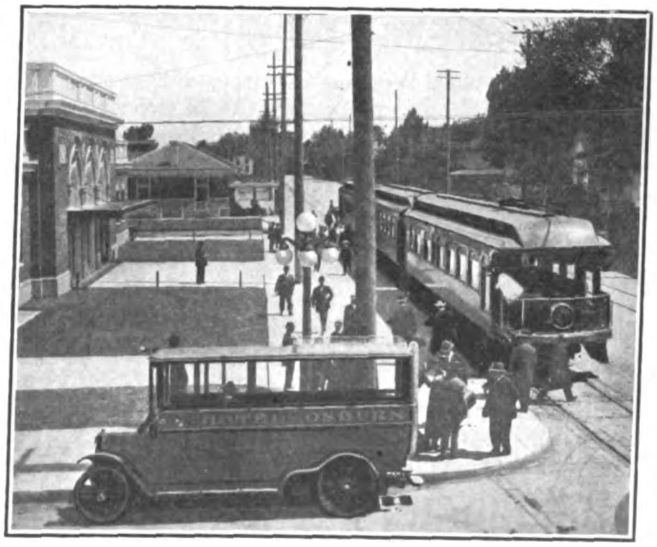
New Station at Eugene

Colonial Station Built by the Oregon Electric Railway at a Cost of $50,000

The accompanying views show the interior and exterior of a new station recently completed at Eugene, Ore., on the line of the Oregon Electric Railway. This station is 122 miles from Portland, the northern terminal of the Oregon Electric Railway. Although the station is much more elaborate than would be found in the East in a city the size of Eugene, it is not greatly different in appointments to several other passenger stations on the line of the Oregon Electric Railway.


INTERIOR OF PASSENGER STATION AT EUGENE

The building is of the Georgian Colonial type with red brick and stone trimming. The interior is a buff terracotta tone, the walls being finished in rough plaster. Quartered oak is used in the finishing, the walls being panelled. The general waiting room is 32 ft. x 56 ft., the baggage room is 28 ft. x 30 ft., and there is an express room 28 ft. x 28 ft. The floors of the main waiting room are of marble terrazzo.


NEW STATION AT EUGENE, WITH TWO-CAR TRAIN

A view of one of the limited electric trains on the Oregon Electric Railway, with a standard coach for the first car and an observation coach for the second car of a two-car train, is shown standing in front of the station.

Conference on Valuation

Delegates in Philadelphia in First Four Sessions Discuss Questions Dealing with the Reproduction Theory of Valuation, Original Cost as a Valuation Basis, Franchise Values and Land Values

The Conference on Valuation was held in Philadelphia, Pa., on Nov. 10, 11 and 12 under the auspices of The Utilities Bureau. Beginning with Wednesday evening, seven sessions were held, each one being devoted to some subject of particular importance in valuation work. These, in their successive order, were as follows: "The Reproduction Theory," "Original Cost," "Franchise Values," "Valuing Land," "Depreciation," "Going Value" and "Valuation and the Future of Public Utilities." The report below deals with only the early sessions, the others remaining to be covered in a later issue.

THE REPRODUCTION THEORY

The opening session of the conference on the reproduction theory of valuation was called to order Wednesday evening with Hon. Rudolph Blankenburg, Mayor of Philadelphia, as presiding officer. The opening remarks were made by Morris L. Cooke, director of public works, Philadelphia, and acting director of The Utilities Bureau, who described the formation and development of this bureau and its intention to take up questions similar to that of valuation at future conferences. He further stated that nearly all discussions between cities and municipally-owned utilities on the one hand and privately-owned utilities on the other are of interest to a middle group. This group, however, does not consist of the actual investors in the private companies or their actual operators, but rather of those who market their securities. He believed that disputed questions can be settled harmoniously between investors and public interests without there being much at issue. These parties would probably select the amount of cash actually invested as the best criterion of fair value, but the other interests, unsatisfied with this basis, have stirred up much confusion on the subject.

MR. ESHLEMAN'S CRITICISM OF REPRODUCTION THEORY

After Mr. Cooke's remarks the first address on the reproduction theory of valuation was delivered by John M. Eshleman, Lieutenant-Governor of California and former president California Railroad Commission. Mr. Eshleman first discussed the term "threat price," or that price which is determined by the amount of the commodity possessed by the prospective purchaser and has no relation to the cost of production. In competitive industries the tendency to exact a threat price is regulated within reasonable bounds by actual or potential competition. All monopolies possess the power of imposing a threat price and of producing a threat value to the patron. As soon as it is admitted that public utilities or natural monopolies should not be destroyed as such monopolies, then it becomes necessary to devise a method of preventing them from imposing a threat value.

Mr. Eshleman then took a supposed valuation of a gas property and showed how every element of threat value that the monopoly character of the enterprise makes possible is included, and the reproduction value is based upon what it would cost another or the government agency itself to build a similar plant entirely independent of the need of such a duplicate plant. This, to his mind, forms the entire basis of the reproduction theory of valuation. Monopoly lawyers and engineers contend for a price based upon an analogy with conditions existing under competition, and instead of measuring the price by what has been sacrificed or done, they want all that the public can be forced to give rather than build an alternative plant or induce a second utility to build such a plant. Mr. Eshleman believed that there are two absolute bars to such a theory. The one is the impossibility of imagining the monopoly never to have existed and the conditions which such monopoly has produced to be still there. The other is the impossibility of having the condition of the property of a monopoly affected by a duplicate competing agency and still remain unchanged.

As to particular phases of the reproduction method, Mr. Eshleman criticised the inconsistency of adopting the historical method with reference to some elements and rejecting it for others. He also deplored the logic of those who urge that original cost should always be used even in their reproduction theory when it would give more than present cost to reproduce, and at the same time repudiate costs of land and similar property when such costs are less than the present market value.

While opposed to the general reproduction theory, Mr. Eshleman stated that the historical method of reproduction is extremely valuable in supplying secondary evidence of original cost when the primary evidence is lost.

The proper amount upon which the utility should be permitted to earn in each case is an amount to be determined only by the governmental authority after consideration of all the facts, historical and otherwise, all the engineering and accounting data and everything to be learned about the utility. A general set of rules is impossible for existing enterprises, but in the future a liberal return upon the investment actually made would be all that is justified.

When government is dealing with monopoly it must of necessity deprive such monopoly of the power of taking all that it can get from its patrons. In this case the government must determine as a substitute what the monopoly ought to receive, and in this the safest and most just guide is what the agency has sacrificed and what service it has performed for the public. A different rule should obtain for the future than for the past. For the past there should be allowed such a valuation basis for earnings as equitable considerations warrant. The investor should receive that treatment which he has a right lawfully to expect and which, if possible of determination, accords the minimum return which would have induced the investment could it have been known in advance. For the future, according to Mr. Eshleman, an inducement which the investor is willing to accept must be held out as long as there is private ownership of utilities. The cost of doing the business plus a return upon the capital necessarily invested in the business, which return shall be as great as that offered in other businesses of similar hazard, is all that ought to be granted.

REPRODUCTION VALUE VERSUS FAIR VALUE

After Mr. Eshleman came H. Findlay French, attorney-at-law, Baltimore, Md., who gave an address on the relation of reproduction value and fair value. Mr. French mentioned that with the exception of a recent Maryland valuation covering only telephone instruments, no attempt has ever been made to estimate the cost of putting in not a duplicate plant but a plant located along the most economic lines, taking into consideration every present condition. He alluded to this failure not by way of suggesting that true reproduction cost should consist of an estimate of the cost of the most efficient and economic plant which could be constructed under prevailing conditions, but rather to point out that the present method of arriving at reproduction cost results in a figure which is not value in the ordinary sense of the word.

Under the reproduction method as applied, the calculations are based upon the costs of labor and materials as they exist to-day. It is well known, Mr. French said, that those costs have been steadily rising for years, and that therefore the values obtained by this method are almost certain to be higher than the actual costs incurred by the public utility. This criticism is really one which, while it affects the public adversely at the present time, might easily be one that some time or other might return to plague the investor. It would not seem fair to the public utility, if cost of labor and supplies had gone down rapidly in the last ten years, to state arbitrarily that the value of its property devoted to public use had decreased in equal amount. It likewise does not seem fair to the public to raise the value of the public utility's property for the reason that costs have risen. To carry this plan to its logical conclusion, it would be necessary to change the value of the property of public utility companies each time that there was a fluctuation in the prices of labor and materials, and such a change would, of course, lead to unstable and undesirable conditions.

In Mr. French's opinion, however, the reproduction method has a true value in that it is of service in ascertaining the present value. In other words, the reproduction method is of service when reasonably applied in the valuation of most kinds of physical property, but it is of no real service in estimating the value of other classes of property, such as rights-of-way, developed business, etc., for the values arrived at by its use are based upon mere conjecture. To obtain the fair value of the property of a public utility company it is necessary to take every relevant fact into consideration, and reproduction value is only one and by no means the most important of the many relevant facts.

DISCUSSION OF REPRODUCTION THEORY

The foregoing addresses were followed by a discussion which was opened by Prof. Morris Knowles, director course in valuation of public utilities, University of Pittsburgh. Mr. Knowles felt that estimates of the cost of reproduction are useful only when carefully and honestly made. Instances of intended inflation of this figure, however, are rare, and he objected strongly to the suggestion that reproduction cost and the current methods of estimating it were invented by engineers for the purpose of maintaining high rates of utility companies. This is certainly quite as far from the truth as would be the statement that original cost was invented by municipal officials for the purpose of depriving utilities of a portion of their property. Furthermore, it is no better argument for the opponents of the utilities to say that cost of reproduction is wrong because it is higher than original cost, than it would be for the utilities to say that original cost is wrong because it is lower than cost of reproduction. The relation of reproduction cost to fair value, according to Mr. Knowles, may be considered from two different points of view, that of law and that of equity. From the point of view of existing law, the speaker believed that a perusal of court decisions can lead to no other conclusion than that the cost of reproduction is the most important item of evidence in determining present value, and that upon it, with occasional modification, most of the decisions have actually been made. Such a conference as the present one, however, need not spend so much time in discussing the question from the point of view of law as from that of equity. It may well interest itself, not so much in what the law is as in what the law ought to be. There is a sense of compensation, of reciprocity, in the word "return" and in equity, when one speaks of a fair return, he means not a reasonable income upon some kind of valuation, but a giving-back to the investor a complete and fair equivalent for what he has devoted to the public service. Consequently, the amount upon which a utility is entitled to earn a fair return is the actual legitimate total investment in the property as determined by the total expenditures, not only in dollars and cents, but in time, energy, ingenuity and effort. Mr. Knowles believed that to the extent that the courts recognize cost of reproduction as the sole measure of fair value, they are in error and will eventually correct this by a reversal of position. Furthermore, the courts will be able to pierce through the fallacy that the basing of rates on actual original historical cost is a taking of property without due process of law.

A. B. Du Pont, consulting engineer, Cleveland, Ohio, was of the opinion that value varies directly in proportion to expected profits and inversely in proportion to risk. He said that for an appraiser to measure the value of a public utility property is for him to express at a given time what he believes to be the market price of the evidences of title to the property, and for an appraiser to measure the non-monopolistic value, he must express what he believes at a stated time would be the market price of the title if the profits and the certainty of the profits were not in any degree based upon monopoly.

Mr. Knowles then introduced several illustrations to show the difficulties of comparing two similar utilities on the basis of reproduction cost and summed up by saying that value is not dependent upon reproduction cost but upon the price of capital, the difference between expected earnings and expected expenses and the future activities of the utility within the limits expected to be imposed by government.

James E. Allison, consulting engineer, St. Louis, Mo., expressed the thought that it is not the business of commissions and other valuation bodies to find an existing value, for this they cannot do on account of their necessary regulation of rates. Their duty is to create a value that will be a just amount, based upon the exact sacrifice of the enterprise—in other words, the value that would have induced the creation of the utility. Then upon this value must be allowed a satisfactory rate of return.

The concluding remarks of the session were then made by Mr. Eshleman, who pointed out that "value" should be left out of the discussion, for what is being sought is simply an equitable amount that can be used as a basis upon which to allow earnings or to set a purchase price.

ORIGINAL COST

The session on Thursday morning was called to order with C. W. Kutz, chairman District of Columbia Public Utilities Commission, in the chair. Before introducing George W. Anderson, attorney-at-law, Boston, Mass., as the first speaker, Mr. Kutz described the beginnings of valuation work accomplished by his commission since a suitable appropriation was obtained a year and a half ago. Mr. Anderson then presented his address.

He discussed the question of how to get rid of the reproduction cost theory rather than the scheduled topic of actual cost as a basis for fair value.

GETTING RID OF REPRODUCTION COST THEORY

Mr. Anderson said that the reproduction cost theory is a menace to public safety, for it is not capable of sound and honest administration. He cited the case of the New York, New Haven & Hartford Railroad, in the case of which a reproduction value submitted to the validation board several years ago was widely understood to be a finding of the board itself and misled both stockholders and the public. He said that the reproduction cost theory originated with the courts. Rate-making power belongs solely to the legislatures, but the legislatures only half finished the job and the courts in taking over the legislative function made a bungle of the remainder of the program. The courts adopted the fair-value concept simply because the legislatures did not act, although the function of the courts is only to interfere to prevent confiscation. Mr. Anderson enumerated the only two things which to his mind are furnished by the private investor—*i.e.*, money and management, and the actual investment is in general all upon which the investor has a right to secure a return. For future cases the actual investment should be the criterion of valuation, while for existing properties the right to include land grants, etc., depends entirely upon specific factors in the company's history or any contract provision in its charter whereby the basing of a return solely upon the actual investment is prevented.

Mr. Anderson described how in Massachusetts, as a result of cases like that involving the Middlesex & Boston Street Railway, the capital honestly and prudently invested is treated as the controlling factor in the basis for fixing fair and reasonable rates. He noted that this practice has never been declared unconstitutional, and he predicted that if the question should come before the United States Supreme Court the validity of this theory would be upheld. In closing he advocated that national and state laws be passed requiring that rates be calculated on the basis of the actual capital furnished by the utility.

ORIGINAL COST AS CHIEF BASIS

Following the address of Mr. Anderson, Prof. Edward W. Bemis, of the Board of Supervising Engineers, Chicago, Ill., spoke on original cost as the chief basis for fair value. He defined original cost in the case of physical assets as the actual cost of the property now in use. In reproduction cost an attempt is made to determine the present-day costs of replacing the existing property, if it were suddenly removed or destroyed. In both cases, depreciation, or the estimated decline in units of service, should be considered. Estimates also are necessary, in both lines of investigation, but with the important difference that reproduction cost is all an estimate, based on current prices of labor and materials, while the original cost is only partly based on estimates, being obtained in large degree, and in some cases in almost its entirety, from the records of the company. The speaker said that the tendency to rely only upon reproduction cost has of late received many a deserved blow. Actual cost appeals to one's sense of justice and fair dealing and leads to security of investment, more than does the reproduction cost. How many investors who now champion the reproduction theory of valuation would adhere to it when it meant a rating down of their original investment by a decline in price levels? The oldest of the state commissions, the Massachusetts Gas & Electric Light Commission, has always sought to base a fair value or rates on capitalization, and capitalization on that part only of the cost that has been borne by direct contributions of the stockholders and bondholders. Professor Bemis did not discuss the propriety of this further step, successfully maintained in the recent Haverhill gas case, but mentioned it only as it is based on the acceptance of original cost as all-important.

DISCUSSION ON ORIGINAL COST

The discussion on the preceding addresses was opened by Robert H. Whitten, secretary Board of Estimate & Apportionment committee on the city plan, New York City. Mr. Whitten thought that the subject of valuation should be discussed from the point of view of the proper theory rather than that of existing law. He believed that under regulation the reasonable rate is that fixed by the normal cost of production, which is itself determined by the normal cost of labor and materials, the proper amount of depreciation and a fair return on the capital cost. The normal capital cost is difficult of determination as to whether it depends on actual cost or reproduction cost. As a general proposition, however, the public is entitled to a cost that is based on the reproduction of the service rather than of the identical plant. Yet because of the difficulties involved in creating a modern and improved design capable of giving the same service, the reproduction theory in practice has deteriorated to involve the reproduction of an identical plant. After discussing how the fair rate of return may be varied from year to year to offset appreciation or depreciation in reproduction cost, Mr. Whitten finally stated that any basis fair to all parties must sooner or later get back to actual capital cost. Utility service is continuous, and present cost is as much a result of past life as of present conditions. Normal actual cost has one advantage from the public point of view in that it does not involve fluctuations in cost, and no utility should be expected to assume the risks of speculation in land, materials and the like.

Edward P. Burch, consulting engineer, Detroit, Mich., stated that engineers were inclined to use an ethical basis in judging inventory items. If a railway actually paid for the paving between its tracks, the cost should be allowed but not otherwise. Attorneys, he felt, were less inclined to consider inventory items on the ground of equity and actual sacrifice. In regard to original cost, however, Mr. Burch was of the opinion that this can seldom be known and must be determined from secondary evidence secured by the reproduction method. Yet so far as the cost can be based upon the actual sacrifice of the investor, one important factor not complicated with hazy intangibles is obtained for a rate basis.

In reply to a question by Prof. John H. Gray of the University of Minnesota, Mr. Anderson stated that so far as he recalled there was nothing in the recent Fall River gas decision that would affect the ultimate upholding of the Massachusetts theory by the highest court. F. W. Stevens, general valuation counsel New York Central Lines, remarked that he had nothing to withdraw from his various attacks on the reproduction theory while on the Public Service Commission for the Second District of New York, but he never had been and is not now in favor of the unqualified statement that rates should be based on original cost. He did not believe that such a method is workable or just in a large number of cases, although in some cases it is absolutely right. The weakness of the whole discussion seemed to him to be the assumption that rates should be based on ethical theory, for no agreement can be reached as to what constitutes an ethical basis in spite of the correctness of such a basis.

Frederic P. Stearns, consulting engineer, Boston, Mass., heartily agreed with the idea that actual cost should be the basis for the future and he supported the plea for legislation to permit the use of this basis. For old properties it may not be possible or just to use the cost basis on account of equities that may have developed. Reproduction under present conditions, however, brings in irrational ideas, and Mr. Stearns saw no reason why the necessary reproduction should not be carried on according to the way in which the utility was actually produced. Every effort and element appearing in the course of development should be included in the reproduction total, except property never created by the utility. The requirements of ethics can be maintained by using original conditions in determining the reproduction cost of both physical property and overhead charges.

INVENTORIES

The subject of the making and maintenance of priced inventories was then taken up by Charles L. Pillsbury, chief engineer valuation bureau, District of Columbia Public Utilities Commission.

Mr. Pillsbury said that the inventory of physical items should be a matter of fact, not of controversy, and disputes should be settled in the field and not in court. Inventories can be maintained to advantage by the operating companies. The public will pay the cost in any case as the inventory maintenance will become an operating cost. A permanent valuation staff should be organized within the company, and the maintenance of the inventory will become a much more simple task than is generally assumed. A large proportion of the requisite data can be obtained almost automatically and with moderate extra labor. Inventory maintenance in this manner would result in highly desirable standardization of purchasing and construction methods and cost keeping.

Mr. Pillsbury's paper was discussed by James W. Phillips, of the grade crossing division Bureau of Survey, Philadelphia, Pa.; F. W. Ballard, commissioner and chief engineer Division of Light & Heat, Cleveland, Ohio, and R. J. Meigs, valuation engineer Western Union Telegraph Company, New York. Mr. Phillips spoke of the importance of having a proper inventory and the great care that should be taken in its formation and maintenance. He believed that the inventory should have the same general foundation regardless of the expected use. Mr. Ballard said that the reproduction cost is the basis of financial valuation and that even when available original cost is of far less value than reproduction cost. Mr. Meigs was of the opinion that the future use of the inventory data should be taken into consideration in making the inventory. He emphasized the importance of co-operation between commissions and utilities in making inventory investigations and said that the lack of a uniform method, a uniform understanding and general broadmindedness were adverse influences in inventory work that should be overcome.

FRANCHISE VALUES

The presiding officer at the Thursday afternoon session was L. S. Rowe, president American Academy of Political & Social Science. Before the main topic of the session, franchise values, was taken up, a paper by John G. Morse, appraiser Associated Factory Mutual Fire Insurance Companies, Boston, Mass., on the subject of valuation by approximation was read and discussed.

VALUATION BY APPROXIMATION

Mr. Morse described the methods of his organization whereby an accurate appraisal of manufacturing property for insurance purposes is made in a few days of actual field work and a few more of office work. He asserted that it is useless to waste time on minor detail in appraisal work when a large proportion of such work must of necessity be based on estimate. In cases where his organization had the time to make an examination of the usual detailed appraisal it always found the usual proportion based on estimate only and errors large enough to counterbalance the value of whole pages of minor items so laboriously collected. These errors do not materially affect the final result, as the law of averages takes care of that, but the same law of averages applies to the shorter or approximation method and the final figure obtained by the detailed method is no more accurate than that made by the shorter method.

In answer to the assertion that the courts will not recognize an appraisal unless made in fine detail, Mr. Morse said that it would take very little effort to demonstrate to any court how largely estimate enters into any appraisal and that an appraisal made on broad common sense lines can be just as accurate as one made in great detail.

The advantages of valuation by approximation were discussed by Mr. Cooke and W. N. Polakov, consulting engineer, Stamford, Conn. The plan of making inventories in minute detail possessed little value according to Mr. Cooke, who cited the case of the inventory made by the Philadelphia Electric Company at an approximate cost of $200,000. This might have been cut to one-fifth that amount had valuation by approximation been used. He maintained that manufacturing and industrial establishments underestimate the value of inventories, whereas public utility companies lay entirely too much stress on valuations. Moreover, he contended that public utility valuations are not made with a view to ascertaining the cost of service but solely for financial reasons.

The necessity for minuteness of inventories, Mr. Polakov thought, was not nearly so important as care in operation. In the New Haven power plants he was able to cut operating expenses 25 per cent without adding a cent to the investment by merely changing the methods of operation. It was pointed out by Mr. Stevens, however, that minuteness in inventory is a necessity in many cases. In a case in which he is interested the addition of just 1 cent to the value of a railroad tie would increase the value of that one item by $500,000. His experience when a member of the Public Service Commission for the Second District of New York, indicated to him that when utilities are treated no better or no worse than a manufacturing company, they do not complain of unfairness. Railroad men, he said, do not look with apprehension on the present valuations because of rate considerations, but because of the possible effect such valuations may have on the credit of the railroads in securing the millions needed for improvements.

DR. WILCOX ON FRANCHISE VALUES

The first address on the subject of "Franchise Values" was by Delos F. Wilcox, deputy commissioner Department of Water Supply, Gas & Electricity, New York City, and consulting franchise and public utility expert. Dr. Wilcox took up the various principles of franchise values as concerned in valuations for the purpose of (1) taxation, (2) rate-making, (3) condemnation (4) involuntary sale, (5) voluntary purchase, and (6) capitalization. In connection with the first point he stated that it is admissible to tax franchise values without reference to the possibility of their being reduced or destroyed in the future by any means. The value for such taxation purposes is to be determined primarily by the capitalization of the net earning power of the franchise after the deduction of a fair minimum return upon the physical property. The duration of the franchise and the fixity of rates are important indirectly as they affect the security of the property or its earning power and thus increase or decrease the fair rate of return.

In relation to franchise values in rate-making cases, Dr. Wilcox said that the valution in a tax case has no significance. He cited the Passaic Gas case and the final reversal granting no separate allowance for franchise value, and said that it is reasonably well-settled that no separate and distinct value need be assigned to franchises except in peculiar cases where these values have been measured and capitalized by authority of the State itself. Moreover, where franchise value is allowed for an original compensation paid for the instrument, it must be based on actual cost or assumed actual cost, without depreciation where the franchise is perpetual and with proportionate depreciation where its life is limited.

In condemnation proceedings the present worth of the prospective earning power, based on fair and reasonable future rates, is the real criterion. Fixed rates are an important consideration, but it must be remembered that in some cases they may prove disadvantageous to the corporation. Public regulation with its requirements results in a tendency toward conservative franchise valuations. The chief value of a perpetual franchise consists of the life and security it gives the physical property, and any attempt to measure its separate value is almost certain to lead to over-valuation, for the future net earnings are likely to be less than any definite estimate on the basis of past figures. This is caused partly by past neglect of depreciation and partly by the constantly increasing expenditures resulting from higher standards of service and greater interferences with operation. As regards limited franchises, these are undesirable to both grantor and grantee, which fact should receive major consideration in valuing them. If the full going value of the physical property without amortization charges is allowed, the value of the franchise should be greatly reduced. If, on the other hand, the franchise is allowed at its full value on the basis of its earning power in excess of a fair return without amortization charges, the present value of the physical property should be considered in the light of the fact that it will have only scrap value at the expiration of the grant. This suggestion, Dr. Wilcox admitted, is revolutionary, and probably a fair valuation would be derived by a method half-way between this and the usual one of basing the valuation upon the expected net earnings above a fair return.

In involuntary sales, or sales enforced in accordance with franchise or contract terms at the option of the city, it is not unusually provided that the property be taken over without franchise value being considered. Even if this agreement is extorted as a condition of securing the franchise, the utility is not entitled to any additional franchise allowance because the property is involuntarily surrendered. Franchise values in cases of voluntary purchase are matters of bargaining. Such values most frequently appear in resettlement cases, where the determination of a future purchase price is a primary factor and the city for certain considerations of fares or service agrees to capitalize the prospective earnings under the unexpired franchise on the old basis. As for capitalization cases, no franchise should be capitalized except to the extent of the necessary original cost to the grantees in the form of lump-sum payments to the public authorities. Annual fees should be treated as operating expenses. In closing Dr. Wilcox mentioned "fag-end" franchise, or franchises covering different routes and expiring at different times, and stated that the valuation of these should be made on the basis of their value to the owner as complete independent operating rights. If they have no value except in connnection with other rights that do not exist, no value should be assigned.

DISCUSSION ON FRANCHISE VALUES

H. DeF. Baldwin, president and counsel Queens County Water Company, New York; C. A. McLain, lecturer Harvard University, and A. Bettman, attorney-at-law, Cincinnati, Ohio, dwelt on certain legal phases of the question of franchise values. Mr. Baldwin admitted that net earnings were an important element in arriving at the value of a franchise, but that the bare permission to use the streets did not enhance the value of a franchise in the case of a company skillfully managed and thereby enabled to show fair profits. In such a case the going value of the concern was enhanced and not the franchise. No other property is appraised as are public utilities, and a frank recognition of the fact that capital has to be paid for should be evidenced in the allowance made for going value. He did not agree with Mr. Wilcox that reductions in rates give stability to a franchise and claimed that the security of the franchise depended on the ethical standards of the community.

Mr. McLain discussed the legal and administrative aspects of the problem. He said a franchise was a privilege, and all privileges may be taxed. His discussion had to do chiefly with the strictly legal side of the definition and limitation of a franchise and of the rights of the public and of the investors. A franchise, he said, was not an element for rate purposes. Mr. Bettman claimed that only for determining compensation in condemnation proceedings did a franchise possess a value. In all other cases its function is to protect, but beyond that it is valueless. The theory of condemnation proceedings should be that the franchise is simply revoked on payment of a sum sufficient to protect the investors who relied on the continuance of the franchise.

VALUING LAND

The session on Thursday evening, on the subject of land values in valuation work, was presided over by Charles F. Jenkins, proprietor *Farm Journal*, Philadelphia. The order of business covered an address by Hammond V. Hayes, consulting engineer, Boston, Mass., on the subject of the principles to be applied in such work, and discussion thereon.

PRINCIPLES TO BE APPLIED IN VALUING LAND

Mr. Hayes said that before any question of the value of land can be considered, two figures must be found, one representing the original cost of the land and the other what it would cost to obtain the land now in use and useful, if held in private ownership and acquired by the railroad company at the time of the appraisal. This last figure is the cost of reproduction. An analysis of both the original cost and the cost of reproduction shows that each may be divided into two parts, (1) the figure which would be assigned in condemnation proceedings as the price which a company should pay for the land acquired by it, and (2) the costs of condemnation, of damages, and of purchase.

The method which should be employed in ascertaining the first portion of both the original and the reproduction cost is that in which the normal market value is ascertained of adjacent similar lands as revealed by the prices paid in voluntary private sales, both at the time of the original acquisition of the lands by the company and at the time of the appraisal. The normal sales value of adjacent similar property should be found not for the time of the appraisal alone but as of the date of the original acquisition of the land under valuation. Moreover, each parcel of land—a parcel being defined as a separate and distinct purchase—should be associated with similar adjacent lands of which the past and present market value can be ascertained. In addition to the two normal basic figures thus found, the amount paid to the original owner of each particular parcel should be found and entered against that parcel. By this method the price paid by the company and the normal market value at the time of purchase is shown for each particular parcel, and there is revealed the difference between the cost to a company of its land and the amount which was paid at that time in voluntary normal sales of similar land. Thus a ratio is established by the use of which the reproduction cost may be found from the normal market value of similar and adjacent land at the time of the appraisal.

The figures obtained through the use of this method, according to Mr. Hayes, give the original cost and, for the reproduction cost, the price which a company has paid and in all reasonable probability would have to pay at the present time for the land now used for the benefit of the public. The fair present value, however, is not the reproduction cost necessarily or the original cost. If the normal market price of the land is increased by a well established multiplier the reproduction cost of the land thus found would be large, but it would show with all reasonable accuracy what it would cost to reproduce the land at the date of the appraisal, and it would give a measure of a maximum beyond which no reasonable claim for a fair rate base could be made. On the other hand, the original cost less depreciation is, in the majority of cases, the minimum cost. Between these two costs, concluded Mr. Hayes, the fair value must be assigned with fair and impartial judgment in the light of all other relevant facts and figures.

DISCUSSION ON LAND VALUATION

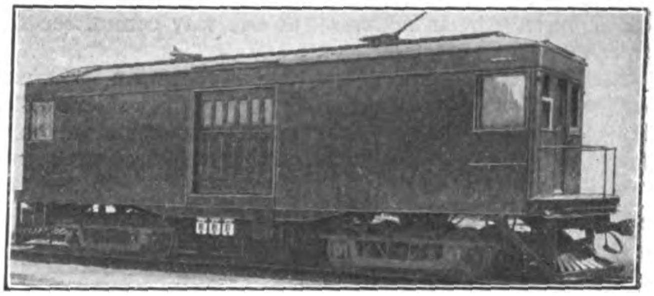
In discussing Mr. Hayes' address A. E. Helm, commerce counsel Kansas Public Utilities Commission, advocated strongly the theory that public utilities are really public property, and the stockholders are only the managers. For these reasons the public cannot allow any private speculation in land values, and the unearned increment becomes a negligible factor. Mr. Eshleman opposed the agency theory. In California the courts have decided that no class of companies can be made utilities and forced into public use unless the companies voluntarily acquiesce. He thought that the unearned increment as an element of value in the case of railroads was decreased in importance because these carriers enjoy their right-of-way on the express condition that it be devoted to only railroad use. Under such a condition the property is less valuable than that which may be used in any way. Mr. Stevens brought out the point that under the agency theory the public assumes all of the benefits and none of the risks. He stated that the court conception of value is now what it has always been—present market value. He mentioned the criticism that some railroad property was wrongfully acquired, but he insisted that by digging into the past the public did not restore such property to the original owners, but only wanted to acquire itself what it had never paid for.

Milo R. Maltbie, member of the advisory board division of valuation, Interstate Commerce Commission, next advocated the inclusion of appreciation of land values as an item of income to be credited as such, on the same theory that depreciation is allowed as a charge to operating expenses. A. Sapolski, member of valuation board, Delaware & Hudson Railroad, Albany, N. Y., objected to Mr. Maltbie's theory from the accounting point of view, for the appreciation as income would not be supported by any cash or other negotiable asset.

The session on Thursday evening then concluded. A report of the meetings on Friday, Nov. 12, will be published next week.

Express Car for Coffeyville, Kan.

Several unique features worthy of mention were embodied in the new locomotive-express car recently put in operation by the Union Traction Company of Coffeyville, Kan. This car is 40 ft. long over all and is of semi-steel construction with an arched roof. The underframe is built with center and intermediate sills formed of 8-in. 25½-lb. I-beams which extend continuous from bumper to bumper. The side sills are 8-in. 25½-lb. channels also extending the full length of the body, but reinforced under the wide center-door openings. The center sill is also reinforced at the center of the car by an additional 8-in. 25½-lb. I-beam which extends as far each way from the center of the body as truck clearances will permit. Features in the design of this car are corner windows, which slide toward the center of the car, and two drop sash openings, one on each side of the center and end doors. In plan the car body is rectangular but the underframe extends beyond the car ends forming semicircular exposed platforms. These platforms are provided with hand rails and, together with the window arrangement, have been found very convenient in switching and road service. The motorman's stand at each end of the car is surrounded by a 1¼-in. wrought-iron pipe bulkhead equipped with a motorman's curtain. This car body is mounted on St. Louis Car Company's No. 61 high-speed interurban trucks, equipped with 33-in. M. C. B. wheels with a 7-ft. wheelbase. The electrical equipment includes Westinghouse 306-volt motors. This car was built complete by the St. Louis Car Company, St. Louis, Mo.



COFFEYVILLE (KAN.) EXPRESS CAR

Measuring Specific Resistance of Earth

The Bureau of Standards has just reprinted from the Bulletin scientific paper No. 258. The paper explains a method for measuring earth resistivity without disturbing the soil, which has been used by investigators of the bureau. It consists in inserting four electrodes in a line in the soil, sending alternating current between the outermost two of these and making measurements of the electrical conditions between the other two by means of a bridge arrangement. In the nature of the case the measurement is not a simple one in theory, but would appear not to be extremely difficult in practice.

In the article on "Seven Years of Operating Experience of a Single-Phase Interurban Railway" printed in the issue of Nov. 6, the captions of the two tables appearing at the top of page 943 were inadvertently transposed. As was explained clearly in the article, there was a very great reduction in train delays in 1915 as compared with 1912.

American Association News

Biographical Sketches of New Officers of Washington Company Section—Details of the Two Week's Conference on the National Safety Code in New York—Notes on Engineering Association Committee Meetings

NEW WASHINGTON SECTION OFFICERS

As already announced, at the recent election C. S. Kimball was selected as president of the Washington Railway & Electric Company section and R. A. Vetter, secretary. Mr. Kimball has been in electric railway work since he was fifteen years of age, and is widely known in engineering and railway circles. He is a charter member and was an incorporator of the Washington Society of Engineers and is a member of the American Society of Civil Engineers. He is also a member of the executive committee of the American Electric Railway Engineering Association, and has served on its committee on way matters for the last five years, having been chairman of the way committee for two years.

Mr. Kimball was born in Dubuque, Iowa, in 1879, and was educated in the public schools in New York City. He started practical work in the engineering department of the Metropolitan Street Railway under the late F. S. Pearson. While at work he kept up his studies in the science of engineering. After six years with this company he joined the engineering staff of William Wharton, Jr., & Company as designer and computer of special track work layout, leaving this firm to join the staff of John Van Vleck, who was engaged on the design of structural steel for the Rapid Transit Subway Construction Company. In 1902 he returned to the Metropolitan Street Railway as assistant engineer, leaving a year later to enter the bridge department of Westinghouse, Church, Kerr & Company, which was at that time designing the Pennsylvania Railroad station in New York. Since 1904 Mr. Kimball has been with his present employer as engineer of way and structure. He has charge of all construction, maintenance and building work, including overhead and underground trolley systems aggregating in excess of 163 miles of track.

C. S. KIMBALL
President
Washington Company Section

R. A. VETTER
Secretary
Washington Company Section

Mr. Vetter is a much younger man, having been with the company but four years after serving elsewhere in one or two capacities of lesser importance. He hails from Ohio. After an elementary training in public and private schools he studied in Mt. Union College and Georgetown University, from the latter receiving the degree of Bachelor of Laws. Since entering the service of the company he has been the round of the managing, accounting and treasury departments, being at present connected with the legal department, the work of which includes the handling of claims.

SAFETY CODE MEETING

A preliminary note on the New York conference on the proposed national electrical safety code was printed in the issue for Nov. 6, page 953. At this conference the American Association was represented by the following delegation: W. J. Harvie, Syracuse, N. Y., chairman; C. L. Cadle, Rochester, N. Y., and B. F. Wood, New York, N. Y., and A. S. Davis, New Haven, Conn., alternates. These men were members of the sub-committees on lines, stations, operation and utilization respectively.

Each day's sessions of the two weeks' conference consisted of general morning meetings and afternoon and evening sub-committee meetings. As the work of the sub-committees progressed the revisions developed were referred to the general conference for approval. At the sessions the code was read rule by rule, and the results of the application of each were considered and numerous revisions were adopted.

Each of the members in attendance upon the conference and others who have presented suggestions to the committee will receive the complete revision as made at the New York Conference, in memorandum form, in order that they may have an opportunity to review the proposed code as it now stands. In addition to this, each member company of the American Electric Railway Association will receive through the secretary a copy of the memorandum code, with a request that the code be immediately studied with a view to its application on each individual property. Suggestions which these companies desire to make will be received at the secretary's office and forwarded to the committee for consideration. It is probable that the rules will shortly be recommended by the Bureau of Standards to the various regulatory and administrative bodies for trial use during a period of approximately a year, prior to their promulgation for definite and final adoption.

ENGINEERING ASSOCIATION COMMITTEE MEETINGS

A meeting of the Engineering Association committee on subjects was held in New York on Nov. 11 to plan the work for the year. In attendance were J. H. Hanna, Washington, D. C., and Martin Schreiber, Newark, N. J.

The executive committee met on Nov. 12 with the following members in attendance: John Lindall, Boston, Mass., president; W. G. Gove, Brooklyn, N. Y., third vice-president; J. H. Hanna, past-president, Washington, D. C.; C. S. Kimball, Washington, D. C.; C. L. Cadle, Rochester, N. Y.; C. F. Bedwell, Newark, N. J., and E. B. Burritt, secretary, New York, N. Y. E. R. Hill, New York, was represented by S. A. Spalding. The committee is in session as this issue goes to press, but it has already completed the subjects assignments for the committees and these will be announced as soon as the committees have been duly notified.

The subject and executive committees of the Transportation & Traffic Associations will meet in New York on Nov. 18 and 19 respectively.

Equipment and Its Maintenance

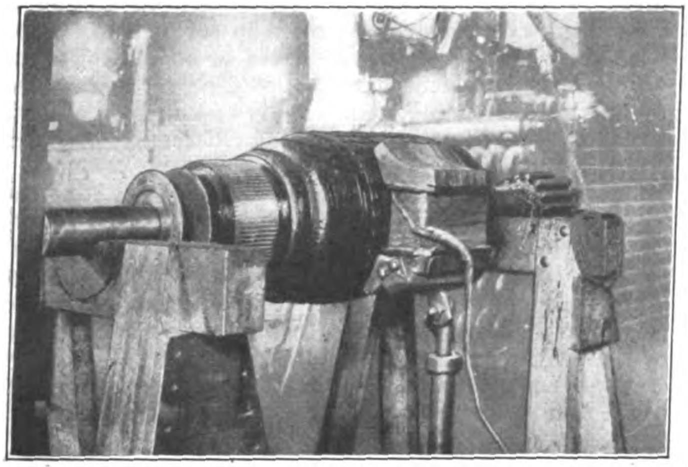
Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Where a Single Winder Maintains 951 Motors

BY JOHN SUTHERLAND, MASTER MECHANIC TRI-CITY RAILWAY & LIGHT COMPANY, DAVENPORT, IOWA

When a single winder can maintain, without difficulty, 951 motors averaging 4000 miles a month, it is evident that the system of inspection must be right or this enviable record could not be obtained. This result is attributed to recent improvements in the system of inspection and repairs effected by the mechanical department of this company. In 1913, with 667 motors in service, 306 motor-defect cards were turned in, of which eleven were for poled motors, the remainder for minor defects, many of which should properly have been charged to other parts of the equipment. Two winders were required at that time in the motor-repair department, whereas in 1914 only eighty-four motor-defect cards were turned in with 793 motors in service, and one winder had no difficulty in maintaining all the motor equipment in the service at a high standard. In addition to the 793 railway motors, this winder also maintained 158 compressors and did some outside work for the lighting and power department. This winder, an experienced man at this work, received 37½ cents an hour and, charging his entire yearly wage to railway motor work, the annual cost of winding per motor was $1.16. This is an exceptionally low figure, particularly when it is considered that the motor equipment included eight different types, seven General Electric and one Westinghouse.

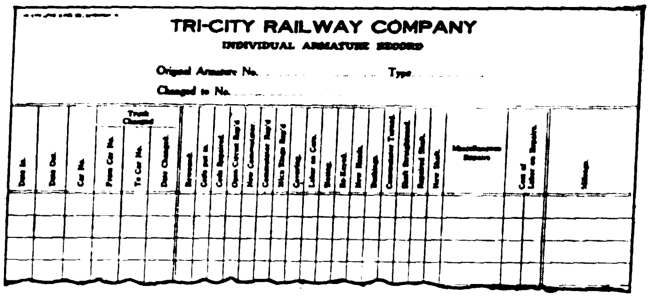


TRI-CITY RAILWAY'S MOTOR-REPAIR METHODS—YOKE FOR POTENTIAL TEST

The success which has attended motor maintenance methods on the Tri-City Railway is largely attributed to the methods of testing for electrical weaknesses and of keeping up the bearings, coupled with minor changes in the quality of material used in making repairs. All motors, regardless of their condition as revealed by inspection, are carefully tested before and after repairs. Whenever a truck is brought into the shop for wheel changes the motors are removed and also submitted to a potential and current test. The mechanical department is satisfied that the current test is more important than the potential test. First-quality material, combined with experienced workmanship, is considered a strong safeguard against weak insulation. As a check on the condition of the insulation, however, it receives a 110-volt a.c. test with a load of 30 amp. This potential test is made with the usual yoke mounted on a portable stand, which is shown in one of the accompanying illustrations.

Two different current tests are employed, depending upon the judgment of the winder as to the necessity for them. In the test generally employed the motor is mounted in the truck, the wheels are blocked with wedges and the motor leads are connected temporarily to a rheostat, after which the wheels are spun. In case this is deemed insufficient to develop all defective conditions the trucks are placed under a car in which position the repaired motor is required to move the car. Either of these energy tests will indicate weak solder joints or open circuits between the commutator and the winding. The excessive energy flow resulting from spinning the wheels is also considered an additional check on the condition of the insulation. Aside from the test value of spinning a motor under a car, the mechanical department knows that, in case of trouble, any car on the system may be brought into the shop with one motor.

In no case is the card report of the inspector taken as final. All armatures and fields are thoroughly inspected and tested whenever they are brought into the shop, which insures the electrical and mechanical condition of all motors when they are returned to service. The fields are also carefully examined and tested with a Century testing outfit. In many cases it is found that the field-coil cushions which were fitted when the motor was new no longer hold the fields secure. This is due to shrinkage both in the cushions and in the coils, and the condition is relieved by supplying as many additional cushions as may be required to restore the coil to the correct position. These cushions are made of scrap Pantasote or canvas, cut to the same form as the field coils, and two or three thicknesses of this material are sewed together for one cushion. To preserve them, the cushions are dipped in linseed oil and permitted to drain

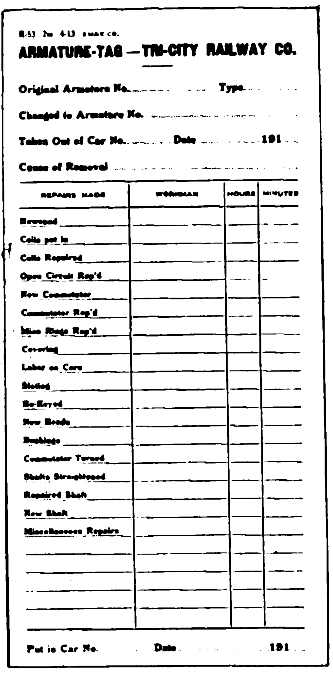


TRI-CITY RAILWAY COMPANY
INDIVIDUAL ARMATURE RECORD

Original Armature No. .... Type ....
Changed to No. ....

TRI-CITY RAILWAY'S MOTOR REPAIR METHODS—PERMANENT ARMATURE RECORD FORM before they are installed. As many of these cushions as are necessary to hold the pole pieces accurately in position are installed between the field coil and the motor frame. The making of the Pantasote and canvas cushions is part of the work of the curtain and trolley-catcher repairman.

Aside from the motor repair and test methods, another phase of the Tri-City Railway's electrical repair practices that has tended materially to reduce motor failures is the method of inspecting and testing all lightning arresters each year. The mechanical department believes that the success of any lightning arrester is not necessarily dependent so much upon the character of the arrester employed as it is upon the care exercised in keeping it in perfect operating condition. On seventy-two cars equipped with lightning arresters in 1914, only three armatures were struck by lightning. In the year previous, when the department was lax in its inspection and testing, fifty-three armatures protected by arresters were struck by lightning. All lightning arresters are now tested at 1800 volts a.c. every February for the spring storms. In addition to the voltage test the gaps in all arresters are carefully gaged to determine their accuracy. This simple test and check insures that the maximum flash point of all arresters is not in excess of 1800 volts.



ARMATURE-TAG—TRI-CITY RAILWAY CO.

Original Armature No. .... Type ....

Changed to Armature No. ....

Taken Out of Car No. .... Date .... 191 ..

Cause of Removal ....

REPAIRS MADE	WORKMAN	HOURS	MINUTES
Rewound			
Coils put in			
Coils Repaired			
Open Circuit Rep'd			
New Commutator			
Commutator Rep'd			
Mica Rings Rep'd			
Covering			
Labor on Core			
Slotting			
Re-Keyed			
New Bands			
Bushings			
Commutator Turned			
Shafts Straightened			
Repaired Shaft			
New Shaft			
Miscellaneous Repairs			

Put in Car No. .... Date .... 191 ..

TAG FORM FOR SHOP USE

Bearing practice on the Tri-City Railway, which accounts in a large measure for the success attained in motor-maintenance methods, was described in detail on page 944 of the May 15, 1915, issue of the ELECTRIC RAILWAY JOURNAL. Motor life is prolonged as well as the bearing life by planing the bearing caps and clamping the bearings securely in position instead of depending upon the dowels to fasten them. The armature records which are kept on the card form reproduced in an illustration on page 997, show that many armatures have not been reported defective, although they have been in service for ten years. Only 12 per cent of the armatures bought five years ago have been brought into the shop for repairs of any kind. Out of sixty equipments purchased two years ago, only three have been taken out of service for repairs. One of these was struck by lightning and two had low bearings. It is also interesting to note that the mechanical department requires only two spare armatures for 244 interpole motors in service.

Another interesting practice obtaining in this company's electrical repair department is that a repair tag placed in a canvas pocket is attached to the armature when it is removed from the frame. This tag contains a record of the cause of removal, the repairs made, the name of the workman and the time consumed. When the armature is returned to service this tag record is sent to the master mechanic's office, where the data are transferred to the office record card. The tag record form is also shown in the illustration at the top of this page.

How Sioux City Reduces Motor Troubles

BY C. M. FEIST, MASTER MECHANIC SIOUX CITY (IOWA) SERVICE COMPANY

Motor troubles in the equipment of the Sioux City (Iowa) Service Company are usually due to short-circuited fields caused by roasted insulation, or defective brush-holder settings. This is particularly true of double-end equipment where the short-circuiting of a few turns in a field coil results in excessive sparking and, in turn, grounding over of the commutator head. In order to locate this difficulty a Weston low-reading voltmeter is employed to test the fields. Measurements of a standard coil in first-class condition are first taken and, when the voltage in a coil under test drops below that for the standard coil, it is evident that the coil is short-circuited. If the reading is above that for the standard coil it indicates a poor connection. The voltmeter is also used in making armature coil tests in addition to the line-voltage test for short-circuits. The voltmeter indicates poor solder connections, cracked or bruised wire, and short-circuits.

Energy for the voltmeter test circuit is obtained from the trolley through a bank of fifteen lamps, in three series of five each. Preliminary to testing a single coil, all coils are connected in series in a circuit with the voltmeter. In case there is no indication of a defect the test ends here, but if a defect is revealed by the meter reading, each coil is tested to locate the trouble. The Weston low-reading voltmeter has been found particularly adapted to these tests, because it is not affected by magnetism, therefore field coils can be tested without removing them from the motor frame. Careful inspection and tests of all motors brought into the shop and through inspection of the electrical equipment in service has reduced maintenance so that it is necessary to wind only six armatures a year with 194 railway motors in service. With sixty-two air compressors in service it is necessary to wind only four armatures a year.

Concrete Pavement in the Track Allowance

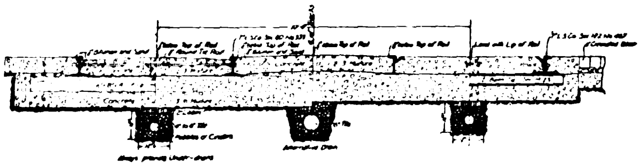
BY H. COLIN CAMPBELL, CHICAGO, ILL.

The widespread favor with which concrete is being received in the construction of street and highway pavements has aroused interest in its suitability for paving between car tracks. Permanence, ease of construction, moderate first cost and low maintenance charges are the distinctive merits claimed for concrete as a paving material. In Sioux City, Iowa, concrete paving between street car tracks has been used for a number of years and has given satisfactory and successful service. Some track in the city mentioned has ten-year-old concrete pavement which at the present time is in good condition. Concrete paving has been put in by the Sheboygan (Wis.) Railway & Electric Company, at Sheboygan and Plymouth, Wis., and the Mason City & Clear Lake Railway, Mason City, Iowa, has also had excellent success with concrete paving between its tracks in Mason City and Clear Lake. About three years ago six blocks were paved with concrete between the car tracks in Bay City, Mich., and the city engineer recently remarked that this was the best piece of pavement in the city. In addition to the cities already mentioned, Birmingham, Ala.; Denver, Col.; Port Huron, Mich.; Knoxville, Tenn.; Richmond, Ind.; Cleveland, Ohio; Minneapolis and Duluth, Minn.; Sioux Falls, S. D.; Manhattan, Kan., and Fond du Lac, Green Bay and Superior, Wis., have installed concrete paving in the track allowance.

Owing to the monolithic character of concrete pavement, careful attention must be given to track design so that the necessity for frequently tearing up tracks will be eliminated. Efficiency of concrete paving between car tracks, therefore, depends greatly upon developing and using a type of track construction that will insure that the rails and other track fittings will endure as long as the pavement itself. Steel as well as wood ties, entirely embedded in concrete, have been used, and time has proved that both properly embedded in well-made concrete are protected from decay and corrosion, hence will certainly last as long as the pavement. Repairs to street railway tracks consist largely of rail joint maintenance. Unless a welded or riveted joint is used, no present-day type of rail connection escapes the necessity for occasional maintenance.

In most cities where concrete has been used for paving between the tracks the material has been placed in practically the same manner as when paving the remainder of the street. Only granite and trap rock should receive consideration as coarse aggregate for concrete pavements in the track space. As vehicular traffic largely follows the tracks, especially in winter when the railways have swept away the snow, shock and abrasion are more extensive on this portion of the paved area than on the remainder of the street. If either granite or trap rock is used the pavement surface exposed to wear offers resistance to abrasion equal, in a properly proportioned and graded mixture, to that afforded by granite block pavement. When the film of mortar that is flushed to the surface by floating the concrete has worn off as a result of traffic abrasion, a properly constructed pavement will present the appearance of a mosaic in which the units consist of granite chips varying in size from ¼ in. to 1½ in.

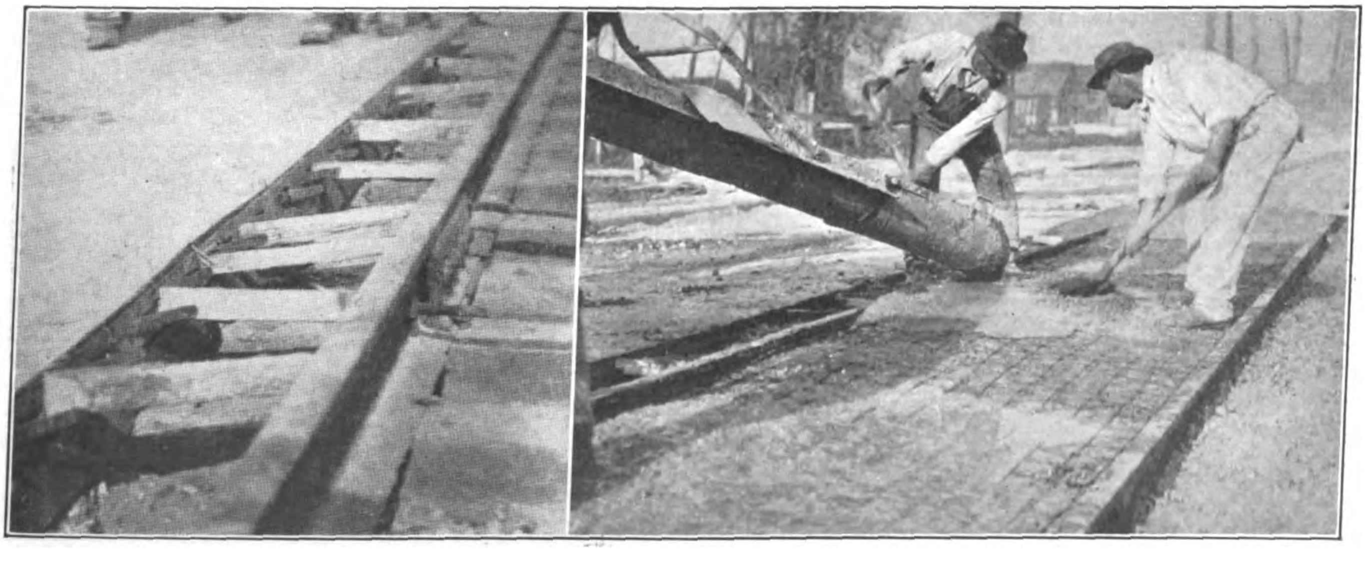
As the street section occupied by car tracks often receives more than its share of heavy vehicle traffic, wear along the rails is excessive. Heretofore the practice has been to lay stone block beside the rail, but where the amount of traffic is not great concrete can be laid directly against the rail. Two methods of construction have been followed when concrete is used. In some cases a construction joint is placed parallel to the rail and directly over the ends of the ties, and in other cases the concrete is laid from the rail to the curb in an unbroken stretch. When a joint along the track strip is contemplated the form is set and the concrete deposited for the street pavement between this form and the curb. After this strip is hard the form is removed and the space between it and the outside of the rail is concreted, leaving nothing between the two stretches of concrete except the construction joint at the ends of the ties. Whether a joint running at right angles with the ends of the ties is used or not, is very much a matter of personal choice. If used, there is no necessity for cutting the street pavement proper when renewing rails or repairing tracks. If the street pavement proper is laid directly against the rails, the track must be very carefully constructed, otherwise if there is settlement or movement, the pavement usually cracks. Rail wear on curves is more rapid than on straight track, hence rail renewals are more frequent, and it is generally considered advisable to place a construction joint at the ends of ties on curves even though such practice is not followed on tangents.



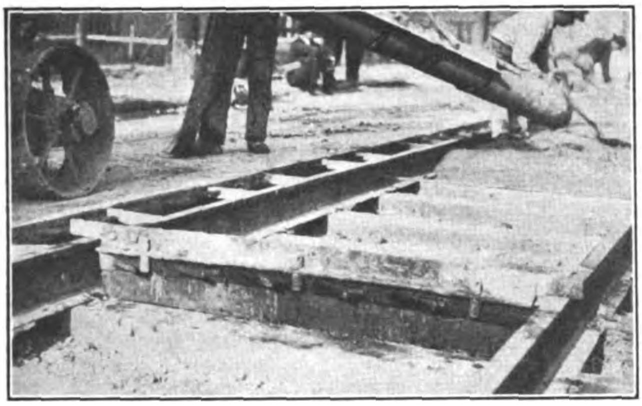
CONCRETE PAVEMENT—DESIGN FOR CONCRETE PAVEMENT BETWEEN STREET RAILWAY CAR TRACKS

When concrete is used for the entire pavement between rails, provision must be made for car-wheel flange clearance where the ordinary type of T-rail is used. In such cases the concrete flangeway is generally made 1 in. to 1¼ in. below the rail top. Investigation has disclosed that there is a strong tendency in present-day practice to form a deep groove for wheel-flange clearance. When the usual horse-drawn vehicle follows the line of rails, a detrimental prying action is exerted particularly when the wheels turn out of this groove, often resulting in chipping the pavement. To overcome this action a gradual crown can be obtained by using a strikeboard or template which is rested on the rails when striking of the concrete. Such a crown also provides drainage for the space between rails.

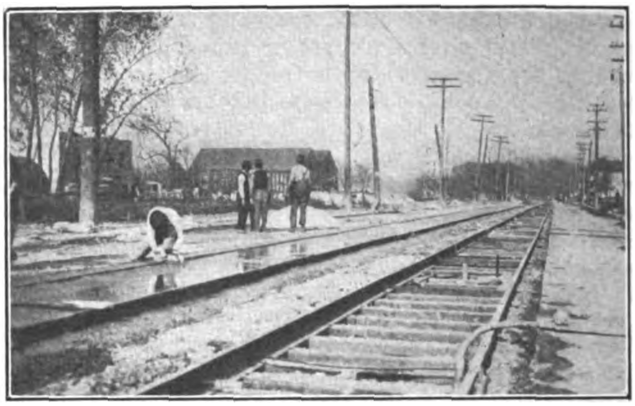
Generally speaking, the crown in the devil strip between tracks should start at the rail ¼ in. below the top and continue as a circular curve to the center line of the strip. The ¼-in. clearance at the rail will allow for false flanges which otherwise cause the formation of a chamfer varying from ½ in. to 2 in. wide by ½ in. deep when the concrete is finished off flush with the



CONCRETE PAVEMENT—BLOCKING OF JOINT PROTECTION PLATE IN POSITION PREPARATORY TO CONCRETING OUTSIDE OF OUTER RAIL; SPOUTING WEARING COURSE OVER MESH REINFORCEMENT LAID ON LOWER COURSE



CONCRETE PAVEMENT—JOINT PROTECTION SET IN PLACE



CONCRETE PAVEMENT—COMPLETED STRETCH OF CONCRETED TRACK

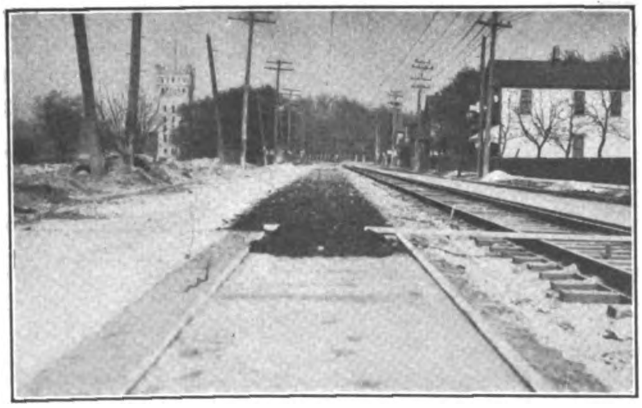
rail top. As the car wheel tread is always equal to and usually greater than the width of rail head, any false flange wear will extend beyond the outside of the rail. Often wear in the wheels forms a slight flange on the tread, thus causing the outer portion of the tread to come in contact with the pavement surface unless the ¼-in. clearance is provided.

When concrete pavement is used in the track allowance rail braces instead of tie rods seem preferable, as the tie rods tend to decrease the net section of concrete. If tie rods are used, however, those having a circular cross-section are preferable to the rectangular type now common in track construction where block pavement is used.

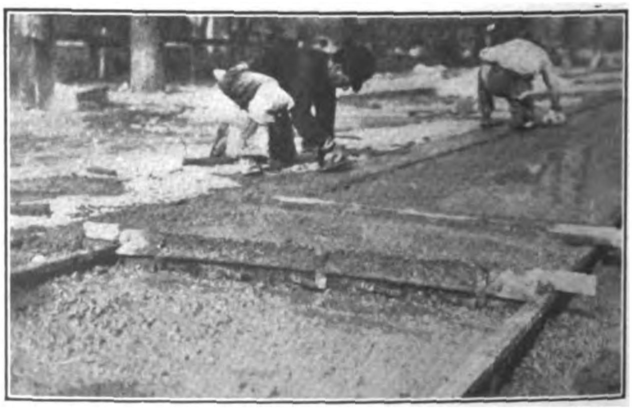
Owing to the severe shock due to the diversion of traffic near switch and frog points, extreme care should be exercised in the concrete construction at these points. Perfect bond between rails and pavement can be secured if the pavement is properly and sufficiently protected while hardening. For this reason special care should be taken to practise the best curing methods and close the paved portion to traffic while the pavement is acquiring strength.

In the fall of 1914 there was constructed in the village of Lyons, Ill., about 8500 sq. yd. of concrete pavement. About 4450 ft. of this pavement included two car tracks with a devil strip and a 12-in. strip of concrete outside of the outer rails. The pavement was 11 in. thick between rails and 7 in. thick between tracks. Two-course construction was followed, the top or wearing course being 2 in. thick, calling for one part Portland cement and two parts aggregate, the latter consisting of two parts sand and three parts of granite chips ranging from ¼ in. to ½ in. in size. The base consisted of a 1:2½:5 mixture in which a clean, hard, crushed limestone ranging from ¼ in. to 1½ in. in size formed the coarse aggregate. A machine mixer delivering concrete by means of a spout was used on this work. Crown between rails and in the devil strip was obtained by the use of a template resting on the rails while striking off the concrete, and wooden hand floats were used for finishing.

Transverse joints 50 ft. apart were installed by using Baker plates and ⅜-in. Carey Elastite. Several views of this work in progress are shown in the accompanying illustrations. An inspection of this work showed that many of these joints were low and uneven, which probably was a result of neglect properly to adjust the plates in the installing device and to finish even with the top of the plates. Finishing with a split hand float would have in part compensated for this. A longitudinal joint was placed at the tie ends and formed by two Baker plates, one was placed in the street pavement when it was laid and the other was placed with the 12-in. strip along the rails. Between these two plates a ⅜-in. Elastite expansion joint was installed. As the plate in the street pavement proper was sometimes placed too low and again too high, the contractor found it impossible to finish a neat joint. The only method of holding the inner plate up to the plate in the street pavement proper and against it was by braces set between rails and plate. This often required such a firm setting of braces that the track was thrown out of line. If any defects occur in this track construction later they are likely to consist of transverse cracks in the pavement between the rails at the rail joints and over tie rods owing to the nature of the track construction, which the paving contractor, of course, could not remedy. Rigid rail joints were not always secured in the track and cracks may later develop at these. Old rails and old ties were used and these will not give the desired results.



CONCRETE PAVEMENT—MOIST EARTH COVERING TO PREVENT TOO RAPID DRYING OF CONCRETE

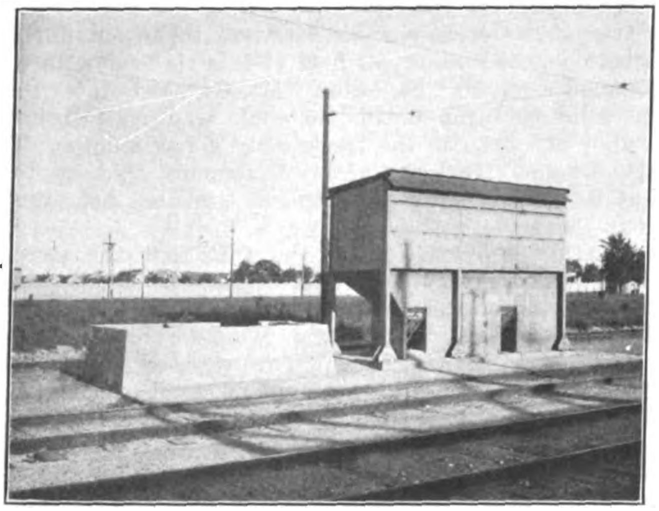


CONCRETE PAVEMENT—FLOATING SURFACE TO FINISH AFTER STRIKING OFF WITH TEMPLATE

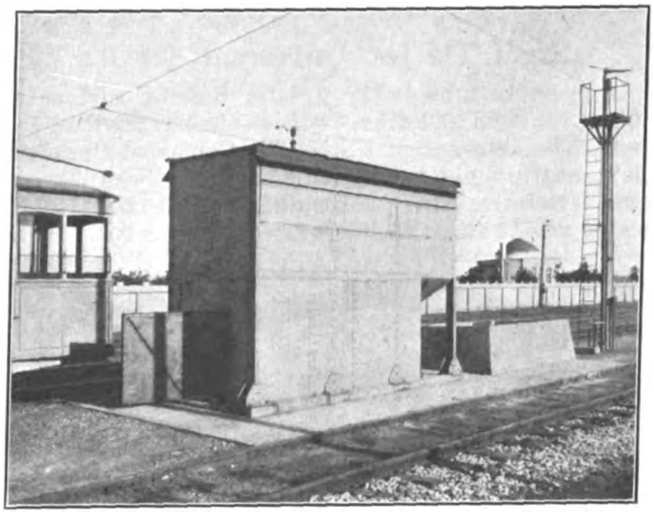
Cleveland Adopts Steel Coal and Sand Storage Bins

Permanency governed the design and construction of the Cleveland (Ohio) Railways operating station facilities, and in conformity with the general plan the mechanical department designed and constructed standard steel coal and sand storage bins for all of these stations. The steel bins are not only fireproof and waterproof, but they are practically indestructible. In these bins the gravity feed system is employed to supply coal and sand to the buckets, thus avoiding the use of shovels, and materially reducing the time required. The feed system adopted also eliminates waste at the bins, as it includes graduated slides in the chutes which enable the operator to cut off the supply of sand or coal instantly. Aside from the advantage gained by the elimination of waste, the neat appearance of the bins and surroundings is greatly in their favor. The design details of one of these bins is shown in one of the accompanying illustrations, while two halftones illustrate an installation at one of the company's new operating stations.

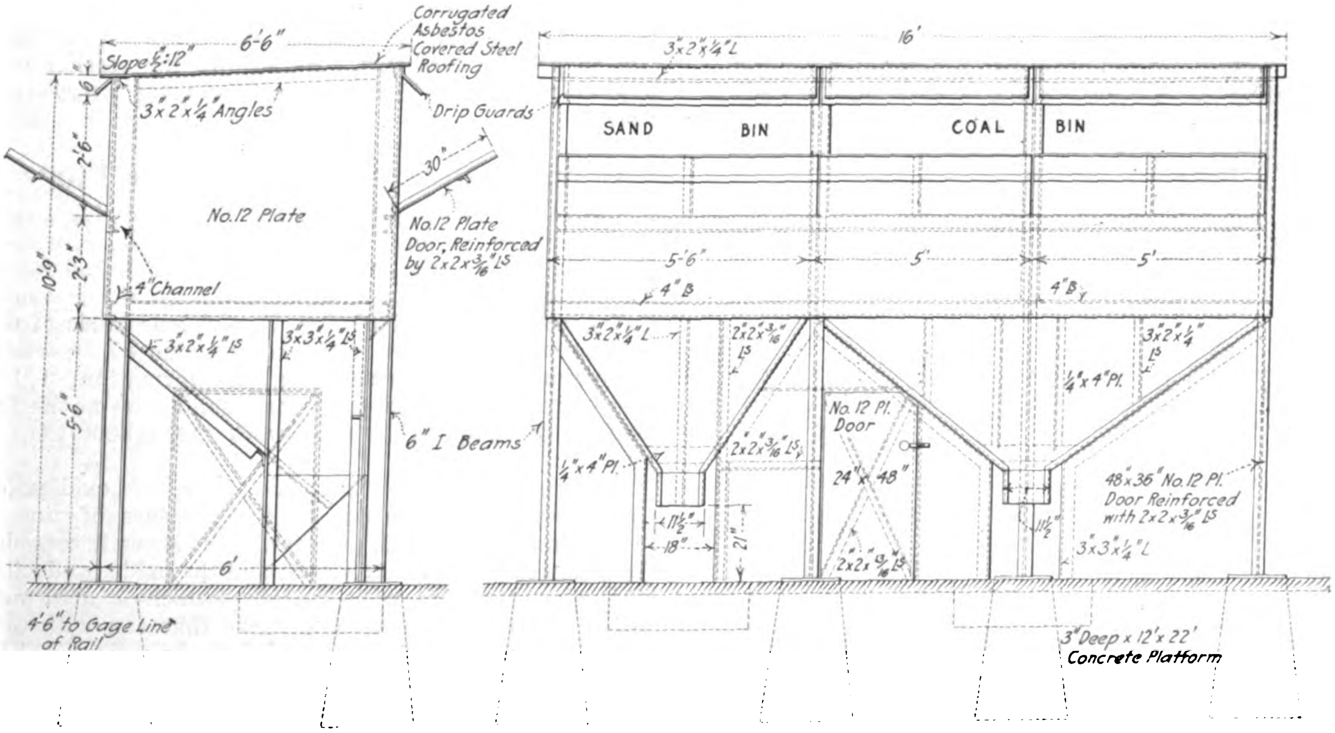
Coal and sand are supplied from a central storage yard, being delivered to the various stations by the company's supply cars. Dry sand is handled in bags, and a plank is laid between the car and the bin so that workmen may carry the bags to the bin door and deposit the sand inside. The coal bin has a capacity for 8 tons of anthracite egg coal, and the sand bin has a capacity for 160 cu. ft. The supply cars delivering coal to these bins have a capacity of 6½ tons, hence, when approximately 1½ tons of coal remain in the bin a fresh supply is delivered. The space below the sloping sides of the bins has been inclosed to provide storage for kindling, coal hods, brooms and other necessary tools which are used by the car cleaning crews. The cost of each bin installed on a concrete foundation and furnished with a concrete platform is approximately $500. Beside the bin shown in one of the accompanying halftones is one of the railway company's standard concrete trash bins. As a rule



CLEVELAND'S STEEL SAND AND COAL BINS—FRONT OF BIN STRUCTURE



CLEVELAND STEEL SAND AND COAL BINS—BACK OF BIN STRUCTURE

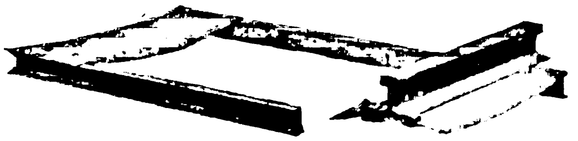

Corrugated Asbestos Covered Steel Roofing
6'-6"
Slope ½:12"
6
3"x2"x¼" Angles
Drip Guards
2'-6"
30"
No.12 Plate
No.12 Plate Door, Reinforced by 2x2x3/16" LS
10'-9"
2'-3"
4" Channel
3"x2"x¼" LS
3"x3"x¼" LS
5'-6"
6" I Beams
6'
4'6" to Gage Line of Rail
16'
3"x2"x¼" L
SAND BIN
COAL BIN
5'-6"
5'
5'
4" B
4" B
3"x2"x¼" L
2"x2"x3/16" LS
3"x2"x¼" LS
¼"x4" Pl.
No. 12 Pl. Door
¼"x4" Pl.
2x2x3/16" LS
24"x48"
48"x36" No. 12 Pl. Door Reinforced with 2x2x3/16" LS
11½"
18"
21"
2"x2"x13/16" LS
11½"
3"x3"x¼" L
3" Deep x 12'x 22' Concrete Platform

CLEVELAND'S STEEL COAL AND SAND BINS—END AND SIDE ELEVATIONS OF BIN STRUCTURE three of these combined sand and coal bins are provided in a storage yard at points convenient for the crews to replenish the cars, and a fourth bin is installed near the outlet to the yard beside the loop track, so that it is convenient for the crews on the regular cars when they are being looped for the return trips to the downtown district.

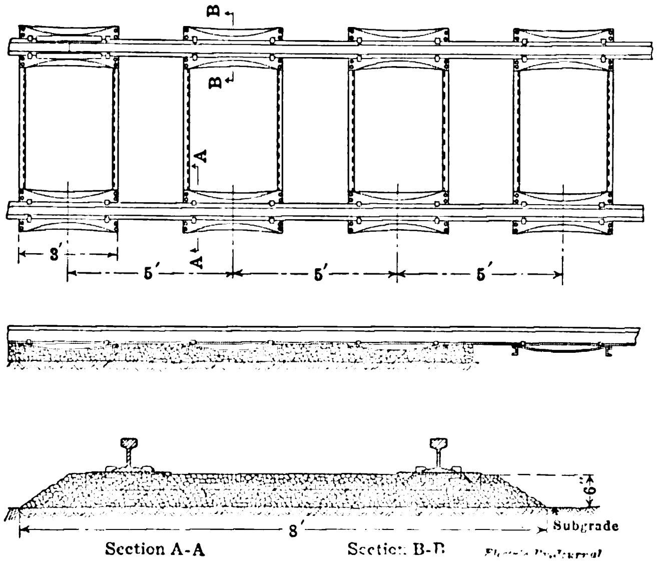
The bins are 16 ft. long over all by 6 ft. 6 in. wide by 11 ft. high. They are supported on substantial frames composed of 6-in., 12.25-lb. I-beam columns with 4-in. channels forming the transverse members. Drop doors, made of No. 12 steel plate reinforced with angles, open just below the roof line on each side of the structure so that the supply cars can refill the coal and sand bins from two sides. The roof is covered with corrugated, asbestos-covered steel roofing, given a slope of ½ in. per foot and designed to carry a snow load of 30 lb. per square foot. These bins are painted yellow to conform to the standard color adopted by the railway company for structures of this kind. They were designed in the office of Terrance Scullin, master mechanic, and installed by a contractor.

Steel Tie for Universal Service

In order to provide the greater bearing surface required for sand and other foundations lighter than concrete, The International Steel Tie Company, Cleveland, Ohio, has brought out a modification of its well-known twin steel tie. In the original design, the bearing plates are 13 in. x 36 in. in area and are flat. In the modified tie the plates are 15 in. x 36 in. and are turned over at the edges, as shown in the accompanying cross-section. This beveling converts the plate into a shallow, inverted trough of maximum bearing surface.



VIEW OF MODIFIED STEEL TIE CUT AWAY TO SHOW INVERTED TROUGH-SHAPED PLATES



PLAN AND SECTION OF MODIFIED TWIN STEEL TIE INSTALLATION

It is obvious that when such a plate is installed it will seat itself firmly in any kind of foundation. Furthermore, such a plate is particularly desirable for keeping the track in line at curves. It also permits tamping to be done from either side of the rail because the 45-deg. bevel of the plate will retain the ballast that is driven under it regardless of whether the ballast is stone or concrete.

Behavior of Treated Ties in Alkali Soils

In 1907 the Los Angeles & Redondo Railway (now part of the Pacific Electric Railway) treated a few thousand Oregon pine ties with "C-A" wood preserver and placed them in sandy, alkali soil. In 1910 a commendatory letter on the behavior of these ties was received from the engineer of that property; and in May, 1915, H. H. Gerhard, president of the C-A Wood Preserver Company, St. Louis, inspected the same ties. Had it not been for the old rail marks still showing on the ties Mr. Gerhard would not have been able to identify them because the Pacific Electric Railway no longer had the Los Angeles & Redondo Railway records. A photograph taken in 1907 served as first aid in getting the exact location of the ties.

One of the eight-year-old ties was taken out during September, 1915, and one-half of this tie is now in the company's office at St. Louis. Mr. Gerhard states that the solid condition of this tie would lead one to believe that it had been in the tracks only a few months. He also learned from the railway company that on this line the life of untreated Oregon ties does not exceed four years.

Another confirmation of the fact that the use of "C-A" wood preserver on ties resists the alkali action is found in the experience of the Union Electric Light & Power Company of St. Louis. This corporation has a switch track, the ties of which are exposed to hard conditions because cars of wet cinders stand over the ties for a day or so at a time. Four years ago the company asked this manufacturer for advice, fearing that the water which drained through the cinders to the ties might contain sulphuric or other acids. The water was analyzed and found to contain alkali, but no sulphuric acid. Thereupon the Union Electric Light & Power Company was advised to use black or red oak ties dipped in the preservative. This counsel proved correct, for although these ties are of cheap, inferior wood they are still in perfect condition. Heretofore the costlier untreated white oak ties had been removed every two years.

Deterioration of Fusible Boiler Plugs

The recent investigation of fusible boiler plugs, conducted by the National Bureau of Standards, developed the fact that the tin in certain plugs which had failed had become oxidized in service, the resulting oxide, SnO_2, melting above 1600 deg. C. Of four kinds of deterioration noticed one could be pronounced especially dangerous. This consisted in the formation of the above-mentioned oxide, either as a solid mass at the fire end of the plug, or as a network throughout the tin filling.

It was discovered that this form of oxidization in service was dependent on the presence of zinc in amounts as small as 0.3 per cent. Zinc is easily corroded by many kinds of boiler water, and the oxide product of this zinc, together with the tin (which is afterward attacked) may form a solid mass that can withstand the pressure of the boiler even after the uncorroded tin has melted out of the plug. The conclusion arrived at is that only material equal to Banca tin 99.9 per cent pure should be used for boiler plugs.

News of Electric Railways

JOLIET ARBITRATION DECISION RENDERED

Findings of the Board of Arbitration on the Chicago & Joliet Electric Railway

The decision of the board of arbitration selected to adjust the wage dispute between the Chicago & Joliet Electric Railway, Joliet, Ill., and Division No. 228 of the Amalgamated Association was handed down on Oct. 30. The demands of the men for an increase in wages were denied.

The company has been operating under a ten-year working agreement with the union. This agreement went into effect on May 8, 1907. It provides that the schedule of wages may be readjusted every two years upon demand, and in the event of a failure to agree that a board of arbitration be appointed. Prior to the expiration of the two-year period ended July 1, 1915, both the company and the union went on record as desiring a readjustment of the schedule. The company asked for a reduction and the union for an increase in wages.

There have been several supplementary agreements, and one arbitration previously under the contract. The present wage scale ranges from 26 cents an hour on the city lines in Joliet to 30 cents an hour on the Chicago division, a line running into the city limits of Chicago. The company contended that wages should be reduced 1 cent an hour on all lines while the union demanded an advance of approximately 6 cents an hour. Other demands made by the union included increased wages for shop men and a "closed shop."

The representatives of the company and of the men were unable to come to an understanding and each of the parties selected a representative for the board. Eneshia Meers was named by the company and Samuel J. Drew by the men. They in turn chose a third arbitrator. That this last was a difficult proceeding is indicated by the fact that the umpire was not decided upon until Sept. 11, four months after the opening of negotiations, when John W. Doney was appointed. All of the arbitrators are lawyers.

The board convened on Sept. 14. Three weeks were consumed in hearing the evidence and arguments. Counsel for the union stated in his opening address that the demands of the men for increased wages were founded upon the high cost of living and the fact that the men were receiving less than the average rate of wages paid to union labor in Joliet. Motormen, conductors and their wives testified as to what it cost them to live and submitted itemized statements of their expenditures; merchants compared current prices with those of five years ago; union officials, representing practically all the trades, testified as to the rates of wages paid in other industries.

The company based its case largely upon its financial inability to pay even the present rate of wages. In proof of this it exhibited the annual reports to the Illinois Public Utilities Commission. In his argument C. L. S. Tingley, vice-president of the company, proved from the union's own evidence that, while the men were receiving a lower hourly rate than that paid to other union men in the city their average yearly wage was considerably higher than the average yearly wage received in other trades. With regard to the increased cost of living he showed that if the average prices for foodstuffs as given in the union exhibits were applied to the weighted average amounts of food consumed in a workingman's family, as determined by the United States bureau of labor, there had been an increase of only 6 per cent in the last five years, during which time the wages as paid by the company had been advanced nearly double that percentage.

In a majority report, from which the representative of the union dissented, the board first of all concludes that its function is to decide the question of wages only, under the clause in the contract whereby it was created, and consequently if other questions were passed upon the decision with respect to them would not be binding upon the parties. The report, after setting forth the demands of both sides, goes on to make the following statement: "The decision of these questions necessarily requires an investigation of the financial condition of the company to determine its ability to pay the increase" and finds after stating the figures involved, that such ability is lacking. The inability of the management of the company to raise fares under the city ordinances, it says, makes the improvement of this condition impossible.

There was no question in the minds of the board from their personal knowledge and the evidence as to the wages paid to motormen and conductors on other roads in Joliet and surrounding cities, that the employees of the company were receiving more than the usual rate for such work. It could not be contended, the board said, that the cost of living was higher in Joliet than in contiguous cities with larger population and consequently a living wage was being paid. The report concludes with the following findings:

"1. We find, from the evidence, that the demands of the association, for an increase of the wage schedule, contained in the contract of May 8, 1907, and the amendments thereto, should be and the same are hereby denied.

"2. We also find that the demand of the company for a reduction in the wage scale, contained in said contract, and the amendments thereto, should be and the same is hereby denied."

MUNICIPAL LOOP PLANNED FOR ST. LOUIS

A detail plan for a proposed municipal loop to the downtown district of St. Louis, Mo., in connection with the free bridge has been prepared by Charles S. Butts, chief designing engineer for Director of Public Utilities Hooke, and is being considered by the Board of Public Service of that city. The plan proposes to utilize the old City Hall at Eleventh and Chestnut Streets as a new central interurban passenger station, to be the terminus of all interurban lines entering St. Louis. The old Four Courts will be remodeled and used as a central interurban express freight station, according to the plan, and would be reached by a loop for express cars only. An entrance to Cupples Station for all interurban lines would be provided by a loop on Spruce Street, branching off from the central loop to the passenger and express stations. The Illinois Traction System would be given the desired connection with Cupples station by the Butts plan, provided it will extend its line to the proposed new central passenger station in the old City Hall block.

The construction of the new passenger station will be with an idea of future use by a subway from the west, which Mr. Butts declares must come within a few years to care for St. Louis street railway and interurban lines to Missouri towns adjacent to St. Louis. In carrying out this subway plan Mr. Butts recommends that when the free bridge is completed the train service on the Eads bridge be diverted to the free bridge, leaving the lower deck of Eads bridge and the terminal railroad tunnel available for the interurban electric lines from the East Side. The electrification of the Eads bridge and the tunnel would make necessary an extension of the present tunnel from Eighth and Chestnut Streets, the end of the wagon and street car approach to the free bridge, according to Mr. Butts' plan. Surface stations every two blocks in the shopping district could be installed.

Mr. Butts has expressed the opinion recently that the St. Louis Terminal Railroad will be willing soon to make use of the free bridge for steam traffic and abandon the old structure to electric roads and vehicles. The loop proposed by Mr. Butts would begin at Seventh and Papin Streets, the end of the wagon and street car approach to the free bridge. It would extend north on Seventh Street to Chestnut Street, west on Chestnut to Eleventh, south through the new central interurban passenger station (now Old City Hall) to Walnut, east on Walnut to Seventh and looping back to Seventh Street to the free bridge.

President Kinsey of the Board of Public Service says that public hearings will probably be held on the problem of a municipal loop in connection with the free bridge before a definite decision is reached.

HEARING ON PROPOSED BUS FRANCHISE IN NEW YORK CITY

The question of additional bus lines for New York was taken up again by the Board of Estimate of that city on Nov. 8. This action followed the recommendation made on Oct. 15 by the franchise committee of the board that a franchise be granted to the New York Motor Bus Company to operate buses over 31 miles of streets in the borough of Manhattan. At the hearing on Nov. 8 William D. Guthrie for the Interborough Rapid Transit Company, operating the present subway and elevated lines and the prospective operator of new rapid transit lines now under construction, entered a protest. This company is controlled by the Interborough-Metropolitan Company, which also controls the New York Railways, operating surface lines, and the Fifth Avenue Coach Company, operating motor buses on Fifth Avenue. In the course of his remarks Mr. Guthrie said:

"My client is the largest taxpayer in the city and it is the city's partner in the dual subway systems in which the Interborough has bound itself to invest $76,000,000 and the city $66,000,000. The city's good faith is pledged to honest dealing with its partner. There can be no question as to that fair play demands that the city shall not force the surface lines into renewed bankruptcy, which is certain if hundreds of motor buses are allowed to take the cream of the short-haul traffic in the most congested parts of Manhattan Borough.

"If the proposed franchise is granted, there will be competing with subway lines 5.3 miles of 5-cent bus lines and 3.26 miles of 10-cent bus lines; there will be competing with elevated lines 0.10 mile of 5-cent bus lines and 0.31 mile of 10-cent bus lines, and there will be competing with surface lines 5.35 miles of 5-cent bus lines and 5.55 miles of 10-cent buses."

FORT WAYNE STRIKE SITUATION

Governor Ralston Intercedes for Former Employees—Hearing in Bondholders' Injunction Suit

Governor Ralston of Indiana, at the request of city officials of Fort Wayne, Ind., has named eight residents of that city as a "conciliatory" committee to attempt to bring about some settlement between the striking trainmen and the Fort Wayne & Northern Indiana Traction Company whereby the old men may be permitted to go back to work and resume their positions on the cars which have been filled for some weeks by new men employed by the company. The Governor announced the appointment of the committee in a letter addressed to Samuel M. Foster, in which he reviewed the deplorable conditions first brought about by the strike, and the consequent loss of wages to the employees and reduction in revenues of the company. He then called attention to the contract existing between the company and its employees which, the company asserted, set forth a method by which troubles of the kind under consideration could be adjusted, and that this contract is at this time involved in an action in the Federal Court.

The Governor stated that he would not do anything that would affect the contract in any way, and that the course he had determined to pursue must not be interpreted as an expression of his opinion of the contract, that he had no power or authority to interpret it and that this was a matter to be decided by the courts. He therefore appointed the committee of eight business men of Fort Wayne to use their own best judgment as to how to proceed to bring about a settlement, if possible, between the company and its employees. The newly-appointed committee held two meetings on Nov. 4 and stated that they would continue to hold such meetings for some days in an effort to arrive at some solution for a settlement of the differences between the company and its employees.

Judge Anderson in the Federal Court at Indianapolis on Thursday afternoon, Nov. 11, dismissed the action of the United States Mortgage & Trust Company in behalf of the bondholders of the Fort Wayne & Northern Indiana Traction Company for an injunction against Joseph C. Colgan, city officials of Fort Wayne and others to prevent activities against the property rights of the company and interference with its railway and lighting business. The court ruled on two points raised by the pleas of the defendant, first, that Colgan is a citizen of Illinois and beyond the jurisdiction of the Indiana court, and, second, that the Fort Wayne & Northern Indiana Traction Company is a necessary party to the suit, which would remove the case from the jurisdiction of the United States Court.

On Sept. 27 the employees of the city lines of the Fort Wayne & Northern Indiana Traction Company went out on strike in the face of a temporary restraining order granted by Judge Anderson in the Federal Court. The trainmen violated their working agreement with the company and demanded a new form of contract between the company and the Amalgamated Association involving recognition of the newly formed union and the closed shop. Within a few days the company was in full operation on schedule and new men were assigned to the regular runs. The labor unions then through their officers and sympathizers brought about a boycott of he city lines by intimidation, threatening with discharge from their occupation all persons who rode on street cars. Through city officials and employees the patrons of the lighting service of the company were induced to break contracts with the company and take current from the city lighting plant. The suit for an injunction was brought to obtain relief from these attacks.

NEW TOLEDO MAYOR CALLS FRANCHISE CONFERENCE

Mayor-elect Charles M. Milroy of Toledo, Ohio, called a conference on the afternoon of Nov. 4 to consider the franchise question in that city. The invitation to the conference was sent to Johnson Thurston, president of the Public Utilities Conservation League; James Thompson, president of the Citizens' Franchise Association; Edward P. Usher, president of the Central Labor Union; Carl B. Spitzer, president of the Commerce Club; Henry L. Doherty, of the Toledo Railways & Light Company; Negley D. Cochran, editor of the *News-Bee*, and to the editors of the *Times* and the *Blade*. In his invitation to the conference the Mayor said:

"Believing that the people of Toledo want the street car question settled at once by the adoption of an ordinance which is just to every interest, and in the framing of which every interest has had its view, I venture to invite you to meet with representatives of the other organizations which took an active part in the recent franchise election, at the Commerce Club, for the purpose, if possible, of devising some proper plan or agreeing upon an ordinance which will be wholly just to the people of Toledo and to the company while it operates under the same, and will absolutely assure the right of the city to take over the street railway when it is ready and able to do so."

At the conference, attended by all but three of those who were invited, an informal organization was formed to push the proposal for an immediate settlement of the street railway question. Mr. Milroy announced to the conference that it is not his intention to preside at the subsequent meetings. He said:

"This question fills the whole civic horizon. I am anxious to have it settled early in my administration, so we can go ahead with other constructive work. For this reason I am offering my good offices to get together the factors which were most energetic in the recent campaign in which the Dotson ordinance was defeated. I myself am favorable to municipal ownership, as you know, and I do not believe that any franchise ordinance will be accepted by the people which does not make clear and indisputable the right of the people to take over the street railway system whenever they wish it. We can't get anywhere while we are all working at cross-purposes. We are all for Toledo and wish to play the Toledo game. We want to see Toledo go ahead. This is the spirit the newspapers have been advocating. Therefore, it seems to me to be the most propitious time to get the forces together. Having done that, I will step out. I have no plan to offer."

Previous to the meeting on Nov. 4 Mr. Doherty was reported to have said:

"It is our intention to do the best we can under the circumstances. If we can obtain any more money for the improvement of the property without a franchise we will do that, but I deem that is impossible. I shall wish to consult with other members of the company before I make any definite announcements as to future policies."

SEATTLE COMPANY'S CASE FOR RELIEF FROM PAVING EXACTIONS

Charles A. Reynolds, chairman of the Washington State Public Service Commission, has fixed Feb. 1 as the date for a hearing on the petition of the Puget Sound Traction, Light & Power Company, Seattle, to be relieved of certain of its franchise obligations.

The petition of the company asks that an order be made by the commission relieving it of franchise obligations requiring it to pave its right-of-way at the same time the city paves the remainder of the street; requiring the payment of 2 per cent of its gross earnings annually to the city and the payment of a portion of the cost of construction of bridges utilized. In 1914 the 2 per cent of the gross earnings amounted to nearly $72,000, and the paving item amounted to considerably more, inasmuch as the company is required by its franchise to pave with the same material, and in the same manner, the 18 ft. in the center of the street at the same time the city paves the remainder of the street. Officials of the company assert that the Second Avenue repaving job, carried out last year, included new track construction, and cost the company about $90,000.

In fixing the date for a hearing on the petition the Public Service Commission declines to accept the offer of the company to advance $10,000 for the completion of the commission's valuation of the street railway property in Seattle. In advising the City Council of the rejection of the offer, and the fixing of the date of hearing, the commission points out that the company has expended large sums of money for experts in the valuation of its properties, and that common justice demands that a hearing be granted. The commission will allow the city to use all of the data now in the possession of the commission and authorize the city's experts to investigate the books and accounts of the company, to ascertain the true value of its properties.

The valuation placed on the property of the Puget Sound Traction, Light & Power Company, exclusive of power, by experts employed by the company is $19,737,122 as of March 31 last. The gross earnings of the company for the last fiscal year were $3,474,885. Including an item of $288,105 for depreciation, the net earnings for the year were $537,105, which equals a return of 2.71 per cent on the money invested. The valuation of the company's properties was undertaken by the Public Service Commission more than a year ago, and the work was about three-fourths done when it was abandoned because of lack of funds. It was because of this situation that the company offered to advance $10,000 to complete the valuation, with the understanding that the commission would ask the next Legislature to make an appropriation to repay that amount.

PRESIDENT PELLISSIER TESTIFIES IN HOLYOKE ARBITRATION

The arbitration board sitting in the wages and hours of work case of the Holyoke (Mass.) Street Railway was scheduled to reconvene on Nov. 12 at Holyoke, following a recess of about a week. At the hearings last week L. D. Pellissier, president of the company, was called to the stand and testified at length upon the company's history, its consolidation with the former Amherst & Sunderland Street Railway, and the working agreement last framed. It was arranged that the arbitrators should receive a copy of all agreed matters to assist in the decision of those in dispute. Mr. Pellissier said that as a rule the company's employees did their work well, but that he was not prepared to say that he would grant increased wages at present, even if the money for this purpose were available. Between 1903 and 1912 hourly rates rose from a minimum of 20 cents to a maximum of 26.75 cents, with reductions in the graduated scale to four years. Since 1891 the company has paid dividends at the rate of 8 per cent, but has not earned the dividends in the last three years. No signed agreement with the union dated back of 1912. At the last hearing representatives of the men urged that the board refuse to consider the financial condition of the company as a factor in the wage issue, and various testimony relative to the increased cost of living was submitted by the men. A former president of the union admitted that the steadiness of the work was a good feature of car service.

ELECTION AFTERMATH AT CLEVELAND

As soon as the franchise vote in Lakewood, suburb of Cleveland, is legally certified the Cleveland (Ohio) Railway will put the new system of fares into operation, and ten-minute service will be restored to the Clifton Boulevard line. The rate of fare between points in Cleveland and any point in Lakewood will be 5 cents straight instead of eleven tickets for 50 cents. Within the city of Lakewood the fare will be at the rate of five tickets for 15 cents, the same as in Cleveland.

The company has not yet devised a system of payment whereby passengers between points within Lakewood and those riding between Lakewood and the city can be identified. Officials of the company are of the opinion that the receipts from Lakewood business will not be materially affected by the change. While the fare between cities will be slightly higher, the Lakewood reduction will just about offset the gain. The traffic within the city of Lakewood is heavy, as there are a number of very large factories on the south side of the town and many of the employees live within its limits. One of the provisions of the franchise is the extension of the double track on Madison Avenue from West 117th Street to Rocky River, a distance of 2½ miles. Work on this extension will be begun as early in the spring as possible.

On Nov. 3 the Cleveland Railway filed with the District Board of Complaints a demand for a reduction of almost $500,000 in the valuation of its real estate, made for tax purposes in 1914. It claims its property has been appraised at almost double the amount fixed on adjoining property. If the appraisement is reduced to the amount fixed for 1913, the company expresses its willingness to pay the taxes. Theodore Bates, president of the board, expressed the belief that the demand has merit. This board must consider the demand and then consult the State Tax Commission and the local deputy tax commissioners.

RIOTING MARKS ATTEMPT OF WILKES-BARRE COMPANY TO RESUME OPERATION

After the first attempt to operate cars on Nov. 4 had resulted in the show of disorder by strike sympathizers, T. A. Wright, general manager of the Wilkes-Barre (Pa.) Railway, held a conference with Mayor Kosek and agreed to allow the city authorities twenty-four hours in which to perfect the police organization before again trying to run cars. The Mayor consequently swore in 100 special policemen. Half of this number were turned over to a former member of the State Constabulary who drilled them for mounted police duty. The other fifty men were spread over the city to do patrol duty in place of the regular patrolmen, who were placed on posts and held as reserves to meet riot calls. This truce of holding the cars in the carhouse did little good, for during the following day strike sympathizers tried to rush the Wood Street carhouse where the new men are quartered. As a result of this attack a number of shots were fired and three of the attacking party were hit.

Later in the day, Sheriff Kniffen refused to swear in as deputy sheriffs the 250 new men engaged by the company. He defended his stand on the ground that there are plenty of men in Luzerne County whom he can call in case of emergency. The sheriff, however, sent an appeal to the State Constabulary for aid in preserving order in the outlying towns. About fifteen men arrived as a result of this request, to aid the troops regularly stationed near Wilkes-Barre.

Other attempts by the company to operate cars on Saturday were met by rioting, particularly in the suburban districts. Public Square Park, where rioting had occurred earlier in the week, has been roped off and no one was permitted to enter.

Late on Nov. 6 some of the engineers and firemen at the power plants left their posts and joined the striking trainmen. The company, apparently anticipating this move, pressed other men in their places.

Continued rioting by mobs that gathered all over the territory served by the lines of the company prompted Sheriff Kniffen to appeal to the authorities at Harrisburg to send 100 additional men of the State Constabulary to aid in preserving peace. The company has succeeded in opening more lines each day and several additional cars have been placed in operation on the lines which were reopened last week.

The latest show of feeling against the State Constabulary by the labor unions is the injection of politics into the strike situation by the action of residents in several of the suburbs in campaigning for legislative candidates known to be in favor of the abolition of the Constabulary. The Burgess of Edwardsville, a suburb, where much of the most vicious rioting has occurred, requested the Sheriff to withdraw the State police from that borough, asserting that they were not needed there to preserve order. In view of the facts the Sheriff ignored the request.

Letters containing threats to dynamite the residence of Mr. Wright have been sent to servants in his employ. Other letters threatening violence have been received by Mr. Wright.

SPRINGFIELD TROLLEY SERVICE CONFERENCE

Service on the Springfield (Mass.) Street Railway is at present under investigation by the Board of Aldermen. At a conference on Nov. 9 Clark V. Wood, president of the company, stated that traffic difficulties at this time are due to the following: the institution of the eight-hour day in manufacturing plants engaged in filling war orders and other work, which has increased the rush-hour peak load; temporary congestion at the Plainfield Street bridge, and the necessity of routeing practically all cars through Main Street. Eighty-eight regular cars are now running, and to meet the evening rush traffic eighty-one extras are being used, compared with eighty-seven regular and forty-four extras last year. Additional cars, crews and inspectors have been put on and soon the company will have twenty-nine more cars in service than a year ago. Delays at the Plainfield Street bridge will be reduced greatly in the future and service at the Carew Street carhouse will be improved by the construction of a new carhouse at Hooker Street. H. M. Flanders, general manager, said that thus far there seemed to be no legal means to stop smoking by passengers in car vestibules. The gross earnings are 5 per cent better than a year ago, but the service is 33 per cent greater. Mr. Flanders said that the company hoped to begin the construction of a new carhouse and shop at Hooker Street at a cost of $250,000 inside of a few months. Postmaster Thomas J. Costello of Springfield said that the company was giving first-class mail car service; that the cars were almost invariably on time and the crews diligent. Recognition of the company's financial burdens and of insubordination in the ranks of union employees has been emphasized by citizens as contributory causes of present operating difficulties.

NEW YORK COMMISSION INQUIRY

The inquiry being conducted by the Thompson legislative committee into the workings of the Public Service Commission of the First District of New York was turned during the latter part of the week ended Nov. 6 into an investigation of the holdings of Chairman Edward E. McCall, prior to his appointment, in the stock of the Kings County Electric Light & Power Company. The par value of the stock with the accretions due to the exercise of subscription rights subsequent to the original purchase is about $50,000. The holdings are in four certificates. Three are for 100 shares each and one for eighty-seven shares.

Mr. McCall insists that the stock was transferred to his wife just before he was appointed to the commission. It appears, however, that since 1908 the stock has been held in the name of John J. Mackin, Mr. McCall's former court officer, although a separate power of attorney or memorandum for transfer to Mrs. McCall was made out but never exercised. Mr. Mackin understood that the stock was Mrs. McCall's and he indorsed the dividend checks to her.

Commissioners McCall, Hayward and Williams were all examined by the committee on Nov. 11. Mr. Hayward said that there were 119 cases before the whole commission since April 1 last and that all the commissioners were present at fifteen of these cases. The record of attendance for the cases was: Hayward, seventy-nine; Williams, seventy-nine; Wood, seventy; Cram, thirty-five; McCall, thirty.

BAY STATE OPENS FARE CASE

Entire Financial and Operating History of Company Subject to Investigation—Hearings May Last Several Months

The Bay State Street Railway fare case was opened before the Massachusetts Public Service Commission at Boston on Nov. 8. So great was the popular interest in the petition for the right to establish a 6-cent unit, with local modifications, throughout the Massachusetts lines of the company, that the commission transferred the hearing to Kingsley Hall, Ford Building. James F. Jackson, former chairman of the Massachusetts Railroad Commission, and Sheldon E. Wardwell, Boston, appeared as counsel for the company. About 100 counsel and officials were registered in opposition on behalf of municipalities served by the company. No official opposition developed, however, from the city of Boston on the opening day.

Chairman McLeod of the commission announced in opening the hearings that the company's case will first be presented, after which an interregnum will be allowed to permit ample study of evidence by the rebuttal. It is expected that the case will be on the docket for many weeks if not for several months, as the commission ruled on the opening day that the entire financial and operating history of the company may be subject to investigation, without necessarily limiting inquiry to matters subsequent to decisions of the former Railroad Commission.

In his opening statement, Mr. Jackson emphasized the faith of the management in the fair-mindedness of the public, once the issue is understood. The company now consists of thirty-eight formerly separate roads consolidated into a single system of about 940 miles of track. In the consolidation process union took place upon the common basis of a share for share exchange; the aggregate stock and indebtedness was not increased, and reductions in fare and additions to facilities were immediately realized. Those behind the enterprise believed that through possible economies and a greater financial strength, the outcome was bound to be a larger and better public service with fair return upon private investment. Events have proved that they were too optimistic about some things, mistaken about others and fated to meet obstacles that the wisest would never have foreseen. Traffic increased, but not at the rate predicted; repairs and reconstruction requirements mounted beyond anticipation; advance in wages and in cost of supplies, competition with other kinds of transportation, seasons of business depression and the multiplication of demands from municipal authorities made inroads upon income that were not anticipated.

In the last fifteen years the company has been compelled to contribute millions of dollars to the cost of constructing, maintaining and improving highways and bridges, eliminating grade crossings and developing parks and boulevards. The following table is significant:

	1901	1915
Taxes	$341,569	$653,380
Construction and maintenance, highways and bridges	$567	$287,727
Platform expenses in per cent of operating revenue	25.29	29.80
Total operating expenses, in per cent of operating revenue	61.38	72.04

The total amount paid by the Bay State and constituent companies from 1892 to 1915 for paving alone aggregated nearly $4,000,000.

The total outstanding securities of the Bay State company and its leased lines in Massachusetts are $47,534,500. Though these securities are lawfully outstanding, this capitalization undoubtedly represents to a greater or lesser extent over-issue of securities in the early history of constituent companies, which cripples it as a measure of capital cost. The construction account is $46,559,327, but this is in insufficient detail, owing to practice in bookkeeping before the consolidation was effected. As a basis for fare readjustment, the company engaged Sloan, Huddle, Feustel & Freeman, Madison, Wis., to make an inventory of the property. They placed the investment cost of the property in Massachusetts at $43,635,365. In the same report the reproduction cost appeared as $46,361,266.

The company requires additional yearly revenue to the amount of $1,615,165 in order to pay a reasonable return (taken at 7 per cent) upon its investment. The imperative feature of the situation is not a call from present stockholders for larger dividends, but the necessity of continuing dividends in order to get the new money required in conducting the service. In other States companies are generally given a free hand to obtain money upon stocks or bonds, but in Massachusetts capital cannot be obtained upon bonds until an equal amount has first been obtained upon shares of stock issued at not less than par. Unless the risk of the business is reduced so that money is ready to take it, i.e., unless reasonable dividends are practically assured, the financing of a railway comes to a halt, and extensions and improvements stop. Dividends for the last fifteen years have averaged only 4.9 per cent. The benefits of centralization have been enjoyed by the communities served, and as a direct result of consolidation there has been a saving in interest of more than $1,000,000, reducing to that extent the amount upon which future returns on capital are based and depreciation calculated in connection with the proposed increase in revenue. In view of the uncontrollable increasing costs the company submits that additional revenue is imperative.

At the hearing on Tuesday, Nov. 9, the company agreed to provide a considerable number of blue printed copies of tabular data for the use of town and city counsel. Charles R. Rockwell, vice-president and treasurer, then reviewed the company's financial history in detail. The surplus account was $794,565 in 1901, compared with $5,751 in 1915. In this period investment increased $18,270,453, or 62.17 per cent, and operating revenue increased $3,720,515, or 66.2 per cent; while operating expenses, including taxes, increased $3,683,978 or 97.18 per cent.

Robert M. Feustel of Sloan, Huddle, Feustel & Freeman, then took the stand. He described the methods utilized in taking the Bay State inventory and presented the results of eighteen months' work in this connection by an average staff of fifty men. A description of these methods and a summary of the results obtained and presented at the hearings will be published in a later issue of the ELECTRIC RAILWAY JOURNAL. The inventory was made on the basis of the detailed investment in the property checked by an exhaustive survey of the physical plant with items listed according to the Interstate Commerce Commission classification of accounts.

At the hearing on Nov. 10 Mr. Feustel continued the presentation of the valuation report, after which adjournment was taken to Nov. 16, at which time the commission will hear counsel as to the jurisdiction of the board in the matters at issue. Counsel in opposition to the company raised the point that the proposed fare increase is an interstate matter and therefore subject to the jurisdiction of the Interstate Commerce Commission.

NEW LOCKPORT-NIAGARA FALLS LINE OPPOSED

The Public Service Commission for the Second District of New York has received final briefs in the petition of the Niagara River & Eastern Railway for a certificate to build and operate a double-track electric railway for passenger and freight service between Lockport and Niagara Falls, N. Y. The proposed line is opposed by the New York Central Railroad, which claims that Niagara County has adequate railroad facilities at present and that its road with the aid of the International Railroad is capable of handling more business than the section produces. It also maintains that a permit to a new road would be unfair to the vested interests of stockholders in existing lines. The Niagara River & Eastern Railway purposes to connect with the International Railway and the Buffalo, Lockport & Rochester Railway at Lockport and with trunk lines of steam railroads in Canada by means of a new bridge across the Niagara gorge at or near Lewiston. It is also proposed to handle freight on the Buffalo, Lockport & Rochester Railway and connect with the Erie and the Pennsylvania Railroads at Rochester. Charles Hickey, Lockport, is president of the Niagara River & Eastern Railway, and officials of the International Railway, Buffalo, and the Beebe syndicate, which owns the Buffalo, Lockport & Rochester Railway, are connected with the new project.

New Oregon Line Opened.—The Willamette Southern Railway, extending from Oregon City, Ore., to Mount Angel, a distance of 32 miles, has been opened for traffic. Grant V. Dimmick, Oregon City, is president of the company.

Clay County Appeal Made.—The appeal in the case of the Interstate Railway vs. the Kansas City, Clay County & St. Joseph Railway to the Supreme Court of Missouri against the recent verdict for $1,500,000 in favor of the plaintiff has been perfected by the filing of a bond for $3,400,000 given by the National Surety Company. Judge Woodson of the Supreme Court approved the bond. This assures the case being heard on the appeal in the highest court of Missouri.

Albany Arbitration Postponed.—On account of the absence of Judge William E. Woollard from Albany, N. Y., on Nov. 4 the meeting of the United Traction Company arbitrators was postponed until Nov. 19. The arbitrators, Judge Lynn J. Arnold, chairman; Mayor Cornelius F. Burns of Troy, and Judge William E. Woollard of Albany will take up the question of the differences between the company and its employees which led to the strike of Sept. 6.

Maine Trolley Plan Revived.—It has been announced at Bangor, Me., that financial arrangements have been completed for the construction of a 23-mile electric railway from Mattawamkeag to Millinockett and East Millinockett, between the Maine Central and the Bangor & Aroostook Railroads, under a charter held by C. W. Mullen and I. B. Wood, Bangor; Artemus Weatherbee, Lincoln, and Frank J. Rich, Mattawamkeag. Power is to be derived from a privilege on the Mattaceunk stream. Stone & Webster, Boston, Mass., are the fiscal agents, and a survey under their direction indicates a favorable route.

Trade Commission Extending Export Inquiry.—The Federal Trade Commission is sending out 30,000 letters of inquiry, followed up by a brief schedule, as a part of its investigation of conditions that affect American foreign trade. A return postcard accompanying the letter is designed to give the commission a broad yes or no referendum on the advisability of export combinations, and to put it in touch with those who are willing to assist the commission by furnishing further facts and suggestions. The schedule inquiries are only one part of the study of conditions which may affect American export trade being conducted by the commission. It has also held a series of public hearings; is engaged on systematic research work covering trade and financial papers, official publications and reports of the United States and foreign governments and other published material, and will send agents abroad to study conditions on the ground.

Ontario Board Refuses to Interfere.—The Ontario Railway Board has refused to interfere in the Yonge Street extension difficulty, pending a decision by the Privy Council upon the legal position of the Toronto Railway and the city. The company sought to have the board enforce its order directing the city to do the preliminary work for the construction of the extension, but the board held that the city's appeal to the Privy Council should be disposed of first. H. S. Osler, appearing for the company, was sure that the Privy Council would uphold the company's right to extend to Farnham Avenue, but added that, if the company were allowed to go on with the construction now, and the decision was an adverse one, it would immediately hand over the extension to the city at cost. Chairman McIntyre pointed out that the validity of the board's order rested upon the construction of the agreement between the city and the company. He did not think the board could facilitate the carrying out of the order so long as there was any doubt as to the legal basis upon which the order rested.

New York Authorizes Another Rapid Transit Route.—The secretary of the Public Service Commission for the First District of New York has reported to the commission that the necessary number of property owners consents have been obtained to legalize Route No. 61, the so-called Sixtieth Street-East River route. This line is a two-track underground railroad, beginning in Fifty-ninth Street west of Fifth Avenue. It curves diagonally under Central Park and Fifth Avenue into Sixtieth Street, runs through Sixtieth Street to and under the East River to North Jane Sreet, Long Island City, where it will emerge from the ground and connect with the new elevated lines in Queens Borough. On the Manhattan side the new route connects with the Broadway, Seventh Avenue and Fifty-ninth Street line, which is for operation by the New York Municipal Railway Corporation. The new route is made necessary by the substitution of the river tunnel for the use of the Queensboro Bridge, as at first proposed by the commission. The change in routes was made at the request of the Board of Estimate & Apportionment of the city.

Terre Haute Abandonment Case Settled.—In the Superior Court at Terre Haute, Ind., on Nov. 3, in the suit of the city of Terre Haute vs. Terre Haute, Indianapolis & Eastern Traction Company, an agreement was reached between the parties whereby the company agreed to return to the city the street known as Cherry Street, one block in length, between Eighth and Ninth Streets, which had been vacated by the city in favor of the company by order of the City Council of Terre Haute in December, 1910. The order was made at that time in consideration of the company giving to the city a tract of land adjoining the alley between Eighth and Ninth Streets, it being thought desirable at that time to make such an agreement to provide a proper site for an interurban terminal building which the company proposed to erect in Terre Haute. At the present time only a temporary one-story building has been erected on the terminal building site, although the Arcade Building, which gives a direct entrance from Wabash Avenue to the proposed terminal station, has been completed for some time. By the new order of the court the city agrees to vacate the platted alley running north and south through the land used by the traction company for a site for its terminal station.

PROGRAMS OF ASSOCIATION MEETINGS

National Railway Appliances Association

The eighth annual exhibition of the National Railway Appliances Association will be held at the Coliseum and Annex, Chicago, Ill., beginning on March 20 and concluding March 23. During the same week the seventeenth annual convention of the American Railway Engineering Association and the March meeting of the Railway Signal Association will be in session at the Congress Hotel. The meeting of the Association of Railway Telegraph Superintendents will be held during the same week at Chicago. These annual exhibitions are for the purpose of exhibiting the products of members of the National Railway Appliances Association in the field of steam and electric railway construction, maintenance and operation. Applications for space by intending exhibitors should be made to C. W. Kelly, secretary-treasurer of the National Railway Appliance Association, 122 Michigan Avenue, Chicago.

Central Electric Railway Association

The program has been announced for the fall meeting of the Central Electric Railway Association, to be held at the Claypool Hotel, Indianapolis, Ind., on Nov. 18 and 19. The business session and the presentation of reports of committees are scheduled for 9 a. m. on Nov. 18. The other program for that day follows:

Address, "The Question," by G. K. Jeffries, general superintendent Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

Address, "The Interurbans," by J. F. McClure, of the Public Service Commission of Indiana.

Lecture and motion pictures, "From Ore to Finished National Pipe," by W. A. Phillis, metallurgist National Tube Company, Pittsburgh, Pa.

The program of papers for Nov. 19 follows:

Paper, "Automatic Substations," by Edward Taylor, engineer General Electric Company, Chicago, Ill.

Paper, "Package Freight on Passenger Cars," by J. F. Strattan, treasurer, and W. L. Foreman, trainmaster Louisville & Northern Railway & Lighting Company, New Albany, Ind.

Financial and Corporate

ANNUAL REPORT

Boston Elevated Railway

The statement of income, profit and loss of the Boston (Mass.) Elevated Railway for the fiscal year ended June 30, 1915, follows:

Gross operating revenues	$17,798,607
Operating expenses:	
Maintenance of way and structures	$1,429,567
Maintenance of equipment	1,203,351
General expenses	1,738,629
Traffic expenses	5,290
Transportation expenses	5,620,829
Power	1,290,317
Total operating expenses	$11,287,983
Net operating revenues	$6,510,624
Non-operating income	87,942
Gross income	$6,598,566
Payments on account of leased lines	3,056,011
Balance	$3,542,555
Other deductions from income	2,218,336
Net income	$1,324,219
Dividends	1,313,367
Surplus for year	$10,852

The operating revenues and the non-operating income together increased $100,571 or 0.56 per cent during the year, the gain of $168,991 or 0.96 per cent in operating revenues being cut to this figure by a decrease in non-operating income. The operating expenses decreased $9,878 or 0.08 per cent, but the total charges against income for taxes, rent of leased roads, rent of subways and tunnels, and interest on funded debt, unfunded debt and miscellaneous items increased $223,399 or 4.4 per cent. Consequently not only was the increase in gross income absorbed, but the net income as compared with the preceding year was reduced $112,949 or 7.8 per cent. Taxes increased $28,242, rent of leased roads $61,087, rent of subways and tunnels, $147,595 and miscellaneous $4,587, small decreases in some items and adjustments in accounts giving the preceding net increase of $223,399. The taxes would have shown a much greater increase if the capital stock of the West End Street Railway and the Boston Elevated Railway had not been abnormally low on April 1.

In regard to the Cambridge subway it is said that neither any increase in business nor the incidental economies effected were sufficient to take care of the large increase in annual charges made necessary by the additional investment, which, with the Boston connections, amounts to $12,293,604. At present the loss in net revenue caused by the construction of the Cambridge subway, including additional taxes, interest and dividends on the investment, is estimated to be approximately $315,000 per annum.

The total requirements for taxes, rentals, interest and dividends at the rate of 6 per cent call for $6,702,523. The amount of income actually available therefor this year was only $6,598,566. Hence the earnings were sufficient to pay only 5½ per cent dividends and to allow $10,852 to be credited to surplus. The payment of reasonable dividends is said to be important in connection with the obtaining of new money to meet growing public demands for improvements, and the directors state their firm conviction that in the near future some adequate provision must be made for a substantial increase in the next income of the company. During the last year the total revenue passengers carried increased 3,135,535 or 0.91 per cent, and the operating expenses showed a slight decrease, as before noted, but in the judgment of the directors no adequate relief should be expected from the ordinary increase in business, from a reduction of operating expenses or from any decrease in the charges ordinarily incident to the capital investment.

In speaking of the difficulties surrounding new security issues the report says that under the law in force in Massachusetts the amount of bonds which the company may issue is limited to the par value of its capital stock plus paid in premiums. The company can now issue, therefore, only $3,286,828 of additional bonds until it has issued additional stock. New stock cannot be issued for less than par, and the outstanding stock is at present quoted on the market at substantially below par. Under present conditions, therefore, the company has no means of providing additional capital of its own for paying for further additions or improvements to its property by the issue of either additional bonds or stock. Any additional money can be obtained only by short time loans, which method of financing is unsafe and not to be used if it can be avoided, or by the issue of West End securities as far as additions are made to the leased property.

The relation between the increases in investment and in total receipts of the company is well brought out in the report. In 1897, just prior to the lease of the West End Street Railway by the Boston Elevated Railway, the investment in street railway properties of the West End Street Railway was $25,291,913. On June 30, 1915, the investment of the system operated by the Boston Elevated Railway in substantially the same territory, including subways, was $112,013,280. This last amount does not include either the East Boston Tunnel extension (estimated cost with equipment, $3,000,000) or the Dorchester Tunnel (estimated cost without equipment, $9,900,000), which have not yet been completed. During the same period the total receipts of the system increased from $8,719,032 to $17,886,549, or 105 per cent. The increase in the investment was 343 per cent. Of this increase in investment more than 69 per cent is represented by the cost of $26,414,878 for the elevated structure and its stations and the cost of $33,394,532 for the subways with their connections. In 1897 the investment was $2.90 for each $1 of total receipts. In 1915 it was $6.26 for each $1 of total receipts.

During the year the company added a net of 5.345 miles of surface track, making the total now 520.722 miles. It expended for reconstruction and maintenance of tracks $617,399 or $1,272 per mile for surface lines and $83,967 or $2,278 per mile for rapid transit lines. On buildings the maintenance and repair costs totaled $119,158. The company put in operation during the year forty-three stepless prepayment middle-entrance vestibule cars, and it received 100 large trailer cars. Two-car train operation so far has proved satisfactory, and it is the present intention to buy twenty-five more such cars.

In connection with transfers it is noted that the number of points at which transfers are honored is 109. The paper transfers issued for the year ended June 30, 1915, totaled 104,307,102. The number of paper transfers received during the same period was 83,415,829. It has been estimated that if at fourteen points where paper transfers are now issued paper transfers can be done away with the company can eliminate 64 per cent of all paper transfers. In other words, it would have left ninety-five points at which there would be received only 36 per cent of the present paper transfers. The company is making careful studies to determine what paper transfer points can be transformed into points for bodily transfers without paper tokens.

The cost of the safety-first campaign during the year was $3,188. The result of the campaign in the reduction in accidents may be summarized as follows: "For July, 1914, when a special account was kept, there was a total reduction of 25.3 per cent in the number of accidents reported as compared with July, 1913, and this in spite of an increase of 9.9 per cent in the number of passengers carried and an increase of 6.8 per cent in the number of trips run."

The net cost to the company of the workingmen's compensation act for the year 1913-1914 was $59,109; for the year 1914-1915 by estimate, $76,184. The Legislature of 1914 increased substantially the benefits to be received by injured employees and the new law went into effect on Oct. 1, 1914. This accounts for the increased cost over preceding years, although the number of employees injured has slightly decreased.

Operating officials of the company believe that during the next year the freight and express business will be substantially increased on account of the additional facilities which are to be provided. Moreover, the public has had an opportunity to see that the company can fittingly enter this field and at the same time perform the service without in any way interfering with the proper operation of the company's primary business of carrying passengers.

STOCKHOLDERS IN KANSAS CITY

Supplementary Plan for Reorganization Provides for Segregation of Railway and Lighting Properties and Deposit of Old Stocks

The final section of Judge Hook's plan for a reorganization of the Kansas City Railway & Light Company, Kansas City, Mo., was made public on Nov. 8. In this the way in which the stockholders will be taken care of in the adjustment is provided for. The section is supplemental to the court's plan announced on July 30, 1915, which made provision for the bondholders of the New Jersey holding corporation and those of the underlying properties. Two commissioners, W. W. Gurley of Chicago and John H. Atwood of Kansas City, have been appointed to carry out the stockholders' plan, and all creditors and stockholders must file with these commissioners their claims and acceptances of the plan before Dec. 20.

As previously announced, the plan insists upon the complete dissolution of the railway and light company. It provides that 80 per cent of the outstanding stock shall determine the basis of division as between the two companies. The stock of these two segregated operating companies shall be deposited with two sets of three trustees each, one to be selected by the preferred stockholders, another by the common stockholders, and the third by these two. They will issue preferred and common beneficial certificates, one for each share of stock now outstanding. The old status as between preferred and common stocks to be maintained as between the preferred and common beneficial certificates, except that the preferred is to be cumulative instead of non-cumulative.

The stock deposit committee is composed of the following men: George M. Reynolds, chairman; G. W. Bacon, New York; Oscar Fenley, Louisville, Ky., and H. T. Abernathy, Kansas City, Mo. More than 90 per cent of each class of stock has been deposited with the committee, which met on Nov. 6 and voted to submit the entire plan in all its details to the stockholders immediately. In the meantime all non-depositing stockholders will be offered further opportunity to participate.

RECEIVER FOR EMPIRE UNITED

Default in Bond Interest Leads to Friendly Receivership For Purpose of Readjusting Finances of Company

Owing to a default in the bond interest due on Nov. 1 Justice W. S. Andrews on that date appointed H. S. Holden as receiver of the Empire United Railways, Inc., Syracuse, N. Y. The interest due was approximately $122,000 on bonds of the Rochester, Syracuse & Eastern Railroad and $70,000 on bonds of the Syracuse, Lake Shore & Northern Railroad and the Auburn & Northern Railroad. Justice Andrews directed that the interest coupons of the Syracuse, Lake Shore & Northern Railroad and Auburn & Northern Railroad be paid by the receiver on Nov. 2. The principal cause of lack of revenue was the general falling off in receipts during the last season. Contributing factors were the good highways paralleling the Rochester-Syracuse division, the excessive amount of rainfall this season, the prevailing business depression and an unfavorable contract for entrance into Rochester and labor troubles.

The appointment of Mr. Holden, who is vice-president and a director of the company, was the result of a friendly action looking toward a readjustment of the company's finances. A representative of the Attorney-General's office of the State of New York filed an objection to the appointment of Mr. Holden on account of his relation to the company, but Justice Andrews decided to make a temporary appointment. On Nov. 27, however, he is to hold a hearing for the purpose of determining whether or not Mr. Holden's receivership shall be made permanent. In the meantime, a bondholders' committee has been formed, consisting of A. W. Loasby, president Trust & Deposit Company, Onondaga, N. Y.; Elbert A. Harvey, representing Lee, Higginson & Company, Boston, Mass., and Deforest Settle, of Bentley & Settle, Syracuse, N. Y. This committee, acting under a bondholders' protective agreement, is securing the deposit of bonds with the Trust & Deposit Company, Onondaga, N. Y., and the Old Colony Trust Company, Boston, Mass. It is expected that this committee will have a very large voice in any reorganization plans which may finally be consummated.

C. D. Beebe, president, has issued the following statement regarding the future:

"The parties interested in the property expect to bring forward at a very early date a plan for the readjustment of the company's finances, which will probably mean some readjustment of the interest charges for a period on the Rochester, Syracuse & Eastern Railroad bonds and a change in the position of the Empire United Railways, Inc., first and refunding mortgage 5's. Moreover, a part of the plan will be to provide for the capital expenditures on the Rochester, Syracuse & Eastern Railroad that will be needed during the next eighteen or twenty-four months. The plan will also cover the same general line of capital expenditures on both the Lake Shore and the Auburn & Northern divisions."

The board of directors of the company was recently reduced from fifteen members to nine members in order to expedite the transaction of business. The new board consists of H. S. Holden, W. A. Holden, E. I. Edgcomb, C. D. Beebe, Joshua Bachman, Lewis P. Smith and William Nottingham, Syracuse, N. Y.; W. O. Morgan, New York, and F. W. Roebling, Jr., Trenton, N. J.

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—The Arkansas Valley Railway, Light & Power Company recently retired $50,000 of first mortgage sinking-fund gold bonds of the Pueblo & Suburban Traction & Lighting Company, purchase having been made through the International Trust Company, Denver, trustee.

Atlantic Shore Railway, Kennebunk, Me.—Frederick O. Conant and C. Southworth, respectively president and treasurer of the Atlantic Shore Railway, were on Nov. 1 appointed receivers of the company by the United States Circuit Court in Portland. The appointment was made in response to a bill in equity filed by the Consolidated Coal Company as a creditor. Shortly before the court proceedings the directors voted not to oppose the suit. In court they admitted the allegation in the bill and asked to be permitted to join in the suit. The financial condition of the company was briefly described in the Electric Railway Journal of Nov. 6 in connection with an Oct. 1 bond interest default.

Birmingham, Ensley & Bessemer Railroad, Birmingham, Ala.—At the receiver's sale of the Birmingham, Ensley & Bessemer Railroad, on Oct. 28, the property was purchased for $700,000 by J. D. Kirkpatrick, representing the bondholders' committee. Steps will be taken to carry out at once the plan for reorganization, as described in the Electric Railway Journal of Oct. 2. As soon as the sale has been approved by the court, the new company will take over the property.

Boston (Mass.) Elevated Railway.—A bond issue of $3,286,000 was authorized by the stockholders of the Boston Elevated Railway at the annual meeting on Nov. 1. The bonds, if approved by the Public Service Commission, will be used for the partial funding of the floating debt, construction, equipment, etc., as noted in the Electric Railway Journal of Oct. 30 in connection with the application to the commission.

Buffalo & Niagara Falls Electric Railway, Buffalo, N. Y.—Sealed proposals will be received on Nov. 15 by the Bankers' Trust Company, New York, for the purchase of $10,000 of second mortgage sinking-fund gold bonds of the Buffalo & Niagara Falls Electric Railway, dated July 1, 1896. No tenders at a rate exceeding 105 per cent and accrued interest from the last interest date will be accepted. This is one of the companies now included in the system of the International Railway.

Croyden (England) Corporation Tramways.—The traffic receipts of the Croyden Corporation Tramways for the fiscal year ended March 31, 1915, amounted to £87,833, and the total revenue to £88,614. The working expenses totaled £70,307 and the war allowances £1,974, leaving a credit balance of £16,332. After deductions for income tax, interest and sinking fund there remained a net balance of £190, which was carried to the renewals fund. From April 1 to July 31, 1914, the traffic receipts increased £2,382, while the net increase during the last eight months amounted to only £525 on account of the war. The combined increases, however, represented 3.42 per cent. Passengers carried increased 619,524 or 3.22 per cent, working expenses £564 or 0.81 per cent. and miles run 2497 or 0.09 per cent.

Manaos (Brazil) Tramways & Light Company.—The report for the year ended April 30, 1915, states that the gross receipts of the Manaos Tramways & Light Company amounted to £110,420, a decrease of £22,457. The expenses were £84,240, a decrease of £12,608, and the net earnings £26,180, a decrease of £9,848. The fall in exchange resulted in a loss of £6,180 on remittances during the year. After providing for interest, London charges, etc., placing £1,725 to debenture sinking fund and £300 to depreciation on furniture, there remained a profit balance of £4,002 to be carried forward. The state, federal and municipal governments are still in arrears with their accounts, although as a result of strenuous efforts some collections were made during the year.

Memphis (Tenn.) Street Railway.—Bertron, Griscom & Company, New York, have completed arrangements to pay $1,000,000 of 6 per cent two-year debenture notes of the Memphis Street Railway, due on Nov. 1. The payment will be made from part of the proceeds of $1,500,000 of 6 per cent two-year collateral gold notes recently sold, as noted in the Electric Railway Journal of Oct. 9.

Merrill Railway & Lighting Company, Merrill, Wis.—It was announced in the Electric Railway Journal of July 24 that the Merrill Railway & Lighting Company had decided to surrender its franchise and vacate the streets. This action was decided upon because the Council insisted that the company, instead of laying its track in concrete, should pave between the tracks with brick, which would necessitate taking up and relaying all track besides paving it and would involve a cost of $3 per foot. When the company announced the suspension of service, however, the newspapers and business men took a hand and the Council by a fifteen to one vote decided to allow the use of concrete between the tracks, which lessened the cost to $1 per foot. The question has now been adjusted to the satisfaction of all parties without a franchise surrender.

Minneapolis & Northern Railway, Minneapolis, Minn.—Judge William E. Hale of the District Court for the Fourth Judicial District of Minnesota on Nov. 6 filed an order requiring F. H. Hunter, receiver Minneapolis & Northern Railway, and all creditors of this company to show cause at a hearing on Nov. 13 why an order of the court requiring the receiver to wind up his affairs and execute a deed of conveyance of the property to the Minneapolis, Anoka & Cayuna Range Railroad should not be entered as a final decree. This action is taken on the application of Charles P. Bratnober, one of the trustees who came into possession of the property by foreclosure. The formation of the Minneapolis, Anoka & Cayuna Range Railroad to take over the property from the trustees was described in the Electric Railway Journal of Aug. 14.

Northern Electric Railway, Chico, Cal.—The Northern Electric Railway and its allied companies have filed an application with the California Railroad Commission for the approval of the proposed reorganization plan, which was described in the Electric Railway Journal of Oct. 23.

Otsego & Herkimer Railroad, Cooperstown, N. Y.—The receivership of the Otsego & Herkimer Railroad under C. H. Lewis and James J. Byard, whose appointment was mentioned in the Electric Railway Journal of Sept. 4, was recently terminated by Judge Ray as a result of an application by the Equitable Trust Company, New York, which had purchased the bonds and stock of the company and taken assignments of all the outstanding indebtedness of general creditors.

Portland (Me.) Railroad.—Upon the application of the Portland Railroad the Maine Public Utilities Commission has authorized the company to mortgage its properties to the New York Trust Company to secure $7,500,000 of bonds, the mortgage to be dated as of Nov. 1, 1915, and due on

Nov. 1, 1945. The company may deposit with the trustee as additional security for indebtedness, now or hereafter, secured by mortgage, its first consolidated mortgage gold bonds, dated July 1, 1901, and due on Jan. 1, 1951. The commission also authorized the company to issue at not less than 90 and accrued interest $1,000,000 of 5 per cent first lien and consolidated gold bonds, the proceeds thereof to be applied to the discharge of $500,000 of Portland Railway extended first mortgage 5 per cent bonds due on Nov. 1, 1915, and of $400,000 of Portland & Cape Elizabeth Railway first mortgage bonds, due on Nov. 1, 1915. A syndicate of bankers composed of A. B. Leach & Company, Charles H. Gilman & Company, Maynard S. Bird & Company, Merrill Trust Company and Fidelity Trust Company has already sold this entire $1,000,000 issue at 97 and interest. These bonds are callable at 105 on any interest day.

Portsmouth (N. H.) Electric Railway.—President Huestis of the Boston & Maine Railroad has notified the Citizens' Railway, Portsmouth, that the Boston & Maine Railroad will give up the operation of the Portsmouth and Greenland line at once, the lease with the road having expired. The road has been operated in connection with the Portsmouth Electric Railway, which is owned by the Boston & Maine Railroad.

San Diego & South Eastern Railway, San Diego, Cal.—The California Railroad Commission recently issued an order authorizing the San Diego & South Eastern Railway to issue a two-year promissory note of $25,000 to the First National Bank, San Diego, interest not to be more than 6 per cent. This note refunds a similar one issued without authorization by the commission.

Southern Iowa Railway & Light Company, Albia, Iowa.—It is reported that Judge Hunter has ordered the sale of the Southern Iowa Railway & Light Company property. Stockholders have protested and may carry the case higher. A note of the appointment of a receiver for this company was made in the ELECTRIC RAILWAY JOURNAL of June 26.

Utah Securities Corporation, New York, N. Y.—The Utah Securities Corporation, through the $500,000 available for the retirement of its ten-year 6 per cent notes, has purchased $578,000 of the issue at an average price of 85½ and interest. Similar purchases previously made were described in the ELECTRIC RAILWAY JOURNAL, issues of March 6 and 20.

Washington-Oregon Corporation, Vancouver, Wash.—The sale of the properties of the Washington-Oregon Corporation, under foreclosure, to Harry N. Putnam, Portland, was effected on Oct. 30. The sale was conducted by Major Charles O. Bates, Tacoma, as special master in chancery. The purchase price offered by Mr. Putnam was $1,569,000. Mr. Putnam deposited with the special master a certified check for $35,000 to bind the sale. In consideration of the transfer of the properties of the Washington-Oregon Corporation by Mr. Putnam to the North Coast Power Company, that company will issue to Mr. Putnam all of its preferred and common stock, aggregating in par value $1,750,000, and bonds of the face value of $675,000. Mr. Putnam will turn over the securities so received from the North Coast Power Company for distribution among the bondholders of the Washington-Oregon Corporation. Referring to the option given by the reorganization agreement to unsecured creditors and second-mortgage bondholders, Mr. Childs, who represents the reorganization committee, said: "The bondholders are willing to let the unsecured creditors and the second-mortgage bondholders take over the property and business of the new company, provided the investment of the first-mortgage bondholders is made good to them. We think it is fair to give the creditors any value there is in the property over and above the amount which has been invested by the bondholders. The North Coast Power Company is not controlled by the stockholders or officers of the Washington-Oregon Corporation, but is organized by the secured creditors of the corporation. The management and policies of the new company will be in the hands of entirely new interests. Herbert L. Harries, who is now managing the properties for the receiver, will be general manager of the North Coast Power Company. The company expects to take over the properties of the Washington-Oregon Corporation about the middle of November."

DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 1 per cent, common.

Bristol & Plainville Tramway, Bristol, Conn., quarterly, 2 per cent.

Central Arkansas Railway & Light Corporation, Hot Springs, Ark., quarterly, 1¾ per cent, preferred.

Detroit (Mich.) United Railway, quarterly, 1½ per cent.

Illinois Traction System, Peoria, Ill., quarterly, three-fourths of 1 per cent, common.

Massachusetts Consolidated Railways, Greenfield, Mass., 1⅜ per cent, preferred.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, original preferred and first preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
ATLANTIC SHORE RAILWAY, SANFORD, ME.					
1m., Sept., '15	$35,132	$22,261	$12,871	$611	$12,260
1 " " '14	36,181	25,031	11,150	631	10,519
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.					
1m., Sept., '15	$168,333	$111,061	$57,272	$45,319	$11,953
1 " " '14	183,355	119,860	63,495	43,638	19,857
3 " " '15	545,797	344,646	201,151	135,485	65,666
3 " " '14	611,209	360,697	250,512	131,360	119,152
CAPE BRETON ELECTRIC COMPANY, SYDNEY, CANADA					
1m., Aug., '15	$33,226	*$18,160	$15,066	$6,603	$8,463
1 " " '14	32,742	*17,485	15,257	6,407	8,850
12 " " '15	338,506	*206,902	131,604	78,999	52,605
12 " " '14	371,858	*209,574	162,284	75,903	86,381
CITIES SERVICE COMPANY, NEW YORK, N. Y.					
1m., Sept., '15	$349,456	$14,301	$335,155	$40,833	$294,322
1 " " '14	279,413	10,577	268,836	40,833	228,003
12 " " '15	4,121,622	159,571	3,962,051	490,000	3,472,051
12 " " '14	3,803,196	101,424	3,701,772	371,662	3,330,110
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO					
1m., Sept., '15	$39,250	*$19,690	$19,560	$10,973	$8,587
1 " " '14	39,933	*21,031	18,902	10,746	8,156
9 " " '15	307,096	*168,018	139,078	98,758	40,320
9 " " '14	316,074	*168,151	147,913	99,162	48,751
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO					
1m., Sept., '15	$109,292	*$71,101	$38,191	$27,458	‡$10,825
1 " " '14	113,019	*69,941	43,078	27,343	‡15,735
9 " " '15	920,132	*619,555	300,577	247,461	‡54,000
9 " " '14	950,590	*613.018	337,622	245,978	‡91,644
COLUMBUS (GA.) ELECTRIC COMPANY					
1m., Aug., '15	$56,000	*$25,760	$30,240	$28,679	$1,561
1 " " '14	54,600	*23,985	30,615	28,791	1,824
12 " " '15	701,436	*321,247	380,189	345,001	35,188
12 " " '14	655,653	*277,119	378,534	309,114	69,420
EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.					
1m., Aug., '15	$55,065	*$29,324	$25,741	$8,930	$16,811
1 " " '14	61,088	*33,858	27,230	8,802	18,428
12 " " '15	670,497	*378,939	291,558	104,831	186,727
12 " " '14	635,869	*394,772	241,097	100,029	‡155,938
EL PASO (TEX.) ELECTRIC COMPANY					
1m., Aug., '15	$75,111	*$42,680	$32,431	$4,203	$28,228
1 " " '14	86,432	*51,225	35,207	4,178	31,029
12 " " '15	979,878	*527,609	452,269	50,361	401,908
12 " " '14	1,002,403	*559,617	442,786	51,330	‡391,524
JACKSONVILLE (FLA.) TRACTION COMPANY					
1m., Aug., '15	$47,613	*$35,435	$12,178	$14,602	†$2,424
1 " " '14	55,797	*38,689	17,108	12,475	4,633
12 " " '15	629,754	*441,862	187,892	170,292	17,600
12 " " '14	731,660	*468,982	262,678	153,103	109,175
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO					
1m., Sept., '15	$126,284	*$75,711	$49,573	$35,127	$13,446
1 " " '14	132,502	*78,521	54,081	35,804	18,277
9 " " '15	1,032,334	*671,143	361,191	324,833	35,358
9 " " '14	1,098,927	*673,882	425,045	319,237	105,808
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.					
1m., Aug., '15	$23,550	*$14,253	$9,297	$7,534	$1,763
1 " " '14	24,804	*15,750	9,054	7,505	1,549
12 " " '15	290,205	*182,704	107,501	91,836	15,665
12 " " '14	306,771	*196,672	110,099	91,470	18,629
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.					
1m., Sept., '15	$816,124	$502,569	$313,555	$133,751	‡$181,603
1 " " '14	803,495	471,512	331,983	138,552	‡205,391
9 " " '15	6,996,426	4,531,392	2,465,034	1,211,105	‡1,272,360
9 " " '14	6,936,839	4,316,299	2,620,540	1,176,503	‡1,453,828

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

JITNEY JOTTINGS

Philadelphia Ordinance Sustained—The Case Against the Jitney in Atlantic City

In an opinion filed on Nov. 4 Judge Patterson, in Common Pleas Court No. 1 at Philadelphia, Pa., dismissed the suit of the jitney men for an injunction restraining the Mayor and Director of Public Safety from enforcing the jitney ordinance. He found that the evidence offered by the complainants failed to establish that the ordinance is unconstitutional, unreasonable, oppressive, prohibitive, discriminatory, confiscatory, or that it conflicts with any existing law. Judge Patterson finds in his conclusions of law that the city, in granting permission for the operation of motor buses in the streets, may by ordinance impose conditions under which such rights may be enjoyed. It may require the owners or lessees of such buses to charge a certain designated maximum rate of fare and to fix maximum lengths of routes, and to require such vehicles to travel the full distance of such routes before returning to the starting point. Judge Patterson quotes from decisions of the Supreme Court of California and the Federal Court in Tennessee. In conclusion he says: "It is well settled, of course, that an ordinance, even when passed pursuant to legislative authority, must be a reasonable exercise of the power conferred by the Legislature, or it will be pronounced invalid. But in considering this question, it is well to remember that the complainants in this case have no vested right in the use of the streets for operating vehicles for hire. No person or persons can acquire the right to haul passengers for hire over the streets or to make any other special or unusual use of the public highways except by grant from the sovereign power. The responsibility in dealing with this question rests with Councils, and not with the courts. Councils have been given ample authority by the Legislature to pass ordinances regulating motor buses in the city streets."

This decision is regarded as dropping the final curtain on the jitney fight in Philadelphia. Unless appeals are taken to the Supreme Court, which is regarded as exceedingly unlikely, particularly as jitney competition has almost ceased to exist for some time, the decision finally disposes of the plans of the jitney drivers to prevent the enforcement of the Broad Street zone provision of the ordinance. The suits were based upon the complaint that the ordinance was prohibitive, as the jitney buses could not be run at a profit at a 5-cent fare over the route prescribed.

At a meeting held in Atlantic City, N. J., to discuss the jitney question and its effect on the investment of the Atlantic City & Shore Railway, a resolution was adopted calling upon the City Commission to pass an ordinance barring the jitney operators from Atlantic Avenue and other streets covered by franchises to the electric railways and requiring the jitneys to furnish a bond of $2,500 each. Isaac H. Silverman, president of the railway, said that the corporation had suffered a loss of $80,000 during the last summer and faced a receivership. H. E. Kohn, of Bachman & Company, Philadelphia, financial agents of the company, said the company was being subjected to a guerilla warfare, which threatened to become ruinous to many investors. Albert T. Bell expressed the belief that the company could solve its problem by adopting the zone system of fares for Atlantic Avenue. Charles Evens, vice-president of the company, said that every dollar the city derived from jitneys was spent in employing policemen to keep them from killing people. Ex-Judge Allen B. Endicott, a bank president, insisted that the city protect residents who have invested their money in the electric railway and the banks which hold its securities. William F. Hanstein, president of the Hotelmen's Association, proposed that jitneys be excluded from Atlantic Avenue. Joseph A. McNamee, a banker, said that a receivership for the company would depreciate every investment in Atlantic City 25 per cent and set back lower resorts ten years. The jitney men are supported by Mayor Riddle and one or two of the newspapers, while most of the city commissioners are silent on the subject.

CONFERENCE ON AUTOMOBILE ACCIDENTS

Meeting at Syracuse Results in Appointment of Committees —Another Meeting in Albany on Nov. 17

The increasing number of automobile accidents occurring at grade crossings, especially on electric railroads, has been the subject of consideration on the part of the Public Service Commission for the Second District of New York. To facilitate its work in this direction the commission deemed it advisable to solicit the co-operation of organized automobile people, and a communication was accordingly addressed to the presidents of the New York State Automobile Association and the Motor Federation, copies being sent also to each automobile club in the district within the jurisdiction of the commission. This communication contained an invitation to these State organizations and affiliated clubs to meet with representatives of the electric railroads in the Onondaga Hotel, Syracuse, on Oct. 27, at 10 a. m. to discuss before the Public Service Commission matters affecting safety of operation at grade crossings of electric railroads.

Suggestions favoring both mechanical and educational methods for preventing accidents, coming from more than fifty sources and freely discussed by ninety persons at the meeting, will be considered by a committee of nine to be appointed by the Public Service Commission. A resolution adopted at the meeting provides that this committee, with the aid of sub-committees which it will appoint, make a thorough study of the grade crossing situation and prepare suggestions of ways and means for the eliminations of such hazards as now exist. Other than the resolution asking the appointment of this committee no action was taken by the conference. Following the moving of this question the meeting spent the time listening to suggestions.

The representatives of the railway companies present advocated education as the method of lessening the casualties. The automobile men were more or less insistent that mechanical means be devised to inform the motorist that danger is near when railroad and railway crossings are approached. Both forces, however, agreed that publicity emanating from both railway and automobile sources and promulgated through the press, direct correspondence with automobile owners and through the publications of automobile clubs, possesses the greatest possibilities as a cure for the evils. It was agreed that a uniform system of signs notifying autoists of their approach to a crossing is an essential detail needing immediate attention. In discussing the matter of signs, J. P. Barnes, general manager Buffalo, Lockport & Rochester Railway, recommended that they be not regarded as danger signs, but rather as safety signs. He said the word "danger" to a certain class of motorists invited taking a chance.

Chairman Van Santvoord of the commission on Nov. 8 appointed the executive committee to consider means for greater safety at the grade crossings of electric railways in New York State, and a meeting of the committee has been called for Nov. 17, at the offices of the commission. The members of the committee are as follows: Peter G. Ten Eyck, Albany, representing the New York State Automobile Association; John B. McInerny, Rochester, representing the New York State Motor Federation; George C. Diehl, Buffalo, representing the American Automobile Association; E. G. Connette, Buffalo, president of the International Railway; B. E. Tilton, Utica, general manager of the New York State Railways; J. P. Barnes, Rochester, general manager of the Buffalo, Lockport & Rochester Railway; Mr. Van Santvoord, Francis M. Hugo, Secretary of State, and Edwin Duffey, State Commissioner of Highways as ex-officio members, and Charles R. Barnes, electric railway inspector of the Second District Public Service Commission, representing the commission.

At the meeting to be held in Albany sub-committees will be appointed to study the various suggestions for safer grade crossings of electric railways, which were submitted by the commission to the Syracuse conference and by many other persons in attendance at that conference. The reports of these sub-committees will be passed upon at a future meeting of the executive committee and the result will be embodied in a report to be submitted to the Public Service Commission.

TORONTO RUNNING BOARD CASE DECIDED IN COMPANY'S FAVOR

The Ontario Railway Board on Nov. 2 issued an order, on the application of the Toronto (Ont.) Railway, relieving it from responsibility for the operation of cars with running boards. Vice-Chairman Ingram and Commissioner Kittson heard the argument and adjourned the hearing *sine die.* Two hours later they issued the order desired by the company in the following terms:

"Upon hearing the counsel for the applicants and respondents and the board having been investigating the question of the change of the type of summer cars in use on the applicant's railway, and having conducted experiments and inspected the tracks and devil-strips of the said railway company's system, and the board being of the opinion that the space between the tracks, commonly called the devil-strip, is not sufficiently wide to permit cars with seats for passengers facing the front with an aisle sufficiently wide to allow the passage of the conductor, the board orders that the applicants be hereby relieved until a final disposition of this application from the obligation imposed by Sub-Section 1, of Section 107, Ontario railway act, to all routes upon which the company operates its street cars."

New Working Agreement in Fort Smith.—The Fort Smith Light & Traction Company, Fort Smith, Ark., has entered into a new contract with its men which runs until Nov. 1, 1916. Under the new contract the present length of the working day and working conditions other than those of wages remain unchanged. The pay of the trainmen, however, is increased 2 cents an hour.

Detroit Patrons Urged to Consider Skip Stops.—The Detroit (Mich.) United Railway, in *Electric Railway Service* for Nov. 5, urged upon its patrons their consideration of the skip stop. The company has asked its riders and readers to let it hear from them as to their opinion of the skip stop. In conclusion the company said: "The discussion will result in good to all of us, and it may lead to the adoption of some plan which will help materially in the transportation of the public."

Trenton Fare Hearing.—The hearing in regard to fares on the lines of the Trenton & Mercer County Traction Corporation, Trenton, N. J., was resumed on Oct. 29. Three reasons were assigned by Rankin Johnson, president of the corporation, as to why the receipts of the company have decreased in the present fiscal year from the total receipts for the same months of 1914. The first reason was the increase in the use of automobiles. The second was the development of the commercial automobile, known as the jitney. The third was the general depression.

How the Louisville Nickel Is Divided.—Passengers on the cars of the Louisville (Ky.) Railway are getting their first lessons in the interdependence of themselves and the company. This is a part of the campaign which the ELECTRIC RAILWAY JOURNAL recently mentioned. It will be continued indefinitely. The first card read as follows: "How the trolley nickel is divided.—2.02 cents for wages. 0.78 cent for expenses. 0.55 cent for taxes. 1.06 cent for interest. 0.59 cent for dividend. Our interests are mutual.—Louisville Railway."

Skip Stops in Washington.—It is announced that the Washington Railway & Electric Company, Washington, D. C., is about to establish an express service from Fifteenth Street and New York Avenue to the District line at Chesapeake Junction, cars running every six minutes between 4 p. m. and 6 p. m. It is further stated that these cars will not take city passengers, and will stop only at indicated points on the road. These indicated points number twelve between Fifteenth Street West and Fifteenth Street East, being the compulsory stops at track intersections and "fire stops."

New Express Rates of Northern Texas Traction Company.—The Northern Texas Traction Company, Fort Worth, Tex., has put into effect a new schedule of express rates over its line extending from Dallas to Fort Worth and Fort Worth to Cleburne, which reduces by approximately one-half the rates charged under the old classification of "merchandise" or "general specials." The Texas Railroad Commission classification of first, second, third or fourth classes is used, and rates corresponding to these classes, the same as are charged by the steam railroads, are assessed, giving express service for freight rates.

San Francisco Municipal Railway's Largest Day.—Receipts from fares on the San Francisco (Cal.) Municipal Railway system on Nov. 2, San Francisco day at the exposition, were the largest in the history of the municipal line. The total cash fares on all branch lines amounted to $14,007, eclipsing by several hundred dollars the receipts on opening day. The exposition attendance on Nov. 2 was about 348,000. It is estimated that more than 280,000 persons rode on the city car lines. No accidents were reported. The total receipts of the municipal line from all sources during October were $215,231.15.

Increase in Wages on Massachusetts Line.—The conductors and motormen in the employ of the Boston & Worcester Street Railway, Boston, Mass., have been granted an increase in wages. The new schedule provides that the men will receive a minimum of 26 cents an hour and a maximum of 32 cents. The old rates called for a minimum of 24 cents and a maximum of 29 cents. The men who have been employed by the company six months or less get 26 cents under the new rate. The second six months the wage is advanced to 27 cents. The wage for the second-year men is to be 28 cents and the third-year men 29 cents. The fourth-year men will receive 30 cents and after this period of service all the uniformed employees will receive the maximum of 32 cents.

New Regulations for Safety in Streets.—Many important recommendations to provide for new traffic regulations with the view to minimizing the number of accidents occurring upon the public streets were approved at a meeting of the street traffic committee of the New York Safety First Society held on Nov. 4. It was the consensus of opinion that the campaign of education being conducted by the Safety First Society was accomplishing much good, but that greater authority must be given to the traffic police to regulate and direct pedestrian travel upon the public streets and that it should be unlawful for any person to cross a street in the middle of a block. The Detroit ordinance, which gives the police commissioner power to regulate and direct the course of pedestrian travel, was approved. An important recommendation provides for an ordinance making it a misdemeanor for any person to "hitch on" or trespass upon a motor vehicle, street car or horse-drawn vehicle, unless employed by the owner thereof.

Accident Fakir Apprehended in New Jersey.—On Oct. 6, 1915, James Ryan, alias James Morrisy, alias Charles Miller, alias Harry Peterson, was arrested on complaint of Claim Agent Van Buskirk of the Central Division of the Public Service Railway, Newark, N. J., charged with attempting to obtain money under false pretences. He received a hearing before Recorder Feister of New Brunswisk, pleaded not guilty and was held under bail to await the action of the Grand Jury. This man, giving a different name on each occasion, has presented four claims against the Public Service Railway in different parts of the State, and his attempts to collect at the same office twice led to his arrest. He invariably gives his occupation as that of a carpenter. In all of the cases his claim is based on a fall inside of a car. In each case he showed symptoms of a fractured skull and got away with it. His story has been that he fell as a result of tripping over a protruding nail in the car. He usually extracted this nail from his shoe in the presence of witnesses at the hospital. He appears to be about fifty years of age; height 5 ft. 9¾ in., weight 190 lb.; hair slightly gray; drooping gray moustache; eyes blue-gray. Ryan has now been positively identified as having made similar claims against the Connecticut Company, in which he used the name of Charles Miller; against the Fonda, Johnstown & Gloversville Railway, in which he used the name of Richard Boshart, and against the Worcester (Mass.) Consolidated Street Railway, in which he used the name of John Meyers. In all of these cases he deceived the examining physicians and the physicians at the hospital.

Personal Mention

Mr. Bury I. Dasent has been appointed publicity agent of the British Columbia Electric Railway, Vancouver, B. C., to succeed Mr. Frank Harris, resigned.

Mr. E. B. Heath, trainmaster for the Spokane, Portland & Seattle Railroad, Portland, Ore., has been appointed assistant superintendent of the Spokane & Inland Empire Railroad and the Spokane Traction Company, Spokane, Wash.

Mr. Walter N. Polakov has resigned as superintendent of power of the New York, New Haven & Hartford Railroad to engage in consulting practice. He had been in charge of the operation of the power plants of the New Haven for eighteen months.

Mr. A. S. Henry has been appointed superintendent of transportation of the Lockport division of the International Railway, Buffalo, N. Y., including the Lockport city lines and the Buffalo and Lockport branch. He was formerly superintendent of the Lockport division of the company.

Mr. Thomas W. Connette, son of Mr. E. G. Connette, president of the International Railway, Buffalo, N. Y., who has been assistant superintendent of transportation of the Buffalo city lines of the company, has been promoted to the position of superintendent of transportation of the Buffalo city lines.

Mr. Edward Schlant has been appointed to succeed Mr. Thomas W. Connette as assistant superintendent of the Buffalo city lines of the International Railway, Buffalo, N. Y. Mr. Schlant was formerly in charge of the Hertle and Forest stations, in which capacity he will be succeeded by Mr. A. H. Hock.

Mr. H. M. Wilson, vice-president of the McGraw Publishing Company, Inc., was struck by an automobile on Nov. 5, in Scarsdale, N. Y., while returning to his home in the evening. The automobile carried no front lights. Although thrown to the ground and severely wounded in the face, Mr. Wilson escaped other serious injury and is now doing as well as can be expected.

Mr. Paul Shoup, president of the Pacific Electric Railway, Los Angeles, Cal., addressed the Jovian League in that city recently. Mr. Shoup reviewed electric railway history in that State, covering some of the points brought out by him in his speech before the American Electric Railway Association in San Francisco, Cal. Out of twenty-two electric railways in California on which he had secured figures only one paid a dividend to stockholders last year.

Mr. E. H. Henning has been appointed superintendent of transportation of the lines of the International Railway, Buffalo, N. Y., radiating from Niagara Falls, including the Buffalo and Niagara Falls division, the Niagara Falls city lines, the Park and River division on the Canadian side of the Niagara Gorge and across the Suspension Bridge and the new fast line between Buffalo and Niagara Falls soon to be built. Mr. Henning was formerly superintendent of the interurban lines of the company.

Mr. Herbert L. Harries, who has been managing the properties of the Washington-Oregon Corporation, with headquarters at Vancouver, Wash., for the receivers, has been appointed general manager of the North Coast Power Company, the successor to the Washington-Oregon Corporation, the property of which was sold under foreclosure on Oct. 30. Mr. Harries became connected with the Washington-Oregon Corporation in May, 1915. Before that he was assistant operating superintendent of the Ceneral Hudson Gas & Electric Company, Poughkeepsie, N. Y., having been theretofore assistant general manager of the Louisville Gas & Electric Company, Louisville, Ky., of which his father, Gen. George H. Harries, is president.

Mr. George G. Yeomans has been appointed purchasing agent of the New York, New Haven & Hartford Railroad, New Haven, Conn., to succeed Mr. H. A. Fabian. Mr. Yeomans was graduated from Princeton in 1879, and after leaving college worked for about two years in the rail mills of the Philadelphia & Reading Coal & Iron Company. He then became connected with the Chicago, Burlington & Quincy Railroad as a rail inspector on the staff of the purchasing agent. After two years in this work he took a clerkship in the department, and filled practically every position in the purchasing agent's office, finally being made purchasing agent, which position he held for seven years. He was in the service of the Chicago, Burlington & Quincy Railroad for twenty-three years, resigning to become assistant to President F. A. Delano of the Wabash Railroad. He held that position for six years, until the road went into the hands of receivers in 1911. Since then he has made a specialty of investigating methods of purchasing and handling supplies on various large roads.

Mr. C. L. Stone, who has been appointed second vice-president and general manager of the Otsego & Herkimer Railroad, Colliers Light, Heat & Power Company and the Hartwick Power Company, Cooperstown, N. Y., was formerly vice-president and general manager of the Manila Electric Railroad & Light Corporation, Manila, P. I. Mr. Stone was with the General Electric Company from 1898 to 1902, first in the testing department and later in the power and mining, the engineering and the commercial departments. From 1902 to 1904 he was assistant to the master mechanic of the St. Louis (Mo.) Transit Company. Since 1904 he has been connected with the J. G. White Management Corporation, New York City. He went to Manila for the J. G. White organization before the electric railroad and lighting property there began operation, and had charge of a considerable amount of construction work. Operation in Manila was started in 1905, and Mr. Stone was appointed electrical engineer of the property. Later he was made assistant general manager of the Manila Electric Railroad & Lighting Company, in which capacity he served for a period of five years. He was vice-president and general manager of the properties there for approximately two years prior to his departure from Manila.

G. O. NAGLE

Mr. George O. Nagle has resigned as second vice-president and general manager of the Wheeling (W. Va.) Traction Company and as president and general manager of both the Pan Handle Traction Company and the Steubenville & Wheeling Traction Company, controlled by the Wheeling Traction Company. His resignation becomes effective on Dec. 1. Mr. Nagle has been with the properties in Wheeling as general manager since July, 1903. Mr. Nagle's incumbency at Wheeling has been marked by an immense amount of new construction work and reconstruction and witnessed the early restoration of the company to a place in public confidence which too few public utilities of the kind enjoy. At no time in the twelve years of Mr. Nagle's work in Wheeling has labor trouble threatened. Mr. Nagle was for Wheeling first. He entered into all work for community betterment, became an influential member of the Board of Trade, entered the Playground Association and recently was appointed by Governor Hatfield of West Virginia to represent the State as a member of the Panama-Pacific Exposition Commission. The esteem in which Mr. Nagle was held is instanced by the following statement made by the Wheeling *Intelligencer:* "Probably no other man in Wheeling during the time Mr. Nagle has lived here has been more highly regarded or has made a more profound impression upon the community at large. As an employer of labor, as an enterprising and aggressive street railway manager, as a citizen interested in civic affairs, and in the welfare of the community in general, Mr. Nagle has taken leadership and filled a place that will be difficult for any other man to fill." Mr. Nagle was born in Milton, Pa., on Dec. 31, 1868. He received his early education in Lima, Ohio, and moved to Chicago in 1886. Shortly after this he entered the employ of the Chicago, Burlington & Quincy Railroad, serving first in the ticket auditor's office and later in the general auditor's office. In February, 1891, he entered the employ of the Chicago (Ill.) City Railway as junior in the claim department. Six months later he was promoted to the position of private secretary to the superintendent, which place he held until appointed superintendent on Jan. 18, 1898. After Mr. Nagle resigned from the Chicago City Railway he became connected with Stone & Webster, Boston, Mass., taking the position of manager of the Savannah (Ga.) Electric Company, which controls the lighting and railway properties there. Mr. Nagle remained at Savannah for several years. Early in 1903 he retired from the management of the Savannah company to take charge of the Stone & Webster properties in the Southeast. In July of the same year he was appointed to the company at Wheeling.

Mr. Charles A. Call, general passenger and freight agent of the New York, Westchester & Boston Railway, New York, N. Y., has been appointed manager of the industrial bureau of the New York, New Haven & Hartford Railroad, to succeed Mr. W. H. Seeley, resigned. Mr. Call entered railroading in 1883, when he became connected with the New York & New England Railway in its passenger department. In 1898 he became passenger agent at Boston, Mass., and in 1905 was appointed general agent of the passenger department of the New York, New Haven & Hartford Railroad with offices in New York City. Mr. Call became general agent of the New Haven at Boston in 1908. He became general manager and freight agent of the New York, Westchester & Boston Railway in 1912.

N. H. BROWN

Mr. Nelson H. Brown, who for the last two years has been superintendent of transportation of the Buffalo division of the International Railway, Buffalo, N. Y., has been promoted to the new position of general superintendent of transportation of the entire system of the International Railway, including the Buffalo, the Niagara Falls and the Lockport city lines, and the Buffalo and Niagara Falls, the Buffalo and Lockport, and the Park and River divisions. The appointment is effective on Nov. 15. Mr. Brown entered the railroad business with the New York Central Railroad in 1891, with the mechanical department. Later he was a fireman between Syracuse and Albany. He resigned from the New York Central in 1894 to become identified with the Consolidated Street Railway, Syracuse. During the year and a half following he was employed as a conductor, but in 1896 he became a motorman for the Syracuse company. In 1898 Mr. Brown was appointed cashier, a position which he held for a year, when he was promoted to inspector. About that time the various street railway properties operating in Syracuse were consolidated, and Mr. Brown was made an inspector with the newly organized company, known as the Syracuse Rapid Transit Company. He remained inspector until 1907, when he resigned to accept a position at Worcester, Mass., as general inspector for the Worcester Consolidated Street Railway. On Sept. 1 of that year he was appointed superintendent of the Worcester & Southbridge Street Railway, at Charlton City, Mass. After five years of service at Worcester, Mr. Brown resigned to accept a position with the Albany Southern Railroad, as superintendent, with headquarters at Rensselaer, N. Y. Early in 1913 Mr. Brown resigned from the Albany Southern Railroad to assume the position of assistant superintendent of transportation of the International Railway, Buffalo, N. Y., and continued in this capacity from Feb. 1 to June 1, when he was appointed to the position of superintendent of transportation of the Buffalo division, in charge of operation in the city of Buffalo and vicinity.

EDWARD DANA

Mr. Edward Dana, assistant superintendent of surface lines of the Boston (Mass.) Elevated Railway, has been appointed superintendent of the recently created department of traffic. In his new work Mr. Dana will have charge of the laying out of surface car service, routeing and time-tables, and will co-operate with the superintendent of transportation in all matters relating to traffic. Mr. Dana was born at Bernardston, Mass., in 1886. He completed the academic course at Harvard College in three years and was graduated in 1907. He entered the employ of the Boston Elevated Railway in 1907 as a conductor, and rapidly rose through the transportation department to the assistant superintendency of the surface lines of the company. Mr. Dana is widely known as an expert in traffic problems and has contributed many valuable articles to the ELECTRIC RAILWAY JOURNAL upon the scientific aspects of car service.

OBITUARY

Carl Witt, storekeeper of the Union Traction Company of Indiana, Anderson, Ind., for the last three years, died suddenly on Nov. 2. He had previously been auditor of the Indianapolis, New Castle & Eastern Traction Company, now a part of the Union Traction system. Mr. Witt was thirty-four years old. He is survived by his widow.

William J. Smith, a street railway pioneer of Kansas City, Mo., died on Nov. 8, at his home in that city. Mr. Smith was born in New York. In 1882 when Kansas City had horse car lines Mr. Smith conceived the idea of building a cable railway, and built the Ninth Street incline, which carried cable cars to the old Union Depot. He later built the Troost Avenue and the Independence Avenue cable lines, and the Summit Street road. Mr. Smith sold his street railway properties to the Metropolitan Railway in 1895.

August J. Reglin, division superintendent of the United Railroads, San Francisco, Cal., was suddenly stricken with heart failure and died on Oct. 22. Mr. Reglin was born in Troy, N. Y., on July 19, 1874. He entered the employ of the Public Service Corporation, Newark, N. J., on July 5, 1895. He served on the platform for fourteen months, when he was promoted to night clerk. He rose steadily in the work, and was called to San Francisco by the late George F. Chapman, general manager of the United Railroads, and on Feb. 8, 1904, he assumed charge of the Twenty-fourth and Utah Division of the United Railroads.

P. A. B. Widener died at his home at Elkins Park, near Philadelphia, Pa., on Nov. 6. Mr. Widener had been ill for some time. He was eighty-one years old. For a third of a century Mr. Widener had been known primarily as a traction financier in Philadelphia, New York and other cities; but as he increased the great fortune based upon street railways, his interests multiplied and he became a director of many industrial corporations, steam railroads and gas and electric companies. Mr. Widener was born in Philadelphia on Nov. 13, 1834. Early in his business career Mr. Widener became associated with the late William L. Elkins. They pooled issues and obtained control of all the surface lines in Philadelphia. In 1886 Mr. Widener entered the New York traffic situation. With Mr. Elkins, Mr. William C. Whitney, Mr. Thomas Fortune Ryan and Mr. Peter Dolan he figured in Metropolitan Traction Company and later Metropolitan Street Railway finance. Mr. Widener stopped active work years ago and gradually shifted his business cares to the shoulders of his son. In 1910 Mr. Widener was still recorded as vice-president of the Cresson & Smithfield Coal Company, and director of the Allegheny Valley Railroad, American Tobacco Company and Union Traction Company, Philadelphia. Five years earlier he had sat on the boards of a score or more corporations.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Waukegan & Woodstock Traction Company, Waukegan, Ill.**—Incorporated in Illinois to construct an interurban line between Waukegan and Woodstock. Capital stock, $50,000. Incorporators: L. C. Roberts, C. A. Spenny, H. A. Hirst, Thomas Howorth, Michael Nelson, F. C. Nickels and F. E. Corliss, all of Chicago.

McComb & Magnolia Railway & Light Company, McComb, Miss.—Incorporated in Mississippi to construct a line in McComb and an interurban railway to Summit, Fernwood and Magnolia. Capital stock, $500,000. Guy M. Walker, New York, president, and A. H. Jones, McComb, general manager. [Oct. 9, '15.]

***Kansas City & Tiffany Springs Railway, Kansas City, Mo.**—Chartered in Missouri to construct a line from Kansas City to Tiffany Springs, 15 miles. Capital stock, $500,000. Incorporators: T. N. Smith, Charles J. Smith, Bayless Steele and C. W. Chandler, Kansas City, Mo.; J. N. Baird and Henry G. Post, Kansas City, Kan., and Robert Engelman, Parkville, Mo.

***South Dakota Short Line Railway, Mitchell, S. D.**—Incorporated in South Dakota to construct an electric railway from Mitchell to Pierre. Capital stock, $2,000,000. G. W. Adams, Council Bluffs, Iowa, is interested.

FRANCHISES

Clarkston, Idaho.—The Lewiston-Clarkston Transit Company has received a franchise from the Council to construct an electric railway in Asotin County from the city limits of Clarkston on Sixth Street to Highland Street and on Highland Street to Thirteenth Street, 1¼ miles.

Henderson, Ky.—The Council of Henderson is considering the matter of renewing the franchise under which the Henderson Traction Company is operating in that city. The ordinance has been drawn for some time and provides that the company, in consideration of the extension of the franchise for twenty years, will make extensions of its lines and will pay an annual franchise fee.

Millersburg, Ohio.—The Dover, Millersburg & Western Railway recently received a twenty-year franchise from the Council to construct and operate an electric railway in Millersburg. The company has also been granted a franchise by the Holmes County Commissioners to build an electric railway in Holmes County to connect Millersburg with Sugar Creek and Canal Dover. [Sept. 18, '15.]

***Henryetta, Okla.**—The Henryetta, Oklahoma & Western Railway has received a franchise from the Council to construct an electric railway in Henryetta. An election on the franchise will be held on Nov. 30.

Walkersville, Ont.—The Sandwich, Windsor & Amherstburg Railway was refused an extension of its franchise at a recent election in return for the construction of a belt line to serve the factory and residential districts.

Astoria, Ore.—The Pacific Power & Light Company has received a franchise from the Council to construct a line on Franklin Avenue, Astoria.

Tacoma, Wash.—The Tacoma Railway & Power Company has received a fifty-year franchise to construct a line from the Fort Steilacoom Insane Asylum to the town of Steilacoom, about 2 miles. The franchise provides that the road must be built in six months. The Council of Steilacoom has already granted the company a fifty-year franchise to operate on its streets.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal. — Preliminary to the construction of the $12,000,000 subway to the beaches, this company will rearrange its tracks at the Hill Street station. The subway planned contemplates the construction of a tunnel under Olive Street, west of the station, and when completed will be more than 6 miles long. The exact date when this work will begin has not been set, but the preliminary work on altering the tracks is to be begun at once. The rearrangement of the tracks at the Hill Street terminal will cost approximately $40,000.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—It is reported that this company, which recently acquired the Wilmington, New Castle & Delaware City Railway, has ordered the equipment necessary to convert the road into an overhead trolley line. Work will be begun the latter part of November or early in December and it is expected that cars will be operated by overhead trolley before the first of next year. The line has heretofore been operated on the electric storage-battery system. The Orange Street line of this company between Sixth and Thirteenth Streets has been abandoned by the company following the recent changes in the routeing of the cars of the company. The tracks of the line will be removed preparatory to repaving the street.

Georgia Railway & Power Company, Atlanta, Ga.—It is reported that this company is considering an extension from Atlanta to Alpharetta via Roswell or Crabapple.

Hawkinsville & Florida Southern Railway, Macon, Ga.—This company will operate a gas-electric car on its line and plans to inaugurate double daily passenger schedules. Another gas-electric car will soon be placed in service as a substitute to a steam train.

Joliet & Eastern Traction Company, Joliet, Ill.—Plans are being considered by this company to extend its line from Chicago Heights, Ill., to Hammond, Ind.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company has about completed concrete abutments for a new bridge to be erected on its extension from Ludlow to Paxton. The grading has been completed almost to Paxton. Rail-laying will be begun within the next week.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company has entered into a contract with the Battleground Light & Power Company to furnish that company with light and power for twenty-five years. The current will be taken from the high-tension wires at Buck Creek. The Battleground Light & Power Company will build the line between the two places.

Mattawamkeag & Northern Railway, Bangor, Me.—It is reported that financial arrangements have been completed for the construction of the Mattawamkeag & Northern Railway from Mattawamkeag to Millinocket and East Millinocket, 23 miles, under a charter held by Charles W. Mullen, Bangor, a member of the Main Public Utilities Commission; I. B. Wood, Bangor; Artemas Weatherbee, Lincoln, and Frank J. Rich, Mattawamkeag. Stone & Webster of Boston are the fiscal agents, and a survey has been made under the direction of that concern. [Nov. 14, '14.]

Winnipeg (Man.) Electric Railway.—The public utilities commissioner has issued an order directing this company to proceed immediately with the construction of a double-track extension on Watt Street, Elmwood.

Bay State Street Railway, Boston, Mass.—Work has been begun by this company extending its double track in Methuen. The new line will extend from the present terminus at the corner of Hampshire, High and Lowell Streets to Railroad Square on the east side of the tracks of the Massachusetts Northeastern Street Railway. The company will repair its tracks on Montello Street between Plain Street and Perkins Avenue, Brockton.

Milford & Uxbridge Street Railway, Milford, Mass.—Work has been begun by this company repairing its trestle bridge on Medway Road. Granite supports and foundation will be substituted for the timber now being used. It is expected that work will be completed within a month.

McComb & Magnolia Railway & Light Company, McComb, Miss.—This company has taken over the plant and equipment of the McComb City Electric Light & Power Company and will begin at once the preliminary surveys for its line in McComb and the interurban lines to Summit, Fernwood and Magnolia. X. A. Kramer, Magnolia, will construct the lines and additional power plants. A. H. Jones, McComb, general manager. [Oct. 9, '15.]

Metropolitan Street Railway, Kansas City, Mo. — Work has been begun by this company on the construction of the double-track extension of its Thirty-first Street line from Indiana Avenue to Brighton Avenue.

Niagara River & Eastern Railway, Niagara Falls, N. Y.—The Public Service Commission for the Second District of New York has received final briefs in the petition of this company for permission to build and operate a double-track line for passenger and freight service between Lockport and Niagara Falls. The Niagara River & Eastern Railway proposes to connect with the International Railway and Buffalo, Lockport & Rochester Railway at Lockport and with trunk lines of steam railroads in Canada by a new bridge across the river at Lewiston. It is also proposed to handle freight on the Buffalo, Lockport & Rochester Railway and have connections with the Erie Railroad and Pennsylvania Railroad at Rochester. Charles Hickey, Lockport, president. [July 31, '15.]

Oakwood Railroad, Dayton, Ohio.—This company is building an extension of its line along the Lebanon Pike and Patterson Road for a distance of about a mile, and it is expected that operation will be begun about Dec. 1 The estimated cost of the improvement is approximately $60,000.

Tiffin, Ohio.—It is reported that forty miles of right-of-way have been purchased for the proposed railway between Tiffin, Bucyrus and Fremont. Contracts for the Tiffin-Fremont section of the line are to be let within two months. Entrance into Toledo from Fremont is proposed over a leased line. A. W. Nyquist, Tiffin, is interested. [Sept. 18, '15.]

***Henryetta, Okla.**—It is reported that plans are being considered by R. D. Long, Muskogee, to construct an electric railway from Henryetta to several small towns.

Oklahoma & Interstate Railway, Oklahoma City, Okla.—At a special meeting of the Council of Galena a resolution was passed calling for an election on Nov. 23 for the purpose of voting on a bond issue not to exceed $15,000 to aid in the construction of this company's line from Columbus and Baxter Springs to Galena. [Oct. 23, '15.]

Sapulpa & Oil Field Railway, Tulsa, Okla.—Work will be begun by this company some time this month on its proposed line from Drumright to some point on the St. Louis & San Francisco Railroad. As published in the ELECTRIC RAILWAY JOURNAL for Oct. 30, J. A. Frates has been elected president of the company and C. F. Hopkins vice-president and general manager. The following directors were elected: J. A. Frates, St. Louis; Frank Brown, Independence, Kan.; C. F. Hopkins, Sapulpa; S. W. Barns, Kansas City; W. A. Moore; J. T. Langtry, Sapulpa, and J. H. Grant, Oklahoma City. The headquarters of the road will be at Tulsa, where offices have been established. An electric locomotive will handle the regular freight cars and the rails will be standard gage. Two electric cars, with a capacity of forty-four persons, and one electric locomotive have been ordered for the preliminary business.

Mimico, Ont.—Presenting the views of Mimico, Reeve Coxhead at a joint meeting of the various municipalities interested in the proposed Toronto to London hydro-electric railway, urged that the Ontario Hydro-Electric Commission appropriate the present line of the Toronto & York Radial Railway from the Humber River through Etobicoke Township. It was stated that plans have already been prepared to be submitted to the Toronto and Hamilton Highway Commission for the widening of the Lake Shore road to 86 ft. to give ample space for the double-tracking of the line. If taken over the line could be put in a condition measuring up to the standard of the other commission-owned lines throughout the province and thereby the conflict of service could be avoided.

Toronto (Ont.) Railway.—This company has placed in operation the extension of its Harbord Street line in conformity with the order of the Ontario Railway & Municipal Board. Some time ago the city laid tracks on Ossington Avenue, north from Bloor Street to Hallam Street, west on Hallam Street to Dufferin Street, north on Dufferin Street to Lappin Avenue and west an Lappin Avenue to Lansdown Avenue. The cars on the Harbord Street line will now operate over the new route. The extension is about 1¼ miles.

Portland & Oregon City Railway, Portland, Ore.—This company has purchased the right-of-way through the tract owned by the Multnomah Mohair Mill Company in Sellwood near Willsburg. This practically gives the company right-of-way from Milwaukie to Portland. Track has been laid through Milwaukie from the south side along the east side of the Crystal Lake Park. South from Milwaukie track has been laid nearly to Bakers Bridge over the Clackamas River. The company is working from Milwaukie toward Portland. [May 1, '15.]

***Ballinger, Tex.**—Business men of Ballinger and Abilene are contemplating the construction of an electric railway to connect the two cities. The present steam railroad is considered inadequate for the traffic.

Petersburg & Appomattox Railway, Petersburg, Va.—Following a conference in Richmond recently between the officials of the Petersburg & Appomattox Railway and the Virginia Railway & Power Company, it was announced that an agreement had been entered into whereby the Virginia Railway & Power Company will furnish to the Petersburg & Appomattox Company current for the operation of its cars between Petersburg and City Point. An agreement was also entered into whereby the Petersburg & Appomattox Company will use the tracks of the Virginia Railway & Power Company from Wythe and Main streets, the terminus of the former company, to the office of the latter company at Bollingbrook and Sycamore Street. The company is rapidly pushing the construction of its line between Petersburg and Hopewell to completion, and it is expected that the road will be in operation to Hopewell on or before Jan. 1. [Oct. 16, '15.]

Washington-Oregon Corporation, Vancouver, Wash.—The light and power properties of the Washington-Oregon Corporation have been purchased by Harry N. Putnam, Portland.

Charleston (W. Va.) Interurban Railroad.—Operation has been begun by this company on its line between Charleston and Marmet, 10 miles. The line will be extended to Montgomery.

Chicago & Wisconsin Valley Railroad, Madison, Wis.—At a recent meeting of the stockholders of this company resolutions were adopted changing the name of the company to the Wisconsin Interurban System. It was also decided to amend the charter, extending the line west from Sauk City and Prairie du Sac to Viroqua and northeast from Madison to Fond du Lac. It is proposed to begin construction next spring. [Oct. 30, '15.]

SHOPS AND BUILDINGS

Tri-City Railway of Illinois, Rock Island, Ill.—This company plans to construct a street car terminal at Watch Tower Park on the site of the old roller skating rink, which has been torn down.

Metropolitan Street Railway, Kansas City, Mo.—Members of the board of control of this company have approved the plans for an ornamental shelter house 48 ft. x 12 ft. to be constructed on the east side of the tracks south of the Main Street viaduct for persons waiting for cars at the Union Station. The ends will be of cement, the sides of glass and the roof of Spanish tile. It is to contain no benches or concessions, but will be only a shelter from the wind and rain.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—Arrangements have been completed whereby this company and the Salt Lake & Ogden Railway will acquire the corner on South Temple and West Temple Streets for a new interurban terminal. The property is to be given to the interurban lines by the Mormon Church authorities and property owners of upper Main Street. The property has a frontage of about 200 ft. on West Temple Street and 330 ft. on South Temple Street. A right-of-way has been secured from First West Street to the terminal site. It is planned to expend about $250,000 for the erection of a station and other improvements on the new site.

Manufactures and Supplies

ROLLING STOCK

Lehigh Valley Transit Company, Allentown, Pa., expects to purchase additional cars.

Port Arthur (Ont.) Civic Railway has just constructed a new air-equipped snow plow in its own shops.

Sapulpa & Oil Field Railway, Tulsa, Okla., a new line, has ordered one Westinghouse electric freight locomotive and two electric cars with a capacity of forty-four persons.

Hawkinsville & Florida Southern Railroad, Macon, Ga., has ordered one gas-electric car which it expects to place in service in about a month. A second car will be acquired at a later date.

TRADE NOTES

Automatic Ventilator Company, New York, N. Y., has received orders for its ventilators from the Buffalo & Lake Erie Traction Company and the Davenport & Muscatine Railway.

Frank Ridlon Company, Boston, Mass., has been appointed New England representative of the Van Dorn & Dutton Company, Cleveland, Ohio, for its electric railway motor gears and pinions.

Van Dorn & Dutton Company, Cleveland, Ohio, has moved its New York office from 50 Church Street to 556 West Thirty-fourth Street. Frank Van Anden has been appointed as district sales manager in charge of the New York office.

E. B. Van Patten has been appointed sales representative for the Acme Supply Company, Chicago, Ill. Mr. Van Patten's territory will include the Southwestern States, where he is well acquainted, having represented other railway supply concerns in that district for the past eight years.

National Tube Company, Pittsburgh, Pa., on Nov. 18 will show a series of three industrial motion picture films before the Central Electric Railway Association in the Assembly Room of the Claypool Hotel, Indianapolis, Ind., illustrating the manufacture of "National" pipe from ore to finished product.

Perfection Springs Company, Cleveland, Ohio, has increased its capital stock from $1,500,000 to $2,500,000 and F. F. Prentiss, C. C. Bolton and T. E. Borton have been added to the board of directors. The increase in the capital stock was needed because of the heavy increase in business and the construction of large factory additions.

John A. Roebling's Sons Company, Trenton, N. J., on Nov. 11 lost by fire its factory building for the manufacture of small wire rope. The loss is estimated at $1,000,000. The factory for heavy rope was not affected. The company will use new buildings, about completed, for the manufacture of small rope, and expects to be in operation in about two months.

Shaw Insulator Company, Newark, N. J., has completed a plant for the molding of composition into insulating parts for all electrical purposes such as generators, motors, starters, magnetos and special requirements. This insulation is manufactured from non-conducting materials carefully selected and tested in laboratory in actual service and is said to be free from excessive contraction and expansion, moisture absorption, varied dielectric strength, carbonization, mechanical imperfection and surface leakage. The material is impervious to acids and will exceed standard requirements for heat.

Paul M. Lincoln, whose term as president of the American Institute of Electrical Engineers expired on July 1 and who has for a number of years been prominently identified with the engineering department of the Westinghouse Electric & Manufacturing Company, has resigned his position with this company in order to be able to devote his time to the manufacture of a meter which he has recently invented. Mr. Lincoln was first connected with the Short Electric Company in Cleveland and then joined the Westinghouse Electric & Manufacturing Company. At the opening of the Niagara Falls Power Company's plant he became its electrical superintendent, but returned to the Westinghouse Company in 1902 and has been connected with it ever since.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces a number of changes in the supply department, which have recently been put into effect. S. A. Chase, formerly special representative; T. J. Pace, formerly in charge of illuminating and rectifier divisions, and Carl G. Schluederberg, formerly head of switchboard sales, have been appointed assistants to Manager J. J. Gibson. C. E. Stephens, engineer of lighting, has been appointed manager of the illuminating section to succeed Mr. Pace. C. Streamer, formerly head of the order division, succeeds Mr. Schluederberg as manager of the switchboard section, and A. P. Joseph is appointed head of the order section to succeed Mr. Streamer. M. C. Morrow, formerly of the Philadelphia office, is appointed manager of the appliance section, which is a combination of the former heating, fan motor and ozonizer divisions of the supply department. M. C. Rypinski, formerly manager of the D. & S. division of the New York office, becomes manager of the meter section. The power department, E. H. Sniffen manager, also announces the following section managers: W. H. Garrett, contracts; J. G. Worker, stokers, and H. D. Storer, auxiliaries.

ADVERTISING LITERATURE

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued a bulletin describing and illustrating its various types of telephone equipment. This company has also issued new price lists of its telephone construction material and supplies.

Lakewood Engineering Company, Cleveland, Ohio, has issued book No. 16 describing and illustrating its various type of industrial cars. These cars include side dump, bottom dump, end dump, all around dump, rack cars, removable sides, gate dump, scale cars, incline cars and platform cars. Many of the types of cars and trucks shown in the catalog can be furnished electrically equipped, either for overhead or underground trolley, third-rail or storage-battery operation, and with either flanged or flat tread wheels.

Calebaugh Self-Lubricating Carbon Company, Inc., Philadelphia, Pa., has issued a catalog describing completely its large number of types of "No-Spark" carbon brushes. A comprehensive price list of brushes adapted for a wide field of electrical machine design is included. The brushes have a complete range of varying resistances, from low to high conductivity, and embrace a wide scope of hardness, specific gravity and other properties necessary to successful operation. The catalog points out the types of brushes particularly adapted for street and interurban railway motors.

Spray Engineering Company, Boston, Mass., has issued a reprint of a paper read by Lee H. Parker, president of this company, before the convention of the National Association of Cotton Manufacturers at New London, Conn. The reprint traces the development of spray cooling of condensing water and contains illustrated descriptions of a number of typical installations. It also shows the advantages in general of a spray system over a cooling tower as regards the following points: saving in power required for operation, flexibility, less make-up water required, usability of spray cooling ponds as a source of supply for fire pumps, longer life and lower first cost.

Carnegie Steel Company, Pittsburgh, Pa., has issued a publication entitled "Steel Sheet Piling," tenth edition, which supersedes a similar pamphlet, ninth edition, issued in 1912 and which covers steel sheet piling for use in cofferdam construction, retaining walls, mine shafts, sewer trenches and other construction where wooden sheet piling is in service. The pamphlet contains tables and data not only on the sections manufactured by this company but on the uses of driving and pulling appliances together with a general discussion on earth and water pressures and the computation of bracing systems for cofferdams, retaining walls, etc., and contains notes on concrete and safe bearing loads for piles. The book also includes information on the weights of materials, strength of hoisting ropes, lifting capacity of tackle, tables on metric conversion and other tables, and thus covers all the ordinary requirements in a handbook intended for foundation engineers and contractors. While intended for free distribution to engineers and contractors engaged in foundation work, copies are available for general sale at 50 cents each.

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THE DECLINE OF THE JITNEY

As we predicted some time ago, the jitney wave is receding. It is settling down from its original stage of mad enthusiasm to one of sober second thought, the inevitable result of which will be fewer jitneys. As one looks over the motley crew in any city where the craze has been active, he notices that the vehicles are getting to look more and more disreputable, the drivers less cheerful and the public less enthusiastic over this new mode of transit. Moreover, we are approaching a time of the year, certainly in the Northern States, when this condition is bound to increase. With the advent of real cold weather it is safe to say that the average person would very much rather ride in a warm street car than in a dilapidated touring car of the vintage of 1910 with an extemporized cover. The jitney was never intended to contend against snow, and the first real storm will probably send most of those remaining on the streets to winter quarters. Whether they will reappear next spring in the same numbers as during the spring of 1915, we consider very doubtful. The experience of the past year has shown that repairs cannot be postponed indefinitely, and that the average patronage was not what was expected. Moreover, in most cities adverse legislation has been passed to protect the public against irresponsible jitney drivers and decrepit cars, and there should be more this winter to discourage the reappearance of jitneys in the spring.

THE EFFECT OF THE JITNEY

Although the jitney is on the decline it will leave its effect behind. One of these is that the railway companies will be less able to make needed extensions and improvements because of the losses which they have experienced from jitney competition. This is a lesson to the public. It ought to have realized that the main work of urban transportation would have to be undertaken by the local electric railway system, and that the more its revenues were depleted by pirate competition the less able was it to maintain its growth equally with that of the city. To the railway company it has also brought some lessons. One is in favor of lighter cars and more of them, so as to increase the frequency of service. The other is to emphasize the desirability of a light motor bus for certain classes of service for which the electric car is not suited, because the traffic to be obtained could not support the larger investment which would be required in permanent fixtures. For service of this kind the motor bus, at a fairly high charge per mile, would occupy a field which is not filled now by any other public means of transportation except the horse-drawn stage, as, for instance, in handling strictly summer business at ocean and mountain resorts. A motor bus is certainly a vast improvement over the ramshackle "depot wagon," familiar at shore stations all along the seaboard. What was good and useful in the jitney bus idea is due to survive, but the disappearance of the wandering jitney, prowling around on rickety wheels and waiting for trusting passengers, will have no mourners.

THE REPULSION-STARTING SERIES MOTOR

The single-phase electrification on the main line of the Pennsylvania Railroad out of Philadelphia, described in last week's issue of this paper, brings this system into the focus of interest once more. On the technical side a most interesting feature of this installation is the departure from the familiar design of a.c. series motors which was adopted. The usual high resistance leads inserted between the armature winding and the commutator bars to limit the transformer currents in the coils short-circuited by the brushes have been omitted. Instead, during the starting period, when the transformer currents in the coils short-circuited by the brushes are maximum, the short-circuit voltages are kept down to the values at which the brushes, through their resistance, can prevent the formation of serious sparking. Information as to just how this is done is not yet available for publication, but an important element is the use of the "repulsion" starting principle commonly employed with single-phase induction motors of moderate size. Up to 15 m.p.h. the armatures of the motors are short-circuited, reducing the armature voltage to a very low value. By suitable proportioning of the windings it is possible to produce an armature current in this way for starting which is much larger than that drawn from the transformer secondaries. Returning to the short-circuited coils and the usual resistance leads it is obvious that the latter are a source of construction cost and originally were the cause of some operating trouble. They are also the source of heat, to offset which the active armature conductors must be made large and a liberal supply of armature iron provided. The successful omission of these leads would therefore be desirable, as the a.c. motor armature would then not differ essentially from the d.c. motor armature. As the resistance is needed only at starting, it follows that if the armature can be brought up to speed with good commutation by any other means such commutation can be maintained without difficulty thereafter. The significance, therefore, of the choice of the repulsion-starting type of motor by the Pennsylvania Railroad, rather than the usual series type, is that it secures thereby a cheaper and lighter motor, one with an armature not radically different from that of a direct-current motor.

ORIGINAL COST IN VALUATION WORK

When commissioners, lawyers, economists, engineers and accountants assemble, as they did in Philadelphia last week, to discuss moot topics in the still undeveloped field of public utility valuation, a marked unanimity of opinion as to detailed theories and practices is not to be expected. Yet varied as were the opinions expressed at Philadelphia there was a marked tendency among many of those present to emphasize the importance of original cost in valuations for rate making rather than reproduction cost. The principal reason for this attitude, not always openly expressed but ascertainable by reading between the lines, is the thought that such a plan would give a lower valuation in most cases of steam railroad valuation than reproduction cost, owing to the increase in land values and present higher costs of material and labor. This, of course, is no reason at all and has no foundation in ethics. The choice of either original cost or reproduction cost as a sole basis of valuation or the determination of the comparative weight of these two costs as factors in present value are questions that are dependent for their solution upon equity and not upon the mere belief that one method or another will give a higher figure.

It is probably true that where original cost can be completely ascertained and properly compiled, it is of more value in showing the sacrifice of the investors than the fluctuating reproduction cost based on present conditions. As long as courts have to act upon this question, however, the point of practicability will undoubtedly have to be largely the guiding principle. On account of missing records and undeveloped accounting methods in the past it is doubtful whether in most cases a just finding of original cost can be made, and the theory of reproduction cost will by virtue of necessity in such cases have a greater weight. Indeed, in the decisions of the courts up to this time, original cost and reproduction cost have been recognized as the two most important factors in the present value of a utility, but the greater ease of applying the reproduction cost theory has led to its acquiring a predominating influence in most valuations. Even where the original cost is to a large extent sufficiently determinable for fair use, the reproduction cost must be used in supplying secondary evidence as to the part of the original cost where the primary evidence is lacking.

While we believe that much can be said in favor of the theoretical equity of the original cost basis, especially in the case of a company which has been through many vicissitudes and changes in equipment, we are opposed to the agency theory in its support as was advanced at Philadelphia. Under this theory, the utility is supposed to have been simply the agent of the municipality in developing the service and should be credited only with the sums actually expended, while being required to return to the public all large profits. There are two vital objections to this theory. One is that it presupposes a guarantee of the agent by the principal against loss. This was never the case with public utilities and cities in the past. If the public claims a right to all past large profits of the successful utilities it should recompense the stockholders of those which were not profitable for their losses of both return and investment. Actually, the successful utilities at the present day are a part only of those which were launched with seemingly equally bright prospects, and as the stockholders in the successful utilities took the risks they are entitled to the profits earned. The other answer to the agency theory is a legal one. The title to the property has always been with the utility, showing it was the principal and not the agent.

After all, equitable considerations must govern the treatment of old companies on all points. In valuation matters the original cost need not be and in many cases can not be the sole basis of valuation for such companies, but it must be considered a prime factor in according to the investor the treatment which he has a right lawfully to expect—in other words, in fixing the valuation basis and rate of return which would have induced the investment, could it have been known in advance. Above all, the combination of the valuation figure and the rate of return constitutes the important figure to be used in judging fairness, and until these are both settled for each particular case the question is largely academic.

The question of a rate basis for the future is not so difficult, for there seems to be no doubt even on the part of public representatives that the real criterion for a rate basis must be the actual legitimate investment honestly made, and on this basis a return must be allowed which the investor is willing to accept, as long as his co-operation is to be secured in utility development.

GREATER SAFETY ON THE STREETS

A marked tendency of the times is the increased attention being given to the promotion of safety on the streets by means of street traffic regulations. It is not many years ago that such regulations were enforced only in the cities of the larger class, and in them only at a few congested corners. Now the marking of safety zones for the guidance of pedestrians when they are crossing the street and the erection of traffic guide posts for the direction of vehicles when turning corners are becoming more common now in even the smaller cities. This is partly due to the fact that there is a larger number of street vehicles now than formerly. In part it is caused by a more general awakening to the necessity of taking precautions and to the activities of the safety-first societies, which have been organized in many cities. Whatever the cause, the electric railway companies are benefited. In congested streets the pedestrian who cuts corners or crosses the street between the regular crossings now does so largely at his own risk and so is more apt to be considered guilty of contributory negligence in case of accident, and vehicles which do not comply with the growing number of rules of the road which govern them are equally out of the pale of legal protection in case of injury.

While these reforms are being made we believe that it would be very desirable to provide for greater protection of passengers during their journeys between the cars and the sidewalk when they are leaving and entering the cars. One way to do this is to provide a penalty for automobiles which pass a car while it is loading and unloading passengers, and where this rule has been enforced it has proved very helpful. As the electric car is confined to its tracks, its passengers are entitled to adequate protection while moving between car and curb.

Still another plan to help in this matter was introduced recently on Broad Street, Newark, N. J., and has been in use for a longer time on Market Street in San Francisco. This is a series of raised boarding and alighting platforms, installed in the street by the municipality, to introduce a safety isle just where passengers enter and leave a car. The operation of these island platforms in San Francisco was watched with the greatest interest by many of the delegates at the recent railway convention in that city, and we understand that the results there and in Newark have been very satisfactory. They are suitable, of course, particularly to broad streets with large traffic, but in all such places are worthy of consideration by municipal engineers.

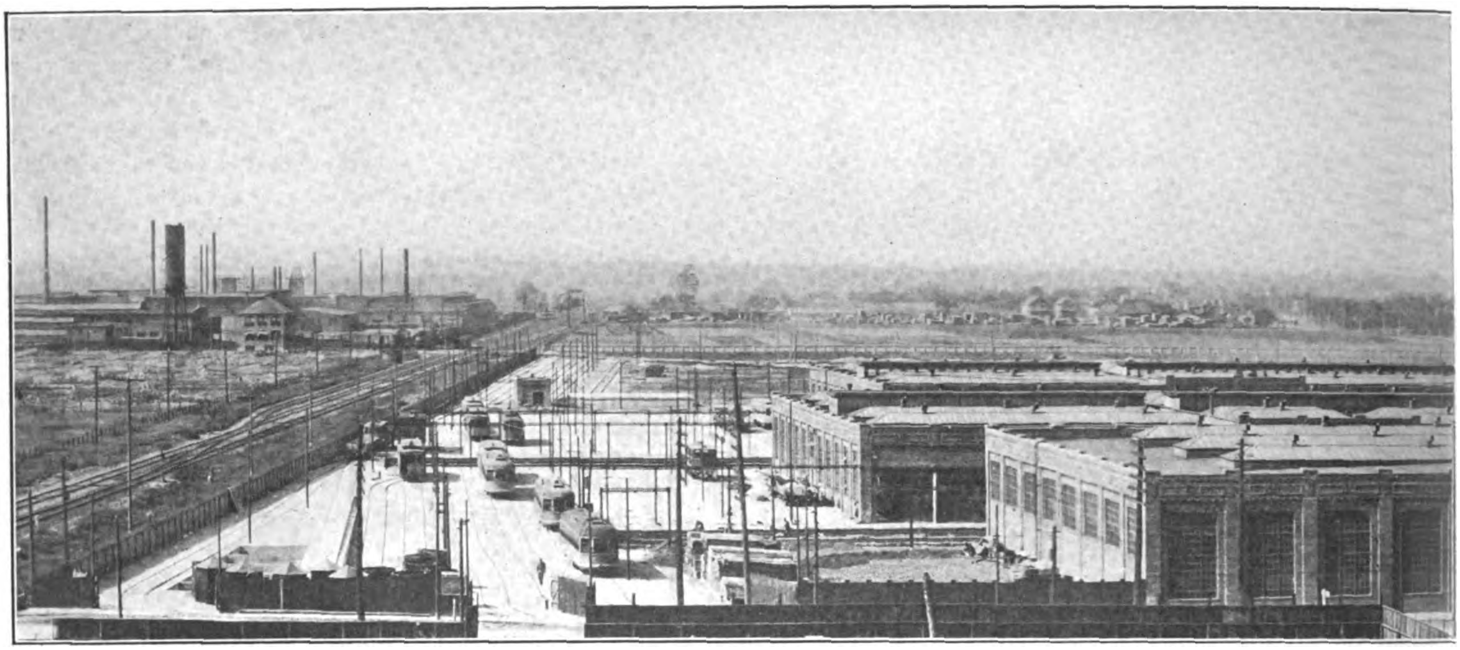
PREPAREDNESS IN TRANSPORTATION

However unsuspicious one may be, the fact stands out with sinister prominence that war is likely to come unannounced even in times apparently pacific. In the great movement for preparedness to insure peace which is sweeping the country, it behooves the electric railway interests to play a patriotic part. Their share in the work is in the main of most pacific form, tending not only to help the country but by active co-operation to help each other. Whether or not the employees are interested in military training, a good thing in itself for efficiency and discipline, makes comparatively little difference, since it is the great problem of transportation in time of necessity that most concerns us. This country is peculiarly weak in railways of strategic importance. Although we have enormous railway mileage we also have a prodigious area of country, and the railways, steam and electric, have been built for definite purposes of inter-communication, without the slightest reference to military affairs. Germany owes an enormous debt in the present war to the carefully planned lines of communication between the eastern and western frontiers and their ability to permit the rapid distribution of men and supplies. If the United States should unhappily get into trouble, the transportation situation would be a very serious one, as was shown only too plainly during our little brush with Spain.

Now the electric railways of the country are in a position, if they will but plan to co-operate, to give very vital assistance in case of need. They run not only from city to city but penetrate the country in all directions, often furnishing parallel lines of transportation to help out an over-burdened railroad, and in particular running to and along the sea coast in a fashion that has a great military value. For instance, along the coast, from Portland, Me., to Norfolk, Va., electric lines run along the shore most of the way, crossing the railroad lines which lead seaward from the trunk systems further inland. There is hardly a spot on the coast to which men and munitions could not be quickly brought, if a suitable system of unified transportation for strategic purposes were properly worked out. Moreover, the transportation managers of electric roads have special training in handling crowds in an emergency. A regiment under arms is a good deal easier, by reason of its discipline, to manage than a baseball or circus crowd, and electric railway men will understand the art of massing cars and sending them out in quick and orderly succession.

The one thing most needful is organization for interconnection, as between one electric road and another, and as between the main line railways and the electric lines. One can pick out, off hand, many spots on the coast which are, so far as main transportation is concerned, very inaccessible but where, by the organized service of electric systems, not one but two or three trunk lines could be utilized for the massing of forces to be distributed as need requires. It would be immensely helpful in the organization of national defense by the general staff if the electric roads through their associations or otherwise could simply schedule their routes, running times, interconnections and supply of rolling stock so as to place the information in orderly fashion before the general staff to aid in its work. Thus fortified, the staff would be put in possession of information such as, for example, the following:

At a given point on the coast two electric railway systems are available, both reaching a trunk line within a running time of an hour. Each has fifteen cars but has power supply of its own, or borrowed from interconnections, able to handle forty. The additional rolling stock could if necessary be borrowed from roads connecting further inland, and everything could be made available on short notice before railway trains could reach the points of intersection. With the electric roads properly organized for co-operation a few telegrams to the men responsible would result in the massing of cars ready to throw a considerable force to the point threatened in very short order. Undoubtedly the general staff tries to acquire more or less information of the character necessary, but it can be furnished so readily by a little patriotic co-operation among street railway managers that the duty of getting together is obvious. Incidentally, the accumulating of this information is a permanent asset for the railways themselves in time of peace, for it enables them to organize through traffic for ordinary purposes with an efficiency which now is conspicuous by its absence. Few people in this country are anxious for trouble, but the chance of its coming quite unasked is sufficient to justify immediate activity, particularly when the steps to be taken are advantageous in themselves.



CLEVELAND REPAIR SHOPS—PANORAMIC VIEW OF

Cleveland Railway Occupies New Repair Shops

Outline of How the Cleveland Railway Operates Its New Repair Shops, the General Features of Which Were Described in the ELECTRIC RAILWAY JOURNAL of Jan. 23, 1915—This Article Also Describes Special Equipment and Unique Crane Installations

To plan and build one of the most complete street railway repair shop layouts in this country was in itself a big undertaking for the mechanical department of the Cleveland Railway, but to continue repairs while the shop equipment was being moved 6 miles across the city from the old to the new shops was an even greater task. Both of these were accomplished, however, without perceptible delay in the progress of repairs, and the mechanical department, after about six months in transit, is now housed in its new quarters. Although it is scarcely settled, organization and shop procedure have been put in perfect running order. Larger areas devoted to the entire layout as well as increased space assigned to the various shop departments naturally simplified the problems for each department, but at first complicated those of the complete shop operation. The men had to be familiarized with new machine tools and the means of transferring materials and repair parts between departments, but this has been done, and the entire shop organization and equipment move forward practically automatically.

RECEIVING AND DISMANTLING CARS

The essential features of this general shop layout were described on page 168 of the ELECTRIC RAILWAY JOURNAL of Jan. 23, 1915. It is the purpose of this article to deal with the methods of operating this large shop layout and describe the special equipment which has been introduced to simplify shop operations. Because the level of the shop property at the corner of Harvard Avenue and East Forty-ninth Street was more than 6 ft. above the street, track entrances which naturally belonged at that point could not be provided. All cars in need of repairs or overhauling, therefore, must enter the shop yard by the two-track leads from Forty-ninth Street, just south of the wood-working shop building. Track outlet from the shop buildings and yards is by way of a ladder track and leads into Harvard Avenue on the opposite side of the property. Unless there is track space in the motor or truck shop bad-order cars are stored in the open yard between Forty-ninth Street and the intersecting transfer-table pit beyond the erecting shop. As space is made available for them, these cars are switched to the transfer table and moved either to the truck or the motor shop, preferably the truck shop, but either serves when cars are to be dismantled.

As shown on the general layout plan, eight tracks in groups of four each pass through these two buildings, and an assembling and dismantling aisle is provided between the two sets of tracks. The truck shop is 157 ft. 11 in. wide by 184 ft. long, and the motor shop is 209 ft. wide by 184 ft. long. Three of the tracks in each group pass over repair pits extending practically the full length of each building. Over the center line of each of these tracks is a monorail crane runway. As shown in one of the accompanying illustrations, two of these monorail cranes, each equipped with a yoke, will raise a body clear of the trucks which are rolled from beneath and dummy trucks are substituted for them. On these dummy trucks the body is again moved to the transfer table and taken to the erecting shop at the other end of the transfer-table pit. While the trucks remain on the track where they were when the body was removed, the monorail picks up the motors one at a time and transfers them to the motor shop. Afterward the trucks are also picked up and transferred to the truck-dismantling and assembling aisle, which is served by a 7½-ton Toledo bridge crane.

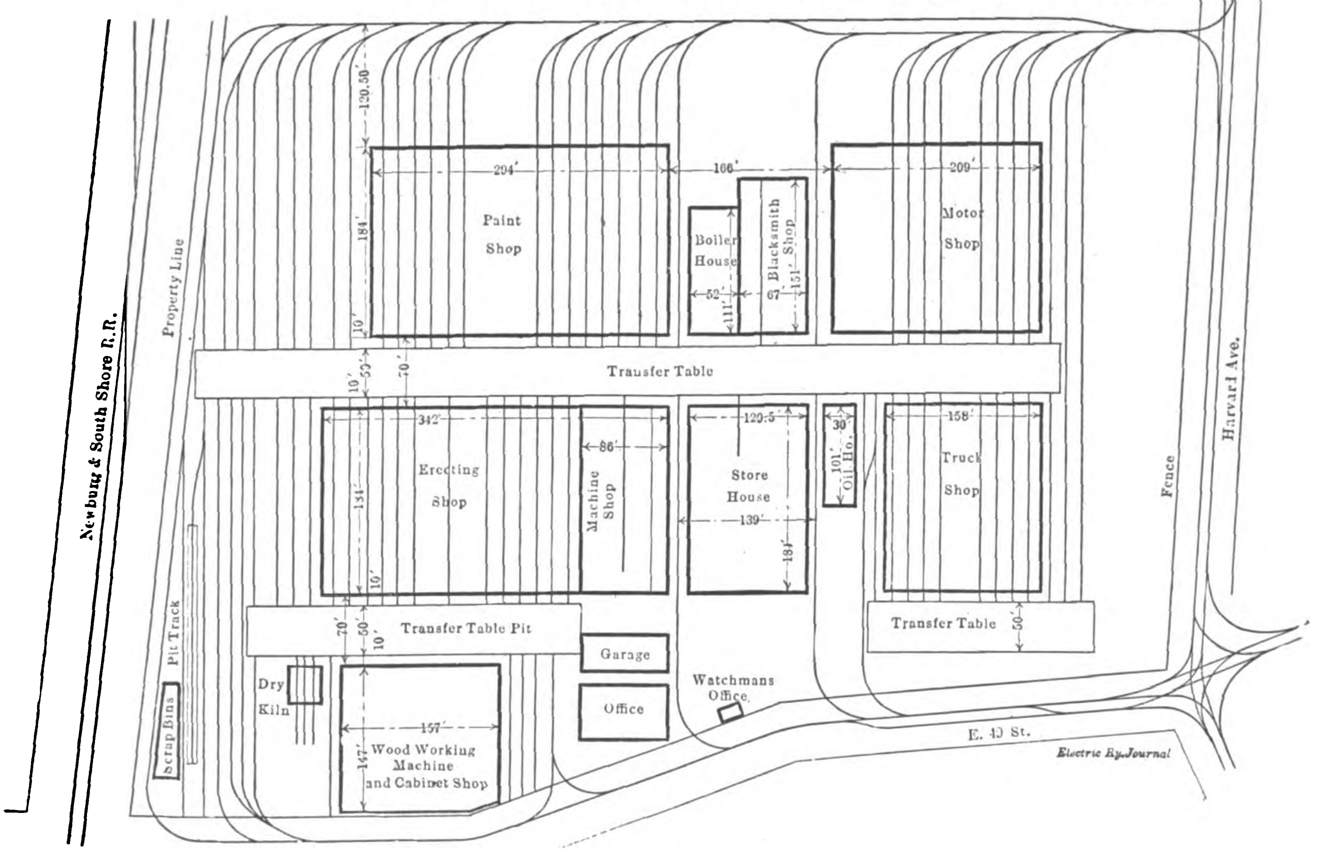
Transverse movement of the monorails in both shops is made possible by overhead transfer bridges at each end of the building. The operator moves the monorail to a transfer bridge, which in turn is unlocked from the runway from which the monorail has just moved. A set of switches under the control of the operator permits this bridge to be moved transversely with the shop,

SHOP BUILDINGS FROM EAST FORTY-NINTH STREET SIDE

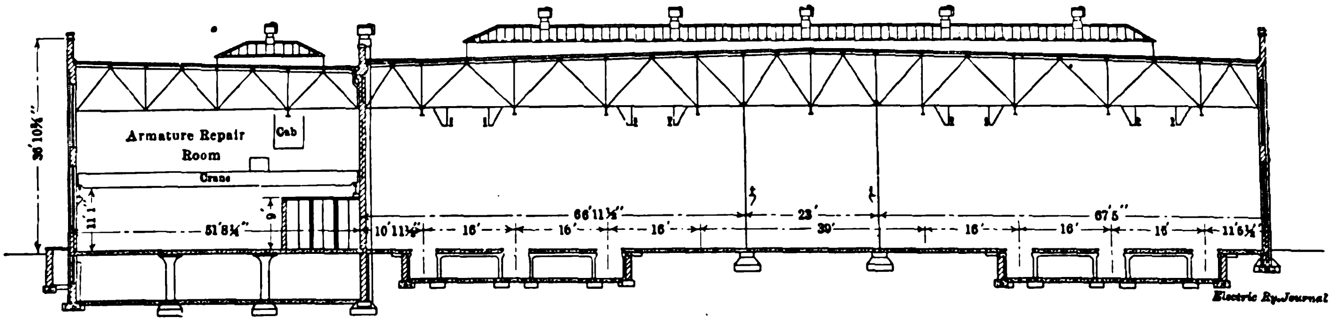
just like a bridge crane. Through his control and locking device the operator may move the bridge to any other parallel runway, lock it in position and move the monorail from the bridge. The entire runway system is suspended from the bottom chords of the roof trusses.

These monorails were built by the Maris Brothers Company, Philadelphia, Pa., and have a capacity of 7½ tons each. This is ample to pick up and transfer the heaviest completely-equipped trucks in the service of the Cleveland Railway. The general layout of the monorail runways and transfer bridges is shown in one of the accompanying illustrations. It must be noted that these monorails pass through automatically-operated doors and across the transfer aisle into the motor shop. The monorail runway and overhead transfer-bridge arrangement is the same in the motor shop as in the truck shop. It will also be noted that the trolley wire serving the monorail also serves to move completely-equipped cars about the shop. The live trolley through each of these two shop buildings is intercepted at the monorail-transfer-bridge aisle, which has a width of 15 ft. Across this bay the trolley-wire clearance is reduced from 22 ft. 6 in. to 15 ft.

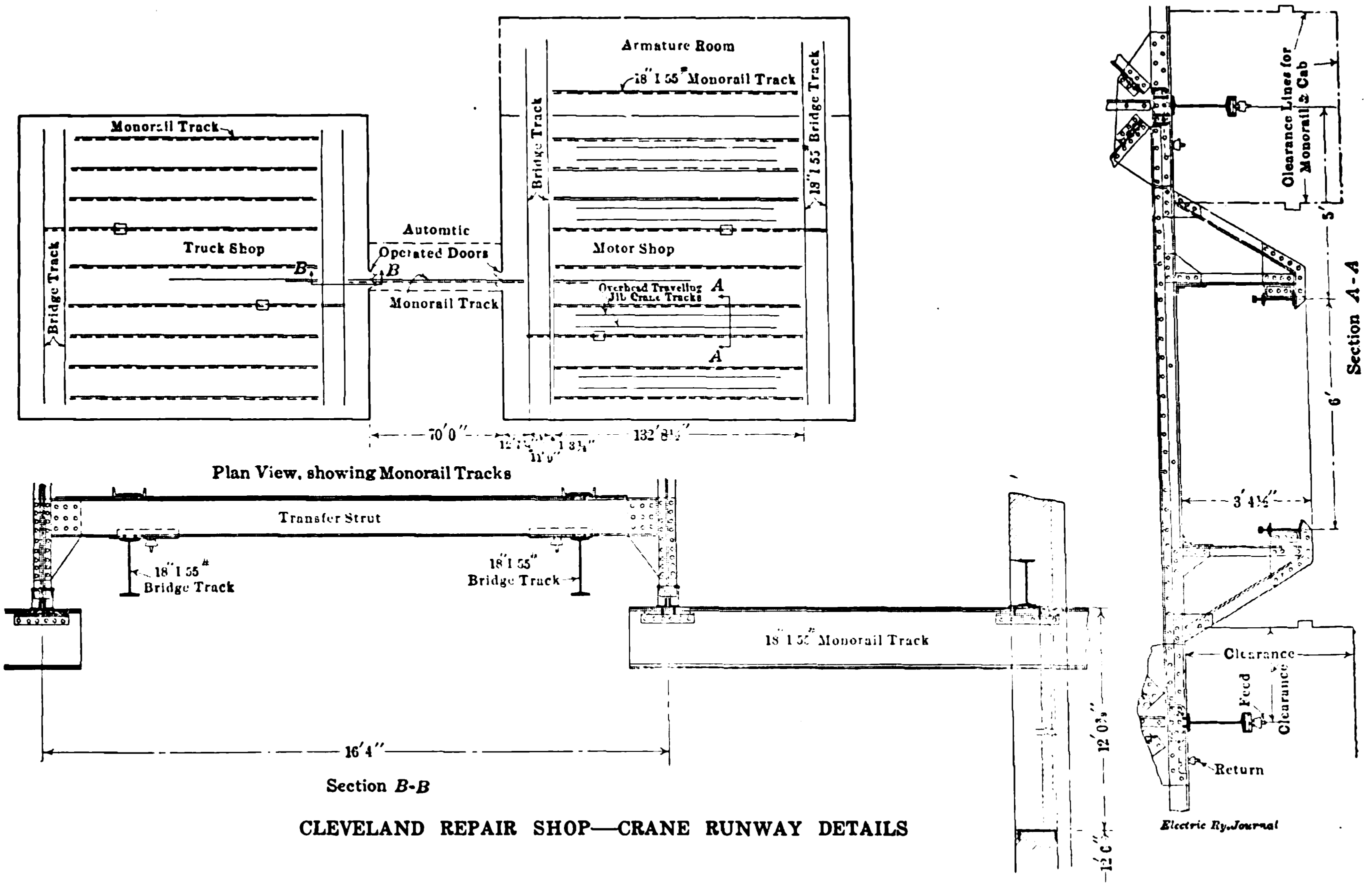
In addition to the monorail-overhead-crane system in the motor shop, overhead traveling jib cranes were in-


120.50'
294'
166'
209'
Paint Shop
184'
10'
Boiler House
52'
111'
Blacksmith Shop
67'
151'
Motor Shop
Property Line
Newburg & South Shore R.R.
Transfer Table
10'
55'
70'
342'
86'
Erecting Shop
Machine Shop
134'
10'
120.5'
Store House
139'
181'
30
101'
Oil Ho.
158'
Truck Shop
Fence
Harvard Ave.
Pit Track
Transfer Table Pit
70'
50'
10'
Garage
Transfer Table
50'
Dry Kiln
Office
Watchmans Office
Scrap Bins
157'
147'
Wood Working Machine and Cabinet Shop
E. 49 St.
Electric Ry. Journal

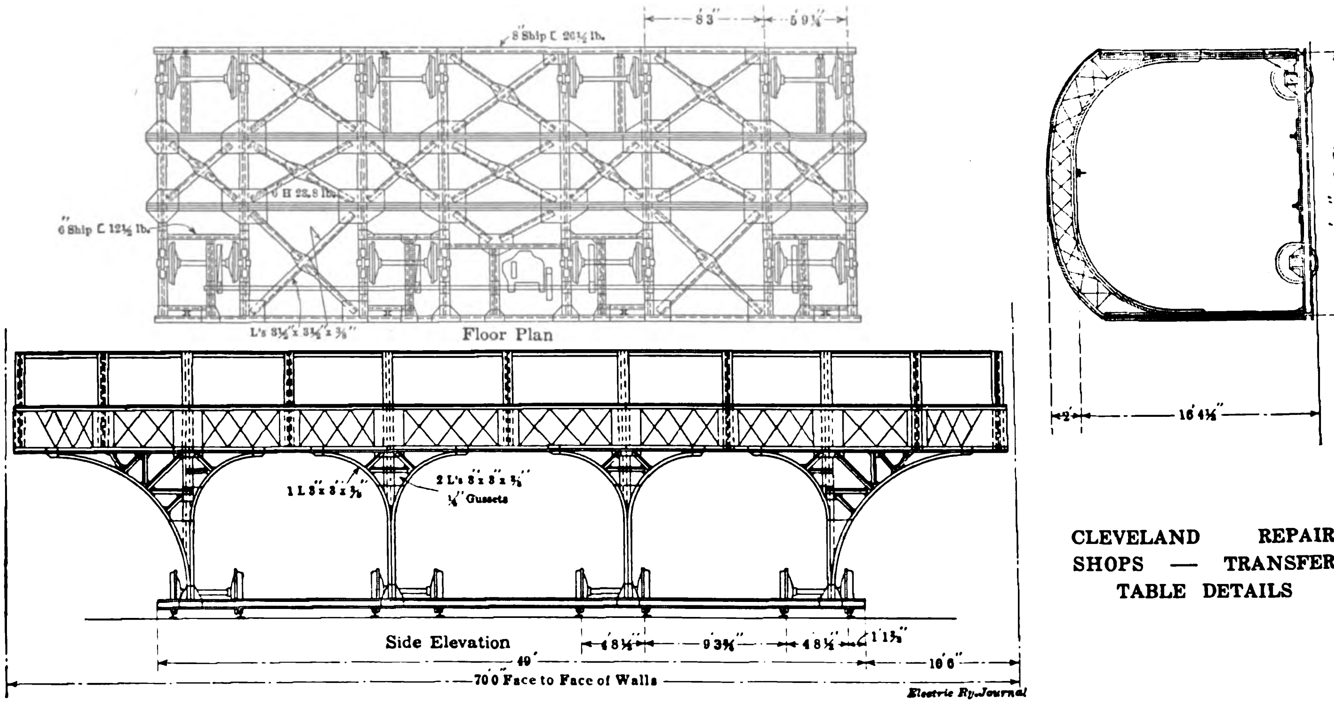
CLEVELAND SHOPS—GENERAL ARRANGEMENT OF BUILDINGS AND TRACKS


Armature Repair Room
Cab
Crane
36' 10¾"
11' 1"
9'
51' 8¾"
10' 11½"
16'
66' 11½"
23'
30'
67' 5"
11' 6½"
Electric Ry. Journal

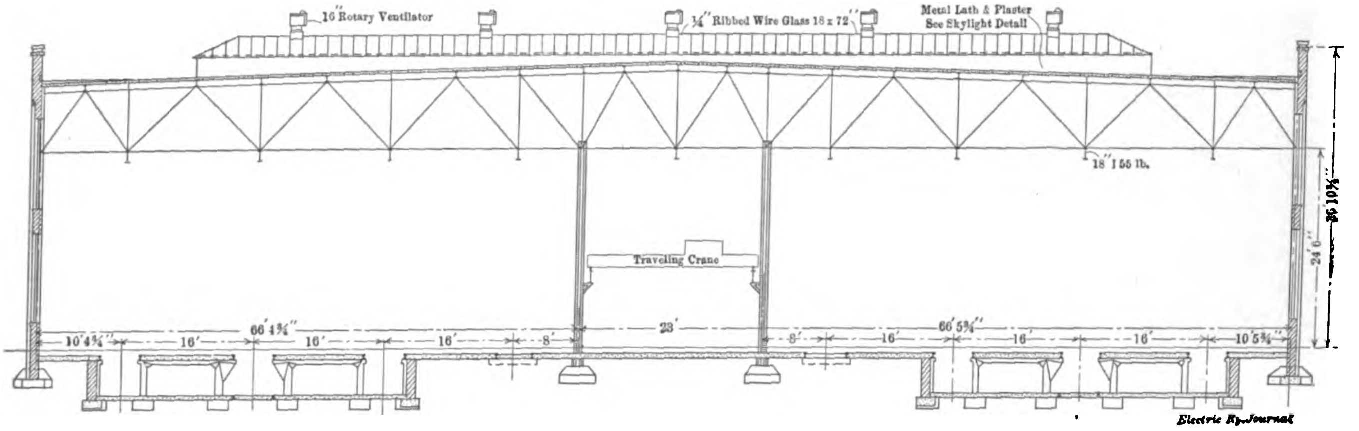
CLEVELAND REPAIR SHOPS—SECTION THROUGH TRUCK REPAIR SHOP


Armature Room
18" I 55# Monorail Track
Monorail Track
Bridge Track
18" I 55 Bridge Track
Truck Shop
Automtic Operated Doors
B
Monorail Track
Motor Shop
Overhead Travelling Jib Crane Tracks
A
70' 0"
132' 8½"
11' 0"
Plan View, showing Monorail Tracks
Transfer Strut
18" I 55# Bridge Track
18" I 55" Bridge Track
18" I 55" Monorail Track
16' 4"
12' 0½"
12' 0"
Section B-B
Clearance Lines for Monorail & Cab
5'
6'
3' 4½"
Section A-A
Clearance
Feed
Clearance
Return
Electric Ry. Journal

CLEVELAND REPAIR SHOP—CRANE RUNWAY DETAILS


8' 3"
5' 9¼"
8" Ship C 20¼ lb.
6 H 23.8 lb.
6" Ship C 12¼ lb.
L's 3½" x 3½" x ⅜"
Floor Plan
1 L 3" x 3" x ⅜"
2 L's 3" x 3" x ⅜"
⅜" Gussets
Side Elevation
4' 8¼"
9' 3¼"
4' 8¼"
1' 1½"
49'
10' 6"
70' 0" Face to Face of Walls
18' 7¼" to 6' 0"
End Elevation
2'
16' 4¼"
Electric Ry. Journal

CLEVELAND REPAIR SHOPS — TRANSFER TABLE DETAILS


16" Rotary Ventilator
¼" Ribbed Wire Glass 18 x 72"
Metal Lath & Plaster
See Skylight Detail
18" I 55 lb.
Traveling Crane
24' 0"
36' 10⅝"
10' 4¾"
16'
66' 4¾"
16'
16'
8'
23'
8'
16'
66' 5¾"
16'
16'
10' 5¾"
Electric Ry. Journal

CLEVELAND REPAIR SHOPS—SECTION THROUGH TRUCK REPAIR SHOP

stalled in the four aisles between the tracks passing over the repair pits. One of these cranes is shown in one of the accompanying illustrations. While this crane cannot be moved about the shop with the same facility as the monorails, it has the advantage of an 8-ft. revolving-jib arm which may be used to pick up a motor in one track and set it in the aisle or in the next parallel track. This crane has a capacity for 3000 lb., the maximum weight of the railway's heaviest motor. It is operated by pendant switches and requires a two-beam runway instead of a single beam as is the case of the monorail. Four of these traveling jib cranes were installed in the motor shop, and they were built by the Euclid Crane Company of Cleveland. Each repair pit in the motor shop is also equipped with portable hydraulic pit jacks for removing armatures.

In connection with the monorail installation it is interesting to note that besides permitting the installation of live trolley wires, four of these monorail cranes took the place of eight bridge cranes. They move much faster and, when two are not required to lift a car body, each with its separate operator is available for general shop use. Over the assembling and dismantling aisle in the motor shop a small bridge crane, operated by pendant switches, was also installed. Energy at 600 volts is supplied from one feeder for the cranes and the energy for the trolley wires is furnished from another feeder.

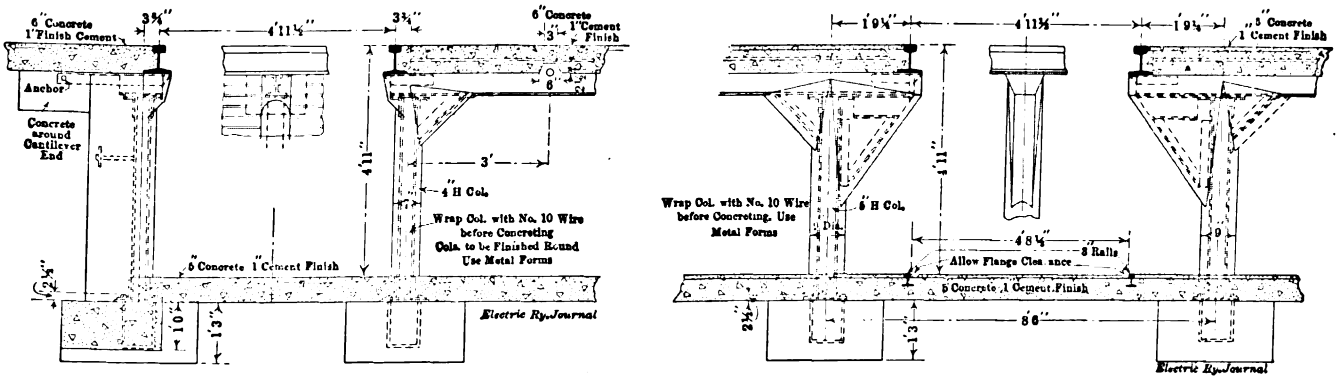
It is also interesting to note that the steel bridge structure necessary to support the monorail runway across the transfer aisle also afforded, with slight alterations, a place for well-lighted locker, lunch and toilet rooms. By building these rooms over the transfer-table aisle the company was able to make the entire floor areas of both the motor and truck shops available for shop use. At the same time if the plan followed in other buildings of the shop group had been adopted, or that of having these facilities on a second floor over the office, it would have complicated the monorail-transfer-bridge installations.

Another interesting feature in these two shop buildings is the repair-pit construction. This is shown in detail in one of the accompanying illustrations. Special attention, however, is directed to the wheel-changing pit and jack in the truck shop. The central pit in each three-track group was designed especially to facilitate wheel changing. In this pit the track rail is supported on a triangular reinforced-concrete cantilever, which extends 24 in. out from the center line of the supporting columns. This permitted a standard-gage track to be laid in the bottom of the pit to which car wheels may be lowered by the pit jack and then rolled from beneath the truck or car body. Wheels are raised to the floor level, set on the track by the monorail cranes, and when a number have accumulated, they are rolled to the transfer table and moved to the machine shop for wheel renewals or turning.

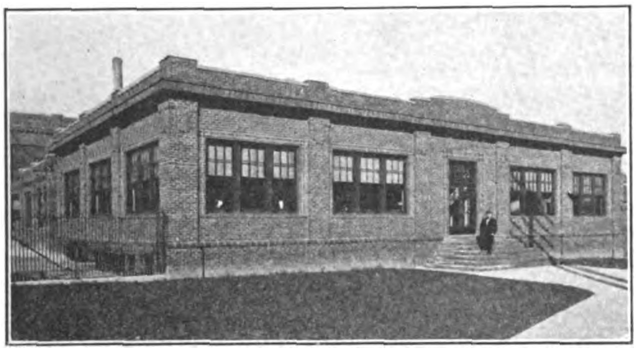
In connection with the wheel-changing facilities a special jack was provided. This is a unique installation in that the drop-pit portion of the track is supported on structural-steel columns. In the elevated position these close the gaps in the track rail, and in the lowered position they close similar gaps in the track in the pit. The lifting capacity of these is 10 tons which is sufficient to raise the end of a car and truck so that they can be blocked to remove the wheels. The two sections of the jack are mounted on the piston of a large air cylinder installed in a sub-basement 20 ft. 6 in. below the shop floor. The locking and control levers for this jack are operated from the pit.

TRANSFER TABLE

Especially-designed transfer tables embodying several unique features were selected for this shop layout. In the 862-ft. aisle between the two main groups of buildings a 25-ton capacity table for handling street-


6" Concrete
1" Finish Cement
3¾"
4' 11½"
3¾"
6" Concrete
1" Cement Finish
3"
6"
Anchor
Concrete around Cantilever End
4' 11"
3'
4" H Col.
Wrap Col. with No. 10 Wire before Concreting Cols. to be Finished Round Use Metal Forms
5" Concrete 1" Cement Finish
2½"
10"
1' 3"
Electric Ry. Journal
1' 9¼"
4' 11⅛"
1' 9¼"
5" Concrete
1" Cement Finish
4' 11"
Wrap Col. with No. 10 Wire before Concreting. Use Metal Forms
6" H Col.
Dia.
9"
4' 8½"
8" Rails
Allow Flange Clearance
5" Concrete 1" Cement Finish
2½"
1' 3"
8' 6"
Electric Ry. Journal

CLEVELAND REPAIR SHOPS—SECTION OF STANDARD REPAIR PIT; WHEEL-CHANGING REPAIR PIT AT RIGHT



CLEVELAND REPAIR SHOPS—VIEW OF FRONT OF OFFICE BUILDING

CLEVELAND REPAIR SHOPS—VIEW OF FRONT OF STOREROOM BUILDING

railway equipment and a 75-ton capacity table for transferring loaded steam railroad cars were provided. The other two transfer tables in the two smaller pits are also of 25-ton capacity. The transfer table proper is 49 ft. long, while the roof projects over the pit walls approximately 10 ft. to within 6 in. of the faces of the buildings. An overhead structure was necessary to support the live trolley wire on the table, and a roof over the table was considered desirable to afford protection from all kinds of weather.

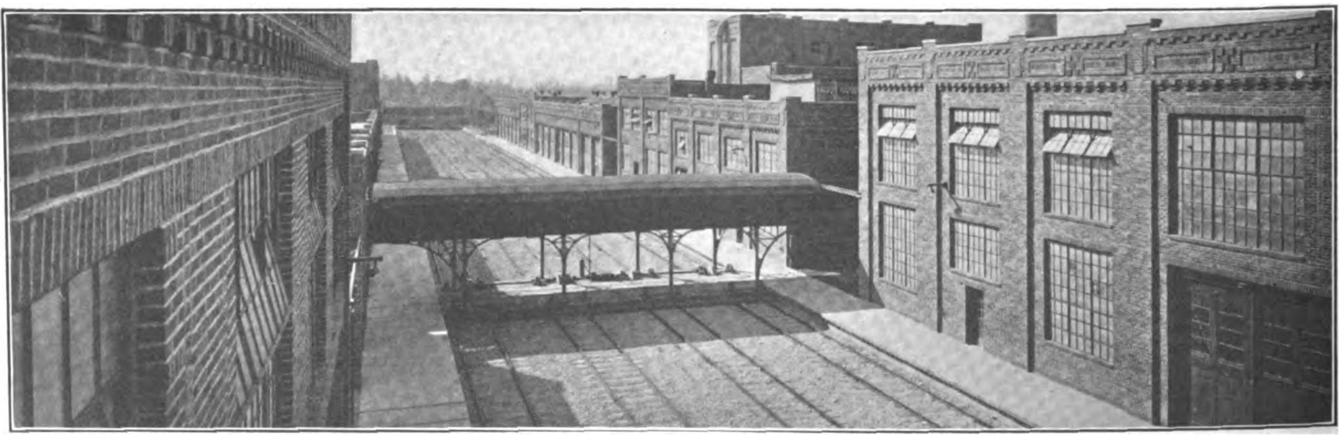
The transfer-table construction is somewhat unusual in that it is of the shallow-pit type and supported on eight pairs of standard car wheels which move over four standard-gage tracks. Four pairs of car wheels on one side of the table are geared through a line shaft to a single 101-B Westinghouse railway motor. This is controlled by a standard railway controller, and a low gear ratio was selected so that the table can be moved at a speed not to exceed 7 m.p.h. Energy is supplied to this motor from a trolley wire installed beneath the overhang of the 10-ft. concrete walkway on one side of the transfer-table aisle. This is also the source of energy for the overhead trolley wire on the transfer table. Details of the transfer table and a view of one of the tables in the long pit are shown in two of the accompanying illustrations.

FACILITIES FOR HANDLING MATERIALS

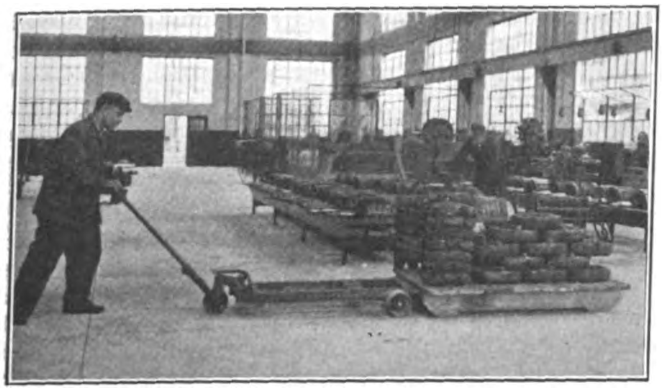
Aside from yard tracks, a steam railroad connection, overhead cranes and transfer tables for handling materials, it was necessary to afford a means of transporting light repair parts and materials between the different shop departments. This is done by three 2-ton, electric storage-battery Buda trucks. One of these trucks is assigned to the store room and two to general shop use. Each has a platform 37 in. wide by 9 ft. 6 in. long, and each motor is of sufficient capacity to pull two trailers. The truck platform is low and equipped with an elevating device so that it may be run under a rack or platform upon which material has been deposited, raise it from the floor and transfer it to any part of the shop. Ten-foot walkways between the buildings and the transfer-table pits were provided to afford a roadway over which these trucks could be operated. Movement across the transfer pits is either by way of the tables or at the ends.

These storage-battery trucks will also be used for moving 1½-yd. dump cars which are used in transporting scrap to the scrap bins or trash to a depressed track where it is unloaded to larger dump cars. As will be noted in the general plan of the shop layout, the scrap bins and the depressed track are beside the track entrances from Forty-ninth Street at the extreme southeast corner of the shop layout. Concrete bins below the yard level are provided for five classes of scrap and when full contain a carload. Steam railroad cars are set on a track beside these bins, and the scrap is loaded into them with a magnet crane.

Another means of transporting material short distances within the shop departments is afforded by small material trucks or transveyors. These have a capacity of 2 tons and were furnished by the Cowan Truck Company, Holyoke, Mass. These transveyors are three-wheeled trucks fitted with steel platforms not more than 6 in. in height. As shown in one of the accompanying illustrations, these trucks may be backed under a wooden platform or steel rack. In this position the truck handle is connected to a small air-pumping mechanism, and when the handle is moved back and forth this mechanism raises the rack or platform clear of the floor. The handle is then released, and the transveyor with its load is moved by hand. Pressure on a foot pedal releases the air from the cylinder and lowers the load to the floor. In the erecting shop, car bodies are stripped of the sashes and doors, which are set in steel racks. These when full are transferred to the sash-washing and re-

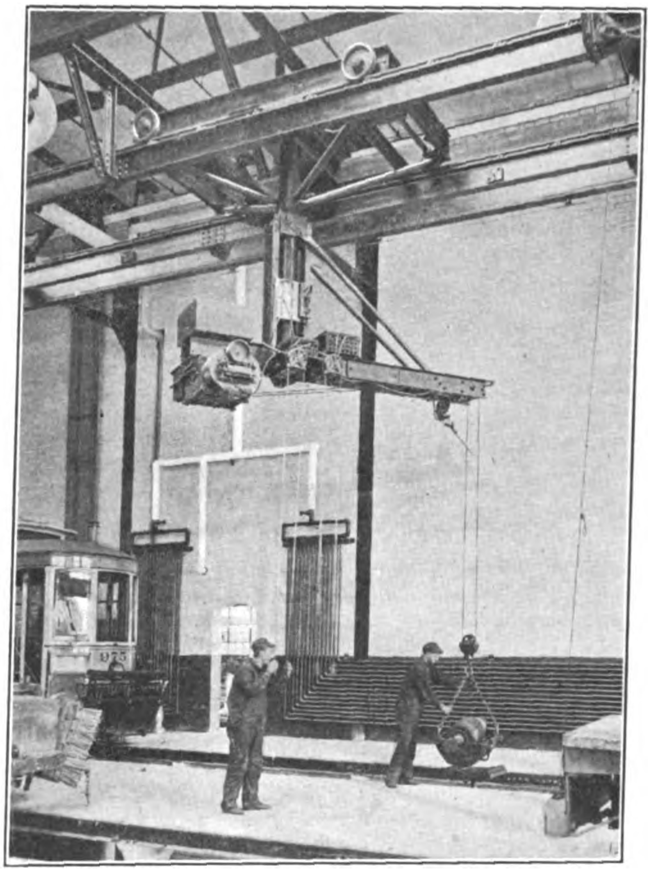


CLEVELAND REPAIR SHOPS—VIEW DOWN 862-FT. TRANSFER-TABLE AISLE



CLEVELAND REPAIR SHOPS—VIEW OF TRANSVEYOR AND LOAD ON RACK

CLEVELAND REPAIR SHOPS—VIEW OF LOADED TRANSVEYOR

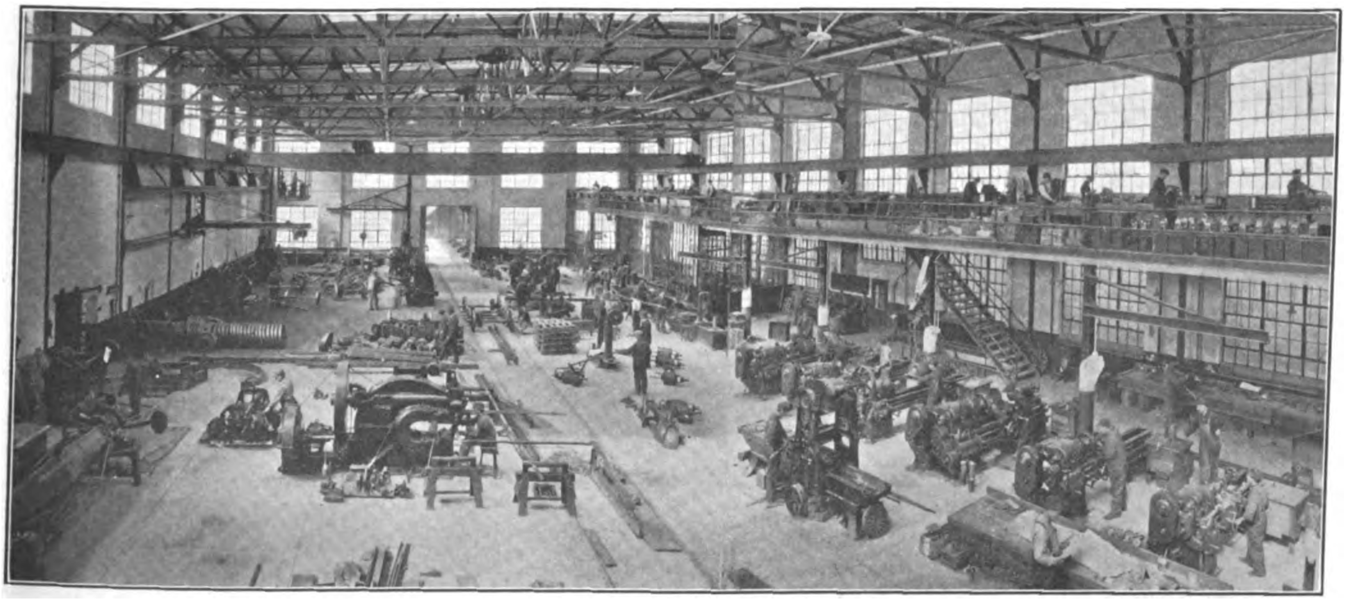


CLEVELAND REPAIR SHOPS—VIEW OF TRAVELING CRANE

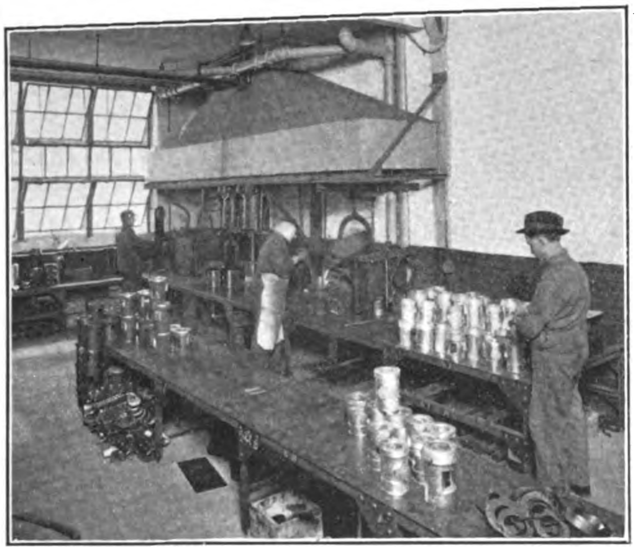
pairing department by the transveyors. Material in the wood shop and elsewhere in the various shop departments is moved in this manner.

In connection with material-handling facilities it must also be noted that a depressed track for the receipt of steam railroad cars enters the storeroom building. With the aid of steel aprons and a 1-ton capacity overhead traveling monorail crane operated by pendant switches, material may be loaded or unloaded readily. As shown in one of the accompanying illustrations, an elevated platform for receiving and delivering materials to teams or auto trucks was provided across the front of the storeroom building. An awning over this platform also supports an extension of the monorail crane runway and permits it to be used in handling materials at this point. A monorail runway system in the basement of the storeroom building and an incline to permit the electric trucks to descend to the basement level from the concrete platform beside the transfer-table pit also simplify the handling of materials.

Incidentally, all materials exclusive of lumber, car wheels, oil and paint are placed in this storeroom. Car wheels are stored in the basement beneath the machine shop where manhole openings in the floor permit the 5-ton capacity overhead bridge crane to lower wheels to the basement floor from a steam railroad car which may be run into the building. Paint and oil for mixing it are stored in tanks and barrels in a room partitioned off of the paint shop. Lumber is stored in the wood mill, where special racks have been installed for it.



CLEVELAND REPAIR SHOPS—GENERAL VIEW OF MACHINE SHOP



CLEVELAND REPAIR SHOPS—VIEW OF BABBITTING EQUIPMENT

Tracks on each side of the storeroom, as well as of the oil house and the heating plant, permit steam railroad cars to be unloaded directly into these buildings.

ARMATURE-ROOM FEATURES

Special equipment in the armature room, which occupies a 50-ft. completely-inclosed bay on one side of the motor shop, includes an overhead bridge crane spanning the entire room and one monorail runway. For the present a 5-ton bridge crane originally intended for one aisle in the erection shop has been installed in the armature room. The monorail runway permits cranes from the motor and truck shops to enter this department through openings in the partition wall. These openings are equipped with automatically-operated fire doors.

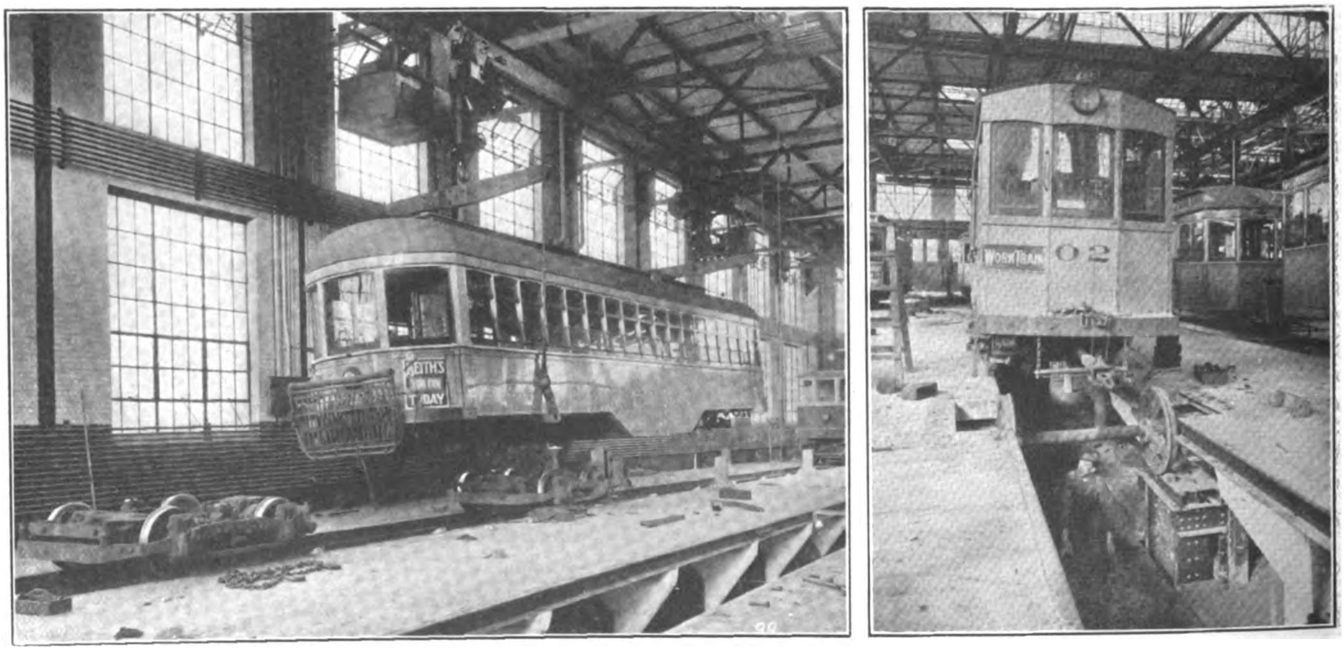
A baking oven, occupying a space 13 ft. wide by 36 ft. long and 9 ft. high, was installed beside the partition wall at one end of the armature room. This oven is divided into two rooms; in one the coils are dipped and allowed to drain and in the other they are baked. A complete equipment of draining and baking racks as well as tanks was provided for this purpose. Armatures held in storage in this department are set on steel racks fitted with wooden bearing blocks to protect the armature-shaft bearings. All work of the armature department is done on contract and must pass the test of a company inspector, who occupies a testing room partitioned off from the rest of the armature room. The usual potential and current tests are applied to ascertain the quality of the work.

Equipment in the forge shop, which is 67 ft. x 151 ft. in size, includes the usual bulldozers, forges and trip hammers conveniently arranged. One special hammer was provided, however, which is worthy of mention. This is a self-contained machine which compresses its own air. In other words, a motor-driven compressor mounted on the hammer bedplate automatically supplies the air with which it is operated. This hammer is of 1500-lb. capacity and was furnished by the Nazel Engine Works, Philadelphia, Pa. Another feature of the forge shop is an electric-welding room completely inclosed with asbestos curtains. Considerable space is devoted to this department, and the curtains protect the remainder of the forge-shop force from the light rays given off during welding operations.

Another portion of the forge shop is given over to the bearing-babbitting department. A view of this room is shown in one of the accompanying illustrations. The steel tables and racks conform to the permanent character of construction used throughout the shop. A unique feature in the babbitting equipment is the kettle-type melting pots suspended in furnaces, the fronts of which may be lowered. When bearings are poured the melting kettle is tilted by means of a goose-neck handle, and the metal flows from the bottom of the pot, thus eliminating skimming and assuring clean metal. The mandrel method of babbitting bearings is employed, and the mandrels are driven out of the finished bearing by an air cylinder mounted on the frame which supports the hood over the furnaces. After the mandrel has been removed, air pressure and a special U-shaped wedge are used to split the halves of the mold. All babbitted bearings are machine broached before being put in stock ready for service.

SPECIAL EQUIPMENT IN THE MACHINE SHOP

The machine shop is, perhaps, one of the most complete of its kind in the country. It occupies a space 86 ft. 9 in. x 184 ft. in size at one end of the erecting shop building. In addition to the ground-floor space, as will be noted in the general view, a balcony along one side



CLEVELAND REPAIR SHOPS—VIEW OF MONORAIL LIFTING CAR CLEAR OF TRUCKS; WHEEL-CHARGING JACK AT RIGHT affords space for the sheet-metal and fare-box departments. Special equipment in this machine shop includes a cornice brake for sheet metals up to ¼ in. thick and 12 ft. long. The size of this brake makes it possible to manufacture many of the special pressings employed in steel-car construction. It also eliminates riveted connections where it is possible to supply a flange to the sheet metal.

A set of six Reed-Prentice lathes, motor driven and equipped with a push-button stop and start and with a full-geared head, are arranged along one side of the shop. These are served by four jib cranes pivoted to the columns supporting the machine-shop gallery, and each jib-crane arm is equipped with a Dake chain and wire-rope hoist furnished by the Dake Engineering Company, Grand Haven, Mich. While the entire machine shop is served by a 5-ton Toledo bridge crane, jib cranes serve most of the individual machines. One of these is a traveling wall jib which serves two wheel presses, an axle straightener and a lathe, all arranged along one of the shop walls. This crane is controlled by pendant switches and travels along the building wall. A 1-ton motor-driven hoist, which travels horizontally the length of the 16-ft. jib arm, gives a wide range to this equipment. This crane and the tools it serves are shown in the general view of the machine shop.

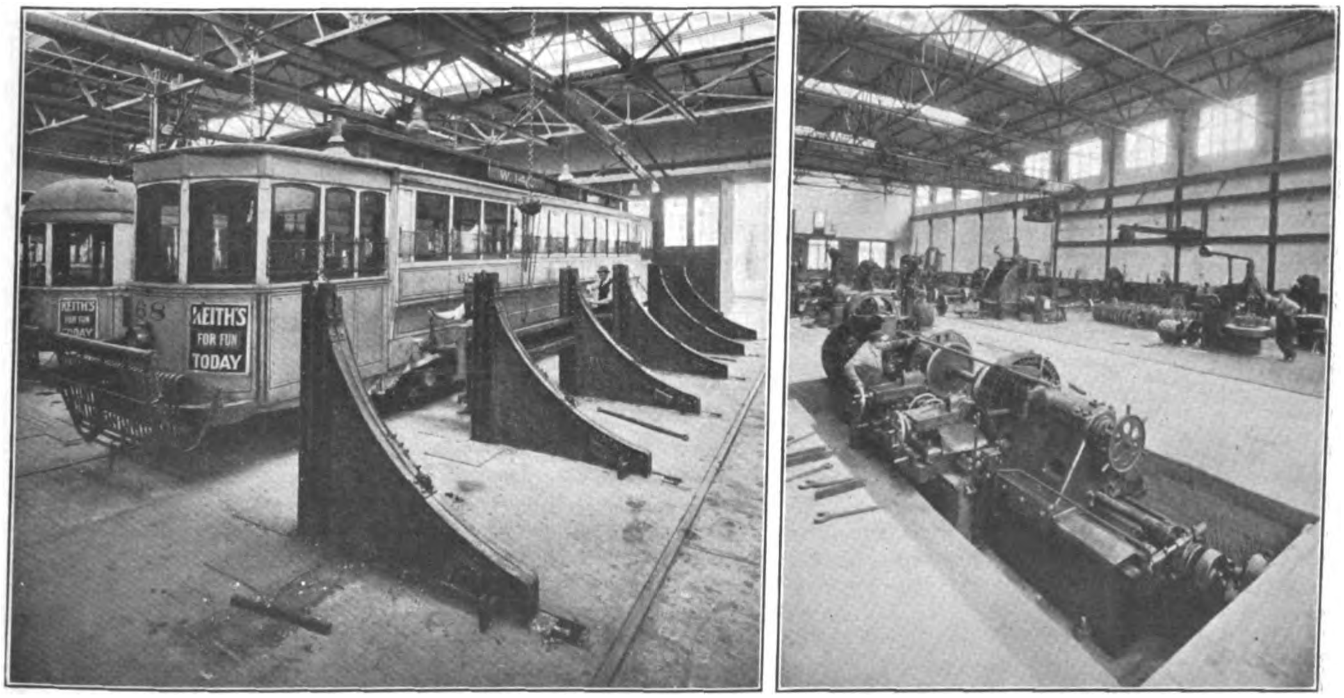
In another part of the machine shop a Putnam wheel-turning lathe of the most modern type has been installed in a pit provided for it in the shop floor. A sheet-steel apron resting on the lathe bed and the shop floor permits wheels to be rolled between the mandrels. An elevating and lowering device at the lathe end of this apron permits it to be set to accommodate wheels of any size. This lathe installation is shown in one of the accompanying illustrations. In connection with the motor-driven tools it is of interest to note that all the automatic-control equipment is installed in the basement below the shop floor. Although the machine tools were installed at the most convenient points on the shop floor, the control sets are concentrated in two groups, one beside each of the two building walls.

STEEL CAR STRAIGHTENER

Undoubtedly the most unique feature in the erecting shop is the steel car straightener. Occasionally a steel underframe or a steel car body is bent out of square or buckled in a collision, and in cases of this kind the car straightener is employed. It consists of six structural-steel angle bearings on each side of a car track with adjustable bearing beams which rest in a horizontal position on the vertical legs of these angles. Against this bearing beam as many screw jacks may be set as are required to straighten the bent members. Each bearing angle is designed to take a load of 15 tons, and the set of six of these bearing angles on each side of the track permits the jacks to bear against each other on the two sides of the car body. Since the erecting shop has been in service several cars have been straightened with most satisfactory results. Incidentally, these angle bearings are pivoted at their right angles, so that they may be dropped beneath the floor when out of service, or raised and locked in the position shown in the illustrations. Small differential chain hoists mounted on a trolley above each set of bearings are employed in handling the bearing beams and jacks.

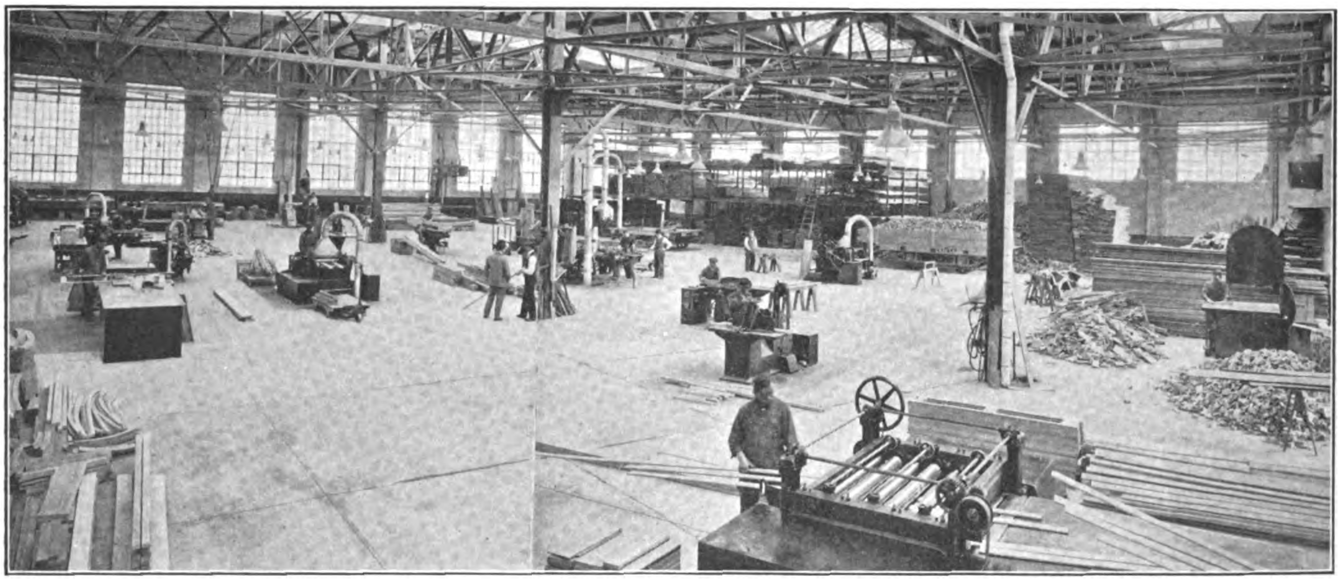
Large shop areas devoted to different operations may, if facilities are not provided, result in much lost motion. To meet this condition each department of these shops

CLEVELAND REPAIR SHOPS—VIEW OF CABINET SHOP



CLEVELAND REPAIR SHOPS—VIEW OF CAR STRAIGHTENER IN SERVICE; WHEEL-TURNING LATHE IN PIT has its tool room and foreman's office. Within the departments numerous portable work benches, punches, shears, compressed-air tools, riveting furnaces, grindstones and pipe threaders are supplied to increase efficiency. The necessity for portable equipment is particularly apparent in the erecting and paint shops. One of the handiest tools in the former is a combined punch and shear. This will punch four sizes of holes and shear sheet steel up to 1/8 in. in thickness. This tool was furnished by the Union Manufacturing Company, New Britain, Conn.

In the wood-working shop and the cabinet shop adjoining it, adjustable pipe, lumber and cabinet racks form an important part of the equipment. These are shown in the general view of the wood-working shop and in the view of the cabinet shop. Material deposited on these racks is classified and tagged accordingly. In the view of the cabinet shop the structural-steel gluing racks and the standard work benches used throughout the shops are also shown. The work benches are 33 in. in height, 30 in. wide and 14 ft. long. Each bench is fitted with two large drawers and a 2½-in. hard maple top. The legs of the benches are of cast steel with diagonal bracing.



CLEVELAND REPAIR SHOPS—GENERAL VIEW OF WOOD-WORKING SHOP

HEATING PLANT, OFFICE AND GARAGE

A heating plant, 52 ft. x 111 ft. in size, adjoins the blacksmith shop and serves the entire shop group. This plant is equipped with stokers, coal bunkers and coal and refuse conveyors. Underground tunnels leading from this plant to the various buildings in the group carry the steam-heat, feed and return pipe systems, as well as the shavings and refuse exhaust system from the wood-working shop.

The supervisory and designing forces of the mechanical department are housed in a separate office building, 57 ft. x 87 ft. in plan, situated beside the employees' entrance to the shop property. Occupying one corner of this building is a company surgery where a trained nurse is regularly on duty. A view of this office building is shown in one of the accompanying illustrations. An interesting feature in connection with the system of communication between the various shop departments is a Tele-Call system furnished by the Mead Electric Signal Company, Cleveland, Ohio. Large gongs in each shop department and as many as are required to be audible in any part of the shop are under the control of the telephone operator in the office building. These gongs, through a code of signals, summon the different department heads to the nearest telephone. Immediately back of the office building is the garage, 40 ft. x 86 ft. in plan, where all the company automobiles are repaired. The Cleveland Railway operates three auto buses as suburban feeders, and they are also maintained at this point.

FIRE PROTECTION

While all the buildings in the shop group are constructed of non-combustible material, a complete sprinkler system served by city water pressure has been installed in all the buildings. Supplementary to this and affording a reserve water supply is a 1,500,000-gal. underground reservoir and an underwriters' specification motor-driven centrifugal pump of 1500-gal. per minute capacity. In case of fire this pump is cut in automatically by a certain decrease in the water pressure in the city mains.

Every detail necessary to make shop operation efficient and appearance neat and orderly has been carefully planned and executed. A concrete retaining wall along East Forty-ninth Street and Harvard Avenue, where the shop property is above the street level, has been constructed, and surmounting this is an ornamental iron picket fence. At the track and employees' entrances hinged gates are provided, and along the inside property lines is an 8-ft. board fence on concrete fence posts which makes it possible completely to inclose the railway company's property. Open spaces have been made into attractive lawns, the tracks have all been filled rail level with stone screenings, and concrete walks and driveways have been provided wherever needed.

Terrance Scullin, master mechanic, is responsible for the arrangement and complete equipment of this shop. It is the result of an exhaustive study of repair shops and a collection of the best ideas in repair-shop arrangement and equipment to be had in this country. Charles H. Clark, engineer maintenance of way, supervised the track installation, and L. P. Crecelius, electrical engineer, the electrical features. The actual design and supervision of construction was done by David W. Morrow, formerly an engineer of the company and now of the firm of Morrow & Cross, civil and architectural engineers, Cleveland, Ohio.

Conference on Valuation

The Final Sessions of the Conference in Philadelphia Were Devoted to Papers and Discussions on the Subjects of Depreciation, Going Value, and the Relation of Valuation to the Future of Public Utilities

The Conference on Valuation in Philadelphia, the proceedings of which on Nov. 10 and 11 were reported in brief in the ELECTRIC RAILWAY JOURNAL of Nov. 13, was continued on Friday, Nov. 12. The three sessions on this day dealt with the topics of depreciation, going value, and valuation and the future of public utilities, as shown in the following report. The Utilities Bureau, under whose auspices the conference was held, is planning to publish the proceedings in full in the January issue of *The Utilities Magazine.*

DEPRECIATION

The chairman for the morning session on depreciation was Frederic P. Stearns, consulting engineer, Boston, Mass., who made some introductory remarks regarding a diversity of understanding rather than of opinion between speakers on depreciation topics and their hearers. Two addresses were then made, one on court decisions on depreciation by J. H. Goetz, of counsel for the Public Service Commission for the First District of New York, and the other on the relation of depreciation to fair value by Halford Erickson, member Wisconsin Railroad Commission.

COURT DECISIONS ON DEPRECIATION

Mr. Goetz stated that while the decisions already promulgated have helped in delimiting the excursions of legislators, regulators and judges in this field, they have also contributed in no small degree to the contention and confusion which usually characterize a fresh attempt to deal with the question. The analysis and comparison of the decisions made by the speaker hardly disclosed any marked passion for uniformity. To his mind, the importance of distinguishing between the various purposes of depreciation has not been grasped. In the earlier rate cases, growing out of state or local legislation or out of determination by supervising officials, usually without adequate investigation of relevant data, the public utilities were obliged to invoke the aid of the courts to prevent the confiscation of their property rights, and in the decision of that question the first inquiry was, what are the property rights? As property which by expiration had ceased to exist could not be the subject of confiscation, the courts, with the object only of determining what property rights were affected, soon adopted the method of reproduction-cost-less-depreciation for ascertaining what the property was.

The depreciation deduction, said Mr. Goetz, was therefore confined to actual depreciation. Yet when the question of earnings came to be considered, a new light was cast upon the subject. The duty and importance of providing out of earnings against the impairment of the capital invested, and for the maintenance of the integrity of the plant for continuous and efficient service, was already realized. In this relation functional depreciation and accrued depreciation received recognition. A failure to distinguish between the different purposes of depreciation, however, soon brought about a confusion as to the measure of depreciation which should be applied to the different purposes, and the expression used in the case of one was applied to the other. Mr. Goetz then endeavored to show the underlying differences connected with depreciation when a particular case involved a valuation for a rate-making basis, a calculation of earnings attributable to the return under a specific rate, a condemnation or purchase, a tax levy, an accounting or capitalization.

DEPRECIATION AND ITS RELATION TO FAIR VALUE

Mr. Erickson was of the opinion that if the treatment of depreciation in valuation largely depends on whether depreciation was provided for in the rates and whether the funds so provided were paid out to stockholders, it would seem to follow that where the amounts provided were used for necessary and proper renewals and for the accumulation of a reserve to cover the accrued but unmatured depreciation of the property still in use, no reduction from the cost new, because of depreciation, should be made in determining the fair value for rate-making and certain other purposes. He felt, however, that the situation might be different when the reserves for accrued depreciation which were provided by the customers had been appropriated by the investors for their own private use. In such cases as this, a situation was created under which justice might demand that the accrued depreciation be deducted from the cost new, and that the cost new less such accrued depreciation be used as the controlling evidence of value in the appraisals. In general, therefore, he considered that the most equitable basis of fair value would be determined by the formula—cost new minus depreciation plus depreciation reserve. Then if the latter had been dissipated in dividends, the company would be penalized accordingly in its valuation. Yet in the case of old companies like railroads, where only maintenance charges were covered by the rates, and there was no collection of accrued depreciation, he believed that the stockholders could have withdrawn nothing from the business and no deduction for depreciation should be made.

In regard to the continuing unexpended balance in the depreciation reserve, which may vary from 10 per cent to 50 per cent of the value of plant, Mr. Erickson thought that if conditions remained above normal, and if all the estimates upon which the balance rested were about accurate, it would seem that at least a part of the balance could with safety be paid over to the investors as a return of that much of their investment without greatly endangering the service. He was not certain, however, that it would be to the best interests of either the investors or the customers to follow this course. Because of its usefulness in meeting sudden or extraordinary requirements, and for other reasons, he considered that it might not be in line with the best policy to place too many restrictions upon the balance in the depreciation reserve.

DISCUSSION ON DEPRECIATION

The discussion on depreciation was opened by James E. Allison, consulting engineer, St. Louis, Mo., who criticised the unreliability and speculative character of estimates of expected life. He pointed out that averages are not justly applicable to individual items, and that the composite remainder of life of a plant is an erroneous factor inasmuch as the life of a plant extends indeterminately into the future if renewals are made as necessary.

In connection with the desire of the public that a continuing unexpended balance in the depreciation account be deducted from the valuation as a part purchase of the plant, Mr. Allison felt that such a procedure would perhaps be ethical for the future if the consumers understood the accumulation to be made for this purpose and the resulting reduction to the investor were fully compensated for by the amount collected from the consumer. It was wrong now to assume, however, that if a theoretical depreciation balance existed as part of surplus not needed above replacements, this had been contributed in the past by the consumer for the setting up of a part-purchase sum. Mr. Allison considered that past profits legally accumulated were the property of the utility, whether or not they are now considered legal.

Prof. John Bauer of Cornell University said that if the basis of valuation were exchange value, no accrued depreciation should be deducted, for present exchange value cannot be depreciated. But for existing utilties the problem is not to find the exchange value but to clear up a confusion of ideas. The reasonable policy for the future is to use for the rate basis the actual investment put into the property through the issuance of securities, but for most existing utilities it is impossible to find out from securities or capital accounts the money invested. In such cases to consider the net sacrifice of the investor and to evaluate earnings that should have been made and were not might produce a total fair value upon which the company simply could not earn a reasonable return, while in other cases the deduction from value of exorbitant past earnings might reduce fair value to nothing or even an actual liability.

The best plan, therefore, Professor Bauer said, is to draw a curtain on the past, and make an appraisal of the physical property on the basis of actual cost or reproduction cost. A deduction from either of these for depreciation constitutes a question of policy. The public is not entirely justified now in making a deduction, but if such is not made the investor may have a rate basis that is filled with junk. The deduction is merely a safeguard in the interests of broad justice. The main thing is to determine now a definite basis for judging existing companies in the future.

Prof. Allyn Young of Cornell University said that in the future the public has a right to set any valuation basis if it grant the proper rate of return thereon. He did not believe, however, in any retroactive rules. It should not be assumed that in the past it was necessary or according to ordinary business practice to accrue depreciation. Most railroad depreciation has been adequately cared for in the past by the maintenance charges to operating expenses. Professor Bauer then in reply to a question by A. Sakolski of the Delaware & Hudson Railroad valuation committee as to whether he would limit losses as well as profits under the agency theory, said that the reasonable return could always be earned if the existence of the utility were justified and the company properly managed. Furthermore, the non-guaranteeing of a reasonable return would be justly covered by the investor's risk when this lack of protection was known in advance.

John M. Eshleman, Lieutenant-Governor of California and former president California Railroad Commission, stated that an investor must be assured of two things—the return of his investment and a fair payment for its use. This payment, however, must be restricted by the cost for which the public could supply the service, or government ownership would be inevitable. He felt that depreciation was a common-sense question, and future rules should be limited in application to the past by the public acquiescence in certain practices. He urged both utility and public experts to stop trying to secure the greatest possible return to each side and to unite in establishing an honest basis sufficient to induce future investments.

GOING VALUE

In opening the afternoon session on going value, the chairman, General Morris Schaff, member Massachusetts Board of Gas & Electric Light Commissioners, stated in a brief address that the four fundamentals upon which Massachusetts had secured sound and satisfactory regulatory results in a pioneer field were these: Insistence upon freedom of utilities from political exploitation; payment of liberal dividends to capital honestly invested; requirement of as low a capitalization as possible, and insistence upon sound and efficient management. Moreover, the policy of providing abundantly for depreciation, of allowing for uncontrollable contingencies and of countenancing even generous dividends in the case of excellent management had resulted in few disputes. He believed that the financial history of a utility should be carefully studied in order to determine whence came the property values—from the investors, from the consumers in addition to dividends or through creation by the state—such information to be used so as to secure to both the investor and the consumer his every right. Furthermore, he suggested that when commissions were summoned before the courts in rate cases under the Fourteenth Amendment, they should plead for a distinction in the application of the law to properties in competition and to properties under protected monopoly.

MR. THORNE ON GOING VALUE

The first address of the afternoon was that on going value as an element in fair value, by Clifford Thorne, chairman Iowa Board of Railroad Commissioners. Mr. Thorne described the various conceptions as to the meaning and inclusiveness of the term "going value." If one construed going value as meaning the actual deficits or early losses suffered during the experimental or developmental stage, he believed that an allowance therefor as development costs should be made in the rate of return or in the valuation basis. Such losses, however, must be actually proved. On the other hand, if one looked upon going value as that value accruing from losses incurred after the property had passed through its development life of the first few years, or from the enhancement in its value caused by its operation as a profitable concern after it had reached a paying basis, then such a value should not be included as a factor in a rate basis.

In other words, as Mr. Thorne summed up in regard to going value, justice to the owners, as well as the best interests of the public, demands that reasonable expenses incurred in the construction and establishment, on a paying basis, of a public utility, reasonably necessary for public use, should either be returned to the owners or should constitute a part of the value upon which the owners are entitled to an adequate return. In his opinion, the public is willing to pay these development costs in order to obtain service, and there is money awaiting investment, on reasonable terms, where they and nothing more are desired instead of the larger amount under the misleading title of "going value."

In connection with his address Mr. Thorne remarked that he looked upon neither reproduction cost nor original cost as the proper sole basis for fair value, which is only in the process of being defined. Both of these are now important. Reproduction cost will, in his opinion, always be considered as a prime factor when original cost is not ascertainable, but in the broadest sense original cost will prove the most important factor when properly compiled and presented. This view, Mr. Thorne maintained, will be supported by the court of last resort.

A. M. Fox, Detroit, Mich., agreed generally with Mr. Thorne's theory regarding the propriety of allowing for early development losses but not for the late-deficit or good-will factors of "going value." William J. Hagenah, public utility expert, Chicago, Ill., did not agree with Mr. Thorne that only the early experimental stages should be considered. He held that with the general extravagance of the last generation, going value was a constantly increasing item extending in some cases even up to the present day. He cited the case of a utility in a fast growing Western city which was constantly compelled to extend its facilities into undeveloped sections and never caught up so as to be in a position to prosper with the community.

FINANCIAL ASPECTS OF REGULATION

The following speaker was Robert C. Wood, member Public Service Commission for the First District of New York, who discussed the financial aspects of regulation. Mr. Wood averred that the three objects to be attained by regulation of utilities are (1) a fair rate to the public, (2) a fair return on the capital invested, and (3) the obtaining from time to time of the capital needed to provide for additional facilities that are demanded by the public. He believed that under public service commission regulation the securities of a corporation having an established earning capacity, a capitalization within the limits of a fair and reasonable valuation of property and under specific requirements for setting aside annually from operating revenues proper allowances for renewals and replacements, should prove safe and desirable investments. Mr. Wood also discussed the influence of utilities on city development and the mutual interest of the public and the corporation in making the latter's securities attractive.

VALUATION AND THE FUTURE OF PUBLIC UTILITIES

The concluding session of the conference was the dinner on Friday evening, over which presided Charles R. Van Hise, president University of Wisconsin. The four addresses at this meeting were as follows: "The Meaning of the Constitutional Protection in Valuation," by both Charles A. Prouty, director of valuation Interstate Commerce Commission, and William D. Kerr, attorney at law, Chicago, Ill.; "Opinion Testimony," by Prof. John H. Gray, University of Minnesota, and "Valuation and the Future in Public Utilities," by Milo R. Maltbie, member advisory board to division of valuation Interstate Commerce Commission.

CONSTITUTIONAL PROTECTION

Mr. Prouty said that there is a twilight zone between the maximum rate that may be fixed by legislative authority and the minimum rate which would not be declared confiscatory by the courts, and in this zone the rate-making power of commissions is supreme. No rate, however, can be properly or justly established until the value of the property is known. It seemed to Mr. Prouty that it may finally be held that the action of commissions in fixing value will be conclusive to the same extent and within the same limits as in the case of fixing rates. The courts will correct all legal errors made in the process of valuation, but they will not review conclusions of fact. Apparently the rate of return and the valuation must be considered together. Courts will not interfere unless the result accomplished by combining these discloses confiscation. This will follow whether it be finally held that the determination by the commissions of questions of fact are within certain limits conclusive or whether the valuation is simply treated as *prima facie* correct. The courts, it is believed, will not set aside a valuation simply because the judges think the amount too small, unless there is palpable or gross error. Hence, concluded Mr. Prouty, the welfare of public utilities is largely under the control of the public service commissioners, and it is of prime importance that the utilities and the public should unite in securing men of the highest grade for these positions and then inform and support them.

Mr. Kerr was of the opinion that the Fourteenth Amendment creates no property rights, but merely prevents invasion by the state of property rights which are vested under general law. There is no property right in things dedicated to a public use that is entirely exclusive, for rate and service regulations necessarily imply some limitation of the right of free enjoyment. The limitation is voluntarily assumed by the corporation as a matter of contract. Mr. Kerr believed that value may be taken as an expression of the intention of the parties to a contract, as such intention is derived from the contract itself and the subsequent conduct of the parties. This view of value, he said, is not far removed from the results reached by the Supreme Court.

OPINION TESTIMONY

Professor Gray, in discussing opinion testimony, first reviewed the evolution of the rules of evidence which resulted in the admission, about 1800, of the opinions of scientists if based on facts testified to by others. As applied to valuation, he said that the so-called expert testimony of engineers was incompetent, that engineers were not trained to a knowledge of wealth or value, and that their expert testimony along these lines was universally regarded by economists as unscientific. Moreover, he held that engineers were not disinterested witnesses, being in effect paid assistant counsel testifying. While the main objection to opinion testimony prior to its first acceptance was held to be the danger of emotions affecting opinion, Professor Gray thought the present effects of cold calculation more dangerous.

Professor Gray also felt that the public was always at a disadvantage in securing opinion testimony in railroad rate cases, because the railroads could combine and pay more for the testimony and because eminent engineers feared to testify for the public because of its effect on their futures. He declared that if the railroads should succeed in foisting their views on valuation on the Interstate Commerce Commission, government ownership would be inevitable.

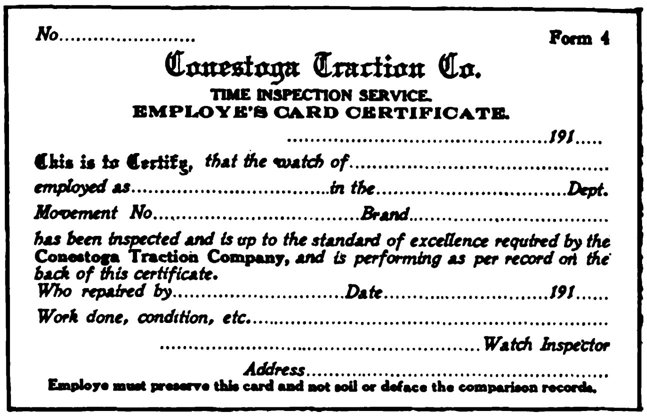
THE FUTURE OF UTILITIES

Mr. Maltbie in the concluding address before the conference said that the future of public utilities and the attitude of the public toward utilities under private management will depend in a large measure upon the principles followed in determining fair value. If commissions, legislatures and courts decide that a utility can legally require the public to pay rates sufficiently high to yield a return not only upon the actual investment in the enterprise but also upon property, tangible or intangible, which the public has donated, the public will decide that under such circumstances it would be better to give no donation to the utility, or, if such is necessary, to control and manage the utility itself. If the public must stand all shrinkage in values due to depreciation of property and may not share in gains due to land and other appreciation, but must even pay a return upon such appreciation, all will pause to consider whether private ownership and operation are not so unfair and burdensome that communities cannot afford to allow utilities to get into private hands. Moreover, in regard to depreciation, if it is finally determined that utility property does not thus decrease in value, then it follows that public utilities cannot collect in operating expenses anything for depreciation from the public through rates. In Mr. Maltbie's opinion, however, the utility which opposes proper depreciation funds or uses them, when accumulated, for other purposes, has not only broken faith with the public but invited retaliatory methods which it would be the first to decry. Furthermore, Mr. Maltbie said that if fair value is based on contemporary unit prices instead of investment or original cost, the stockholders will gain or lose according to economic conditions over which they have no control, development being stimulated in a time of rising prices and retarded in the case of falling prices. In conclusion he said that public confidence is one of the greatest assets that any corporation can have, and those who destroy it through their extravagant claims in valuation matters must face an enormous responsibility.

Lancaster's Experience with Time-Inspection System

BY R. B. HULL, GENERAL MANAGER CONESTOGA TRACTION COMPANY

For some time before we adopted our time-inspection system we were somewhat skeptical as to its efficiency and the need for it on our lines, for we felt that we had always maintained a fairly accurate schedule and, fortunately for us, had done so without any severe accident at any time. Our property, known as the Conestoga Traction Company, includes the street railways of Lancaster, a city of 50,000 population, and a network of lines covering the county branching out from Lancaster, which is the county seat and almost the geographic center of the county. Our lines feed through a splendid territory and bring a population of approximately 150,000 into the city.



No.......................... Form 4

Conestoga Traction Co.

TIME INSPECTION SERVICE.

EMPLOYE'S CARD CERTIFICATE.

....191.....

This is to Certify, that the watch of..

employed as..............................*in the*..............................*Dept.*

Movement No..............................*Brand*..............................

has been inspected and is up to the standard of excellence required by the Conestoga Traction Company, *and is performing as per record on the back of this certificate.*

Who repaired by..............................*Date*..............................*191*.....

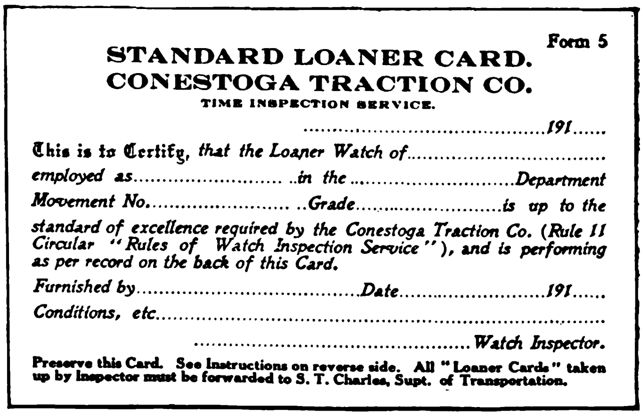
Work done, condition, etc...

....*Watch Inspector*

Address..

Employe must preserve this card and not soil or deface the comparison records.

TIME-INSPECTION SYSTEM—CARD CERTIFICATE, FACE



Form 5

STANDARD LOANER CARD.
CONESTOGA TRACTION CO.

TIME INSPECTION SERVICE.

....*191*......

This is to Certify, that the Loaner Watch of..

employed as.............................. ..*in the*..............................*Department*

Movement No.............................. ..*Grade*..............................*is up to the standard of excellence required by the Conestoga Traction Co. (Rule 11 Circular "Rules of Watch Inspection Service"), and is performing as per record on the back of this Card.*

Furnished by..............................*Date*..............................*191*......

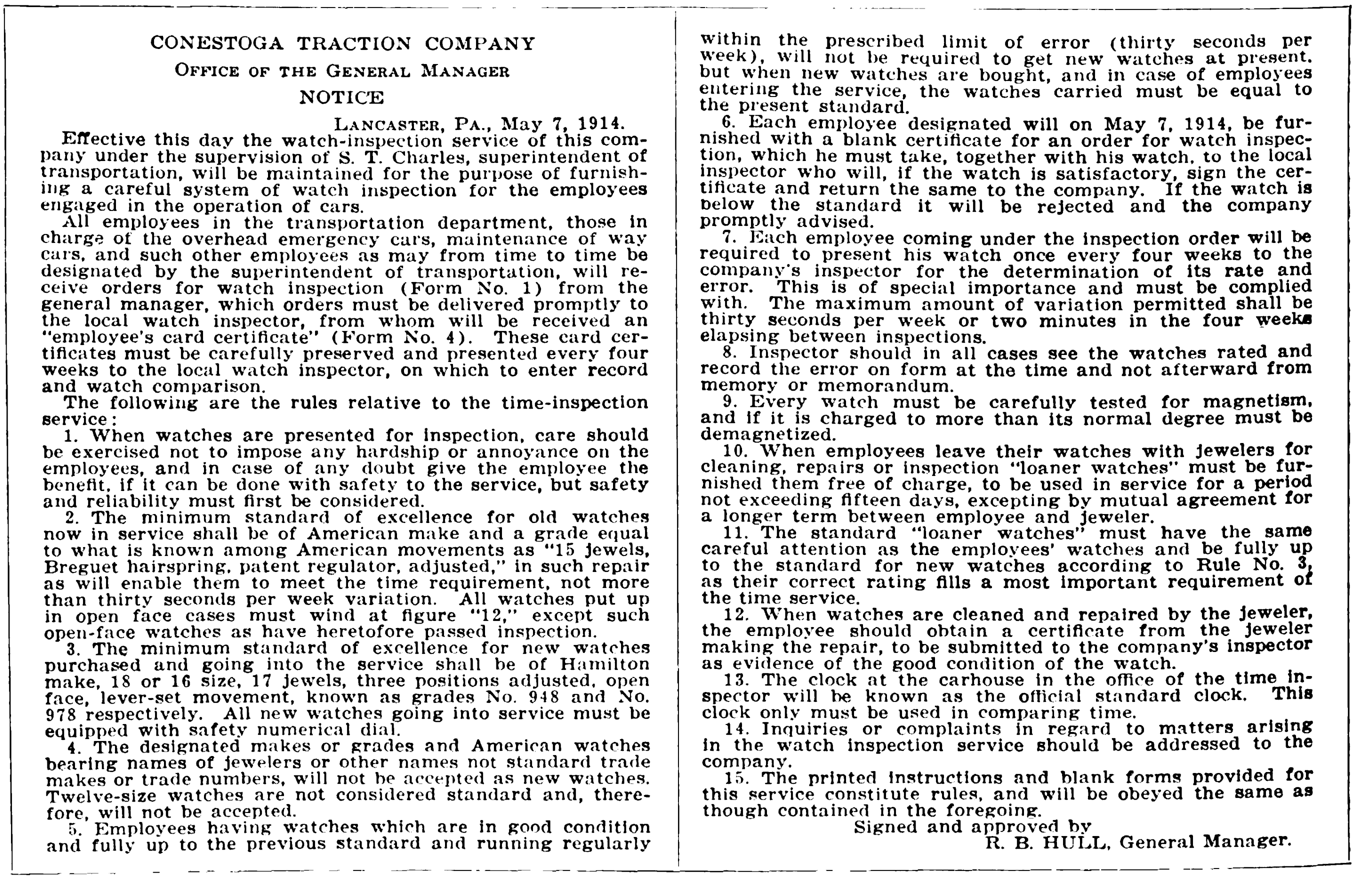
Conditions, etc..

....*Watch Inspector.*

Preserve this Card. See Instructions on reverse side. All "Loaner Cards" taken up by Inspector must be forwarded to S. T. Charles, Supt. of Transportation.

TIME-INSPECTION SYSTEM—STANDARD LOANER CARD, FACE

In May, 1914, we inaugurated a watch-inspection service under the supervision of our superintendent of trans-



CONESTOGA TRACTION COMPANY

OFFICE OF THE GENERAL MANAGER

NOTICE

LANCASTER, PA., May 7, 1914.

Effective this day the watch-inspection service of this company under the supervision of S. T. Charles, superintendent of transportation, will be maintained for the purpose of furnishing a careful system of watch inspection for the employees engaged in the operation of cars.

All employees in the transportation department, those in charge of the overhead emergency cars, maintenance of way cars, and such other employees as may from time to time be designated by the superintendent of transportation, will receive orders for watch inspection (Form No. 1) from the general manager, which orders must be delivered promptly to the local watch inspector, from whom will be received an "employee's card certificate" (Form No. 4). These card certificates must be carefully preserved and presented every four weeks to the local watch inspector, on which to enter record and watch comparison.

The following are the rules relative to the time-inspection service:

1. When watches are presented for inspection, care should be exercised not to impose any hardship or annoyance on the employees, and in case of any doubt give the employee the benefit, if it can be done with safety to the service, but safety and reliability must first be considered.

2. The minimum standard of excellence for old watches now in service shall be of American make and a grade equal to what is known among American movements as "15 jewels, Breguet hairspring, patent regulator, adjusted," in such repair as will enable them to meet the time requirement, not more than thirty seconds per week variation. All watches put up in open face cases must wind at figure "12," except such open-face watches as have heretofore passed inspection.

3. The minimum standard of excellence for new watches purchased and going into the service shall be of Hamilton make, 18 or 16 size, 17 jewels, three positions adjusted, open face, lever-set movement, known as grades No. 948 and No. 978 respectively. All new watches going into service must be equipped with safety numerical dial.

4. The designated makes or grades and American watches bearing names of jewelers or other names not standard trade makes or trade numbers, will not be accepted as new watches. Twelve-size watches are not considered standard and, therefore, will not be accepted.

5. Employees having watches which are in good condition and fully up to the previous standard and running regularly within the prescribed limit of error (thirty seconds per week), will not be required to get new watches at present, but when new watches are bought, and in case of employees entering the service, the watches carried must be equal to the present standard.

6. Each employee designated will on May 7, 1914, be furnished with a blank certificate for an order for watch inspection, which he must take, together with his watch, to the local inspector who will, if the watch is satisfactory, sign the certificate and return the same to the company. If the watch is below the standard it will be rejected and the company promptly advised.

7. Each employee coming under the inspection order will be required to present his watch once every four weeks to the company's inspector for the determination of its rate and error. This is of special importance and must be complied with. The maximum amount of variation permitted shall be thirty seconds per week or two minutes in the four weeks elapsing between inspections.

8. Inspector should in all cases see the watches rated and record the error on form at the time and not afterward from memory or memorandum.

9. Every watch must be carefully tested for magnetism, and if it is charged to more than its normal degree must be demagnetized.

10. When employees leave their watches with jewelers for cleaning, repairs or inspection "loaner watches" must be furnished them free of charge, to be used in service for a period not exceeding fifteen days, excepting by mutual agreement for a longer term between employee and jeweler.

11. The standard "loaner watches" must have the same careful attention as the employees' watches and be fully up to the standard for new watches according to Rule No. 3, as their correct rating fills a most important requirement of the time service.

12. When watches are cleaned and repaired by the jeweler, the employee should obtain a certificate from the jeweler making the repair, to be submitted to the company's inspector as evidence of the good condition of the watch.

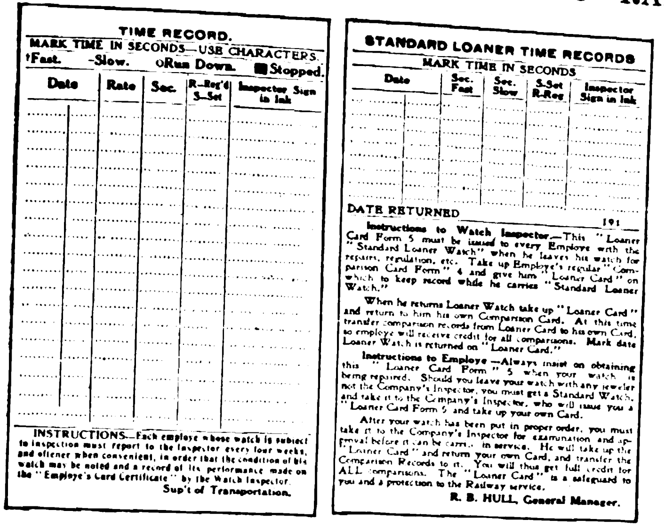
13. The clock at the carhouse in the office of the time inspector will be known as the official standard clock. This clock only must be used in comparing time.

14. Inquiries or complaints in regard to matters arising in the watch inspection service should be addressed to the company.

15. The printed instructions and blank forms provided for this service constitute rules, and will be obeyed the same as though contained in the foregoing.

Signed and approved by
R. B. HULL, General Manager.

TIME-INSPECTION SYSTEM—NOTICE ANNOUNCING INAUGURATION OF SYSTEM



TIME RECORD.

MARK TIME IN SECONDS—USE CHARACTERS.

+Fast. -Slow. ○Run Down. ■Stopped.

Date	Rate	Sec.	R—Reg'd S—Set	Inspector Sign in Ink

INSTRUCTIONS.—Each employe whose watch is subject to inspection must report to the Inspector every four weeks, and oftener when convenient, in order that the condition of his watch may be noted and a record of its performance made on the "Employe's Card Certificate" by the Watch Inspector.

Sup't of Transportation.

STANDARD LOANER TIME RECORDS

MARK TIME IN SECONDS

Date	Sec. Fast	Sec. Slow	S-Set R-Reg	Inspector Sign in Ink

DATE RETURNED ________ 191__

Instructions to Watch Inspector.—This "Loaner Card Form 5 must be issued to every Employe with the "Standard Loaner Watch" when he leaves his watch for repairs, regulation, etc. Take up Employe's regular "Comparison Card Form" 4 and give him "Loaner Card" on which to keep record while he carries "Standard Loaner Watch."

When he returns Loaner Watch take up "Loaner Card" and return to him his own Comparison Card. At this time transfer comparison records from Loaner Card to his own Card, so employe will receive credit for all comparisons. Mark date Loaner Watch is returned on "Loaner Card."

Instructions to Employe.—Always insist on obtaining this "Loaner Card Form" 5 when your watch is being repaired. Should you leave your watch with any jeweler not the Company's Inspector, you must get a Standard Watch, and take it to the Company's Inspector, who will issue you a "Loaner Card Form 5 and take up your own Card.

After your watch has been put in proper order, you must take it to the Company's Inspector for examination and approval before it can be carried in service. He will take up the "Loaner Card" and return your own Card, and transfer the Comparison Records to it. You will thus get full credit for ALL comparisons. The "Loaner Card" is a safeguard to you and a protection to the Railway service.

R. B. HULL, General Manager.

TIME-INSPECTION SYSTEM—REVERSE SIDES OF CARD CERTIFICATE AND STANDARD LOANER CARD

portation, for the purpose of furnishing a careful system of watch inspection for the employees engaged in the operation of cars, namely, the employees in the transportation department, those in charge of the overhead emergency cars and maintenance of way cars, and any other employees who were from time to time designated by the superintendent of transportation to receive orders for watch inspection and an employees' card certificate.

The accompanying copies of our forms show the itemized detail of the system now in use. They include the card certificate, the standard loaner card and our printed rules covering the inauguration of the system.

I want to emphasize particularly the fact that one of the rules of the inspection service is that when watches are presented for inspection care shall be exercised not to impose any hardship or annoyance on the employees. In case of any doubt, we give the employee the benefit, if it can be done with safety to the service; but safety and reliability must be considered first. This rule is particularly important in the successful working out of the system, for without a clear understanding of the rule on the part of the employees there is a tendency to imagine that this is something that is being forced upon them. In reality this time-inspection system is one of the best possible safeguards of the employee's life, and it contributes to the more accurate timing of the cars.

For old watches in service we took as a minimum standard of excellence the conditions that they should be of American made, of a grade equal to what is known among American movements as 15 jewels, Breguet hairspring, patent regulator, adjusted and in such repair as to meet the time requirements of not more than thirty seconds per week variation.

In view of the great predominance of Hamilton watches on the steam and electric railways in America, we specified that the minimum standard of excellence for new watches purchased and going into the service should be Hamilton make, 18 or 16 size, 17 jewels, three-position adjusted, open face, lever set, known as grade Nos. 948 and 978 respectively. All new watches going into the service must be equipped with safety numerical dials. This latter feature is one which has been very successfully used by the men on steam railways, for it tells at a glance the minutes after the hour.

The time-inspection system has worked out to our entire satisfaction and at a minimum of expense to this company. It has not caused any friction among our employees. In fact, I think it has worked just the reverse, that is to say, our employees are well pleased. This company would not hesitate to recommend the adoption of the time-inspection system by any other railway.

One-Man Cars*

All Closed Cars in the City of Anniston Have Been Rebuilt for One-Man Operation

BY A. L. KENYON, LOCAL MANAGER ALABAMA POWER COMPANY, ANNISTON, ALA.

Given the right conditions there is no question as to the advantages of the single-truck, pay-as-you-enter car for the smaller cities, especially those of from 15,000 to 75,000 population. The light car, giving quick service at short intervals, furnishes the solution of many railway problems in such cities when the street car company is barely meeting its fixed charges, and in many instances doing this only by "skimping" maintenance. This reacts on the company through the public, which is quick to notice poor roadbeds and illy-kept cars, preferring to walk rather than to ride in such vehicles.

To provide a rapid, frequent service without a prohibitive increase in cost of operation, platform costs must not be increased. Hence one-man operated cars seem to promise a partial solution of the question. But there are several problems involved in one-man service. One is the negro problem. Another is that of steam railroad crossings. Where the steam road does not maintain a flagman, safety regulations require the electric railway conductor to go ahead and flag the car across.

The only way to overcome this is to employ a regular crossing flagman, paid for jointly by the steam and electric roads, or to install an automatic signal system operated by the electric car. On a large system the employment of the flagman is warranted. On a small system, when two to four cars are operating on a fifteen-minute or thirty-minute headway, the expense of keeping two flagmen at each crossing nearly offsets the saving in one-man operation. The remedy for this is to install an absolutely reliable signal system, approved by the State railroad commission. We are now experimenting with the Nachod signal system at a proposed cost of about $400 per double-track crossing.

All of our cars are electrically heated, and Johnson fare boxes are employed on all, so that except in rush hours one-man operation is easy and possible, but is not as yet practised on all lines. We have one line operating two cars, with a fifteen-minute schedule, running through the heart of the city and with the aristocratic section at one end, that has a light traffic and no difficulty is experienced with it. This line is free from railroad crossings, and it is equipped with pay-as-you-enter, one-man cars. These are new cars, built by the Southern Car Company. They seat thirty-six passengers, are mounted on Brill 21-E trucks with 8-ft. wheelbase and 30-in. wheels, and are furnished with air brakes and folding doors and steps.

All cars operated in Anniston, except the open cars, have been rebuilt this year for one-man operation. All bulkheads were removed, and folding doors and steps were added. The mechanism was arranged for normal operation by one man, but provision has been made for opening the front and rear doors on one side by the motorman if desired. The one-man plan has been of great advantage in reducing petty accidents, due to the impossibility of passengers getting on and off before the cars came to a full stop. While this service has been given for but a short time, so far the public is well pleased. Strict attention to cleanliness and courtesy in all dealings with the public are absolutely insisted upon, and the efforts of the company to please the public are appreciated.

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*Abstract of paper presented before the Alabama Light & Traction Association at the meeting held Oct. 20 and 21, 1915.

Exhibition of St. Paul Locomotives

The First 3000-Volt St. Paul Locomotive Was Taken from Erie to Seattle and Shown at Many Cities to Interested Visitors—Tests of Regenerative Features of Another Locomotive Made Last Week in Montana

A decided novelty in methods of publicity was recently carried out by the Chicago, Milwaukee & St. Paul Railway Company in connection with its 440-mile electrification across the Continental Divide, one of the electric locomotives having been hauled across the continent and exhibited at every important city on the route, finally being placed in trial operation on the Butte, Anaconda & Pacific Railway, which joins the St. Paul System at Butte, Mont. That the exhibitions were an unqualified success is shown by an article by E. S. Johnson in the forthcoming issue of the *General Electric Review*, wherein it is indicated that some 60,000 people took advantage of the opportunity to inspect the machine.

The railway company's contract, which was made on Nov. 25, 1914, called for the delivery of the first locomotive in ten months, and shipment was made on Sept. 25, 1915, a delivery that is unusual in view of the fact that the design is entirely new, that the capacity exceeds that of any steam or electric locomotive ever built, that the voltage of the system is higher than that of any direct-current system for commercial operation, and that the important feature of regenerative control, which is included in the design, was entirely untried for direct-current railways. Since the first delivery several additional locomotives have been shipped, so that electrical operation of the first division between Deer Lodge and Three Forks is expected to begin about Dec. 1.

The first public inspection of the exhibition locomotive was held in Chicago at Fulton Street near the Union Station on Oct. 6, from 12 o'clock noon to 4 p. m. It was estimated that 10,000 people gathered to see the great machine and 5000 visitors actually passed through the interior. So great was the popular interest that several "movie" operators were on hand and made films at different points which are now being exhibited throughout the country.

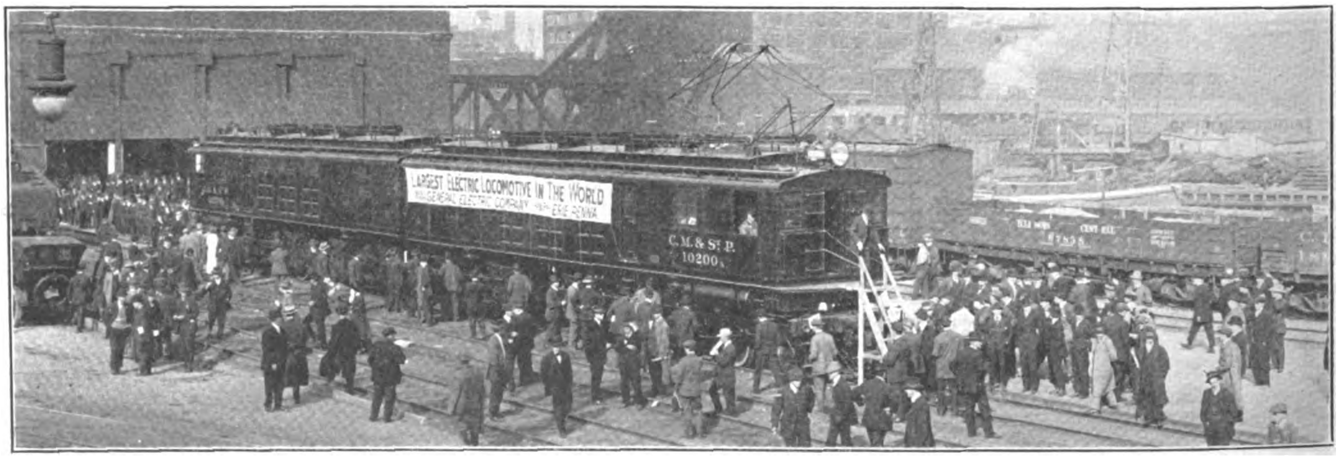
Prominent among these visitors were many railroad officials located in Chicago and university professors; particularly those interested in engineering work at the University of Chicago and at Northwestern University. A number of students were dismissed from class work in order to give them an opportunity to examine the locomotive. Superintendents of motive power, street and steam railway officials, consulting engineers and city officials from Chicago and points within 200 miles took advantage of the opportunity to inspect the first transcontinental locomotive. Public men of every profession and city officials were especially interested on account of the agitation in favor of electrification of the railway terminals of Chicago.

The feature that evoked the greatest interest was, naturally, the regenerative braking which enables the locomotive to hold back the heaviest trains on long descending grades—at the same time returning power to the line. The air brakes are thus used only for emergency service or in making the final stop. Regeneration is controlled by the engineer through an auxiliary handle on the master controller which causes the motors to return power to the trolley in the proper amount to maintain any desired speed. This feature, it may be said, was very thoroughly tested on the General Electric Company's experimental track at the Erie Works before the locomotive was shipped.

The general public showed much interest in the fact that cold weather offers no obstacles to electric locomotive operation as is the case with steam. It was pointed out that steam locomotives are usually in difficulties in the winter time, necessitating extra leeway in the time-table to take care of delays. With electric operation there will be no delays for fuel or water or cleaning fires and the electric engine will always be ready at a moment's notice. Trains will move exactly as scheduled so the meeting and passing points may be figured to the minute. Fuel trains will be eliminated in the mountain districts, thus giving track-room for additional trains handling revenue freight.

During the inspection at Milwaukee an accurate count was kept, and it was found that 5010 people went through the locomotive. As many more inspected the locomotive from the outside and either did not have the time or the opportunity to make an examination of the interior. Especial interest was displayed by the employees of the railway company, practically the entire office and shop force taking occasion to visit the machine.

In St. Paul 2550 visitors passed through the locomotive, and in Minneapolis nearly 6000. Opportunity



CHICAGO, MILWAUKEE & ST. PAUL LOCOMOTIVE ON PUBLIC EXHIBITION NEAR UNION STATION, CHICAGO, DURING SPECTACULAR TRANS-CONTINENTAL TRIP was also afforded the faculty and students of the railway engineering course of the University of Minnesota to make a careful examination at a special hour. On the trip west over the Chicago, Milwaukee & St. Paul lines stops were made at Aberdeen, Miles City, Butte and Missoula, an average of 2000 to 3000 visitors inspecting the locomotive at each stop.

At Butte, the president's special car was attached and a trip made over the lines of the Butte, Anaconda & Pacific Railway to Durant and return. It is noteworthy that the locomotive was operated under its own power as a demonstration to these officials the day it arrived at Butte after being hauled more than 2000 miles. Among the officials on the trip to Durant were President A. J. Earling, Vice-President H. B. Earling, Assistant to the President C. A. Goodnow in charge of electrification work, R. M. Calkins, traffic engineer at Seattle; A. M. Ingersoll, assistant to the vice-president; R. Beeuwkes, engineer in charge of electrification; H. A. Gallwey, general manager of the Butte, Anaconda & Pacific Railway, and many others.

Final exhibitions were made at Ellensburg, Spokane, where there were 10,000 visitors on the first day, Seattle and Tacoma. The number desiring to inspect the locomotive at both Spokane and Seattle was so large that it was necessary to allow two days at each place for the exhibition. From Tacoma the locomotive was sent back to Butte to be placed in trial operation. Most of the tests now being conducted on the Butte, Anaconda & Pacific Railway with the new St. Paul electric locomotives received there have applied to the power regenerative feature. The results of one of these tests, conducted on Nov. 13 with locomotive No. 10,201, show the severity of the trials to which the locomotives are being subjected.

TEST OF REGENERATIVE BRAKING

The weight of the train tested was as shown in the following table:

Sixty-five ore cars at 70 tons each	4,550 tons
One caboose	15 tons
One business car	94 tons
Total, excluding locomotive	4,659 tons
Total including locomotive	4,943 tons

This load was hauled from Rocker to Anaconda yards without the use of air brakes except to stop at Durant and Anaconda yards, electric braking being used to hold the train on the 1 per cent down grade with the current averaging at times as high as 880 amp. at the locomotive, corresponding to approximately 2100 kw. returned to the line at substation voltage. The train was allowed to speed up to approximately 25 m.p.h. on the down grade, and the train was brought to as low as 7 m.p.h. with the electric brakes in order to demonstrate the wide field of application of this method of braking. The braking was very smooth, and the reduction of speed from 25 m.p.h. to 7 m.p.h. was made without the slightest jar to the train. As the braking was done entirely by the engine, the slack between cars was bunched, and at no time was there any danger of breaking the train in two.

The tests were witnessed by the following representatives of the Chicago, Milwaukee & St. Paul Railroad: C. A. Goodnow, assistant to the president; E. H. Barrett, assistant general superintendent; R. Beeuwkes, electrical engineer; George Spaulding, traveling engineer, and H. A. Gallwey, general manager Butte, Anaconda & Pacific Railway. A. H. Armstrong, chairman of the electrification committee General Electric Company, and P. P. Spaulding of the same company were also present.

Australian Railways to Be Electrified

According to a recent commerce report from Sydney, Australia, to the bureau of foreign and domestic commerce, Washington, D. C., two schemes for electrifying existing lines of urban and suburban railways of Sydney are engaging the attention of the local transportation departments. The railway service, known as the North Shore Lines, running from Milson's Point, the traffic center immediately opposite the city proper, to Hornsby, 13 miles away on the main line from Sydney to the north, is about to be electrified. Already a tunnel under the harbor for carrying the necessary feeder cable is being driven, and but for an unexpected interruption, owing to a fault in the rock, would have been nearly completed by this time. The plan is to supply energy for this service from the existing power stations at White Bay on the Sydney side of the harbor. The work is being carried on by the Railway Department of the New South Wales government.

The second project, for the construction of a metropolitan railway, is much more extensive in conception. Parliamentary sanction for the expenditure of $32,000,000 has just been obtained. J. J. C. Bradfield, who is chief engineer of metropolitan railway construction, is in full charge of the preliminary arrangements.

The electric railways about to be constructed in the metropolitan area of Sydney include: (a) The immediate electrification of the inner zone suburban railways, comprising 64 route-miles or 200 track-miles, and in the near future the electrification of the outer zone suburban railways radiating some 36 miles from Sydney, and additional length of 200 track-miles. (b) The construction of a 16-mile, double-track loop railway around the city of Sydney. (c) The construction of double-track railways to the eastern, western and northern suburbs, connecting with the existing railways and with the city railway, a length of 37 miles of single track. The ruling grades will be about 3½ per cent with the load and 2½ per cent against the load, while the sharpest curve is 11½ deg. All platforms will be 520 ft. long and will be placed in shallow subways; access will be generally by steps. Energy will be supplied from overhead wires to the train motors at 1500 volts.

The railways to the northern and western suburbs necessitate long-span cantilever bridges across the harbor, without piers in the fairway; the bridge to North Sydney is to be 1600 ft. long, center span, accommodating four tracks, and having a main roadway 35 ft. wide, a motor roadway 18 ft. wide and a footway 15 ft. wide. A bill for the construction of this bridge is shortly to be submitted to Parliament, and though the European war may postpone its commencement it is hoped that a beginning will soon be made. The bridge to Balmain is to be 1350 ft. center span, accommodating double-track and the same roadways and footways as the North Sydney bridge. The clear headway for shipping under the bridges is to be 170 ft. at high water. The total cost of the scheme is approximately $97,330,000.

The construction of the Sydney City Railway, Sydney, Australia, will be begun as soon as the scheme has received the sanction of Parliament. Electric traction will be used, and it is intended to connect the lines with North Sydney and the Nelson's Point Railway. The estimated cost of wiring from the present Nelson's Point terminus to Hornsby is $526,500; in addition further expenditure will be necessary to provide rolling stock, transmission lines and substations. The question of funds for the electrification of the Nelson's Point-Hornsby Railway will be considered in connection with the next loan estimate.

C. E. R. A. Meets in Indianapolis

Ways and Means of Increasing Electric Interurban Railway Revenue, the Question Raised in the Paper by G. K. Jeffries, Was the Principal Topic Discussed at the Opening Session on Nov. 18

The November meeting of the Central Electric Railway Association was held at the Claypool Hotel, Indianapolis, on Thursday and Friday of this week. More than eighty members were in attendance when the meeting was called to order on Thursday morning, and President Henry presided. The first order of business was the report of the standards committee, which was presented by R. N. Hemming, superintendent of motive power Union Traction Company of Indiana. This committee is collecting and putting in proper form all the standards adopted by this association, with a view of having them printed and distributed in loose-leaf form. Mr. Hemming reported progress and requested the permission of the association to make certain minor changes and corrections before putting these standards into final form. This was granted.

In the absence of S. W. Greenland, general manager Fort Wayne & Northern Indiana Traction Company, and chairman of the committee on uniform charges for repairs to foreign equipment, Secretary Neereamer read the report of this committee. Its recommendations were adopted by the association without change.

President Henry then advised the association of the death of two of its members, George Parker, general freight and express agent Detroit United Railways, and C. M. Witt, storekeeper Union Traction Company of Indiana. Upon motion a committee was appointed to draft suitable resolutions to be sent to the families of the deceased.

Under the heading of new business Mr. Hemming called attention to the difference of opinion among interurban roads regarding the manner of applying the locking pawl on hand brakes. Some roads specify that the operator must hold his foot on the lever which engages the pawl in applying the brakes and must keep his foot on the lever as long as he desires the brakes to be applied. Other roads specify that the automatic pawl, after it has engaged with the ratchet, must stay in that position, and that it may be released only by the operator's foot again being placed on the releasing lever. He said the second method was better practice because it was safer. He said that two types of hand brakes also created an additional hazard, particularly where cars were subject to interchange, because all operators would not be familiar with the peculiarities of the two types of brakes, and accidents might result.

Accordingly Mr. Hemming recommended that this matter be referred to the standards committee for consideration. His suggestion was adopted.

President Henry then called attention to the plan of the Bureau of Standards of preparing standard rules for overhead lines. He said that he understood a number of roads did not agree with the tentative rules and that the bureau would send out revised copies of them for further consideration. Prompt action on the part of those not agreeing with the standards, in submitting their criticisms, would aid in bringing about the desired changes.

The president also announced that the annual meeting of the association would be held at Dayton, Ohio, Feb. 24 and 25. He appointed a nominating committee composed of E. B. Peck, Terre Haute, Indianapolis & Eastern Traction Company; W. H. Bloss, Ohio Brass Company; E. F. Schneider, Cleveland, Southwestern & Columbus Railway; W. S. Whitney, Ohio Electric Railway, and S. D. Hutchins, Westinghouse Traction Brake Company.

METHODS OF INCREASING REVENUE

The president then announced that the next matter on the program was the presentation of a paper by G. K. Jeffries, general superintendent Terre Haute, Indianapolis & Eastern Traction Company. This paper, which was called in the program "The Question," was devoted to a discussion of the best means of increasing the revenue. An abstract is published on the opposite page. A lively discussion followed the reading of this paper.

W. A. Carson, general manager Evansville Railways, said that his road was not suffering greatly from automobile competition because there were but few good roads in its territory. He was seriously considering the question of buying some automobiles to serve as feeders to his line. These would be operated between small towns in adjoining territory to his line. Mr. Carson said he was now operating boat lines where he could not get private parties to handle the traffic because they considered it unprofitable.

After the first year, these boat lines have succeeded and in addition have increased the railway revenue more than $100 a month. He expected the automobile lines to be unprofitable at first but to pay after service had been established. C. A. Baldwin, superintendent of transportation Union Traction Company of Indiana, recommended fast through cars that are comfortable and clean to increase passenger travel.

C. N. Wilcoxon, president Chicago, Lake Shore & South Bend Railway, thought that electric interurban lines should branch out and away from the lines followed in the past to increase earnings. He suggested getting into the freight business on an extensive scale. It should equal that of steam railroads and include particularly car-load freight. He said he was satisfied that if electric railways would correct some of their physical errors a general freight business would prove to be profitable.

W. S. Whitney, general freight and passenger agent Ohio Electric Railway, agreed that car-load freight was very desirable for electric railways. He said that it must be borne in mind, however, that this business originated and was delivered on side tracks and at terminals and not on the main line. John F. Keys, general passenger agent Detroit United Railway, was of the opinion that the increase in the number of automobiles would work to the ultimate advantage of electric railways. They created the travel habit, and all people could not own automobiles nor could automobiles travel everywhere and during the entire year. Mr. Keys also told of the advantages of advertising posters within and on cars. He said his road was using posters successfully to stimulate passenger traffic. He urged all railways to use their advertising opportunities to develop the passenger business.

J. H. Drew, Drew Electric & Manufacturing Company, and L. G. Parker, Cleveland Frog & Crossing Company, brought out the importance of systematic advertising and urged using the association as a medium for developing business. Their idea was to operate all roads in the association as one big system and advertise the service and connections to the general public. Others taking part in the discussion brought out the possibilities of selling light and power and making connections with the trains of steam roads.

OTHER BUSINESS

Hon. J. F. McClure, member Public Service Commission of Indiana, then read his paper entitled "The Interurban." At the afternoon session the members heard an interesting lecture by W. A. Phillips on the complete process of manufacturing steel pipe. This was accompanied by motion pictures showing all the important processes.

A report of Friday's session will appear in next week's issue.

METHODS OF INCREASING REVENUE

BY G. K. JEFFRIES, GENERAL SUPERINTENDENT TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

I think the subject foremost in the minds of all interurban men at the present time is the development of the best method to increase revenues. We all know that the increased use of the automobile has become a factor which has seriously affected the revenues of practically all the companies. The larger amount of this loss of business is in the short distance travel. There is no indication that the farmer and small town storekeeper and all others who can raise $450 or $500 are going to abandon the use of the automobile and return to the electric road for transportation whenever they want to go 3 miles or 4 miles to town or country or even to the principal towns or cities 20 miles or 30 miles away. There is no use injuring ourselves by butting against this wall. We must look to other things to take the place of this lost travel. An editorial in a trade publication recently suggested, as one method of partially eliminating automobile competition, the advocacy by railway officials of a higher license for automobiles, the thought being that the license fee should be about ten times as much as it is now. I am afraid that this would prove a boomerang. It would antagonize the hundreds and thousands of automobile owners and drivers, and they would be even more ready and willing than they now are to take their neighbors and friends with them on their journey.

The principal other source of passenger revenue is the long-haul business, where the use of the automobile is only occasional instead of being the rule, as it is for comparatively short distances. The development of attractive service over long divisions, or between points on different divisions of one system, and more particularly, good service over the lines of two or more connecting companies, should bring good results. We cannot expect to compete in running time with parallel steam roads, but we can, by making the service attractive, secure much of the business that now goes to these competitors. One of the principal items of attraction is through service without change of cars. Another is the elimination of stops. A through service is ruined if the train stops at all the towns. This kind of a train does not equal the peddling locals of steam lines, as the service stops on electric lines are greatly in excess of those on steam roads.

Of two trains making the same time between terminals, one making all town stops and the other those only at the principal cities, the latter would be much more popular with the traveling public. The traveler does not notice the time consumed if the train keeps on the move. It will not be necessary to increase the speed of our motors to give this faster service. All we will have to do is to eliminate some of the delays, of which stops are the largest item. Of course, regularity and reliability of the service are large factors. Trains arriving at terminals on time are the best advertisement a road can have.

The possibility of long trips via connecting interurbans or interurban and steam roads should be called to the attention of the public in advertisements, and these schedules should be worked out by traffic departments and shown in folders. Very few people know the possibilities of this through travel which, among other things, enables them to save money on interstate journeys as compared with the trip entirely on steam lines. On our own lines we carry quite a number of passengers for Illinois points and St. Louis via Paris, Ill., the passenger getting through for 2 cents per mile. If he goes all the way on steam lines he pays 2½ cents.

Ask the managers of any lines which have originated through fast service and you will find that these trains are the most profitable ones on their lines. I have in mind some fast schedules with Indianapolis as one of the terminals made by trains which have been running for some time and which have been extensively advertised. These trains are so popular that they are always filled, a trailer often being necessary to take care of the travel. I know of others which are just as well advertised and would be equally popular if they were not spoiled by doing local work over a portion of the run. The criticism heard from passengers on these trains is not good advertising, and it injures not only that particular line but it reflects on all electric roads which advertise limited service and then do not give it.

In every interurban district there are points between which travel is heavy, particularly during the summer season, and where the steam road service and connections are poor and where electric lines, either alone or in connection with some steam road, can give superior service. More attention should be given to attracting this travel to the electric road. Many of the steam lines are antagonistic, but none of them will refuse business handed to them or to handle passengers for an interurban connection, and some of the more broad-minded traffic departments are glad to enter into traffic arrangements with us.

The establishment of sleeping car service between cities of from 50,000 to 250,000 population would, I think, be a paying proposition. In many cases the steam road competition would not be serious because the sleepers on the steam lines are on through trains and the passenger can board a sleeper only when the train arrives, and he must leave it when the train gets to his destination. He probably must either remain up until midnight to get his sleeper or rise at a very early hour in the morning to leave it. Where sleepers on electric lines are in operation they are paying well. The fare is less than on Pullman cars, and as the schedule need not be fast, the trip is comfortable and void of dust and cinders and smoke.

If we can get the managers of connecting lines together and have them talk over the possibilities of developing business which now goes to our competitors, I believe much good will come of it.

The *Electrical Review*, calling attention to the growing importance of railway electrification in England, states that the aggregate length of single track now under, or being equipped for, electrical operation in that country is nearly 1000 miles.

COMMUNICATIONS

Wider Use of Public Libraries

FREE PUBLIC LIBRARY
NEW HAVEN. CONN., Nov. 8, 1915.

To the Editors:

It is with great interest that I note the step of The Connecticut Company in making the beginnings of a company library in connection with the Accountants' Association correspondence course, as described in the in the issue of the JOURNAL for Nov. 6, page 953, and commented upon editorially in the same issue.

It is very possible that no railway company, large or small, will purchase enough books for all employees. This thought entered my mind as soon as I read the list of books published in the article referred to. I at once made a list of the books in this library that duplicated The Connecticut Company's list and mailed a copy to the company, requesting that copies be placed in prominent locations in order that their employees might reap the benefit of the city library. It has since occurred to me that as this correspondence idea is big enough to start a company like The Connecticut Company in establishing a library, perhaps other companies would follow suit, and thereby afford a chance for the public libraries to lend a hand.

The above is merely the view I get from my side of the matter. I shall be interested to learn the viewpoint of the electric railway industry.

KENNETH C. WALKER,
Head Department of Technology.

Indexing Car Equipment Data

THE SOUTHWESTERN ELECTRICAL & GAS ASSOCIATION
DALLAS, TEX., Nov. 9, 1915.

To the Editors:

With reference to the classification suggested by Mr. Litchfield in his article on "Indexing Car Equipment Data" in the Oct. 2 issue of the JOURNAL, I would primarily suggest a considerable modification of his main divisions. In the first place Mr. Litchfield's suggested main heads seem to duplicate certain items while they leave out certain others. As a matter of principle in filing there should never be any such thing as a "miscellaneous" file. In practice it will be found that such a file will simply become a dumping-ground for negligence and carelessness in nomenclature. Such a thing is a misnomer, as a portion of a file; to use it violates the very principle of exactitude that is the vital portion of proper filing. If it is really considered necessary to have such a collection of miscellaneous matter, it had better be kept out of the file and in the basket or folder on the desk where it may be "pawed over" at will, for that is exactly what will have to be done with that portion of the file if a "miscellaneous" folder or section is allowed. Every piece of it will have to be "pawed over" to find what is desired. With a little thought and care given to the matter, there is hardly any item that will not naturally fall under some head or subhead or sub-subhead, and if this is found not to be the case it is decidedly better to give it a fixed arbitrary location and index it in such position than to put it into a "miscellaneous" scrapheap with a lot of other anonymous orphans.

As I understand Mr. Litchfield's article he is suggesting a method of indexing and filing all the data that may be desired with reference to car equipment—meaning thereby, according to his classification, the whole of the car and including the body and everything connected with it. If the information desired is strictly with reference to such, it is necessary to know exactly what information will be desired from such a file. If that information relates only to the physical features of the different portions of the equipment—to their weights, dimensions, the materials of which they are made and the process of making them—in short, their "specifications"—then the plan of making these records and indexing and filing them would be in a certain way and would be a most simple matter.

If, however, as seems to be the case from the classifications shown, there ensue the further matters of costs, progress, mileage, together with the outside matters of the "office" and "transportation and traffic," then the problem becomes a very complicated one, and the suggestion of the writer would be that instead of trying to crowd all this unconnected and irrelevant matter into one file, it would be much more simple and tend to less work and time and to greater accuracy and facility of reference, to separate these sources of information into separate files and indexes. One of the early mistakes that is often made in the beginning of any system of "filing" is to have each file cover too much. While it has been urged that it is wise to have all the possible information with reference to one item, object or subject in one place, this needs the necessary modification of departments; otherwise there would be complication instead of simplification. If the file suggested by Mr. Litchfield were such as to give the car-shop foreman every bit of information with reference to the car equipment—direct as well as indirect—he would have in that file information that was really the property of the accounting, the purchasing, the stockroom, the track, the line and transportation departments. And, in such case, there would either be an enormous duplication of information with its attendant expenditure of time and money if these other departments kept similar files, or if they did not do so they would have to come to the shop files to obtain information needed by them. In a very small railway property where neither the size nor the earnings of the property permitted any great amount of departmentizing, where the manager or superintendent was either the whole of most departments or their technical head, the idea of such a general file might be permissible.

In any railway property which is sufficiently large or prosperous enough fairly and fully to departmentize itself, it would be the wisest and most economical method to have each department keep in its departmental files that detailed information only of which it was the originator. Under such an arrangement there would be a much greater likelihood of accuracy and "up to dateness" in the records of each, and, for general inquiry or information, it would be much easier and tend to greater accuracy to combine the information from the several departments in the main office than to have this partially done by each separate department. This suggestion is in line with the latest practice of "efficiency," the principle of "the economic division of labor" and "the largest results with the least expenditure," and the writer would strongly suggest to those interested in the article by Mr. Litchfield that, when their railway property has separate and distinct departments, their "department files" consist only of their proper departmental statistical forms or data properly collected, collated and integrated and that the "data and statistics" of all the departments as a whole are better handled by one person or department that makes a specialty of so doing.

It is doubtless pleasing to a foreman or superintendent to have under his hand and eye all the detail relating to the subject of his department and the results attained by that department, but, in actual practice, it is better that any "outside" data and statistics be prepared by others who have all the basic information at hand, whose specialty is such work and who neglect no other work while so doing. Such others will not use the method of classification suggested by Mr. Litchfield if they desire the best and most easily accomplished results. The best results to be obtained from the proper use of "filing" are not by making the files complex or trying to make any one file cover everything.

H. S. COOPER, Secretary.

Association News

On Nov. 18 the committee on subjects of the Transportation and Traffic Association met in New York with the following in attendance: J. K. Choate, New York, N. Y.; L. H. Palmer, Baltimore, Md., and H. A. Nicholl, Anderson, Ind. The committee prepared its report for submission to the executive committee on the following day. The subjects selected by this and the other subjects committees will be announced as soon as they have been submitted to the respective committees concerned.

The executive committee convened at 8.30 o'clock Friday morning and is in session as this issue of the ELECTRIC RAILWAY JOURNAL goes to press. The following members are in attendance: H. A. Nicholl, Anderson, Ind., president; R. E. Danforth, Newark, N. J., second vice-president; W. H. Collins, third vice-president; M. C. Brush, Boston, past-president; L. H. Palmer, Baltimore, Md.; J. J. Dempsey, Brooklyn, N. Y.; R. P. Stevens, Youngstown, Ohio, and E. B. Burritt, New York, N. Y., secretary. J. K. Choate, New York, N. Y., and H. C. Donecker, Newark, N. J., also attended part of the session.

Higher Temperature Limits for Electrical Apparatus

At the A. I. E. E. meeting held in New York on Nov. 12, F. D. Newbury of the Westinghouse Electric & Manufacturing Company presented a paper in which the statement was made that the mica-insulated generators installed in the power plant of the Niagara Falls Power Company twenty years ago had operated at temperatures as high as 285 deg. C. His paper brought out a number of comments in favor of more liberal temperature-rise allowances in some classes of electrical machinery.

In a written discussion Philip Torchio of the New York Edison Company called attention to the conditions which resulted in the A. I. E. E. standards committee adopting the present allowable temperature limit of 125 deg. C. for class B insulations. He also referred to temperature guarantees which he had accepted on two 20,000-kva., three-phase generators employed by the United Electric Light & Power Company for supplying single-phase energy to the New York, New Haven & Hartford Railroad. In referring to the data presented by Mr. Newbury, he pointed out that if the temperature obtaining in the Niagara generators were permitted in the United company's machines they would carry continuous single-phase loads of 16,000 kva. and overloads of over 25,000 kva. at 60 per cent power factor. Mr. Torchio declared that on account of the high speeds required for high steam economy the diameter of rotors must be minimized and the radiation sacrificed so that insulating materials capable of withstanding high temperatures must be employed. Again, turbo-generators for carrying single-phase loads must have large overload capacities at low power factors. In this case it is doubly necessary that generator dimensions be minimized so as not to sacrifice steam economy, for in an unduly large machine carrying low power-factor overloads iron and field losses are likely to be relatively large. Special guarantees on built-up mica insulated machines might be allowed, he suggested, but a special protective apparatus should be provided to minimize stresses on the machine in case this is done. In closing, he questioned the value of applying the data obtained from the Niagara machines to higher voltage generators and those machines in which the windings consist of several wires instead of rigid bars.

Power Station Extension Near Youngstown

The Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, is installing a 15,000-kw., 60-cycle, 2300-volt General Electric turbo-generator at its power station at Lowellville, thereby practically doubling its size. The power station is being extended to house the new machine, and a reinforced concrete and brick-lined stack, 202 ft. high, and 12 ft. 6 in. in diameter, is being erected. Attached to this turbo-generator will be a Worthington surface condenser with 35,000 sq. ft. of cooling surface. A Worthington volute circulating pump, driven by a Terry steam turbine, a Laidlaw-Dunn-Gordon Corliss dry vacuum pump and two Worthington hot well pumps, one driven by a Terry steam turbine, and the other by electric motor, will be used. The boiler feed pump will be of the three-stage Jeansville type, direct connected to a two-stage Terry turbine.

The boiler room equipment will consist of 5400-hp. Babcock & Wilcox boilers in nine units of 600 hp. each. Five of these will be installed at the present time and four will follow later. These boilers will be equipped with Foster superheaters and Taylor underfeed stokers. The latter will be able to drive the boilers under peak load conditions to 300 per cent of their rating.

The engineering and installation of this work is being carried out by the Stone & Webster Engineering Corporation, and it is hoped that the extension will be ready for service by the first of next year.

Swedish Hydroelectric Power Station Nearing Completion

Construction will soon be completed on the new Swedish State hydroelectric power station at Porjus, which will generate electrical power on a large scale for railway and industrial use. The generator equipment is divided into five large units: Two of 12,500 hp. maximum each, intended for the railway load; one of normally 12,500 hp., maximum about 14,000 hp. for supplying power to the iron mines; and a reserve unit. The fifth will only be installed when the requisite demand for power has materialized. The units consist of twin turbines, placed in closed plate cases with horizontal shafts and direct-coupled electric generators, constructed so as to supply single-phase alternating current for the railway traction purposes and three-phase current for the other power distribution. The turbines operate at 225 r.p.m. for the single-phase units and 250 r.p.m. for the three-phase unit.

According to a statistical table recently compiled by the *Commonwealth Engineer*, the total trackage of tramways in Australia amounted to 357 miles. The total capital cost of the properties was $51,350,424. The number of car-miles run was 44,000,000. Gross revenue amounted to $13,875,132. There were 12,498 employees in the tramways' service. The track mileage and control are as follows: Government, 284.5; municipal, 110.25; privately-owned, 146.75.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

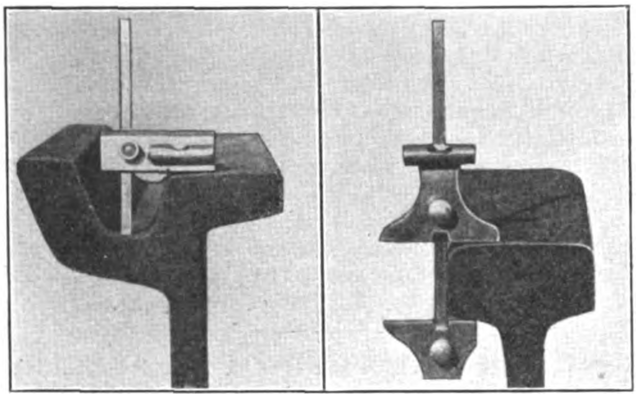
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Gages for Measuring Rail Wear

BY A. R. BAILEY, ASSISTANT PROFESSOR OF CIVIL ENGINEERING UNIVERSITY OF MICHIGAN, ANN ARBOR, MICH.

During the last few years a large amount of appraisal work has been done on steam and electric railway lines. In order to arrive at the value to be assigned to rails that have been in service for any length of time it is necessary to determine the amount of wear that has taken place on the head of the rail. Much of this has depended entirely on the judgment of the field inspector.

The best device for use on T-rails is a railograph machine, which gives an exact profile of the railhead. From this it is easy to determine the area of the worn section, which can be deducted from the area of the section when new, leaving the area worn away. The railograph machine so far has not been constructed so that it can be used on girder grooved or tram rails, so that some other method must be used to determine the amount of wear of these rails.



RAIL WEAR GAGES—GAGE FOR GIRDER, GROOVED AND TRAM RAILS—GAGE FOR T-RAILS

Following is a description of two types of gage, one used on T-rail and the other on rails of the girder type of section. These have both been used during the last six months for measuring rail wear on a large street railway property, and the results secured have been very satisfactory. The T-rail gage was used on several lines where railographs had previously been taken at the same points, and a very careful comparison was made of the results of the two methods. In all of this work the gage readings were an aid to the inspector's judgment in estimating the per cent condition. The tables which were used in connection with the estimates were not followed blindly, but when necessary allowance was made for such items as cupping of joints, corrugations, side wear and condition of track as to line and surface.

As shown in one of the accompanying illustrations, the gage for girder grooved and tram rails is a Starrett depth gage, No. 46-A, with a portion of the horizontal bar cut off and a level tube fastened to the other end of the bar. The length of bar was decided upon only after considerable study had been made on different rail sections under different conditions of wear. The other end of the bar was shortened so that readings could be taken on sections of girder guard rails. It was left the length shown in the illustration, about ½ in., to allow the finger to be held under it, in order to change the setting of the scale. The gage was first used without the level bubble, but a few trials showed that only a slight inclination would change the reading by 1/64 in., which is the least reading of the scale.

Each inspector carried with him a table showing the depth of groove for each section of rail used by the company, also the per cent condition of the rail, corresponding to a variation of 1/64 in. of vertical wear. These figures were adopted after making a study of the different wheel flanges used.

The second gage shown, which was used on T-rail sections, was devised when it was found that openings could not be made in the pavements on certain streets owing to the time and expense required for removing pavement and concrete to allow the placing of a railograph machine. It was a development from the first gage used on girder rails. The principle is the same in that the horizontal bar reaches far enough across the rail head to get the wear at a corresponding point on each type of section.

As shown in the illustration, this instrument is made by using the heads of two Starrett depth gages, No. 237, and placing them on one scale. A level bubble is added for the same reason as given for the other gage.

A portion of the lower head was cut away to make it easy to insert the gage in the joint between two paving bricks without removing the latter. It will also be observed that a portion of the side of the same head has been removed to allow the corner to bear against the under side of the rail head at a fixed distance from the vertical edge.

A table was prepared similar to the one mentioned above, so that gage readings could be quickly transposed into per cent condition.

Trolley Wire on Double-Leaf Bascule Bridge

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

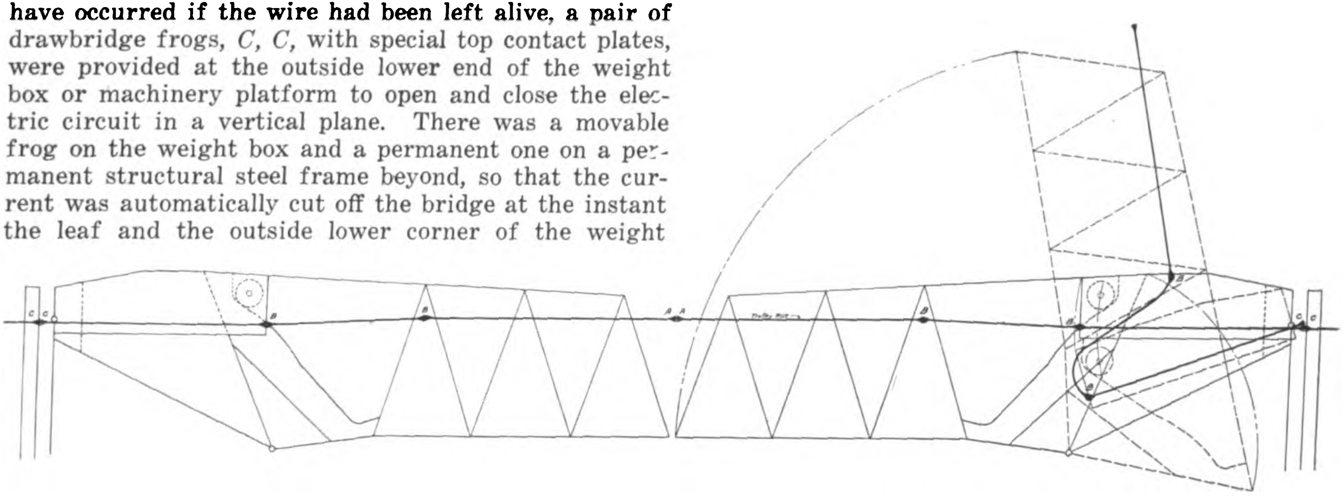
In San Francisco the problem recently arose of installing trolley wire for an electric railway line over a double leaf Page-Schnable bascule bridge erected in 1905. The problem was a new one for the local men and help was sought from the designers of the bridge and then from the builders, but nothing of practical value was received. Information as to how this subject had been treated on later bascule bridges in other cities was obtained from several obliging engineers, but none of it seemed to apply to this particular bridge.

The final solution decided on is simple and satisfactory, and as it was unheard of before locally it seems worth describing briefly. It involves no pulleys, tighteners, counterweights or other usual bascule-bridge supplementary complications, and has been in perfect operation now for several months.

The diagram makes the plan clear. It was found that by selecting the points of support for the trolley wire there could be exactly the right amount of slack thrown into the trolley span at the hinge in the bridge when the leaf was lifted to suffice for this complicated movement of the bascule-bridge mechanism without straining the trolley wire attachments at the terminals of this span.

To prevent the trolley wire from becoming crystallized or broken from repeated up and down flexures that would occur at the openings of the bridge, hinged frogs, *B*, *B*, were installed at each end of the particular span referred to.

To prevent any injury to the trolley wire, to the bridge structure, or to persons coming into contact with the loose trolley wire of this span which might have occurred if the wire had been left alive, a pair of drawbridge frogs, *C*, *C*, with special top contact plates, were provided at the outside lower end of the weight box or machinery platform to open and close the electric circuit in a vertical plane. There was a movable frog on the weight box and a permanent one on a permanent structural steel frame beyond, so that the current was automatically cut off the bridge at the instant the leaf and the outside lower corner of the weight box began to rise, the latter being slightly beyond the trunnion center of the weight box.



SKELETON OUTLINE OF DOUBLE LEAF BASCULE BRIDGE, SHOWING LOCATION OF TROLLEY WIRE AND SPECIAL OVERHEAD PARTS FOR CLOSED AND OPEN POSITIONS OF BRIDGE LEAVES

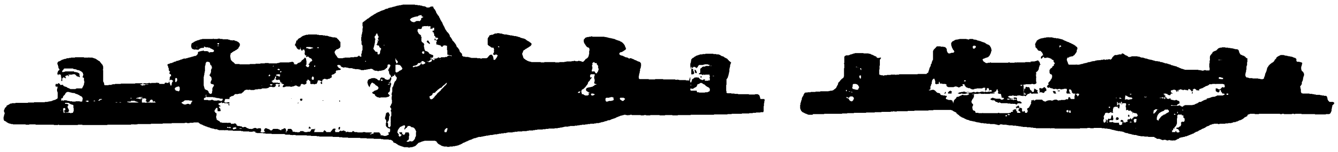
To secure durability in the trolley wire, solid round No. 00 phono-electric wire was selected in preference to stranded or hard-drawn solid copper wire in spite of the smaller conductivity of the first-named wire. To provide for possible emergencies, a section insulator was installed in the trolley wire just beyond the bridge at each end with a fuse and knife switch around it.

As each side of this bridge was fed by different feeder cables there was no necessity for a current-carrying contact device in the trolley wire at the middle of the bridge and a pair of ordinary drawbridge frogs, *A*, *A*, without contact plates, sufficed.

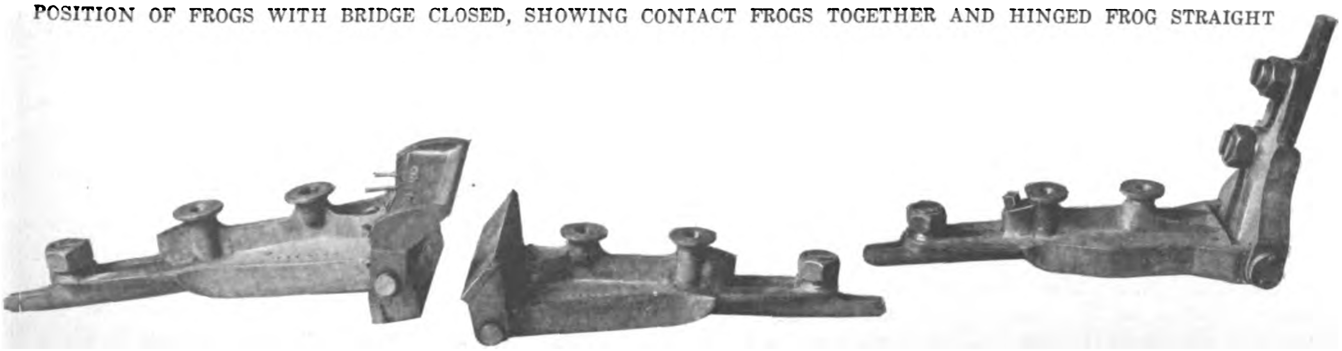
Thus when the bridge leaf rose, the inside face of the weight box descended and the lower corner of the outside face of the weight box ascended, opening the circuit several inches and making the trolley wire on the bridge dead as it slackened off and began to lie loosely though harmlessly about on the top of the weight box. As the bridge leaf descended, the lower corner of the outside face of the weight box descended and as the trolley wire in the hinge span tautened up to its original condition, the drawbridge frogs at the outside face of the weight box closed the electric circuit and made the trolley wire alive once more and ready for the passing cars to draw power from it.

As the hard-drawn No. 00 trolley wire on a near-by swing bridge lasted fourteen years without renewal, longer life is expected of this tougher phono-electric wire and, with monthly examinations at the time of inspection and overhauling of electric track switches, block signals, sectionalizing switches, etc., on the system, with re-earing of the clinched ears every five years or so, and with perhaps the replacement of an occasional frog, the whole installation is confidently looked upon as likely to require a minimum of attention and maintenance expense. All frogs were provided with case-hardened steel wearing plates.

The electric road over this bridge is a double-track line, but the description and illustrations were made to apply to but a single trolley wire for simplicity. The two trolley wires were cross-connected at each end of each leaf of the bridge, and elsewhere than at the hinge spans were provided overhead with flat 2 in. x 10 in. untroughed wooden guards with 4 in. x 4 in. wooden parallel stiffeners on top to prevent a possible wild trolley pole from coming into contact with the live trolley wire and the grounded steel superstructure of the bridge at the same time, a protection that proved entirely satisfactory on a near-by bridge for fourteen



POSITION OF FROGS WITH BRIDGE CLOSED, SHOWING CONTACT FROGS TOGETHER AND HINGED FROG STRAIGHT



POSITION OF FROGS WITH BRIDGE OPEN, SHOWING CONTACT FROGS APART AND HINGED FROG FLEXED years. All supporting rods, bolts and other metal parts of these trolley guards and overhead supports combined were hot-dip galvanized, and thoroughly painted after installation.

The electric motors that operate the bridge mechanism and all the lights on the bridge receive their current from the local electric light company so that the railway company's trolley wires are used only for furnishing power to the passing cars. As the bridge opens, there being no cars on it, there is no current to be broken at the switch surfaces on the weight box devices and these switches are likely to require no repairs.

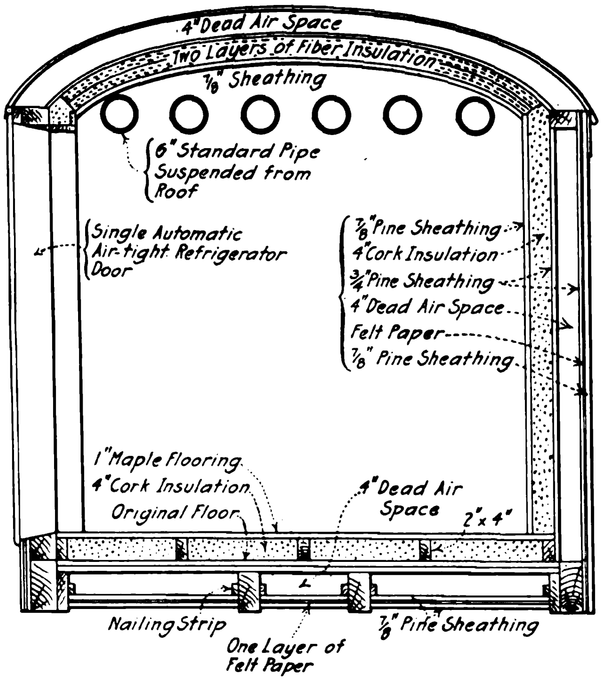
The double trolley line with the two parallel wires cross-connected assures a factor of safety of two in the contact-making devices at the weight boxes providing against the possibility of corrosion of their parts from exposure to the influences of the salt water and the sewage gases of the channel below.

The illustrations show the general layout of the bridge and the contact and hinged frogs in two positions depending on whether the bridge is closed or open.

Detroit United Builds Refrigerator Car

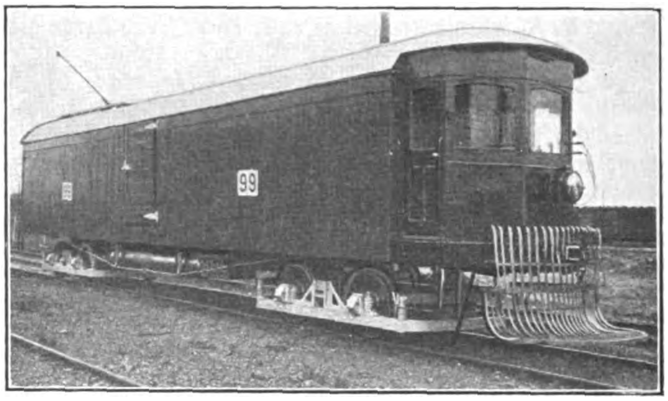
BY C. L. KELLER, ASSISTANT MASTER MECHANIC DETROIT UNITED RAILWAY

As the result of an agreement entered into between the Detroit (Mich.) United Railway and one of its patrons, a refrigerator car was recently built at the company's shops and placed in service to transport milk in cans and cases. This car was one of the company's 50-ft. freight cars, rebuilt with a large refrigerator compartment, a small front vestibule for the motorman and a large rear vestibule inclosed on three sides for the transportation of perishable freight which does not require refrigeration. As shown in the accompanying cross-section of the car body, the sides, ends, floor and roof of the refrigerator compartment are blocked to provide a 4-in. dead-air space. Owing to the construction of the body underframe, portions of the car floor are protected by a space greater than 4 in. Some difficulty was experienced at the body bolsters in locating nailing strips for the sheathing, but this was overcome and no portion of the floor was left uninsulated.



DETROIT UNITED REFRIGERATOR CAR—CROSS-SECTION OF BODY

The floor of the refrigerator compartment was laid on 2-in. x 4-in. scantlings placed edgewise on the old body floor. The 4-in. space between these scantlings was filled with sheets of pressed ground cork. Large slabs of cork insulation were also used to line the sides and ends of the car body. Pine sheathing ⅞ in. thick was laid on top of the cork in such a manner that no metal conductors extend from the inside sheathing to outside car walls except at doors and corner posts.



DETROIT UNITED REFRIGERATOR CAR—SIDE VIEW

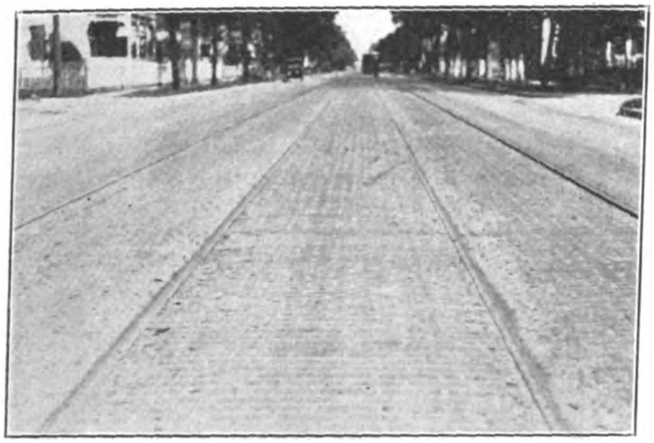
Two layers of flexible fiber insulation were used in the roof above this compartment because it was impossible to bend the ground cork to the roof contour. The car body walls were formed of two thicknesses of pine sheathing between which felt paper was laid to furnish additional insulation. At the center of the body and on each side are single, automatic, air-tight refrigerator doors weighing 300 lb. each. The front end of the car, back of the motorman's stand is also fitted with a smaller door of the same type.

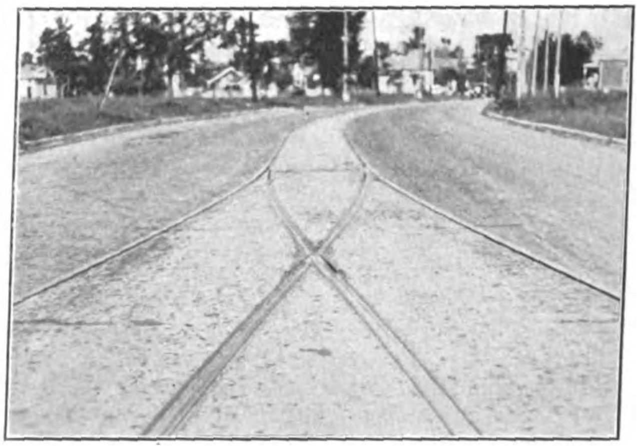
The refrigeration equipment was furnished by the York (Pa.) Manufacturing Company. The principle of this is a distinct departure from the usual methods of car refrigeration, in that the piping system includes 180 ft. of 6-in. pipe suspended from the roof of the refrigerator compartment. These pipes perform the work of a brine storage as well as that of a circulating system. When the car is first loaded with freight the piping system is connected to a pump at the freight house, the car doors closed and the brine solution kept circulating through the pipes until the interior of the car and its contents are at a temperature of 35 deg. Fahr. when it is ready for the road. In this condition the compartment will remain at a refrigerating temperature for twenty-four hours provided the doors are kept closed. The initial trips of this new car indicate that there will be an increased demand for this class of service which will necessitate additional refrigerator cars in the near future.

Four Years of Maintenance of a Track Crossing on Steel Substructure

BY C. A. PRENTICE, DIVISION ENGINEER UNION TRACTION COMPANY OF INDIANA, MUNCIE, IND.

In view of the satisfactory results obtained the readers of the ELECTRIC RAILWAY JOURNAL may be interested in the further history of the International steel tie substructure placed under the two Big Four crossings on Ohio Avenue, Muncie, Ind., on Dec. 3 and 4, 1912. A description and maintenance record of this crossing was published in the issue for Jan. 2, 1915. On Oct. 6, 1913, we spent ninety-two hours in labor at a


HOUSTON PAVEMENT—BRICK ON MORTAR WITH GROUT FILLER LAID IN 1913, 7-IN. T-RAIL


HOUSTON PAVEMENT—BRICK ON MORTAR WITH GROUT FILLER LAID IN 1914

cost of $16.51 for surfacing; in 1914 we spent 158 hours in labor at a cost of $29.86 for surfacing, and in 1915 up to Oct. 19 we had spent $10.38 for filling up crossings with crushed stone and tightening bolts. This year is the first time it has been necessary to use bolts in these two crossings since the steel crossing ties were installed. The total cost in labor for maintaining these two crossings up to the present time is $56.81, and we have used thirty-four crossing bolts and twenty steel wedges for the steel ties.

I consider this a splendid record considering the amount of traffic that goes over these two crossings every twenty-four hours.

Before the steel ties were installed it was necessary to do something on these crossings nearly all the time. In fact, they were a constant source of worry to me as well as to my section men, but now, in so far as these two crossings are concerned, we can take life easy.

The crossing frogs are nearly as good as the day we put them in, while the L. E. & W. crossing, put in on wooden ties just five days later not 30 ft. from these two, is nearly worn out.

Mortar Cushion in Houston Eliminates Pavement Maintenance

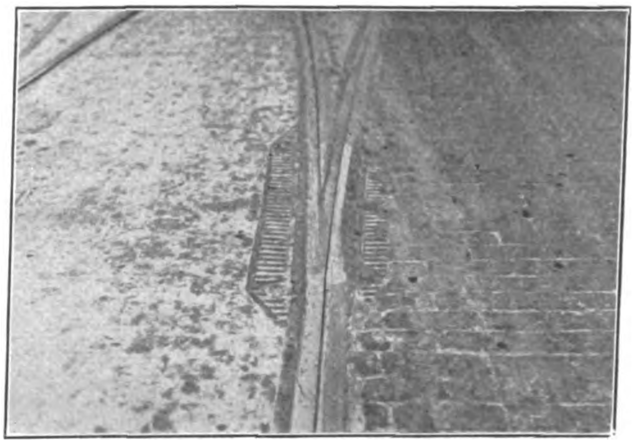
BY W. M. ARCHIBALD, ENGINEER MAINTENANCE OF WAY HOUSTON (TEX.) ELECTRIC COMPANY

Prior to four years ago considerable difficulty was experienced with brick pavement laid on an ordinary sand cushion. In order to obviate this, it occurred to me that if a mortar cushion was used and the brick pavement grouted with cement, it would make a much more satisfactory pavement and one that would stay in place better between the rails. Experiments along this line, extending over a period of eight months, indicated that the mortar cushion would solve the difficulty. Many small pieces of maintenance work were installed under the heaviest vehicular traffic obtaining in Houston. In every case these experimental patches proved very satisfactory, and about three years ago I adopted a sand and cement cushion for all brick and wood-block pavements for both new work and repair work. Grout and pitch fillers have proved equally satisfactory in pavements laid in this manner. Every piece of pavement which the Houston Electric Company has laid in the past three years has been constructed in this way.

As evidence of the results being obtained by the substitution of a mortar cushion for the sand cushion, pavements built in this manner under different traffic conditions are shown in the accompanying illustrations. Some of our pavement has now been down four years, and during that period no money has been expended on it in maintenance. As will be noted in these illustrations the pavement surface is perfect and shows no appreciable wear even where this type of pavement is laid along T-rail.

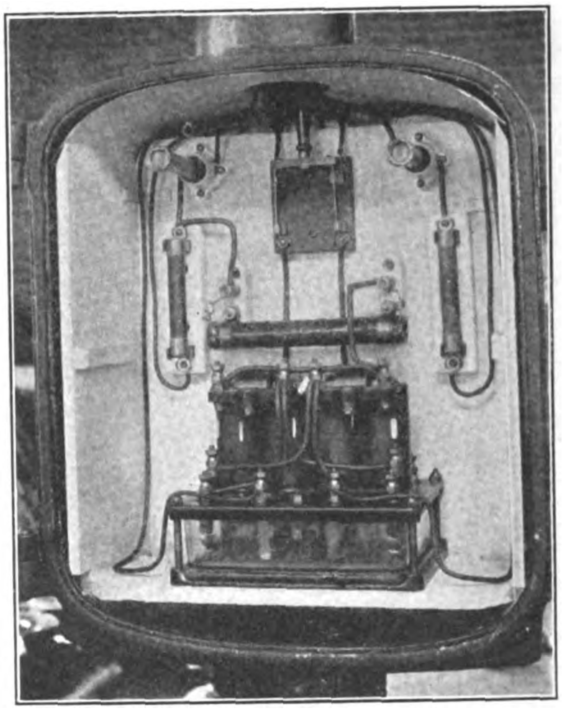
The *Electric Railway & Tramway Journal*, in commenting upon a recent article published in the ELECTRIC RAILWAY JOURNAL regarding the method used by the United Railroads of San Francisco to grind out rail corrugation, wherein the blocks for wooden track brakeshoes are replaced by carborundum blocks, states that at least a dozen systems in Great Britain have been using this method for several years past.

HOUSTON PAVEMENT—BRICK ON MORTAR WITH GROUT FILLER LAID JANUARY, 1912, 7-IN. T-RAIL


HOUSTON PAVEMENT—PAVEMENT LAID IN 1914, CLOSE VIEW

Highway Crossing Signal with Indicators

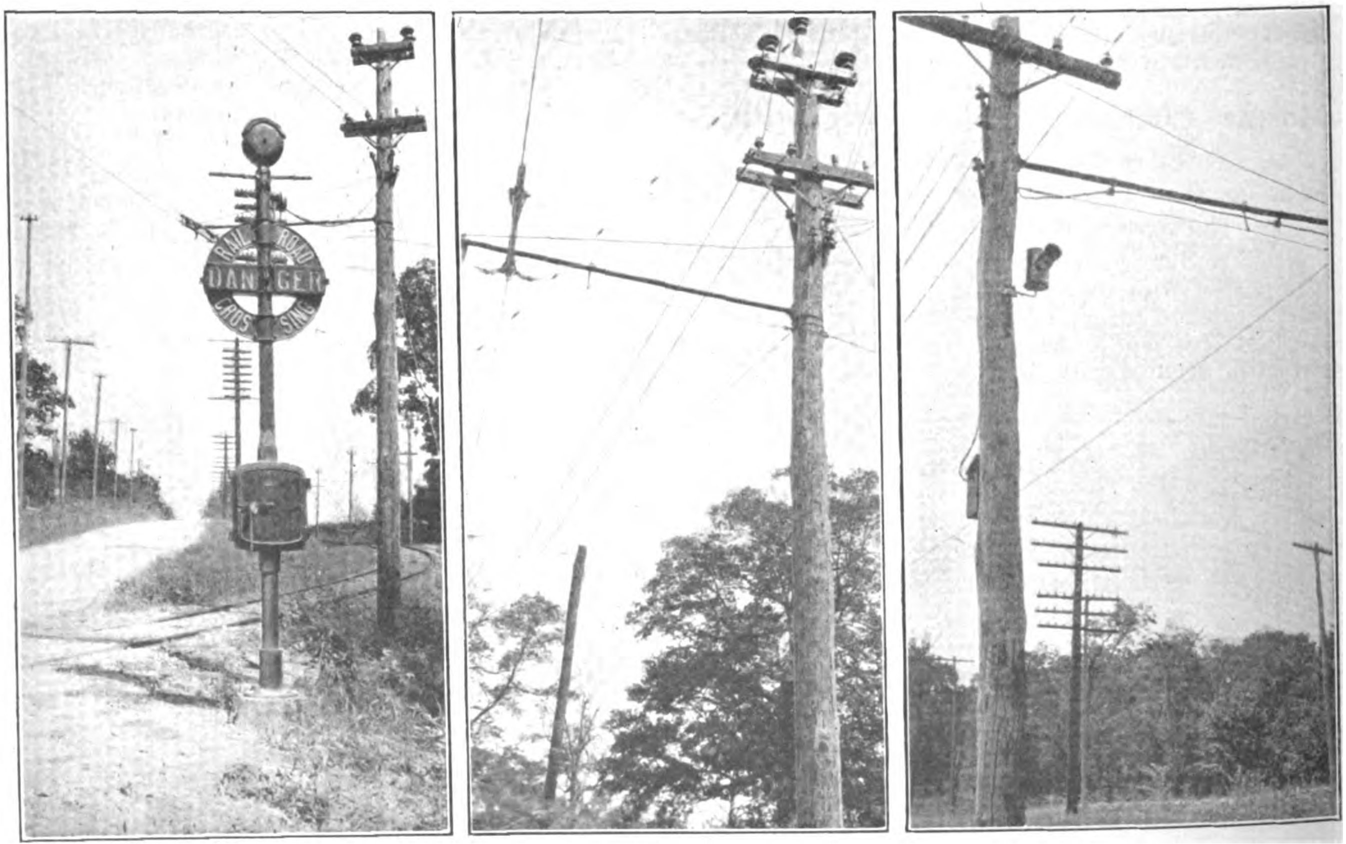
The line of the Nashville (Tenn.) Interurban Railway crosses an important highway 9.6 miles out of Nashville. This crossing is at a reverse curve in the line, and cars approach the highway around a curve and on a down grade from both directions. In addition, the view of the motormen on southbound cars is limited by the sides of a cut. At this point a Nachod highway crossing signal has been installed, the general aspect of which is shown in one of the accompanying illustrations. A 12-in. bell forms the top of the pipe standard, and below are attached in succession a railroad crossing sign, a danger transparency, an iron relay box and the base, and all are mounted on a concrete foundation. The control mechanism consists of a special "last-position" relay, with resistances, which is shown in one of the accompanying illustrations. This box also contains fuses and disconnecting switches. The "last-position" relay is similar to the standard track relay and is constructed of Norway iron throughout its magnetic circuit. It has a Bakelite molded top with glass-inclosed contacts, and the windings are of enameled wire. Complete access to the parts is obtained through the door, which is gasketed and fitted with a compression lock. The danger transparency is hinged so that the lamps and shunts are easily reached.



HIGHWAY CROSSING SIGNAL—RELAY AND FUSE BOX

A starting contactor is located about nine poles on each side of this highway crossing, and the stopping contactor is at the crossing. The contactors are of the wiping type and are fastened by the usual trolley ears, so that the wire is neither cut nor bent. The stopping contactor is shown in one of the illustrations. A southbound car passing the starting contactor at full speed sets the bell in operation and lights the lamps in the danger transparency, thus giving both audible and visible signals. A hooded light signal or motormen's indicator is mounted on one of the trolley poles about four spans from the highway and faces the motorman as he approaches the crossing. This indicator lights up when the crossing bell rings and shows to the motorman that the warning is being given, when he can neither see nor hear the crossing signal. When the car reaches the crossing the alarm is automatically cut out. As the car passes under the contactor beyond the crossing no change is made in the control circuit. An opposing car, however, would operate the crossing alarm in exactly the reverse manner.

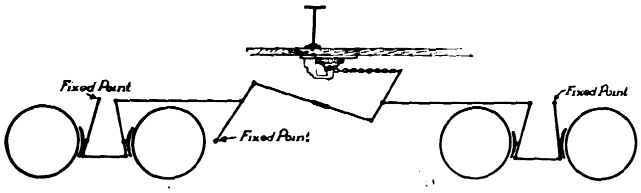
Two line wires are required between the starting con-



HIGHWAY CROSSING SIGNAL—SIGNAL INSTALLED ON CONCRETE FOUNDATION; STOPPING CONTACTOR; MOTORMEN'S INDICATOR tactors and one between the motormen's indicators. The lamps in the danger transparency and motormen's indicators are in series with the bell. Each is individually shunted by a resistance so that the burning out of a lamp will not interrupt the circuit, but only slightly dim the brilliance of the remainder. The bell is rung, the lamps are lighted and the relay is operated by the 600-volt trolley current, so that batteries are not required and no changes are necessary in the track return. The control is based on a space interval and not on a time interval. Bells depending on a timer give false indications at times and, therefore, may be disregarded at a critical moment.

Heavy Duty on a Geared Brake

W. O. Hay, vice-president and general manager Northampton Traction Company, Easton, Pa., reports the successful operation of a home-made flat car under unusual conditions. This car is 8 ft. 9 in. wide and 30 ft. long over all and it is used to carry loads up to 20 tons. It is used on lines where grades of 12½ per cent and curves of 50-ft. radius are encountered. In spite of predictions to the contrary there has been no difficulty in controlling the car by means of a hand-brake rigging like that shown in the accompanying diagram. In this the brake spindle was placed in the middle of the car for simplicity, and a "Peacock" eccentric drum was used to give the necessary brake-chain pull. During three years of use the rigging has given no trouble.



SKETCH OF BRAKE RIGGING OPERATED FROM HAND BRAKE IN CENTER OF FLAT CAR

Metal Ticket and Fare Box Effect Saving

The substitution of metal tokens for paper tickets and the installation of a fare box and registering device especially designed to receive and register pennies, nickels, dimes and metal tickets has effected a tangible saving for the Lincoln Traction Company, Lincoln, Neb. The metal tickets and the registering fare box were put in service on April 1, 1915. Coins of the denominations of 1 cent, 5 cents and 10 cents, and metal tickets are dropped into one hopper. The registrations of the coins are made on one dial and show on a separate trip and totalizer. Metal tickets or tokens are registered on another dial with a separate trip and totalizer, and complimentary tickets, transfers and all classes of paper tickets are registered on a third dial having a trip and totalizer. With the three registers an excellent check on the work of conductors is obtained. The combined coin, metal ticket and transfer register was manufactured by the International Register Company, Chicago.

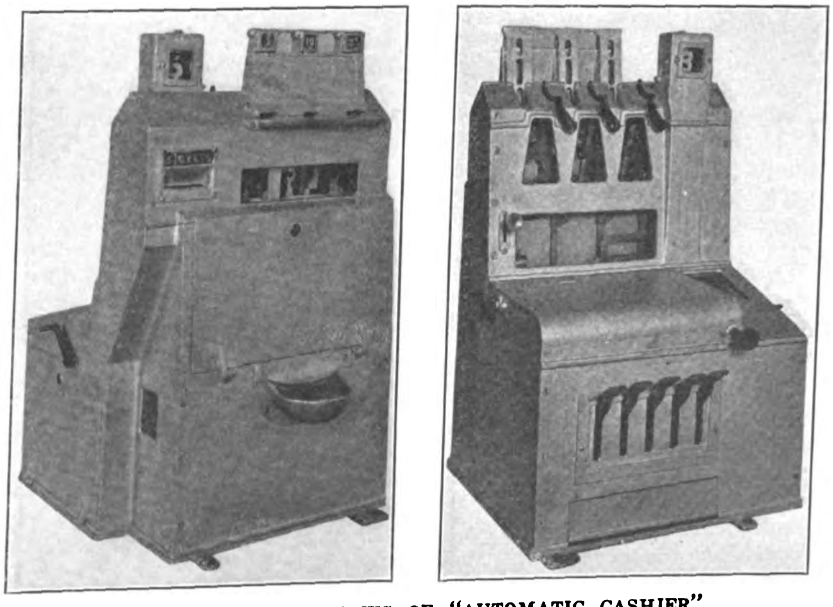
Before the installation of the registering fare box the company was paying a monthly rental of approximately $200 for registers. It was also spending about $60 per month for paper tickets, and it is estimated that about $25 per month was spent for work in the auditor's office, which has also been made unnecessary. After charging off interest and depreciation on the present fare-collection system, the savings effected by its adoption show a considerable financial gain. Aside from these savings, however, and more important, is an increase of 9.07 per cent in the cash fares collected for the months of April, May, June and July, 1915, over the same period in 1914. Ticket fares increased during this period 1.44 per cent and revenue increased 4.79 per cent.

Another important advantage brought out by experience with this fare-collection system was that on lines where schedules were very difficult and almost impossible to maintain, no trouble has been experienced since the new system was installed. This improvement is attributed to the fact that passengers when boarding the car, now usually have the correct change ready, deposit it in the fare box and pass immediately into the car. Under the old system the delay occurred when each passenger stopped to pay his fare to the conductor.

Automatic Fare Collector and Change-Making Machine

A device of very unusual character has just been brought out under the name of "automatic cashier." Of greatest interest is a mechanical change-making feature, which not only assures the owner that every cent deposited in the machine is charged to the operator, but also removes all cause for contention between those who have to do with its operation. This makes the device especially suitable for use on one-man cars, or in ticket booths as a means for replacing the ticket sellers ordinarily employed there. When it is used upon a street car it relieves the conductor of the worry of making and carrying change in his pockets and likewise eliminates all of his responsibility after the fare is paid. The only requirement of the conductor is that he must insist upon the payment of all fares to the machine. In fact, when it is in use there is absolutely no occasion for the handling of fares by the conductor.

The device measures 12 in. x 13½ in. x 17½ in. It is fitted with four slots designed to receive coins of the respective denominations of 5 cents, 10 cents, 25 cents and 50 cents. When the coin is inserted in the machine, the operator presses what is termed the coin lever, and the change mechanism is automatically set to change a



FRONT AND REAR VIEWS OF "AUTOMATIC CASHIER" coin of the denomination that is inserted. However, the mechanism only opens to the extent of the coin deposited. That is to say, it is impossible to register more than the coin inserted and it is impossible to change a coin without deducting at least one fare. After pressing the coin lever, which allows the coin to drop to a point where it is visible within the machine, the operator presses a second lever, termed the "delivery lever," which instantly records, indicates and delivers change.

There are five levers that serve for delivery and these are numbered from one to five, enabling the operator to register at one stroke any number of fares from one to five. Each one is interlocked, so that if a second passenger inserts a coin in the slot before the delivery of change to the previous passenger the second transaction cannot be recorded nor can change be given until the first transaction is completed. An interlocking arrangement applies also to the coin levers and this makes it impossible for errors to take place which are at the expense of the company.

The machines are so constructed that only the coin of the proper denomination can be inserted in the slot. If any attempt is made to do otherwise the coin passes through the slot and comes back to the passenger's hand. There is also a device which permits ejection of "slugs" or other spurious or non-acceptable coins. The ejector, however, does not throw the spurious coin back to the passenger's hand, but confiscates it. However, before confiscation the coin is visible through a glass cover so that it can be readily shown to the passenger.

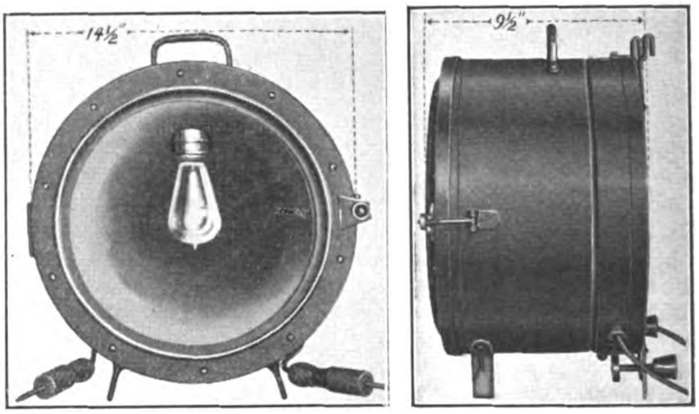
Although the machine changes coins only up to the denomination of 50 cents it is possible for the operator, by the use of a Yale key to deliver into the passenger's hand as many 50-cent pieces as may be desired. However, each time that one of these coins comes out of the machine an automatic record is made of it so that it is properly charged to the operator. When the machines are started on a run the magazines are usually loaded with $3 in 25-cent and 50-cent pieces, $1.50 in dimes, and 50 cents in nickels. This has been found to be sufficient for all requirements, as each coin, after it is deposited in the machine, immediately enters the magazine or change tube and thus becomes available for change. There is a small till which opens from the back of the machine automatically when the key for expelling the 50-cent pieces is inserted. When the run begins this till is empty, and as soon as a coin or bill is presented which requires change beyond 50 cents, the operator inserts the key and automatically puts change in the passenger's hand, retaining the bill or larger coin which is offered and placing it in the till.

The machines are equipped with four registers, one denoting the total amount of cash fares, and another the amount of ticket fares. A third records operations of the coin ejector, and a fourth serves the device for changing bills. In another form the machine delivers tickets and change simultaneously, this being especially advantageous for elevated or subway railroad operation. The machines have been placed on the market by Henry C. Ebert, Rochester, N. Y., and they are to be sold at a price that is materially less than that of some of the registering fare boxes now in common use.

The work of extending the Saigon-Binhtay line of the Compagnie Francaise de Tramways in Indo-China and of electrifying that portion has been carried on as far as possible. The transformers and traction apparatus could not be delivered, the manufacturing plants which were to furnish them having been captured since the outbreak of hostilities. Electrical operation, therefore, could not be begun on Jan. 1, 1915, as anticipated.

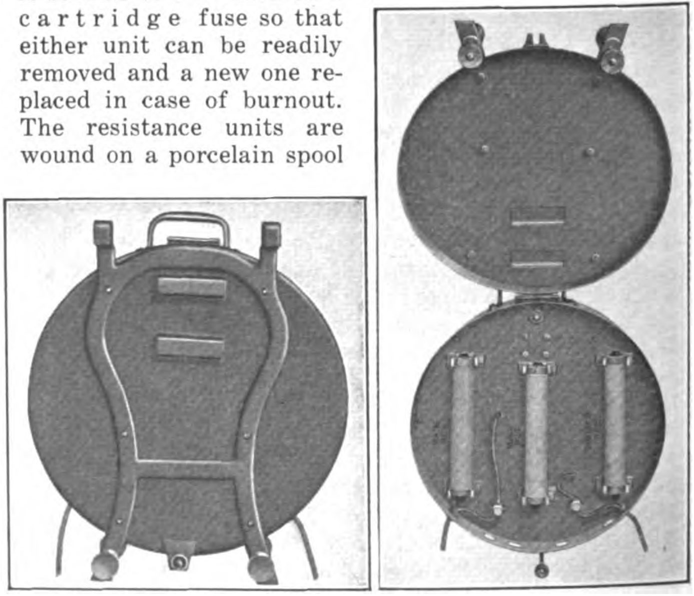
Pressed-Steel Headlight for Interurban Cars

A new type of pressed-steel headlight for interurban cars, known as the "perfect headlight," has recently been put on the market by the Trolley Supply Company of Canton, Ohio. The frame is entirely of No. 20 gage pressed steel. It is 9¾ in. deep and 14½ in. in diameter, and the weight, including lamp, resistance, etc., is 25 lb. The reflector is 12 in. in diameter at the front and 6 in. deep. It is made from No. 18 gage brass, double nickel plated and highly polished. The headlight is equipped with a 100-watt concentrated filament lamp on a resistance similar to the arc lamp.



FRONT AND SIDE VIEW OF HEADLIGHT

At the back of the reflector there is a partition of sheet steel, and the space between the partition and the front of the lamp, 6½ in., is perfectly airtight, so that dust and dirt will not accumulate on the reflector. On the back of the partition and of the lamp proper is a resistance in three units. Two of these units are the main resistance and one is an auxiliary to dim the light while the car is within the city limits. The method used of fastening the resistance units to the partition plate is similar to that used on a cartridge fuse so that either unit can be readily removed and a new one replaced in case of burnout. The resistance units are wound on a porcelain spool 8½ in. long, threaded twenty-four threads to the inch, and the wire is wound on this thread so that it is impossible for the wire to sag or get out of place. The headlight is said to throw a light a distance of from 800 ft. to 1000 ft. ahead of the car, and the consumption is only 1 amp.



REAR OF HEADLIGHT—RESISTANCE AT BACK

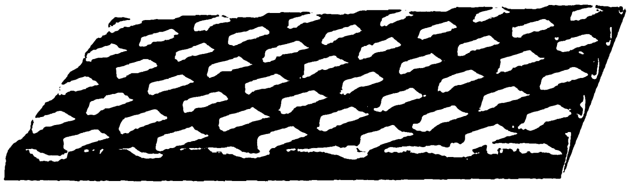
One advantage claimed for this lamp over the arc lamp is that when it is installed on the car and focused properly it will always throw the light directly at the point intended and not change its position if the trolley goes off or passes over a section insulator. Then, of course, no trimming is required.

The method of hanging the lamp to the car is similar to the ordinary arc headlight, and it can be carried from end to end.

New Form of Safety Tread

The American Mason Safety Tread Company, Lowell, Mass., has recently brought out a new form of safety tread called the "Black Diamond," which includes a deformed surface for catching foreign substances and open-end grooves for drainage, thus obviating the annoying pools of water which are sometimes found on flat treads in wet weather. The abrasive mixture used in the tread base is composed of asphaltum and carborundum, and over this is placed a skeleton metal frame, the surface of which presents a series of raised diamond-shaped openings. As the base is substantially of a mineral-rubber composition it has a tendency to be elastic. Actual tests prove that traffic causes the bearing frame to press slightly downward into the mixture, forcing it gradually upward through the diamond-shaped perforations, so that an even contact surface of both metal and abrasive mixture is insured throughout the life of the tread.

CBOSS-SECTION OF "BLACK DIAMOND" SAFETY TREAD



"BLACK DIAMOND" SAFETY TREAD

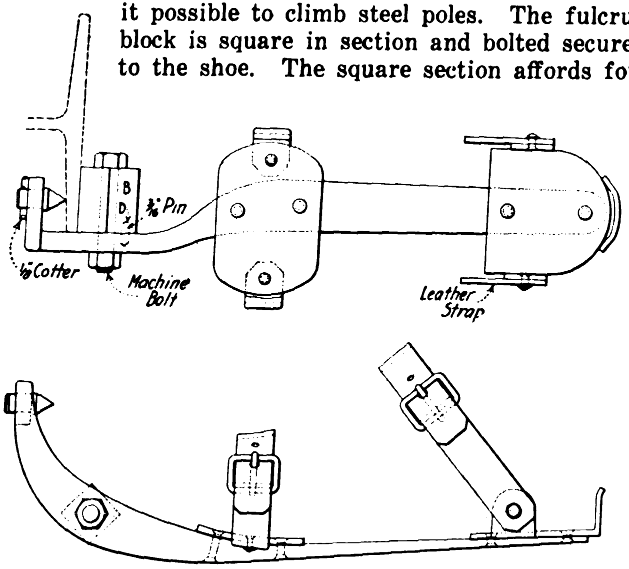
Each non-slip diamond-shaped unit is surrounded by a frame of metal on edge, thus assuring durability, and as the tread has no metal baseplate, even when it is worn down through the metal frame on the top, a non-slip abrasive surface still presents itself for surface until the tread is entirely worn out. The tread is light in weight and the beveled edges with which it is equipped make it especially adapted for exposed positions owing to the attractive appearance. It is furnished in either steel or brass in lengths up to 8 ft. and in a number of standard widths.

Cleaning Circulating Water Screens

A contributor to *The Engineer* of London outlines a method of cleaning the screens for circulating water that are installed at power houses. In this a high-pressure jet of water is sprayed against the inside of the screen after it rises above the water level in the circulating tunnel, the method being especially adapted to screens that take the form of an endless band which is kept in constant movement by the rotation of a drum at the top, well above water level. The jet washes the screen perfectly clean, regardless of the fineness of the mesh used, and the wash water serves as a carrier for the material that is picked up by the screen, which can thus be discharged along troughs or pipes back into the river on the down-stream side of the intake.

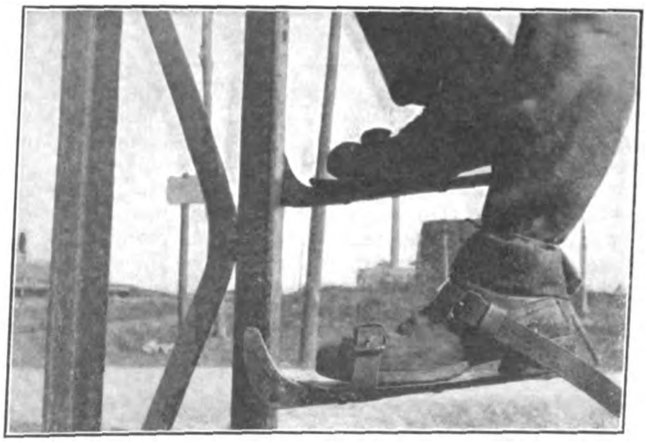
Climbers for Structural-Steel Poles

With the introduction of steel poles originated the joke among linemen that "sky-hooks" were necessary in order to climb them. That was sufficient reason for the Bates Expanded Steel Truss Company, Chicago, Ill., to design a climber especially for its expanded steel poles, an illustrated description of which was published in the ELECTRIC RAILWAY JOURNAL of Aug. 28, 1915. This climber consists of a forged steel shoe with large comfortable bearing area for the foot. The toe of the shoe, as shown in one of the accompanying illustrations, curves upward, and is provided with two hardened tool-steel projecting bearing or clamping points, which make it possible to climb steel poles. The fulcrum block is square in section and bolted securely to the shoe. The square section affords four cutting edges which makes sharpening unnecessary until the four edges become dull.



TOP AND SIDE VIEWS OF POLE CLIMBER FOR LEFT SHOE, SHOWING CLAMPING POINTS

This fulcrum block bears on the outside of the steel pole and a point near the end of the shoe bears on the opposite side. This point is fastened to the shoe with a cotter pin, which permits it to be readily removed and renewed in the field. The clamping action of the shoe on the vertical flange of the steel pole is obtained by the pressure of the lineman's weight on the heel end of the climber. Weight naturally comes at this point when a lineman climbs a pole, and when he raises his foot for the step upward the natural move of raising the heel first releases the grip of the climbing shoe. The shoe is strapped to the foot, and weighs about the same as a climber for wooden poles.



STEEL POLE CLIMBERS IN ACTUAL OPERATION

News of Electric Railways

CHICAGO TRACTION PROBLEMS CONSIDERED

Consolidation of Surface and Elevated Lines and Construction of Subway Discussed—Commission of Engineers Authorized to Report on Operating, Engineering and Financial Problems Involved

Improved transportation for Chicago was discussed at a recent meeting of the local transportation committee of the Chicago City Council, to which Samuel Insull, L. A. Busby and B. I. Budd were invited. It was the consensus of opinion that a consolidation of the surface and elevated railways, bringing the latter into a contract with the city similar to that of the surface lines, was important to any plan of improved transportation. Contingent upon this consolidation, however, the terms must be decided upon which universal transfers between the surface and the elevated lines will be granted, and a decision must be reached as to the type and extent of a subway system to give both surface and elevated lines additional downtown terminal capacity.

Mr. Busby spoke for the surface lines. He stated that they desired to consolidate with the elevated roads upon some equitable basis. No other city matter was so important at the present time as the proper solution of Chicago's transportation problem. Many plans for unified operation of the local transportation facilities and for the construction of a subway had been offered, but he was of the opinion that the only way to arrive at a plan satisfactory to all parties concerned was to employ the advice of high-grade, independent experts experienced in making investigations of the kind presented in Chicago.

Mr. Insull, president of the Commonwealth Edison Company and chairman of the executive committee of the associated elevated railway companies, expressed the opinion that the whole question of improved transportation including consolidation, operating arrangements and a passenger subway should be considered as one problem. On the question of legislation necessary to bring about a consolidation of the surface and elevated lines, Mr. Insull said that such legislation was desirable but not absolutely necessary. The consolidation could be brought about by action of the City Council and approved in a referendum by the public, after which legislation authorizing it could be obtained.

The question of the valuation of the elevated roads was then brought up. Attention was directed more particularly to the wide difference between the figures presented by the city's experts and by the experts employed by the elevated railway companies. Members of the committee asked Mr. Insull if he thought that this difference could be reconciled. In reply he said that negotiations at the time the two valuations were presented had never reached the point where the elevated railways were asked to trade. He did not believe that the question of agreeing on a valuation would offer any great obstacle to the consolidation of the properties. Any valuation agreement, however, would have to be based upon the actual cost of the property or very near that. Mr. Insull said that the $60,000,000 figure placed upon the property by the city's experts was very much too low. In explanation he advised the committee that the companies were earning interest on considerably more than that amount. So long as the companies were solvent and earning interest on their original cost, they could not be bought for less than that amount. Mr. Insull agreed with Mr. Busby's suggestion concerning a plan for bringing about improved transportation for Chicago. He was of the opinion that the experts should be selected by the city.

The local transportation committee of the City Council at a meeting on Nov. 17 adopted a resolution authorizing the chairman to submit a list of engineers from which three are to be selected to investigate and submit a plan for improved local transportation. These engineers must be of high standing with broad experience in solving transportation questions. One must be from Chicago and two must be familiar with the efforts to solve the transportation problems of New York, Philadelphia and Boston. These engineers will be authorized by an ordinance which is now in preparation to submit a report providing for a unified and comprehensive system of transportation including the present surface and elevated lines and the proposed subway. Specific provisions of this ordinance require that the engineers recommend a plan for unified operation of the surface and elevated lines; value the elevated properties using as far as possible information contained in previous valuations; submit a location and a general plan without detailed specifications for the construction of a subway system to be operated in connection with the surface and elevated lines with a provision for extensions to take care of future traffic needs; present an operating plan which shall provide for the surface and elevated lines in the proposed subway and for a uniform system of transfers between all lines; suggest necessary extensions to the elevated lines and a financial plan covering the investments in the surface and elevated lines as well as methods for securing the additional capital required by the city over and above its accrued traction fund, for subway purposes and for extensions to the elevated lines. This report is to point out specifically the benefits to be derived by any plan recommended and is to be completed by March 1, 1916. The ordinance embodying these features and authorizing that the engineers be compensated from the traction fund will be submitted on Nov. 24.

NORTHERN OHIO FRANCHISE DECISION

The Northern Ohio Traction & Light Company, Akron, Ohio, has issued a statement in regard to the recent decision of the Supreme Court of Ohio with respect to that portion of the railway between Canton and Massillon. The company says in part:

"It should be understood that the rights in dispute have nothing to do with any part of the system excepting only the line between the boundaries of Canton and Massillon—about 4½ miles. The grant to build and to operate an electric railway along the roadway at this point was made by the Stark County Commissioners, to the original Canton-Massillon Railway, the property of which was bought by the Northern Ohio Traction & Light Company. This grant was in the form of a resolution spread on the records of the County Commisioners and no time was specified through which the grant was to run. Two or three years ago the question of the duration of this grant came up in connection with a number of improvements and also a lower fare which were desired and contemplated. The company offered to join in all the improvements and to give a 10-cent fare between Canton and Massillon, with transfers to local cars in both Canton and Massillon, also to extend the 5-cent fare zone, etc., all of which were to be provided in a new twenty-five-year contract. The negotiations came to a standstill, however, because the company would not take entirely upon itself an unforeseen item of $50,000 for unexpectedly large cost in the proposed widening of the highway. The ouster suit, which was then started by the prosecuting attorney, was based on the contention that the county was at liberty to terminate the grant it had originally given.

"The contention of the company was that the resolution or grant, not limiting the time, was purely because of the very necessities of such a grant, involving the building of an extensive railway and the operation thereof, and the rights of property holders along the line; that for these reasons it was not the intention of either of the parties to the original grant that it could be terminated at any time by either party, and that such a contention would be unfair to both parties and unfair to the property owners along the line. The Supreme Court in its recent opinion, by a fair majority, decided that the grant was not perpetual, but that it was such a resolution and grant that the county or company could at will terminate it. The vote of the judges stood four for and three against the company.

"Although this decision does not in any way affect any of its other property, the company believes that it is of such vital interest and the question involved of such great importance that the Supreme Court of the United States should review the State Court's decision, and to that end the necessary papers will be prepared and filed."

McCALL'S DISMISSAL RECOMMENDED

Legislative Investigating Committee Files Report with Governor of New York

On Nov. 13 the report of the Thompson legislative committee embodying a recommendation to Governor Whitman of New York for the summary dismissal of Chairman Edward E. McCall of the Public Service Commission for the First District was filed at Albany. A summary of the charges against Mr. McCall follows:

Misconduct in office:

First: That at the time of his appointment to office he was the owner and is still the owner of stock in a corporation subject to his official regulation and supervision, which act is in violation of the statutes.

Second: By officially aiding and abetting in procuring approval of the order permitting the acquisition of the outstanding stock of the Amsterdam Electric Light, Heat & Power Company by the Edison Electric Illuminating Company, Brooklyn, while having a financial interest in the subject of such order as a stockholder in an allied company.

Third: In participating in dealings of the commission where matters were under consideration affecting corporations in which he had a financial interest as a stockholder.

Fourth: That while owner of stock in such corporations he knowingly and willfully performed the duties and exercised the prerogative of a public service commissioner.

Neglect of duty:

First: That upon the application of the Edison Electric Illuminating Company, Brooklyn, to acquire outstanding stock of the Amsterdam Electric Light, Heat & Power Company he neglected to perform his official duties by failing to give the application proper consideration; procured the approval of the application against the interests of the city of New York and over its protest and to the irreparable injury of the city of New York and its inhabitants.

Second: In procuring the issuance by the commission of an improper and inadequate certificate of authority for the construction of the third tracks in Manhattan, whereby the city of New York and its inhabitants and the stockholders of the company suffered irreparable injury and whereby extravagance in contracting and in construction was permitted.

Third: That he personally voted and exercised his official power and influence to defeat a resolution introduced at a meeting of the commission to procure the enforcement of an order of the commission directing the repair, improvement and alteration of defective and inadequate construction of the Third Avenue Railway and the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad.

Fourth: That he failed as a commissioner to protect and safeguard the interest of the city, of its inhabitants, and of stockholders and corporations subject to his official regulation; that he has exercised his official power and influence for the particular advantage and benefit of certain stock interests, and that he has failed properly or adequately to supervise corporations subject to supervision by the commission of which he was a member.

Fifth: With misconduct in office, neglect of duty and inefficiency, in failing to attend the meetings of the commission, improper official action at meetings which he did attend; that he used time required in official business in private law practice for hire; failed to give adequate service as a commissioner in the supervision and regulation of corporations; failed to maintain a proper, efficient, and economical organization of the Public Service Commission, and of inefficiency in the supervision, control, and disposition of the funds entrusted to his charge as public service commissioner for the purpose of creating rapid transit facilities in the city of New York, and had delayed proper action in divers and sundry matters properly the subject of disposition by the commission.

Chairman McCall is allowed ten days by law to answer the allegations, after which a hearing on the charges, either by the Governor himself or by a commissioner designated by him, will begin. The ten days will expire on Thanksgiving Day, and the hearing consequently could begin on Friday, Nov. 26, unless the Governor should find it advisable to set a later date.

NEW YORK BUS FRANCHISE ARGUED

Bainbridge Colby argued on Nov. 15 before the Board of Estimate and Apportionment of New York City the case of the New York Motor Bus Company, which is awaiting the city's approval of a motor-bus franchise practically agreed upon. This was the third of the public hearings held by the board on the advisability of motor buses in Manhattan streets, first proposed in December, 1912.

Mr. Colby answered the arguments of William D. Guthrie and James L. Quackenbush of the Interborough Rapid Transit Company, John M. Bowers of the Third Avenue Railway and George D. Yeomans of the Brooklyn Rapid Transit Company, who, at the two previous hearings, contended that the city would risk its big investment in the dual subway system if it permitted motor-bus competition. He said that the counsel for the existing lines would have it appear as though there was a "traffic famine" in this city. In the course of his remarks Mr. Colby said:

"The Borough of Manhattan is declining in population; its taxable values are shrinking. There is one reason for this, and only one, namely, that it is easier to get from any outlying borough to Manhattan than it is to get from point to point in Manhattan. The conditions in Manhattan are an unanswerable argument in favor of the bus. This borough is suffering from a complete lack of adequate local transportation. This the existing surface lines cannot supply. The bus alone can supply it.

"The opposition is dictated by the Fifth Avenue Coach Company. It filed bids for these routes before we did. It filed two bids to our one, and is now seeking to file a third. The whole purpose of this opposition is to throw the city back three years, undo all its careful progress in that time toward the development of new transit means, in order that the Fifth Avenue Coach Company, which has been outbid, may wipe off the slate and begin all over again.

"The proposed routes are not competitive with the existing surface and subway lines. The purpose of the Board of Estimate, skillfully worked out, has been to devise a supplementary service that will relieve the lack of local transportation in great populous districts now wholly unserved. Transportation in this city has always been ten years behind its needs. The possibilities of a new system are at once swallowed up in the steady and colossal increase of travel."

COMMITTEES AT WORK ON NEW TOLEDO MEASURE

What is known as the sub-committee of the general committee named by Mayor-elect Milroy of Toledo, Ohio, to formulate some plan of settling the street railway question has selected as advisers forty-three men, known to have been opposed to the Dotson franchise ordinance. This sub-committee came into existence through a division of the original committee into factions for and against the Dotson franchise. Its members hope to secure from these advisers the views of those opposed to the franchise to aid them in formulating a plan of settlement. Members of the sub-committee believe that these men represent all the factions of the opponents. This sub-committee has held several meetings to discuss various matters connected with the selection of the advisers. Other members of the original committee have remained inactive in order to give the sub-committee full time to secure information and select its advisers.

At a session of the sub-committee on Nov. 10 Charles S. Ashley suggested that the provisions relating to the rate of fare remain as they are and that all passengers who cannot secure seats be carried at a fare of 1 cent each.

At the regular meeting of the City Council on Nov. 10 legislation was introduced which was intended to force the company to a settlement of what the city claims is its portion of the pavement on several sections of street on which it has no franchise. It is said that this amounts to $125,000. The city owes the company almost that amount for light service. A sub-committee of the committee on railroads and telegraphs was named to confer with officers of the company on this subject and make a report.

At a meeting of the sub-committee of the general committee named by Mayor-elect Milroy on the evening of Nov. 16, the men selected as advisers of the committee were asked to express their opinions in regard to the street railway situation and the kind of settlement they desire. This was done by the sub-committee in an effort to secure ideas from those who opposed the Dotson ordinance at the election. Warren L. Smith insisted that the committee stop at nothing less than municipal ownership. Gus Granger suggested that a valuation of the property be determined and the company allowed a return of 6 per cent on this. He would then fix the fares at a sum sufficient to yield an additional 2 or 3 per cent and require that this sum be paid to the city to create a fund with which the property shall be taken over by the city. Many other suggestions were also advanced.

A meeting of the sub-committee of the committee on railways and telegraphs of the City Council was held on Nov. 15 to discuss the claim of the city against the company for pavements laid between its tracks on certain sections of streets. The city auditor reported that the company would owe the city $6,091.69, after the city debt for lighting is deducted. It was finally decided to await the return of Henry L. Doherty before taking any further steps.

ALL WILKES-BARRE LINES IN OPERATION

Practically all lines of the Wilkes-Barre (Pa.) Railway, the employees of which have been on strike for four weeks, have been opened for traffic. One hundred or more of the troopers of the State Constabulary are now scattered over the lines of the company with strict orders to break up riots and protect the property of the company. This they are doing in salutary fashion. Beyond the slight damage inflicted on the rolling stock the greatest hindrance to the running of the cars has occurred in the outlying districts, where signal boxes have been demolished or switches and tracks damaged.

T. A. Wright, general manager of the company, has notified all municipal authorities that the company will look to them for protection of its property. The notice emphatically declares that the company intends to hold each municipality to strict accountability for any damage done to the company's property. The burgess of Nanticoke, a suburb, informed company officials that the Borough Council had passed an ordinance prohibiting cars from operating in that town. He declared that he intended to enforce the ordinance, and the company prepared to enjoin him from interfering in any way with the service.

HOLYOKE ARBITRATION HEARINGS

Hearings in the wage arbitration case of the Holyoke (Mass.) Street Railway were resumed on Nov. 15 in the aldermanic chamber at Holyoke.

Arthur Sturgis, Boston, who was retained as an electric railway engineer and economic investigator by the employees' union, occupied the witness stand for a large part of the day. Testimony was presented leading to the conclusion that the average increase in the cost of living in Massachusetts in the past fifteen years has been about 42 per cent. Since 1900 the increase in wages on the Holyoke system has been about 42 per cent in maximum rate, 26 per cent of this having been since 1901. Attorney T. D. O'Brien, for the company, announced that cross-examination of Mr. Sturgis on statistics, tables and quotations from various economic authorities included in the testimony would occur later. On Nov. 15 Attorney Vahey, representative of the union on the arbitration board, said that it was hoped that all the evidence on behalf of the union would be presented by Nov. 18.

Thomas Y. Weir, representing the employees, testified on Nov. 16 as to the difficulties of platform work. The witness contended that the double running boards ordered by the Public Service Commission were inconvenient and produced extra work. He acknowledged that the men expected full pay whether or not they worked nine hours a day and extra pay for work beyond nine hours. The witness admitted that if it could be proved that the $60,000 loss sustained by the company in the recent strikes was caused by the unjustified acts of the men, this should be taken into consideration in the settlement of the contract. He conceded that with the small present margin allowed on the runs there is a temptation for the men to run late in order to get the extra pay.

Chicago Electrification Report Again Postponed.—There has been another postponement of the time at which the report of the Commission on Smoke Abatement and Railway Terminal Electrification is to be presented to the Chamber of Commerce in Chicago. It is now thought that the report may be presented early in December.

Albany Safety Conference Postponed.—The conference over greater safety at grade crossings of electric railroads which was to have been held on Nov. 17 at the offices of the Public Service Commission for the Second District of New York in Albany among representatives of the railroads, the automobilists and public officials forming an executive committee recently appointed by Seymour Van Santvoord, chairman of the commission, has been postponed indefinitely.

Kansas City Franchise Election Protest.—Attorneys for J. D. Wilson, who is the plaintiff in a suit which is being contested to recover damages from certain election judges on account of alleged fraud in the Metropolitan Street Railway franchise election of last July, have filed a protest and brief in support of the objection they have raised before the commission against the approval of the franchise. The protest has been referred to the board in accordance with State laws.

American Employers' Profit Sharing Plans.—The National Civic Federation will have ready for distribution about Dec. 1 the results of its investigation of the subject of profit sharing between employer and employee. The report will contain an analysis of more than 100 plans now in operation in this country, as well as a description of many abandoned ones and the causes of their failure. The views of employees and the attitude of labor unions will be set forth.

Bay State Fare Case Adjourned.—Upon request of counsel for opponents to the proposed fare increase on the Bay State Street Railway, the Massachusetts Public Service Commission has continued the case until Feb. 1, 1916, to give ample time for the study of evidence submitted by the company. On Nov. 29 the board will hear counsel on the contention that the commission has no jurisdiction in the case in view of the interstate service rendered on some of the company's lines.

Indictment for Failure to Comply with Commission Order.—County Judge Lewis in Brooklyn, N. Y., has overruled the demurrer entered by John J. Dempsey, superintendent of the elevated lines of the Brooklyn Rapid Transit Company, to the indictment charging him with failing to comply with an order issued by the Public Service Commission. As a result Mr. Dempsey will be obliged to stand trial in the County Court. The indictment against the superintendent charges a misdemeanor.

Toronto Rapid Transit Report Promised for Dec. 1.—Transportation matters claimed considerable attention at the City Hall, Toronto, Ont., on Nov. 12. Mayor Church announced that the rapid transit report would be issued about Dec. 1. The engineers who have been engaged in the preparation of the report have nearly completed their labors. The Mayor stated that the report would provide for the entrance of the radial lines. After it has been presented to the Council, the Mayor will urge that a traffic commission be appointed to carry out the scheme recommended and to supervise all transportation affairs of the city.

Right of City to Inspect Books Decided.—The Supreme Court of Kansas holds that the legislative act of 1907, giving cities access to the books of utilities holding franchises, does not apply to utilities holding franchises of date prior to the enactment. The city of Wichita had asked a writ of mandamus to examine the books of the Wichita Railroad & Light Company, and compare them with the annual statement filed by the company. The company's franchise in Wichita was granted in 1903, and provides for an annual statement of earnings and expenses. The city was refused access to the company's books and brought mandamus proceedings.

New Haven to Spend $25,000,000.—Plans for spending $25,000,000 in the next five years were announced on Nov. 15 by Edward Buckland, vice-president of the New Haven Railroad. The new bridge across the Thames River at New

London will cost about $2,500,000. Another $1,500,000 must be spent in electrical facilities in order to get the full benefit of the electrification between New Haven and New York, and diminish, if not abolish, the smoke nuisance in New Haven, so far as the railroad is responsible for it. Three million dollars must be spent for trackage, yards and sidings. Regularity and safety are to be assured by improved and added signals, at an estimated cost of $1,000,000. Passenger cars, steam engines and freight cars must be supplied, at an estimated cost of more than $9,000,000.

Further Discussion of Pittsburgh Subway.—Following a hearing on Nov. 11, W. B. Ainey of the State Public Service Commission of Pennsylvania indicated that the commission would not attempt to approve or disapprove a proposed ordinance of the Pittsburgh Subway Company for an underground railway in Pittsburgh. A discussion arose as to whether it was not the duty of Council, instead of the commission, to handle the subway matter. It was explained that Council would be glad if the commission would point a way to a reasonable ordinance. After a statement regarding the history of the subway by A. O. Fording, attorney for the Pittsburgh Subway Company, Chairman Ainey said: "It is self-evident that a subway would be a good thing for the city. For the commission, it seems to me, it is a question of the commission's jurisdiction—what we can lawfully do."

Chicago Investigates Railway's Advertising Campaign.—At a meeting of the Chicago City Council on Nov. 15, an order was passed directing the local transportation committee to investigate how the advertisements are being paid for that are being run in the local newspapers by the Chicago Surface Lines. It was stated that the railway company had spent approximately $30,000 and that a contract had been made with the Lord & Thomas agency for $75,000 worth of advertising space. The Alderman who introduced the order said that the purpose was to determine whether the advertising was being paid for out of operation or out of the company's profits. City Comptroller Pike has instructed E. J. Bemis, city representative on the Board of Supervising Engineers, to protest the expenditure if it is being taken from operation, as all charges to operating expenses affect the return to the city under the participation plan.

Officials Study Condition of United Railroads.—Mason B. Starring, New York, president of the United Railroads Investment Company of New Jersey, is in San Francisco with a group of his associates studying the present condition of the United Railroads of that city. With Mr. Starring are J. H. Reed, Pittsburgh; B. S. Guiness, George W. Bacon and Moritz Rosenthal, New York, all officials or stockholders in the holding company. In explanation of the purpose of the present study of conditions first hand, it is pointed out that $1,800,000 of the Market Street Cable Railway first mortgage 6 per cent bonds, which have been extended, will become due and payable with interest on Dec. 15 of this year. It is also stated that mainly on account of the Municipal Railway and the jitney buses, the number of passengers carried during the twelve months ending June 30 fell off 9,500,000 as compared with the preceding year. The decrease in passengers carried for the calendar year 1915 has not yet been calculated, but has been estimated to be as much as 22,500,000 below normal.

Plans for Extensions in Detroit.—Following the rejection of the plan to have the city purchase the city lines of the Detroit (Mich.) United Railway, Mayor Marx has intimated that within a short time he will take up with the Street Railway Commission the formulation of a plan which will secure several miles of needed extensions in Detroit. He recently informed the Common Council that a plan of some sort would be prepared for submission to the Aldermen at an early date. It is understood that Mayor Marx will ask the Detroit United Railway to build and operate these extensions. The company has previously indicated its willingness to build several miles of track if authorized to do so by the city. Among some of the members of the Municipal Ownership League there is an agitation to have the city build the extensions under their proposal for starting by piecemeal the construction of a municipal system. Inasmuch as the Mayor and the Street Railway Commission opposed this plan as too costly and confusing in the recent street railway campaign, it is not regarded as likely that they will recommend such a procedure at this time.

Forty-five Operating Railroads in Greater New York.—The Public Service Commission for the First District of New York has issued a 1500-page volume entitled "Documentary History of Railroad Companies," which contains the corporate and franchise history of all railroad and street railroad corporations incorporated at any time to do business within Greater New York. The book summarizes the record of not less than 726 companies that have been organized to operate routes within the present limits of New York City. Of these 455 are now dead, dormant, or inchoate. In other words, there are some 271 companies that are now represented in the existing operated routes. Of these 195 have lost their identity by merger, foreclosure, or change of name, thus leaving seventy-six distinct companies in the present operated systems. Of these thirty-one are operated under lease or agreement by other companies, so that there are actually forty-five companies now engaged in the operation of railroad routes in the city of New York. The general complexity with respect to corporate relationship is well shown by that of the Brooklyn Rapid Transit System. In that system no fewer than eighty-three companies are represented. Of these sixty-seven have lost their identity through absorption. Of the remaining sixteen companies, nine are operated under lease or agreement, so that there are actually seven operating companies in the system, all of which are subject to stock control through the Brooklyn Rapid Transit Company, which is a business corporation and not a transportation company.

PROGRAM OF ASSOCIATION MEETING

Pennsylvania Street Railways Association

The annual meeting of the Pennsylvania Street Railways Association will be held at Scranton, Pa., on Dec. 14 and 15. During the morning of Dec. 14 delegates, representatives and guests will register at the Board of Trade Building. The meeting will be called to order at 2 p. m. The program for the meeting as at present drawn is subject to change. The tentative program for the session on Dec. 14 is as follows:

Address, C. L. S. Tingley, president of the association.

Paper, "Railway Electrification," by N. W. Storer, Westinghouse Electric & Manufacturing Company.

Presentation of problems presented to the "Question Box," in charge of W. A. Heindel.

Paper, "Carhouse Methods," by J. F. Layng of the General Electric Company.

Report of committee on proposed safety rules and code of Bureau of Standards, Gordon Campbell, chairman.

Paper, "Efficiency Through Conservation in Time in Interurban Traffic," by E. C. Spring of the Lehigh Valley Transit Company.

On the evening of Dec. 14 there will be a dinner of those in attendance at the meeting.

The tentative program of the session of Dec. 15, which will be called at 9.30 a. m., is as follows:

Presentation of illustrations of safety devices by H. P. Megargee of the American Railways.

Paper, "State Insurance Against Workmen's Compensation Liability," by H. A. Mackey, chairman Workmen's Compensation Board of Pennsylvania.

Paper, "Mutual Insurance Against Workmen's Compensation," by Walter S. Bucklin, president Massachusetts Employees' Insurance Association.

Paper, "Stock Company Insurance Against Workmen's Compensation Liability," by Walter G. Cowles, vice-president Travelers Insurance Company.

Paper, "Some Practical Questions Arising Under Workmen's Compensation Laws," by Lefferts S. Hoffman, general attorney Public Service Corporation of New Jersey.

The general discussion will follow, after which the "Question Box" problems will be considered. The meeting will conclude with the presentation of the reports of committees, consideration of new business and the election of officers.

Financial and Corporate

ANNUAL REPORT

Virginia Railway & Power Company

The comparative statement of income, profit and loss of the Virginia Railway & Power Company, Richmond, Va., for the years ended June 30, 1914 and 1915, follows:

	1915	1914	Change
Operating revenues:			
Railways	$2,838,370	$2,982,065	—$143,695
Electric light and power and gas	2,271,252	2,173,983	+ 97,260
Total operating revenues	$5,109,622	$5,156,048	—$ 46,426
Operating expenses:			
Railway:			
Maintenance of way and structures	$ 268,560	$ 289,752	—$ 21,192
Maintenance of equipment	173,136	187,571	— 14,434
Traffic expenses	6,741	9,436	— 2,694
Transportation expenses	901,005	903,518	— 2,513
General expenses	293,156	280,306	+ 12,850
Total	$1,642,601	$1,670,585	—$ 27,983
Light and power and gas	826,473	795,323	+ 31,149
Total operating expenses	$2,469,074	$2,465,908	+$ 3,166
Operating income	$2,640,548	$2,690,140	—$ 49,592
Other income	80,919	80,909	+ 9
Gross income	$2,721,467	$2,771,049	—$ 49,583
Taxes and licenses:			
Railways	$ 205,537	$ 217,122	—$ 11,585
Electric light and power	80,070	78,163	+ 1,907
Gas	12,944	12,825	+ 117
Total taxes and licenses	$ 298,551	$ 308,111	—$ 9,561
Income applicable to fixed charges	$2,422,916	$2,462,938	—$ 40,022
Total fixed charges	1,337,867	1,307,347	+ 30,520
Surplus	$1,085,049	$1,155,591	—$ 70,542
Other charges:			
Depreciation charged direct	$ 100,000	$ 100,000	....
Proportion of discount	29,262	25,768	+ 3,494
Net miscellaneous charges	33,284	57,918	— 24,634
Total other charges	$ 162,546	$ 183,686	—$ 21,139
Surplus over fixed and other charges	$ 922,503	$ 971,905	—$ 49,402

When the general business conditions and the very considerable losses from jitney bus competition, as indicated in the reduction of railway receipts compared with the preceding year, were all considered, the management felt gratified that the gross income of the company from all sources for the fiscal year showed a decrease of only $49,583 as compared with the preceding year, or less than 1 per cent. While the management undertook to conserve its resources and reduce expenses as much as practicable to meet the adverse conditions existing, this was not done at the expense of the property. Expenditures for maintenance of way and equipment during the year amounted to 15.56 per cent of the gross railway revenues as compared to 16.01 per cent for the fiscal year ended June 30, 1914, and 14.99 per cent for the fiscal year ended June 30, 1913. Moreover, in addition to the regular charges for maintenance of way and equipment, the sum of $100,000 was set aside in cash in monthly instalments during the year and carried to the depreciation reserve, half for the railway property and half for the light and power property. An additional sum of $105,821 was credited to the depreciation reserve and charged against surplus as of Dec. 31, 1914. The balance to the credit of depreciation reserve on June 30, 1915, was $960,572, as compared to $856,639 at the close of the preceding fiscal year. The capital expenditures for the year totaled $336,898, the sum of $137,570 being in the railway department.

In July, 1914, there was a distressing accident on the Ocean View division of the Norfolk Railway & Light Company in which a loaded two-car train ran into a freight train on the Virginian Railway at a crossing, owing to the motorman losing consciousness just before reaching the crossing and failing to see the signals or the train ahead of him. Several persons were killed and more than 130 were injured. Settlements were made, without serious litigation, at an aggregate cost of $107,816, including expenses. Mostly as a result of this accident the payments and expenses on account of injuries and damages for the fiscal year ended June 30, 1915, amounted to $235,267, as compared to $115,577 for the preceding fiscal year. The payments for the current year amounted to $91,122 in excess of the amount reserved, and, after absorbing the surplus accumulated, left a deficit of $42,402 against this reserve. The board of directors therefore increased the amount of the reserve on the Norfolk and Portsmouth divisions from 6 per cent to 8 per cent of the gross transportation receipts and this increased reserve is rapidly absorbing the deficit thus created. On account of a much smaller accident on the Richmond division the reserve for injuries and damages here was increased from 3.5 per cent to 5 per cent.

In November, 1914, the property of the Richmond & Henrico Railway, a small competing line in Richmond which had been in the hands of receivers for more than a year, was sold under foreclosure. The purchasers organized the Richmond Railway & Viaduct Company to operate this property, and the Virginia Railway & Power Company, under arrangement with the purchasers, acquired the securities of the Richmond Railway & Viaduct Company under an arrangement effective on July 1, 1915.

In relating the experiences of the company with the jitney bus, the report states that in order to test the profitableness of such service the company organized a subsidiary company known as the Motor Transit Corporation, which acquired forty cars in April, 1915, and operated these on regular schedules in that section of the city of Richmond where jitney service was being rendered. The result of these operations demonstrated that the business could not be conducted without a loss, and while the operation was being conducted at the close of the fiscal year it was discontinued in September. In the meantime, the independent operators who started the business in March gradually dropped out until at the close of the fiscal year very few of those who originally started were still in the business. Like other fads in the transportation business, it is believed that the jitney bus will soon pass out of business.

The following table shows some of the more important operating and traffic statistics:

	1915	1914	Change
Revenue passengers carried	62,271,603	65,695,197	—3,423,594
Transfer and free passengers carried	14,706,115	15,676,096	— 969,981
Total passengers carried	76,977,718	81,371,293	—4,393,575
Percentage of passengers using transfers	18.10	18,13	— 0.03
Average fare per passenger including transfers	$0.037	$0.036	+ $0.001
Car mileage	12,439,758	12,478,058	— 38,300
Car hours	1,513,612	1,515,016	— 1,404
Total revenue per car mile	$0.228	$0.239	— $0.013
Total revenue per car hour	1.87	1.97	— 0.10
Operating expenses per car mile	0.132	0.134	— 0.02
Operating expenses per car hour	1.09	1.10	— 0.01

KANSAS CITY SUPPLEMENTAL PLAN

Further Details of Arrangement for Distributing Railway and Lighting Equities to Stockholders

Further details are now available in regard to Judge Hook's supplemental plan for the stockholders in the Kansas City Railway & Light Company reorganization, described briefly in the ELECTRIC RAILWAY JOURNAL of Nov. 13. Of the authorized capital stock of this company $9,407,500 of preferred and $9,543,080 of common stock is outstanding in the hands of the public. These are the amounts entitled to participate in the distribution of the equities involved in the complete separation of the railway property and the lighting property. The remaining $5,672,000 of stock pledged as collateral is to be cancelled. The representatives of about 90 per cent of each class of this $18,950,580 of stock now say that no law of any state can be found authorizing the formation of a corporation with both preferred and common shares having no specified par value. They have therefore suggested that the equities be conveyed to trustees who shall distribute among the stockholders preferred and common participating beneficial certificates of no specified par value. The concurrence of the holders of 80 per cent severally of the existing preferred and common stock shall determine the division of equities between the properties.

All the stock of the new railway company representing the equity in its property except that necessary for organization purposes shall be conveyed to three trustees. One trustee shall be chosen by the holders of a majority in amount of the preferred stock allotted to the street railway properties; another by the like holders of the common stock, and the two trustees so chosen shall select the third. A similar course shall be pursued with respect to the stock of the light company, but there shall be no common trustee in the two trusts.

The principal laid down in the plan of preserving, as far as practicable, the relative rights of each class of interests shall apply among the stockholders under the reorganization, and the differential qualities of the preferred stock as between it and the common will be carried into the beneficial certificates, provided, however, that after Jan. 1, 1919, the dividends upon the preferred beneficial certificates shall be cumulative. The reasons for this change are first that the net earnings of the street railway and electric properties have constituted a common source of dividends for the existing preferred stock. In future each class of beneficial certificates of the new railway company or the light company will have to rely for dividends upon the earnings of its particular business without aid from the other in case of deficiency. This is materially to the disadvantage of the rights of the preferred certificates. Again, during the receivership no dividends have been paid upon the preferred stock, though substantial earnings otherwise applicable thereto have been used for permanent improvements and betterments.

While a direct assessment upon the stockholders has been avoided by provisions for new mortgage bonds for the expenses of reorganization, and for payments into sinking funds to discharge new second mortgage bonds from net earnings, there are other costs and expenses which all participating stockholders should bear proportionately. The plan requires the stockholders (a) to take or cause to be taken at par sufficient first and refunding mortgage bonds of the new railway company to pay certain expenses and liabilities chargeable to the street railways and to supply that company with $1,000,000 in cash for new capital expenditures presently available; (b) to form a syndicate to underwrite the exchange of the old funded debt (excepting the bonds of the Elevated and Westport lines) for bonds of the new railway company and the light company. A responsible depositing stockholder has guaranteed both obligations.

The trustees in either trust may issue and sell first preferred beneficial certificates to raise funds for the purposes of the business of the new railway company or the light company if the holders of two-thirds in amount of each class of beneficial certificates so authorize. Nothing in this plan prevents either new company from issuing and selling preferred stock to the public whenever duly authorized by law and by the vote of the holders of the beneficial certificates. Whenever a corporation can be lawfully formed with preferred and common shares of no specified par value with authority to take over the stock of another corporation as its assets, each set of trustees shall cause one to be organized and shall turn over to it the stock in their custody.

A formal statement has been filed with the court by the receivers of the subsidiary Metropolitan Street Railway declaring the reorganization plan operative for bondholders. The following amounts were deposited with the reorganization committee: Kansas City Railway & Light Company first lien refunding 5 per cent bonds, 96.6 per cent; 6 per cent collateral gold notes of this company, 96.5 per cent; notes to Kansas City banks, 93.3 per cent; Metropolitan Street Railway consolidated mortgage 5 per cent gold bonds, 99.3 per cent; Central Electric Railway 5 per cent mortgage bonds, 97.7 per cent, and East Side Railway first mortgage 5 per cent gold bonds, 100 per cent. As stated in last week's issue the stockholders' committee, which has already secured deposits of 90 per cent of all stock, has set the limit of participation for stockholders at Dec. 20. The entire reorganization is now to be completed by Feb. 7.

STATISTICS FROM NEW JERSEY COMMISSION

The Board of Public Utility Commissioners of New Jersey has just issued a report containing statistics of public utilities in the State for the year ended Dec. 31, 1913. Among the abstracts of reports for 561 utilities there are reports for twenty-six operating and thirty-eight non-operating electric railways. On account of the lack of reports concerning intra-state revenue, no gross revenue is stated for steam railways, but for the other classes of utilities the amount of such revenue was as follows: Electric railways, $18,923,587; gas companies, $12,504,344; electric light and power companies, $10,530,188; municipal electric · light plants, $145,187; private water utilities, $4,545,684; municipal water utilities, $4,771,361; sewer companies, $185,440, and telephone companies, $8,863,372—total, $60,469,163. On account of its interstate traffic, the Hudson & Manhattan Railroad is not included in the electric railway total.

The report presents a short description of the organization of all electric railways, with statements showing the capital stock and funded debt of the non-operating companies and, in addition to these, the income figures for the operating lines. A separate tabulation shows the gross amounts for the various subdivisions of operating expenses and the corresponding average amount per car-mile. Other mileage, traffic and miscellaneous statistics for the different operating companies as calculated by the commission are published in the accompanying table.

	Miles of Track Owned	Capitalization Per Mile of Track	Miles of Road Operated	Operating Revenues Per Mile of Road	Revenues Car-Miles Per Mile of Road	Revenue Car-Miles Per Car-Hour	Average Fare Per Revenue Passenger (Cents)	Transportation Revenue Per Car-Mile (Cents)	Transportation Revenue Per Car (Hour)	Total Operating Revenues Per Car-Mile (Cents)	Operating Expenses Per Car-Mile (Cents)	Operating Ratio (Per Cent)
Atlantic & Suburban Railway	17.0	$49,442	16.0	$5,650	30,601	11.8	4.77	18.4	$2.18	18.5	12.3	66.9
Atlantic City & Shore Railroad	7.7	254,237	24.5	25,279	71,902	10.8	4.76	34.6	3.73	35.2	18.2	51.8
Atlantic Coast Electric Railway	35.6	84,246	20.3	21,527	64,837	9.4	5.00	25.9	2.43	33.2	18.0	54.1
Bridgeton & Millville Traction Company	37.9	26,406	36.2	3,833	16,258	9.5	4.29	23.4	2.22	23.6	16.5	70.1
Burlington County Transit Company	14.8	8,122	15.8	4,631	23,698	2.1	5.00	19.2	0.39	19.5	15.3	78.2
Cape May, Delaware Bay & Sewell's Point Railroad	7.1	42,253	8.5	2,958	17,538	...	5.00	16.7	...	16.7	18.9	113.3
Central Passenger Railway	3.0	96,346	4.0	8,337	41,899	6.4	2.06	15.2	0.98	19.9	14.7	74.0
Five Mile Beach Electric Railway	5.7	44,859	4.9	12,085	44,115	5.3	5.00	26.9	1.43	27.4	14.3	52.1
Hudson & Manhattan Railroad	18.8	......	8.5	434,500	936,192	18.3	5.86	43.3	7.86	46.4	17.1	36.9
Jersey Central Traction Company	39.9	75,188	35.1	6,386	25,457	11.0	4.98	23.3	2.56	25.1	15.4	61.4
Millville Traction Company	12.5	30,542	12.5	4,205	25,471	9.4	4.82	16.4	1.54	16.5	21.7	131.4
Monmouth County Electric Company	17.7	46,584	15.0	6,700	36,147	10.2	5.00	18.0	1.83	18.5	14.2	76.5
Morris County Traction Company	59.5	55,481	47.8	5,901	25,895	10.1	4.95	22.6	2.28	22.8	15.9	69.7
New Jersey & Pennsylvania Traction Company	15.0	106,667	13.3	8,608	31,522	13.4	4.98	25.0	3.34	27.3	16.7	61.2
New Jersey Rapid Transit Company	6.0	53,333	6.0	786	9,312	12.0	5.00	7.6	0.91	7.6	5.9	77.6
Northampton, Easton & Washington Traction Company	18.0	110,703	18.0	3,534	12,111	16.6	5.00	28.5	4.74	29.2	13.7	46.9
North Jersey Rapid Transit Company	14.5	110,192	15.2	4,171	20,167	15.1	9.18	20.3	3.06	20.7	12.8	61.7
Ocean City Electric Railroad	10.0	17,500	10.0	2,466	16,051	9.1	4.99	15.3	1.40	15.4	12.8	83.6
Phillipsburg Horse Car Railroad	7.1	4,240	6.9	15,542	72,118	7.9	5.00	21.4	1.68	21.6	14.9	69.3
Point Pleasant Traction Company	3.2	124,224	3.1	3,327	16,872	7.7	5.00	19.6	1.51	19.7	18.6	94.6
Public Service Railroad	*41.8	†49,956	36.7	2,310	11,435	20.9	22.48	20.0	4.17	20.2	19.1	94.6
Public Service Railway	*823.4	†163,916	488.2	31,814	101,241	8.7	4.96	31.1	2.71	31.4	17.6	55.9
Trenton & Mercer County Traction Corporation	*74.2	†108,570	53.3	14,410	63,125	8.8	4.32	22.5	1.97	22.8	12.1	53.2

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*Miles of track operated.

†Capitalization per mile of track operated, including capitalization of lessor companies.

American Cities Company, New York, N. Y.—D. H. Cantrell, president Little Rock Railway & Electric Company, Little Rock, Ark., has been elected a director of the controlling corporation, the American Cities Company, to succeed the late W. M. Kavanaugh.

Ardmore (Okla.) Electric Railway.—The property of the Ardmore Electric Railway is advertised to be sold at public sale on Jan. 1, 1916. The receiver, whose appointment was noted in the ELECTRIC RAILWAY JOURNAL of Aug. 14, has made arrangements to resume operations until the date of sale.

Boston (Mass.) Elevated Railway.—The Public Service Commission for Massachusetts has approved an issue of $3,286,000 of thirty-year 5 per cent bonds by the Boston Elevated Railway. The proceeds of the new issue as set forth in the petition are to be used "for construction and equipment, for funding its floating debt and also for the purchase of such real and personal estate as may be necessary or convenient for the operation of the road."

Buffalo & Williamsville Electric Railway, Williamsville, N. Y.—The Buffalo & Williamsville Electric Railway has been authorized by the Public Service Commission for the Second District of New York to issue $49,000 of 5 per cent forty-year first mortgage bonds. The bonds are to be sold at not less than 95.

Cities Service Company, New York, N. Y.—At a special meeting of the board of directors of the Cities Service Company on Nov. 10, the officers were authorized to sell $5,000,000 of preferred and $2,500,000 of common stock to a syndicate, for $5,000,000 cash. The syndicate will take over the stock at once, and the proceeds will enable the company to retire its entire floating debt and give ample working capital in addition. Arrangements with the syndicate provide that the stock will not be offered to the public at present, and purchasers may withdraw their stock only on condition that the preferred is sold at not less than 85, and the common at 125. Holders of preferred stock as of record on Dec. 15 will have the right to receive on Jan. 1 5 per cent convertible debenture bonds of the company for the 9 per cent of accumulated dividends to Jan. 1, 1916. These debentures may be converted at any time into stock upon a basis of $100 of preferred and $25 of common stock for each $100 in debentures. The holders of common stock as of record on Dec. 15 will on Jan. 1 have 9 per cent of these debentures set aside for them to be distributed when all holders of preferred stock have received their deferred dividends in full. Regular monthly cash dividends of one-half of 1 per cent will be resumed on the preferred stock on Feb. 1, 1916, payment being made to holders that are of record on Jan. 15.

Cleveland & Eastern Traction Company, Cleveland, Ohio.—An initial dividend of one-half of 1 per cent has been declared on the $468,865 of 5 per cent non-cumulative preferred stock of the Cleveland & Eastern Traction Company.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich.—The Consumers' Power Company of Michigan, principal generating subsidiary of the Commonwealth Power, Railway & Light Company, has filed in Michigan a mortgage securing an authorized bond issue of $35,000,000 with the Harris Trust & Savings Bank, Chicago, Ill., as trustee. The new mortgage and the bonds under it are secured by liens on the entire property of the company, and takes the place of the present collateral mortgage. The filing of the new mortgage is one of the final details in the plans of the company by which the Consumers' Power Company holds all its properties in fee, instead of through ownership of underlying stocks and bonds.

Detroit (Mich.) United Railway.—First mortgage 5 per cent gold bonds of the Detroit Railway numbered from 151 to 200, both inclusive, and due on Dec. 1 will be paid at par and interest at the People's State Bank, Detroit, at maturity.

Empire United Railways, Inc., Syracuse, N. Y.—A bondholders' protective committee is asking the holders of the first mortgage 5 per cent gold bonds of the Rochester, Syracuse & Eastern Railroad due on May 1, 1945, to deposit their bonds with the Trust & Deposit Company of Onondaga, Syracuse, N. Y., or the Old Colony Trust Company, Boston, Mass. The members of the committee are Arthur W. Loasby, president of the Trust & Deposit Company of Onondaga, Syracuse, N. Y.; Elbert A. Harvey, representing Lee, Higginson & Company, Boston, and Deforest Settle, of Bentley, Settle & Company, Syracuse, N. Y. Mr. Loasby is chairman of the committee and Mercer V. White, 100 North Salina Street, Syracuse, N. Y., is secretary.

Fostoria & Fremont Railway, Fostoria, Ohio.—The Ohio Public Utilities Commission has authorized the Fostoria & Fremont Railway to sell for the highest price obtainable, and for not less than 87½ per cent, $200,000 of its first mortgage 5 per cent gold bonds, now pledged as security for a loan made by the Cleveland Trust Company. The proceeds are to be used to discharge the indebtedness of $165,870 and accrued interest thereon unpaid to the trust company, any balance being available for corporate purposes.

Memphis (Tenn.) Street Railway.—The Memphis Street Railway has filed for record at Memphis a mortgage to the Guaranty Trust Company, New York, to secure $30,000,000 of bonds, which are to be issued when necessary in different amounts from time to time to refund maturing securities or to provide for any extension or additions which may be necessary, but only in the proportion of 80 per cent of the cost of such betterments. Moreover, the bonds may be retired by the company at stated periods if desirable to take advantage of any lower interest rates that may at such times be prevailing.

New York (N. Y.) Railways.—A preliminary decision favorable to the plaintiff bondholders has been handed down in the Appellate Division of the New York Supreme Court in the suit of the New York Railways adjustment income 5 per cent bondholders against the New York Railways to recover back interest amounting to about $50 a share. The Supreme Court has decided, thereby overruling the decision of a lower court, that George B. Leighton, holder of the New York Railway adjustment income 5 per cent bonds, could continue the suit brought by the New York Life Insurance Company against the New York Railways, alleging violation of the terms of the mortgage securing the adjustment income bonds in regard to the payment made as interest for the last three years. The New York Life Insurance Company has discontinued its connection with the case.

Republic Railway & Light Company, New York, N. Y.—A syndicate composed of Lee, Higginson & Company, Boston, Mass.; Drexel & Company, Philadelphia, Pa., and Reilly, Brock & Company, Philadelphia, Pa., has purchased from the Republic Railway & Light Company an issue of $7,000,000 of five-year 5 per cent bonds of the Mahoning & Shenango Railway & Light Company; and Reilly, Brock & Company have purchased an issue of $3,000,000 of three-year notes of the Republic Railway & Light Company. The proceeds of the sale of these securities will be used to pay off the $3,000,000 of 5 per cent notes of the Republic Railway & Light Company, maturing on Jan. 1, 1916, and the $4,844,000 of Mahoning & Shenango Railway & Light Company first consolidated refunding mortgage 5 per cent bonds also maturing on Jan. 1, 1916, to pay off all floating indebtedness of the Republic Railway & Light and the Mahoning & Shenango Railway & Light and their subsidiaries, and to furnish funds for construction requirements well into 1916.

Seattle, Renton & Southern Railway, Seattle, Wash.—Judge Kauffman in the King Superior Court at Seattle has ordered Scott Calhoun and Joseph Parkin as receivers to wind up immediately the affairs of the Seattle, Renton & Southern Railway and to sell the property. Judge Kauffman found that the company has been hopelessly insolvent since May, 1912. One of the largest creditors is the Puget Sound Traction, Light & Power Company, which has a claim of more than $100,000 for power furnished. The estimated total indebtedness is $1,600,000. The appointment of the receivers was noted in the ELECTRIC RAILWAY JOURNAL of April 12, 1913.

Toronto (Ont.) Civic Railway.—A by-law to issue twenty-year debentures to the amount of $108,696 for new cars for the Toronto Civic Railway has been carried by the City Council.

DIVIDENDS DECLARED

Central Mississippi Valley Electric Properties, Keokuk, Iowa, quarterly, 1½ per cent, preferred.

Citizens' Traction Company, Pittsburgh, Pa., $1.50.

Cleveland & Eastern Traction Company, Cleveland, Ohio, one-half of 1 per cent, preferred.

Northern Texas Electric Company, Fort Worth, Tex., quarterly, 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$88,743	*$62,455	$26,288	$16,909	‡$9,559
1 " " '14	87,236	*82,577	4,659	17,129	†‡12,277
3 " " '15	271,606	*191,754	79,852	50,895	‡29,398
3 " " '14	285,320	*237,342	47,978	51,235	†‡2,669

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$94,588	*$61,079	$33,509	$30,121	$3,388
1 " " '14	87,086	*55,095	31,991	28,456	3,535
12 " " '15	1,047,202	*719,406	327,796	355,230	†27,434
12 " " '14	1,119,695	*702,784	416,911	330,335	86,576

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$266,435	*$154,383	$112,052	$40,200	$71,852
1 " " '14	256,125	*148,485	107,640	39,239	68,401
12 " " '15	3,066,603	*1,819,624	1,246,979	471,860	775,119
12 " " '14	3,063,698	*1,935,396	1,128,312	477,012	651,290

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$1,211,588	*$660,915	$550,673	$372,360	$178,313
1 " " '14	1,175,031	*678,116	496,915	352,245	144,670
12 " " '15	14,116,576	*7,527,018	6,589,558	4,366,950	2,222,608
12 " " '14	14,088,426	*7,733,072	6,355,354	4,122,756	2,232,598

CONNECTICUT COMPANY, NEW HAVEN, CONN.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$754,081	*$518,518	$235,563	$98,015	‡$161,289
1 " " '14	704,175	*532,281	171,894	98,887	‡94,570
3 " " '15	2,356,785	*1,500,087	856,698	294,425	‡631,821
3 " " '14	2,305,359	*1,675,040	630,319	295,106	‡399,941

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$249,418	*$133,406	$116,012	$65,433	$50,579
1 " " '14	230,663	*122,671	107,992	63,711	44,281
12 " " '15	2,586,678	*1,475,987	1,110,691	781,995	328,696
12 " " '15	2,503,949	*1,429,718	1,074,231	762,788	311,443

EAST ST. LOUIS & SUBURBAN RAILWAY, EAST ST. LOUIS, ILL.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$206,405	*$122,453	$83,952	$62,904	$21,048
1 " " '14	216,514	*130,542	85,972	63,992	21,980
12 " " '15	2,424,763	*1,441,513	983,250	759,927	223,323
12 " " '14	2,718,761	*1,699,872	1,018,889	655,766	363,123

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$73,130	*$42,571	$30,559	$15,956	$14,603
1 " " '14	67,326	*40,914	25,412	15,550	10,862
12 " " '15	715,579	*467,213	248,366	188,860	59,506
12 " " '14	673,618	*462,414	211,204	184,676	26,528

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$184,243	*$114,182	$70,061	$43,526	$26,535
1 " " '14	196,155	*109,267	86,888	41,858	45,030
12 " " '15	2,137,894	*1,286,864	850,970	496,497	354,473
12 " " '14	2,258,848	*1,380,280	870,568	493,467	385,101

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$37,310	*$26,014	$11,296	$8,000	‡$3,364
1 " " '14	37,175	*27,132	10,043	7,876	‡2,223
3 " " '15	133,352	*86,752	46,600	24,000	‡22,808
3 " " '14	139,233	*90,557	48,676	23,627	‡25,222

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$41,652	*$40,840	$812	$6,355	†‡$3,829
1 " " '14	36,811	*42,864	†6,053	5,283	†‡9,803
3 " " '15	124,885	*125,455	†570	20,543	†‡15,542
3 " " '14	110,149	*128,188	†18,039	17,821	†‡30,937

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$340,918	*$212,824	$128,094	$53,081	$73,013
1 " " '14	311,656	*195,367	116,289	51,426	64,863
9 " " '15	2,829,360	*1,748,732	1,080,628	466,670	613,958
9 " " '14	2,728,559	*1,663,018	1,065,541	455,246	610,295

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$474,919	*$352,574	$122,345	$120,822	‡$3,082
1 " " '14	467,400	*338,755	128,645	118,649	‡12,195
3 " " '15	1,458,560	*1,021,732	436,828	361,390	‡79,683
3 " " '14	1,538,795	*1,043,989	494,806	355,948	‡145,494

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$23,397	*$21,172	$2,225	$1,598	‡$656
1 " " '14	25,705	*23,701	2,004	1,215	‡803
3 " " '15	74,132	*66,072	8,060	4,787	‡3,364
3 " " '14	80,637	*71,006	9,631	3,612	‡6,055

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

JITNEY AS STATE AND CITY ISSUES

Four Jitney Cases Before the Illinois Commission—Atlantic City Bill Killed

In four cases now before the Illinois Public Utilities Commission, the question of the right of jitney buses to operate without a certificate of necessity and convenience is squarely before that body for decision. The cases are from Springfield, Rock Island, Quincy and Hillsboro. Interest centers in these cases from the fact that the commission in its decision in the recent Jacksonville case did not take jurisdiction over all classes of jitneys. In Jacksonville, the jitneys were operating over specified routes and on schedules. The commission held that they were, therefore, common carriers and subject to regulation under the utilities act. In the pending cases the situation is different, for the buses in Springfield, Rock Island, Quincy and Hillsboro do not adhere to certain routes and schedules. In the answers filed by all the defendants, except those in Springfield, the jitney bus owners contend that they are no more subject to regulation than cab drivers. The same defense probably will be made by the Springfield men when they file their answer to the petition of the Springfield Consolidated Railway. Another mistaken impression regarding the rules prescribed by the commission for the operation of jitneys is that in the Jacksonville case the commission held that no permit for the operation of jitneys along streets on which street cars operate would be issued. Such is not the case. Commissioner Thompson, who heard the case, issued a statement in which he expressed the belief that this should be the attitude of the commission, but this statement was not written into the commission's ruling. The Rock Island jitney bus case has been before the commission some time, but is not likely that there will be any early decision. A court fight is expected on the question of jurisdiction, it being contended that the operation of jitneys between Rock Island and Davenport, Iowa, makes the jitney company an interstate concern. In all the pending cases complaints were made by the street railways.

The bill introduced before the City Commission of Atlantic City by W. H. Bartlett, director of public safety, and designed to drive the jitneys from Atlantic Avenue, the principal business street, has been killed. Even the sponsor of the bill himself voted for its defeat. J. B. Thompson, director of public highways, alone registered a negative vote. Members of the business men's delegation declared the fight to drive the jitneys from Atlantic Avenue, or to so restrict them as properly to protect the Atlantic City & Shore Railroad, has not been abandoned by any means. Charles Evans, president of the Atlantic City National Bank and vice-president of the railway, said that apparently the members of the commission were willing to permit a corporation which has helped Atlantic City to prosperity, to be ruined by guerilla competition.

Provisions of the jitney ordinance approved some time ago by the Board of Works of Newark, N. J., were discussed on Nov. 10 at a meeting of the license committee of the Common Council. Several changes in the measure were suggested. A scale of license fees, with $75 as the maximum charge, was approved. One of the suggested insertions to be passed on by the law department would require jitney men operating in Newark to prove at least one year's residence and to present references from at least three reputable citizens. The changes will be presented to the Board of Works when the measure, as revised on Nov. 10, comes before that body, preceding a joint conference.

The Supreme Court of California has upheld the recent finding of the Railroad Commission in that State, which decided that it has no jurisdiction over motor-bus lines, auto trucks or auto stages engaged in the business of transportation. The case was the result of an appeal by the Western Association of Short Line Railroads, asking that the commission be instructed to assume this jurisdiction.

The jitney fleet of the Motor Transit Corporation, a subsidiary of the Virginia Railway & Power Company, Richmond, Va., has been sold at public auction. There were thirty-three Briscoe and seven Ford cars, and they brought an average of $216 per car.

A proposition by which the Memphis (Tenn.) Street Railway would receive the exclusive rights to operate over certain streets free from competition of jitney buses, provided the company agrees to sell tickets at the rate of twelve for 50 cents, with transfer privileges, is being considered by the City Commission of Memphis. Commissioner Dies is sponsor for the proposition. A meeting of jitney owners, members of the commission and representatives of the street railway has been called, at which the proposal will be considered and perhaps some action taken. No expression of opinion has been made by the company or the jitney owners.

TRENTON FARE HEARING CONTINUED

An Outline of the Trend of the Hearing in Which It Is Sought to Prevent Elimination of Six-for-a-Quarter Tickets

At the hearing on Nov. 4 in the Trenton fare case counsel for the city sought to prove that all recent changes and improvements made by the Trenton & Mercer County Traction Corporation had been charged to capital account and that in this way the patrons of the company had not obtained the full benefit of the increase in the capital liabilities of the company allowed some time ago by the Board of Public Utility Commissioners. Rankin Johnson, vice-president of the company, contended that at the time the system was being rehabilitated the earnings would not permit of any large charges for renewals or replacements being made against current earnings. On Nov. 5 Frank R. Ford of Ford, Bacon & Davis, was cross-examined by George L. Record, special counsel for the city. On Nov. 8 Mr. Record delved into the intercorporate relations of the Trenton & Mercer County Traction Corporation and the United Power & Transportation Company, which latter company leased the Trenton system. Mr. Johnson insisted that the lessees and the lessors were entirely separate. The testimony on Nov. 9 was concerned largely with the obligations of the company to the city with respect to paving, etc., and with how well the company had lived up to its contractual obligations in this respect. On the same day answer was filed in the United States Court at Trenton by the city of Trenton and the State Board of Public Utility Commissioners to the equity suit brought against them by the Trenton & Mercer County Traction Corporation as a result of the action against the company's desire to increase the rate of fare. The answer denies that the statutes and ordinances referred to in the bill of complaint, in which it was provided that the rate of fare should be a sum not greater than 5 cents for the carrying of each passenger more than five years of age for any distance within the limits of the city of Trenton, constituted contracts; and deny that these ordinances give any right to the complainants to charge and receive the sum of 5 cents for the carrying of each passenger more than five years of age within the limits of the city of Trenton. Similar denials are made regarding like subsidiary corporations of the company.

In the absence of the books of original entry of the Trenton & Mercer County Traction Corporation and its predecessors, President Donges of the Board of Public Utility Commissioners permitted E. C. M. Rand, connected with the late Russell Sage for seventeen years as an expert on property investments and security buying, retained by the city, to testify in regard to the capitalization of the company, adding that the board "would receive the testimony for what it purports to be in the circumstances." On the same day, Nov. 10, the city called as an expert John C. Brackenridge, vice-president Manhattan Bridge Three-Cent Line.

The case was continued on Nov. 15 and 16. Mr. Brackenridge was cross-examined by counsel for the company. Counsel for the city took up again the question of intercorporate relations.

The order of the Board of Public Utility Commissioners suspending the abolition by the company of the sale of tickets at the rate of six tickets for a quarter expired on Nov. 15. The company will respect the order pending a ruling by the board.

NEW JERSEY SCHOOL TICKET DECISION

The Board of Public Utility Commissioners of New Jersey made an order on Nov. 12 in which it declared unreasonable and unjust the increase in fare through the Public Service Railway withholding the special rates of fare from students of business schools. On the lines of the Public Service Railway school children have a fare which amounts to about 3 cents, but the company sought to prevent the students of business schools taking advantage of these rates because these institutions are conducted for profit and it would be an unusual preference. In dealing with the situation, the Board of Public Utility Commissioners, in its opinion, says:

"The fallacy of the argument lies in the assumption that because the teacher may receive a stipend from the pupil for instruction, the latter shall be deprived of a right to which otherwise he would be entitled. There is probably nothing that so manifests itself in the public policy of the State as its fixed purpose to further the education of the young to the end that they may be fitted to assume the duties and responsibilities of citizenship. The citizenship at which the State aims is most likely to be found when the largest possible number are employed in useful pursuits. The business schools supplement the grammar school education, which the State gives, by giving a training for commercial employment to those of high school age who cannot or will not avail themselves of the high school course which the State furnishes.

"The business school course is shorter than the high school course. The end obtained, however, is largely the same, namely, the development of a citizenry intelligent and useful. To hold that the business school pupil of school age shall be denied the right to the same rate of fare as other children of school age is to discriminate against him. To hold that because he pays for an education during the years of his school age, the more quickly to befit himself for a useful occupation, is in effect to penalize him for doing the thing, without expense to the State, that the State aims to do in pursuance of its public policy.

"The Supreme Court has indicated that the issuing of school tickets to school children involved neither injustice nor discrimination, the company, either by agreement with the municipalities or on its own volition without agreement, having constituted itself an auxiliary of the State in furthering the cause of education. The company having failed to show that any reasonable distinction can be made between business school pupils and those of other schools, the Supreme Court decision would seem to include such pupils as among the school children to whom the giving of a reduced rate is not unreasonable or preferential. The board, in conclusion, holds that the company has not made out a case and the fare change, or alteration, is accordingly disapproved."

The case is a sequel to the action of the company in seeking to do away with all special school rates upon the ground that they constituted an unreasonable discrimination and hence were in violation of the law. That action, taken in 1911, was held up by an order of the Public Utility Commission whose findings were subsequently affirmed by the Supreme Court. Failing to obtain sanction for the increase of rates to all school children, the company more than a year ago undertook to make a new order that school tickets should not be sold to pupils attending business schools. The operation of this order was temporarily suspended by the board on Sept. 22, 1914, and by mutual agreement was not enforced by the company pending the determination of the appeal, notwithstanding the lapse of the two months' statutory period for which an order of suspension can be made effective.

Safety-First Posters in New Jersey.—The Public Service Railway, Newark, N. J., is installing in its cars lithographed posters 10 in. x 24 in. in size which depict accidents that result from failure to heed safety-first rules. A series of twelve subjects has been designed, one to be shown each month for a year.

Skip Stops in St. Paul.—The Twin City Rapid Transit Company, Minneapolis, Minn., has decided to run during the rush hours cars which will make no stops between Seven

Corners and Dale Street, on the Selby-Lake and Grand to Cretin lines in St. Paul. The company has announced that if the plan proves successful it will be put into operation on other lines.

Rerouteing Proposed in Providence. — Officials of the Rhode Island Company, Providence, R. I., have presented to the committee on railroads of the City Council a tentative plan for the rerouteing of the cars on ten of the city lines which are subjected to the heaviest traffic. This plan is suggested as a part of the scheme for putting into use the new Fountain and Empire Street tracks.

New Springfield Tariff Suspended.—The Public Service Commission of Massachusetts has suspended until Jan. 1, 1916, operation of the proposed local and joint class rates and minimum tariff filed by the Springfield Street Railway to become effective on Nov. 15, covering business in connection with the Worcester Consolidated Street Railway, Rhode Island Company, and four other street railways.

Open Cars for Brooklyn Smokers.—Except on stormy days, or when the temperature is excessively low, the Brooklyn (N. Y.) Rapid Transit Company plans to run open cars at intervals of approximately fifteen minutes on all its lines. This is primarily in answer to the pleas of smokers. The company has announced that the policy is definitely settled for the operation of the cars throughout the year.

Proposed Fare Increases Suspended.—The Public Service Commission of New Hampshire has suspended for three months proposed fare increases from 25 cents to 32 cents on the Manchester-Nashua, and from 15 to 21 cents on the Manchester-Derry line of the Manchester Traction, Light & Power Company, Manchester, N. H. The commission said that no complaint had been received, but that it deemed an investigation expedient.

Increase in Wages in Wheeling.—The wages of the trainmen of the Wheeling (W. Va.) Traction Company and affiliated lines were increased on Nov. 1 in accordance with an agreement entered into last May. All of the employees who were receiving 29 cents an hour were granted the advance in salary and others will receive this increase, after working so long. When the men are first taken on they receive 22 cents an hour, and at the end of each year advance until they reach the limit, now 30 cents an hour.

Courtesy in Topeka.—The Topeka (Kan.) Railway, always solicitous to provide special accommodations for visitors to the capital of Kansas, by the instruction of its trainmen in the giving of information and the handling of crowds, made unusual efforts during the recent convention of the State Teachers' Association. The service rendered by conductors in pointing visitors to destinations in the residence district was the subject of much favorable comment. The company took occasion, in its newspaper advertisements addressed to the teachers, to refer to the advantages of its service as compared with the jitneys.

Fare Concession to Steel Workers.—The International Railway, Buffalo, N. Y., has inaugurated a 6-cent service during morning and evening rush hours to and from the plant of the Lackawanna Steel Company in Lackawanna, N. Y. Heretofore it was necessary for passengers to pay a 5-cent fare to the Buffalo city line on either the International Railway or Buffalo & Lake Erie Traction Company cars and then an additional 5-cent fare on the lines of the latter road to the various gates of the steel plant. The line starts at Seneca Street and Bailey Avenue and no transfers are issued to passengers going farther than this point.

New Form of Safety Zone in Kansas City.—A new form of safety zone is designed by Street Commissioner Beggs in Kansas City, Kan., to be painted in black on the pavement now being laid on Minnesota Avenue. These zones will be extensions of the sidewalk lines across the street, and will mark the path to be taken by pedestrians in crossing the street, and serve as warnings to drivers of vehicles as well as motormen as to the exact line where the pavement intersection begins, where pedestrians are likely to be found, and outside of which vehicles and street cars must stop. The zones are intended primarily to encourage square turning of corners by vehicles.

Toronto Running Boards to Go.—The running boards on the cars of the Toronto (Ont.) Railway are to go. A statement to this effect was made by D. L. McCarthy, counsel for the company, before the judges of the Second Division Appellate Court on Nov. 8 during the hearing of the city's appeal from the interim order of the Ontario Railway Board, which relieved the company of the necessity of immediately dispensing with the running board. Mr. McCarthy thought all the cars would be reconstructed by next season. Application will, however, be made by the city to the Legislature for the passing of an act to compel the company to discontinue the use of the running board on all open cars. This decision was reached by the Board of Control on Nov. 10.

Competition on Traffic Question in San Francisco.—At the suggestion of M. M. O'Shaughnessy, city engineer of San Francisco, Cal., a competition was recently held in that city under the direction of the Beaux Arts Society for the handling of traffic at the foot of Market Street. The prize of $50 offered by the San Francisco Society of Architects was won by Ernest Weihe, whose plans provide for the segregation of traffic into three classes, each to use its own level; street cars would rise by ramps to the level of the upper decks of ferryboats, the street level would be used by vehicles, and subways would be provided for pedestrians. Two large piers for pleasure purposes, cafes, etc., are also included in the plan. They would give an ornamental effect to the scheme.

Temporary Jitney Injunction Denied in Terre Haute, Ind.—In the United States District Court at Indianapolis, Judge Anderson has denied a temporary injunction to the Fidelity Trust Company, Philadelphia, Pa., trustee under the mortgage of the Terre Haute, Indianapolis & Eastern Traction Company, in its suit against the jitney operators in the city of Terre Haute. A hearing in this case was held at the Federal Building, Indianapolis, on Oct. 4, and was reported in the ELECTRIC RAILWAY JOURNAL of Oct. 9, page 782. At that time Judge Anderson stated he would take the case under advisement, but indicated that he did not think the plaintiff had conclusively proved interference with its business and property rights. The case was dismissed as to forty-two of the sixty defendants, as they were found to have discontinued the business as jitney operators. It is not yet known whether the case will be pushed on a hearing for a permanent injunction against the remaining eighteen defendants.

Westfield Trolley Service Finding.—The Massachusetts Public Service Commission has recommended that twenty-minute service be reinstated on the Mill and Union Streets and the Highland-Franklin Street lines of the Westfield division of the Springfield Street Railway. The former is 2.68 miles in length and the latter 2.79 miles. Early in October the headway was increased to thirty minutes. The board held a public hearing at Boston, at which both the complainants that the old service should be restored and the company conceded that car-mile receipts were insufficient for profitable operation, but the commission held that the twenty-minute service should be restored in view of the fact that it had been in effect more than twenty years, during which time the population of the town has steadily increased. The finding points out that the increase in headway materially discouraged traffic and calls attention to the opinion of the former Railroad Commission that a street railway cannot reasonably expect that all the lines which it operates in any given district will be profitable.

First Brooklyn District Safety Campaign.—The first meeting in the district safety campaigns which, in connection with the public safety instruction in the schools, will be the features of the work of the Brooklyn Institution for Safety during the coming year, was held on the evening of Nov. 17. This campaign covers the district along the South Brooklyn water front from Erie Basin to the neighborhood of Joralemon Street. Coincidently with these meetings, safety posters are to be displayed throughout the district and thousands of safety leaflets distributed through the congested areas within the district. The preliminary work of organizing the first of the district safety campaigns has consumed several weeks and from now on those campaigns will follow each other in quick succession. It is expected that about twelve district safety campaigns will be conducted during the next year in co-operation with various public and semi-public agencies and organizations. These twelve campaigns will, in the aggregate, cover all of the congested sections of Brooklyn and will have to do not only with the perils of the street, but with the fire hazard and all of the other elements entering into the question of public safety.

Fare Reduction Complaint Dismissed.—The Railroad Commission of California has decided the case of J. W. Ray vs. the Pacific Electric Railway, Los Angeles, Cal. The complainant attacked the rates of the company between Pacific Ocean Avenue Junction and Temple Avenue, both points being within the limits of the city of Long Beach, and petitioned the commission to reduce such rates from 10 cents to 5 cents, contending that the 10-cent rate was a material detriment to the development of the district adjacent to Temple Avenue. The commission held that though territory may be within the incorporated limits of a city it does not necessarily mean that a street railway should operate at a 5-cent fare irrespective of the excessive mileage covered and the light traffic to be obtained. It was shown that the defendant's present line is operated at a loss and was constructed only at the earnest solicitation of property owners who agreed at the time that the present rates would not be questioned. The complaint was dismissed with the understanding that the defendant would establish at an early date the adjustments which it proposed at the hearing.

New Fast Service in Indiana.—Additional and faster limited service between Indianapolis and Terre Haute was inaugurated by the Terre Haute, Indianapolis & Eastern Traction Company on Nov. 7 with the adoption of a limited service to be known as "The Highlander." The two trains will be operated in each direction every day, covering the distance of 72 miles from terminal to terminal in two hours and five minutes, cutting twenty minutes from the regular limited schedule. Stops are made at Plainfield, Greencastle and Brazil. Of the total running time of two hours and five minutes, twelve minutes are required to reach the city limits of Indianapolis, fifteen minutes to pass through the city streets of Brazil, and twelve minutes passing over the city streets of Terre Haute. The standard three-compartment passenger car of the company, with an over-all length of 61 ft. 6 in., equipped with four Westinghouse No. 121 motors, rated at 90 hp. at 500 volts, will be used for the new service. The choice of the name "Highlander" to designate the new service was the result of a prize contest arranged by the company. The name was derived from Terre Haute, meaning high land. The new service was created to permit business men to travel between Indianapolis and Terre Haute, transact their day's business and return home before nightfall.

Overcrowding Held to be a Crime.—In upholding the conviction of the Toronto (Ont.) Railway so far back as February, 1911, the judges of the First Division Court of the Appellate Division at Toronto on Nov. 9 in a lengthy written judgment disposed of the company's appeal and directed that the overcrowding nuisance be abated. Chief Justice Sir William Meredith, who expressed the opinion of the court, said there was no doubt that the company was charged with and convicted of having committed a public nuisance and the evidence showed there had not been an isolated case of overcrowding, but a systematic course of the conduct which affected all who became passengers in the cars. The court at first sight thought that the argument that there could not be an indictment because there had been an abatement of the nuisance was fatal to conviction, but held that a count on the indictment which alleged that the nuisance was continued at the time of the indictment disposed of that argument. One section of the Ontario railway act gave the court power to interfere when there was a contravention of the by-law such as to cause danger or annoyance to the public. The court held that the offence of the company was indictable and punishable as a crime and in concluding the judgment Sir William Meredith expressed the hope that the decision would result in putting a stop to overcrowding.

Personal Mention

Mr. J. T. McMahon has been appointed roadmaster of the East St. Louis, Columbia & Waterloo Railway, East St. Louis, Ill., to succeed Mr. Joseph Genduso.

Mr. William Dods, formerly vice-president of the Carbon Transit Company, Mauch Chunk, Pa., has been elected president of the company to succeed Mr. Val Smith.

Mr. F. B. Van Vorst has been appointed secretary and assistant treasurer of the United Railways Investment Company, New York, N. Y., to succeed Mr. W. J. Duane.

Mr. F. H. Mason has been appointed engineer of maintenance of way of the Waterville, Fairfield & Oakland Railway, Waterville, Me., to succeed Mr. Lester E. Choate.

Mr. D. Penman, formerly assistant traffic manager of the Pittsburgh & Butler Railway, Pittsburgh, Pa., has succeeded Mr. Thomas G. Orr as traffic manager of the company.

Mr. C. H. Latta has been elected vice-president of the Carbon Transit Company, Mauch Chunk, Pa., to succeed Mr. William Dods, who has been elected president of the company.

Mr. Trueman J. Bach has been appointed electrical engineer and master mechanic of the North Kankakee Electric Light & Railway Company, Kankakee, Ill., to succeed Mr. John McFarland.

Mr. Louis P. Baurhenn, who has been superintendent of the Bergen division of the Public Service Railway, Newark, N. J., has been made superintendent of the Hudson division of the company.

Mr. Elmer L. Williams, who has been superintendent of the Hudson division of the Public Service Railway, Newark, N. J., since 1905, has been made superintendent of the Essex division of the company.

Mr. F. H. Chamberlain, general manager of the Alabama Power Company, Anniston, Ala., was elected president of the Alabama Light & Traction Association at the meeting of the association in Montgomery on Oct. 20 and 21.

Mr. Frank A. Bailey, who has been superintendent of the Southern division of the Public Service Railway, Newark, N. J., with headquarters at Camden, N. J., has been made superintendent of the Bergen division of the company.

Mr. James P. Gorman has succeeded Mr. S. E. Jones as claim agent of the Wilkes-Barre & Hazleton Railway, Wilkes-Barre, Pa. Mr. Gorman has also succeeded Mr. Jones as claim agent of the Lehigh Traction Company.

Mr. William B. Graham, who has been superintendent of the Essex division of the Public Service Railway, Newark, N. J., since 1907, has been made superintendent of the Southern division of the company, with headquarters at Camden.

Mr. W. M. Morton has been elected secretary and treasurer and appointed auditor of the Charlottesville & Albemarle Railway, Charlottesville, Va. He succeeds Mr. E. E. Starke, as secretary, Mr. Norman James as treasurer and Mr. J. H. Windsor as auditor.

Mr. H. C. Bushnell has been appointed mechanical assistant to the superintendent of motive power of the United Railways & Electric Company, Baltimore, Md. Mr. Bushnell was formerly employed as an engineer with Mr. H. E. Mole, a consulting engineer with offices in New York City.

Mr. Nathan Rumney, traveling freight and express agent, has been named general freight and express agent of the Detroit (Mich.) United Lines to succeed the late George W. Parker. Mr. Rumney has been connected with the Detroit United Railway in the freight and express department for fourteen years.

Mr. Charles W. Bosworth, a director of the Springfield (Mass.) Street Railway, has been appointed counsel for the company to succeed Ely & Ely, who have resigned, effective June 30, 1916. Mr. Bosworth will handle all the new business from now on and will take over all the unfinished business next June. Mr. Bosworth is widely known among the legal fraternity in Massachusetts. He has built up a lucrative law practice in addition to his duties as referee in bankruptcy and president of the Union Trust Company. Mr. Bosworth conducted the trial of the company's cases against the three conductors who were discharged early this spring for the alleged mishandling of fares. The elder Mr. Ely, Mr. Henry W., has been counsel for the Springfield Street Railway since June, 1906.

Mr. George H. Binkley has resigned as engineer of maintenance of way and structures of the San Francisco-Oakland Terminal Railways, Oakland, Cal. Mr. Binkley's experience in engineering work has been very broad. He was born in Richmond, Ind., and was educated at De Pauw University. He entered engineering work with the Pennsylvania Railroad, served on the engineering staff of the Chicago exposition, engaged in track elevation work for the Chicago, Rock Island & Pacific Railway in Chicago, served for five years as chief engineer of the Calumet Electric Street Railway, Chicago, and was subsequently connected in turn with Kohler Brothers, Chicago, contracting engineers; the American Engineering Company, Indianapolis, Ind., of which he was vice-president and chief engineer, and the Arnold Company, Chicago.

Mr. Oscar T. Crosby has returned from Brussels, Belgium, where he has been since April in general charge of the distribution of supplies for the Commission for Relief in Belgium. On Nov. 17 he made an address at the Technology Club in New York advocating the establishment of an international court for the settlement of international disputes, with sufficient military and naval force to carry out its decrees. This is a plan in which Mr. Crosby has been interested for several years and which he hopes will be adopted by the United States and other leading countries. Its main principles were embodied in a resolution introduced last spring in the United States Senate by Senator Shafroth, and at about the same time a similar resolution was introduced in the House. These resolutions did not succeed in passing at the last session but it is expected that they will be introduced again at the coming session. Mr. Crosby expects to remain in this country for some time and will reside at Warrenton, Va.

Mr. T. W. Connette, assistant superintendent of transportation of the Buffalo division of the International Railway with headquarters at Buffalo, N. Y., became superintendent of transportation of the Buffalo division of the company on Nov. 15, as previously announced in the ELECTRIC RAILWAY JOURNAL. Mr. Connette is not yet twenty-six years old, but has had unusual opportunities to become well versed in the management of street railway properties. As early as 1901 he was employed in the shops of the Syracuse (N. Y.) Rapid Transit Railway, of which his father, Mr. Edward G. Connette, now president of the International Railway, was then general manager. In 1906 he began work during the summer months with the Worcester (Mass.) Consolidated Street Railway, of which his father at that time was general manager, and for several years was in the shops, mechanical department, power house and the track and line departments. He attended Williston Seminary, Easthampton, Mass., and in 1910 he entered Lehigh University and took a course in civil engineering. In 1912 he entered the transportation department of the International Railway at Buffalo. During that year he was made assistant superintendent of equipment in the mechanical department under Mr. G. W. Dunlap, superintendent of equipment. On Aug. 25, 1913, he was made assistant superintendent of transportation, Buffalo division, under Mr. N. H. Brown. He now succeeds Mr. Brown as superintendent of transportation of the Buffalo division, Mr. Brown having been made general superintendent of transportation of the entire system.

T. W. CONNETTE

OBITUARY

Dennis Sullivan, a director of Cities Service Company, New York, N. Y., and a Colorado pioneer in mining, banking and public utilities, is dead. Mr. Sullivan was born in Rensselaer County, New York, in 1837.

Joseph G. Hendrickson died on Nov. 4 after an illness lasting less than a week. Mr. Hendrickson was sixty-nine years of age. He founded the Ajax Metal Company in 1880. He retired as president of the company a little more than a year ago and since then has been chairman of the board, also chairman of the board of the Ajax Metal Company of the South, Birmingham, Ala., and president of the Ajax Lead Coating Company.

William Frederick Allen, president of the National Railway Publication Company, New York, N. Y., which publishes the *Official Railway Guide*, died on Nov. 9 at his home in South Orange, N. J., in his seventieth year. In 1910 Mr. Allen was elected vice-president of the company, and president in 1914. He was appointed general secretary of the American Railway Association when it was founded in 1875 and held that office until his death.

Charles Haglin Rinker, superintendent of the St. Paul lines of the Twin City Rapid Transit Company, Minneapolis, Minn., died of pleurisy at St. Luke's Hospital, St. Paul, on Nov. 9. Mr. Rinker was born in Minneapolis, and after he was graduated from the University of Minnesota he continued to reside there and was identified with Haglin-Stahr, general contractors, Minneapolis. In September, 1912, he became connected with the Twin City Rapid Transit Company. He was thirty-two years of age.

George Whitfield Parker, general freight and express agent of the Detroit (Mich.) United Railway, died on Nov. 11 at Harper Hospital, Detroit, following an operation. He was forty-five years old. Mr. Parker was born in Detroit. He became connected with the Detroit United Railway as general freight and express agent in September, 1901, and his years of service had given him an exceptionally wide acquaintance in traffic circles among both steam and electric railway officials. His preliminary experience in freight business was gained under Mr. J. K. Muir on the Grand Trunk Railway, where he served in the capacities of rate clerk, chief clerk, soliciting freight agent and traveling freight agent with headquarters in Detroit. He is survived by his widow.

E. T. Munger, who was general superintendent of the Hudson & Manhattan Railroad, New York, N. Y., from January, 1909, to January, 1914, died on Nov. 14 at Paterson, N. J. Mr. Munger was born in Menominee, Wis., in 1870. He was graduated with the degree of bachelor of mechanical engineering at the University of Wisconsin in 1892. Previous to his work on the Hudson & Manhattan Railroad Mr. Munger had held a number of responsible engineering positions, such as master mechanic and later superintendent of motive power and equipment of the Metropolitan West Side Elevated Railway, Chicago, and later president and general manager of the Havana (Ill.) Telephone Company. After resigning from the Hudson & Manhattan Railroad Mr. Munger was for a short time general manager of the Cumberland County Power & Light Company, Portland, Me., which position he relinquished on account of ill health. Mr. Munger is survived by his widow and three daughters.

Herbert M. Wheeler, engineer in charge of electrolysis and electrical distribution of the Chicago (Ill.) Surface Lines, died suddenly on Nov. 12, 1915. Mr. Wheeler was born in Shawano, Wis., in 1876, and following his graduation in electrical engineering at the University of Minnesota in 1896, he began work with the Fort Wayne (Ind.) Electric Corporation. His career as electrical engineer in street railway work began in 1899 with the North Chicago Street Railroad, where he served as an assistant engineer. Four years later he resigned to become an instructor in mathematics and engineering at Lewis Institute, Chicago, and in 1907 he again returned to railway work as electrical engineer of the Chicago Railways. In 1909 he was made assistant to Mr. John Z. Murphy, then chief engineer of the company. In February, 1914, he was appointed to the position which he held at the time of his death. Mr. Wheeler is survived by his widow and two children.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Mexico & Santa Fé Railroad, Mexico, Mo.—Incorporated in Missouri to construct and operate an electric railway from a connection with the Chicago & Alton Railroad at Mexico to a point in Monroe County, 16 miles northeast. Capital stock, $160,000. The Mexico Investment & Construction Company is building the road. Incorporators: J. A. Botts, W. W. Mundy, M. W. Beamer and J. P. Cauthorn of Molino, and T. C. Botts, J. D. Bates and W. W. Botts of Mexico.

FRANCHISES

Berkeley, Cal.—The petition of the San Francisco-Oakland Terminal Railways to discontinue the operation of its line on Dwight Way from College Avenue to Shattuck Avenue has been denied by the Council of Berkeley.

San Pedro, Cal.—The Council of San Pedro has authorized the sale of a franchise through Front, O'Farrell, Newport and Bay Streets to the Pacific Electric Railway.

Decatur, Ill.—The Council of Decatur has revoked the franchise of the Illinois Traction System to use Morgan, William and other east-side streets over which the interurban line from Champaign into Decatur was to have entered the city and which have never been used.

Peoria, Ill.—An ordinance is being prepared by the legal department of the city of Peoria extending the time of the franchise granted the Illinois Traction System in February, 1914, to construct tracks on Jefferson and Hamilton Streets into the new traction terminal building.

Buffalo, N. Y.—The International Railway has received a franchise from the Council to construct a line on Bailey Avenue. It is planned to complete the line between Clinton and Broadway and between East Genesee and East Ferry Streets by Jan. 1, 1917; between Broadway and East Genesee Street by Jan. 1, 1918; between East Delavan Avenue and Kensington Street by Jan. 1, 1919, and between Clinton and Seneca Streets by Jan. 1, 1920.

***Baker, Ore.**—J. L. Soule has asked the Council for a franchise to construct and operate an electric railway in Baker. The Commercial Club of Baker is interested.

Dallas, Tex.—The Northern Texas Traction Company has received a twenty-year interurban franchise from the Board of Commissioners of Dallas on Jefferson Street between Commerce Street and Trinity River. The franchise stipulates that work on the proposed viaduct over the steam lines entering the new Union Terminal, crossing the rails of the Northern Texas Traction Company, must be started within ninety days from the date the ordinance becomes operative, and the work must be completed within fifteen months thereafter. The original petition of the company included local street car service to Oak Cliff, but this was eliminated by the city attorney and must be handled under a separate franchise when the present ordinance expires.

TRACK AND ROADWAY

Pacific Gas & Electric Company, Sacramento, Cal.—Plans are being considered by this company for the construction of an extension of its East Lawn line through Elmhurst to the State Fair grounds.

Municipal Railways of San Francisco, San Francisco, Cal.—At a meeting recently held in San Francisco the Board of Park Commissioners unanimously declined to grant permission for the municipal cars to cross Golden Gate Park from Tenth Avenue to Fourteenth Avenue. While denying the petition, the Board intimated that it might favorably consider a proposition to construct a tunnel line in the vicinity of Nineteenth or Twentieth Avenues.

Hartford, Meriden & New Britain Railway, Hartford, Conn.—This company has been organized to construct a line from Meriden to Hartford via Kensington, New Britain and Newington, 20 miles. Stock to the amount of $1,000,000 has been subscribed, company officials elected, a full preliminary survey of the route made and plans completed to begin work next spring. Construction will be begun in Meriden, New Britain and Hartford at the same time. Louis Fiske, Branford, has been elected president of the new company and Robert O. Eaton, North Haven, secretary and treasurer. [May 29, '15.]

Evansville (Ind.) Railways.—This company has placed an order with the Cloverport Boat & Machine Company, Cloverport, for two boats to be used in connection with the interurban service of the company at points along the river. The boats will cost $8,000.

Iowa & Illinois Railway, Clinton, Iowa.—This company will rebuild 5 miles of overhead structure in the vicinity of Comanche at an estimated cost of from $7,500 to $10,000. It is also reported that the company will rebuild much of the overhead work between Davenport and Clinton.

Boston, Mass.—The contract for the construction of Section G of the Dorchester Tunnel, on Dorchester Avenue, between West Fourth Street and Old Colony Avenue, South Boston, has been awarded by the Boston Transit Commission to Coleman Brothers, 1 Marginal Street, Chelsea, Mass., at $382,364. [Oct. 30, '15.]

Bay State Street Railway, Boston, Mass.—Work has been begun by this company installing double track on Main Street, Haverhill. The line will be constructed from the Pleasant Street turnout to the end of the Haverhill bridge this year, and the remainder of the work of double-tracking the line to the corner of Main and Salem Streets will be done early next year.

New York Municipal Railway Corporation, Brooklyn, N. Y.—Bids will be received until Dec. 7 by the Public Service Commission for the First District of New York for the construction of Section No. 3, Route No. 8, comprising the tunnel section under the East River from Fourteenth Street, Manhattan, to North Seventh Street, Brooklyn, being a part of the Fourteenth Street-Eastern District subway line. This line connects with the Broadway elevated line of the New York Consolidated Railroad, which runs out to East New York.

International Railway, Buffalo, N. Y.—After informal conferences with city officials of North Tonawanda, the objections raised against the elevation of tracks through that city of the fast line to be built between Buffalo and Niagara Falls by the Frontier Electric Railway have been withdrawn. Work has been begun on the line and with the exception of a few very small parcels of property, all the right-of-way has been acquired. The Frontier Electric Railway is owned by the International Railway.

New York, N. Y.—Bids for the installation of tracks on the Queensboro subway extension, the Astoria elevated line and the Corona elevated line, all in the borough of Queens, were received by the Public Service Commission for the First District of New York during the week. The Queensboro subway extension is a part subway and part elevated line, extending from the present terminus of the subway near Jackson and Van Alst Avenues, through Fourth Street, Davis Street and Ely Avenue to the Queensboro Bridge Plaza, where the line connects with the Astoria and Corona railroads, the former extending northerly through Second Avenue to Ditmars Avenue, Astoria, and the latter northeasterly through Queens Boulevard, Greenpoint Avenue, Skillman Avenue and Roosevelt Avenue to Sycamore Avenue, Corona. The contractor must begin work within thirty days from the date of delivery of the contract, and complete the work within six months. According to unofficial figures, submitted by representatives of the contractors present at the bid opening, George S. Bennett, 36 Northern Avenue, was the lowest bidder, at $204,000, the second bidder being the Thomas Crimmins Contracting Company, of 444 East Sixty-ninth Street, at $204,900.

Interborough Rapid Transit Company, New York, N. Y.—Bids will be received until Nov. 30 by the Public Service Commission for the First District of New York for the construction of Section No. 2 of Routes Nos. 19 and 22, being the elevated extension of the Southern Boulevard and Westchester Avenue branch of the Lexington Avenue subway, extending over Westchester Avenue, The Bronx, from Whitlock Avenue to Pelham Bay Park.

Bartlesville (Okla.) Interurban Railway.—Plans are under consideration by this company for the construction of extensions from Bartlesville to Pawhuska and from Bartlesville to Nowata.

Toronto (Ont.) Civic Railway.—The Council of Toronto has authorized the construction of the Bloor Street line from Dundas Street to Quebec Avenue at a cost of $125,000.

Toronto (Ont.) Civic Railway.—The Council of Toronto has approved plans for the extension of this company's lines on Yonge Street from the tracks of the Canadian Pacific Railway to Farnham Avenue.

Hershey (Pa.) Transit Company.—Surveys have been completed and work has been begun by this company on the construction of an extension of its line from Hershey to Fredericksburg. The line will enter East Hanover, north of Hershey, and will extend east to Fredericksburg via Ono and Jonestown. It is estimated that the cost will be about $300,000.

Philadelphia, Pa.—Bids are desired until Dec. 7 by the Department of City Transit, Bourse Building, for the construction of concrete column foundations on piers for about 4000 ft. of two-track elevated railway in Frankfort Avenue from Unity to Dyre Streets. Bids are also desired until Dec. 14 for the construction of steel superstructure and appurtenant work for the same section. [Sept. 25, '15.]

Eastern Pennsylvania Railways, Pottsville, Pa.—Work has been begun by this company on its extension from Pottsville to St. Clair, 2½ miles. From St. Clair the line will extend on Third Street to Patterson Street, to Second Street, north on Second Street to connect with the line from Frackville. The entire line from Pottsville through to Frackville will be completed by the end of next February. The road is being built by the White Construction Company.

Scranton, Pa.—Rights-of-way are being obtained for a third-rail electric railway system throughout central Pennsylvania. According to J. F. Richard, fiscal agent of the Northumberland County Gas & Electric Company, Sunbury, franchises will be asked for in many towns in that section. Starting at Scranton, the proposed road will follow the west side of the Susquehanna River, touching Kingston, Mocanaqua, Shickshinny, Berwick, Bloomsburg, Danville, Northumberland and Sunbury. Recrossing the river, it is to follow the Susquehanna River to Harrisburg. From Sunbury a line is to be built to Shamokin, Mount Carmel, Tamaqua and Hazleton, where it will connect with the Lackawanna & Wyoming Valley Railroad. Power for the system is to be furnished by the Harwood Electric Company, Hazleton.

Nashville & Eastern Railway, Nashville, Tenn.—It is reported that this company plans to begin construction immediately on its line from Lebanon to Smithville, 35 miles. Myers Construction Company, Chicago, will build the road. C. T. Edwards, Nashville, is interested. [Sept. 4, '15.]

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—At a meeting of the directors of this company held at Fort Worth on Nov. 11, it was decided to release the Stone & Webster Engineering Corporation from its contract to build the line upon receipt of one-half the losses sustained by the company, provided these do not exceed $30,000, which, with the $52,000 now on hand would be returned to the stockholders. The money on hand together with the amount to be received from Stone & Webster will make possible the return of 80 per cent of the money originally paid in as stock. The financial statement presented by President Sam Davidson showed that the company sustained a loss of approximately $39,000, due to the failure of the Fort Worth Savings Bank & Trust Company. The contract from which Stone & Webster were released bound them to start work on the line within one year, and the promoting company agreed to furnish a bonus of $75,000 and right-of-way. G. H. Clifford, general manager of the Stone & Webster interests at Fort Worth, told the directors that his company desired to build the Fort Worth & Denton Interurban Railway but had been prevented from doing so because of stringent financial conditions brought about by the European war and the introduction of the jitney into the city traffic. [July 17, '15.]

Houston, Richmond & Western Traction Company, Houston, Tex.—Offices have been opened by this company at 506-507 Moore Building, San Antonio, to take charge of the construction of the first 100 miles of this company's line between San Antonio and Houston. It is expected that engineers will soon be sent out and a decision reached as to which of the two routes under consideration will be adopted. E. Kennedy, Houston, president. [Oct. 16, '15.]

Richmond, Rappahannock & Northern Railway, Richmond, Va.—Bids have been received by this company for the construction of its line from West Point to Urbana, 17 miles, and it is expected that the contract will soon be awarded. C. L. Ruffin, 514 American National Bank Building, Richmond, chief engineer. [Oct. 2, '15.]

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Operation has been begun by this company on the extension of its Twenty-seventh Street line between Center Street and Hopkins Avenue.

SHOPS AND BUILDINGS

Union Traction Company of Indiana, Anderson, Ind.—This company will build a new freight house on East Washington Street, Alexandria. The building will be of cement blocks or brick. The passenger station will be removed at once from the present site at Harrison and Monroe Streets to a location farther up-town.

Springfield (Mass.) Street Railway.—Plans have been drawn up for this company's new Hooker Street carhouse and shops which will be erected shortly. The buildings and tracks will cover the entire property of the company, which measures 300 ft. on North Main Street and extends the entire front of the property and back 350 ft. It will be of fireproof construction with an office section in front. One-half of the office section will be two stories high and the rest one story. The new carhouse will eliminate that now in use at Carew Street, but the one on the west side of Birnie Avenue will be retained and two more tracks will be extended to the Boston & Maine tracks. The principal building will have a capacity of 120 cars, the yards 190 and the Birnie Avenue carhouse thirty-two. It is estimated that the cost will be about $175,000.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The contract for the construction of station finish on Section No. 2 of Route No. 39, the New Utrecht Avenue elevated railroad in Brooklyn, has been awarded by the Public Service Commission for the First District of New York to A. L. Guidone & Son, Inc., the lowest bidders, for $513,656. The steel structure for this section is nearly completed. This line will be operated by the New York Municipal Railway Corporation on a branch of the Fourth Avenue subway. The contract provides for the finishing of the stations between Thirty-eighth and Sixty-second Streets within three months so that the new road may be operated as far south as Sixty-second Street, where transfers can be given to the Sea Beach line to Coney Island.

Toronto (Ont.) Suburban Street Railway.—This company is constructing a carhouse at Lambton Park.

POWER HOUSES AND SUBSTATIONS

Illinois Traction System, Peoria, Ill.—This company has completed the construction of a stack at Danville, Ill. The stack is 250 ft. high and is 18 ft. in diameter. It will take the place of three stacks which have been used in the past.

McComb & Magnolia Railway & Light Company, McComb, Miss.—It is reported that this company, which was recently incorporated in Mississippi to construct a line in McComb and an interurban railway to Summit, Fernwood and Magnolia, contemplates the construction of a power plant. H. W. Bell, Laurel, engineer.

Jersey Central Traction Company, Keyport, N. J.—Plans are being made by this company to erect a new substation at Stone Church to replace the portable one now in use. The new station will supply energy in Highlands and adjacent towns.

Toronto (Ont.) Suburban Street Railway.—Substations are being constructed by this company at Georgetown and Guelph.

Manufactures and Supplies

ROLLING STOCK

Pittsburgh (Pa.) Railways are reported as expecting to purchase at once a large number of cars.

Miami (Fla.) Traction Company advises that it will need construction cars and equipment for extensions, also trailer cars.

Lake Erie & Northern Railroad, Brantford, Ont., has ordered eight electric cars from the Preston Car & Coach Company, Preston, Ont.

American Sugar Refining Company, Brooklyn, N. Y., is considering the possible purchase of one electric freight locomotive, for third-rail, overhead or storage battery operation.

Muscatine & Iowa City Railway, Muscatine, Ia., has ordered four gas-electric motor cars from the General Electric Company and will also purchase some gas-electric locomotives.

United Traction Company, Albany, N. Y., noted in previous issues of the ELECTRIC RAILWAY JOURNAL as expecting to purchase fifteen new cars, has ordered these car bodies from the Wason Manufacturing Company.

Toronto (Ont.) Suburban Railway has ordered six center-entrance interurban cars from the Preston Car & Coach Company, Ltd., Preston, Ont. They will be 61 ft. long over vestibules and will be mounted on Standard Motor Truck Company trucks. They will be equipped for 1500-volt d.c. operation.

General Electric Company, Schenectady, N. Y., has received an order from the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., for eighty General Electric motors, to replace a similar number of motors of its present equipment.

TRADE NOTE

S. K. F. Ball Bearing Company, Hartford, Conn., which is about to erect a factory in Hartford for the purpose of manufacturing the S. K. F. ball bearings in America, as noted in the ELECTRIC RAILWAY JOURNAL of Sept. 18, 1915, has elected Frank A. Vanderlip of the National City Bank as a director. The board of directors will also consist of B. M. W. Hanson, vice-president; Pratt Whitney, Hartford; F. B. Kirkbride, 7 Wall Street, New York; A. Carlander and S. Winquist. B. G. Prytz will act as president.

ADVERTISING LITERATURE

Trolley Supply Company, Canton, Ohio, has issued a catalog describing its headlight for interurban cars.

E. I. du Pont de Nemours & Company, Wilmington, Del., has issued a colored sheet illustrating the uses of its explosives for railroad construction and other purposes.

Ajax Metal Company, Philadelphia, Pa., has issued a catalog describing its various metals, including white metals, ingot metals, journal brasses, plastic bronze and "bull" babbitt metals.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a large catalog announcing its Christmas program for 1915, in connection with Electrical Prosperity Week.

Canton Culvert & Silo Company, Canton, Ohio, has just published a set of specifications for corrugated metal culverts. These have been prepared with a view to co-operating with railways and highway engineers, contractors and others, in supplying them, for references at least, if not for adoption, a foundation for a comprehensive specification for culverts. The specifications are not limited to any single type, riveted or nestable, but rather present a choice of all that the company considers fair and good in the production of a first-class culvert. The various sections embody the experience gained by the company in studying metal culverts. One of the sections covers the analytical features which call for a pure iron, but the company explains that this may be omitted and the remaining clauses cover the best type of culvert construction.

Harrison Safety Boiler Works, Philadelphia, Pa., has issued a 68-page booklet entitled, "Finding and Stopping Waste in Modern Boiler Rooms," and devoted to the use and design of Cochrane meters. The value of feed-water and condensate meters as aids in the management of power plants is taken up in detail in the introductory part of the book, covering among other factors, grade of fuel, grates, methods of firing, air leaks, control of draft, condition of gas passages, scale and soot on boiler tubes, radiation, etc. With a feed-water meter installed, it becomes possible to measure the effect of changes in connection with these several factors. As a result, scientific management becomes easy and natural, and standard rules of operation, such as directions for handling fires, regulation of draft, blowing of soot, banking of fires, carrying overloads, etc., can be written out, so that any man following them can obtain good results. The use of records further arouses the ambition and spirit of emulation of the men, and makes it possible to reward special skill or attention to duty by bonuses or promotions. In the subsequent sections of the book, the Cochrane metering heater, a combined open feed-water heater and hot-water meter, with its several modifications, is described in detail, also the Cochrane flow recorder for use in connection with V-notch weirs. In the last pages of the book a new type of meter, working on the volumetric principle by means of which it is possible to obtain an accuracy of within one-third of 1 per cent, is described.

NEW PUBLICATION

Statistics of Railways in United States, 1904-1914.—Consecutive Bulletin No. 81. Bureau of Railway Economics, Washington, D. C. 67 pages.

This bulletin, which supersedes Consecutive Bulletin No. 75, gives tabulations for steam railroads based upon official data published by the Interstate Commerce Commission for the fiscal years ended June 30, 1904, to 1914, the latest year for which such official data are obtainable. Mileage, capitalization, operating, equipment, labor and accident statistics are included.

NEW YORK TRANSIT CONTRACT AWARDS

The Public Service Commission for the First District of New York has adopted the recommendation of its counsel and chief engineer and denied the request of the New York Municipal Railway Corporation for permission to let the contract for the construction of the Coney Island terminal to the George W. McNulty Company without competitive bidding. The New York Municipal Railway had asked permission to do this on the ground that the McNulty Company, which had built the Sea Beach Railroad, was thoroughly familiar with the work required, had given satisfactory service in its previous contract, and had submitted a list of unit prices for the proposed work which were reasonable and compared favorably with prices obtained by the commission under competitive bidding. The commission, however, refused to consent to the award of the contract without competitive bidding.

Alfred Craven, chief engineer of the commission, has approved the award of a contract by the New York Municipal Railway Corporation to the Charles A. Myers Contracting Company, Inc., for grading, removing existing tracks, laying new tracks and special work, installing contact rail and other electrical work, etc., in the improvements now being made by the company in its Fresh Pond Road yard in Queens Borough. The contract amounts to $17,123.

The commission has given a qualified approval to the award by the New York Municipal Railway Corporation to the American Bridge Company of a contract for furnishing steel to be used on the third-tracking of the Fulton Street elevated line in Brooklyn between Nostrand Avenue and Adams Street, on the Coney Island terminal, on the third-tracking and reconstruction of the elevated railroad at East New York, and for the reconstruction of the Brighton Beach line from Church Avenue to Malbone Street, aggregating $2,274,700. The company submitted to the commission bids from eight different firms to whom the specifications were submitted, and the American Bridge Company was the lowest of these bidders.

Electric Railway Journal

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RULE-OF-THUMB VS. RATIONAL METHODS

As the electric railway business becomes more highly developed from the technical standpoint the methods used in solving problems naturally tend to become more rational or systematic. This fact has been increasingly evident in the articles published in the ELECTRIC RAILWAY JOURNAL from time to time, especially when comparison is made of the practices over an interval of several years. It is illustrated this week particularly in the article by J. R. Brown which appears in the "Equipment and Its Maintenance" section of this paper. The question as to the effect of the welding process on the rail head is answered by appeal to analysis. In the present case this consists in sectioning a rail to which a bond has been welded, and in bringing out the characteristic structure of the steel by etching, from which its properties can be determined with some measure of exactness. Supplementing this, hardness tests are made with simple apparatus. As such methods become more popular progress will be more rapid, for the results of a proposed improvement can be predicted at a nominal cost without waiting for the test of time. With the increasing difficulty of making a fair profit from electric railway operation accurate testing must take the place of "cut and try."

EVIDENCE OF REAL PUBLIC JUSTICE

Waiving its right under the franchise agreement to limit rates to a stipulated figure, the authorities of a certain town voluntarily assented to a 30 per cent increase in order to permit successful operation of a private utility. This sounds Utopian, but it actually happened recently in connection with the gas company in West Seneca, N. Y. Some pessimists may assert that selfishness was the leading motive of the town, for the utility easily showed that the franchise provision in question had been for years inimical to its prosperity and with rising costs would mean its dissolution. We wish, however, that there were more of such selfishness. It has been too little recognized that a utility and its customers have a mutual interest in the business and that good service must be properly compensated if the utility is to prove attractive to investors and beneficial to the public. Some day the public will more fully understand that unreasonable demands in regard to service and rates ultimately mean loss and inconvenience to themselves as well as to the utility. The rights of the utility to income and benefits must be conserved fully as much as the rights of the public to rates and service. The two points of view are not antagonistic; they are mutually dependent, even if not always so recognized by the public.

CAN ELECTRICAL MACHINERY RUN HOTTER?

The discussion on safe working temperatures for electrical apparatus, which occupied the New York meeting of the A. I. E. E. this month, treated of a subject of the most vital character. Some surprising information was given out, but, thanks to the existence of a great store of practical knowledge of insulation matters, the statement that electric generators had been operating for many years at temperatures frequently above 250 deg. C. in the "hot spots" was received calmly. Insulation of Class B in the A. I. E. E. code was the center of interest. Manufacturers believe that this will safely withstand a higher temperature than that now permitted, without special guarantee by the manufacturer, under the A. I. E. E. rules. The users of machines are conservative as they want to be sure of long life of their equipment. The general tendency, however, is toward more liberal temperature rise allowance. The New York discussion suggests a number of significant facts. First is the influence that the A. I. E. E. rules have in guiding electrical practice. Again, temperature rise limitations for machines insulated with refractory materials have in the past been quite conservative. A third point is that the hotter generators and motors can be operated the cheaper they are in first cost. The relation of maintenance and first costs must determine the limits of economical temperature rise. Unfortunately, the resistance of electric conductors increases with the temperature, so that the same current produces heat faster in a hot machine. This may prove to be a controlling factor.

WEIGH L. C. L. FREIGHT AT POINT OF ORIGIN

Although electric interurban railroads have been careful to render their patrons the full measure of service in connection with freight traffic, they have, in some instances, been exceedingly lax in safeguarding their own interests. This applies particularly to checking the weight of all less-than-carload freight shipments. The extent of the losses due to negligence in this particular may vary from a few cents to several dollars on a single shipment. Aside from the possibility of a gain in revenue, the process of checking the weight of a shipment also serves as a check on its condition and the number of packages contained and also frequently reveals illegible marking which would delay or make impossible prompt delivery. In case a claim is filed subsequently, information of this nature is invaluable. Weighing and checking at the point of origin will also eliminate the cause of many claims and increase the number of satisfied patrons. If relief from the former is obtained the traffic department may devote more of its energies to obtaining new business and less to the most undesirable and unsatisfactory phase of the freight-handling business. As a general proposition the way station agent is not a busy man, so that insistence on weighing and checking at this point does not work a hardship. At terminals or heavy shipping points such a requirement might increase the burden, but the savings effected would warrant employing additional help. As we see it, therefore, insistence upon weighing at the point of origin is a panacea for many freight-department ills.

LOCOMOTIVE MILEAGE AND ELECTRIFICATION

The electrification of 440 miles of the Chicago, Milwaukee & St. Paul Railroad is by no means interesting only because of the immensity of the project, nor is its importance measured alone by the radical nature of the forward step that has been taken by its sponsors. As it stands, the installation will go further than any of its predecessors toward providing a definite answer to one of the most important but mooted questions of the electrical operation of steam railroads, namely, that of the influence on cost of operation of the large mileages of which electric locomotives are capable.

Heretofore everyone of the electrifications that has been undertaken in this country has covered much too short a route mileage to escape the handicap of the terminal detentions which are invited every time an engine arrives at the end of its run, even though it may be perfectly ready to continue in revenue service at the head of a train. On the St. Paul, however, no such condition will obtain, and as pointed out in these columns when the project was first agitated, electrification will permit each locomotive to take its train over the whole 440 miles of route, setting out bad-order or local cars as are required at the various stations and changing crews in accordance with their physical limitations. Obviously this provides an opportunity to increase locomotive mileage to an extent that is unparalleled in previous railroad practice. With the short divisions of, say, 150 miles that are necessary for steam operation, the time lost at the division points and chargeable only to the terminal delay may actually constitute more than half of the time spent between terminals in revenue service, but with the division points eliminated, practically all of the time thus wasted may be utilized by the locomotives in hauling trains. The vastly increased locomotive mileage thus possible may, and probably will, go far to offset the effect of the lesser traffic density which has been cited from time to time as a reason for believing that the St. Paul installation will not equal the record of 20 per cent return on the investment that has been made on the Butte, Anaconda & Pacific electrification in the same territory.

Traffic density is, no doubt, essential in a large degree for the profitable substitution of electricity for steam as a motive power. But the underlying reason for this advantage is, in the end, nothing more than the fact that it is necessary to make frequent and regular use of the costly contact and transmission system in order to earn interest charges and profit upon the investment. Exactly the same reasoning applies to the electric locomotives, which constitute from one-half to one-third of the total investment in the ordinary electrification project. If the locomotives are not utilized to their fullest extent, or, in other words, if they do not make the maximum revenue mileage of which they are capable, they become just as much of a financial handicap as an expensive contact system that is used by only one or two trains daily. For example, the St. Paul locomotives comprise roughly 40 per cent of the entire investment for electrification, and if the annual mileage per locomotive now expected should be cut in half for some unforeseen reason, the installation would have to carry 40 per cent more interest on account of the necessity for double the number of locomotives, to say nothing of the increased cost of maintenance per mile that invariably follows reduced mileage. Such an increase in interest would offset the major part of the net earnings, but, on the other hand, if the annual mileage per locomotive now expected should be doubled, the interest on the installation would be reduced 20 per cent as soon as a place could be made for the surplus locomotives, and this would be the equivalent of a corresponding increase in profit.

Pending the results of actual operation it is, of course, impossible to say what the St. Paul locomotives will accomplish in the way of yearly revenue-miles, although as outlined above there is every reason to believe that it will be very high. The main point is that this electrification will at last give an opportunity to show what can be done along these lines by electric units, and when the results are known it is quite possible that the ensuing economies will be sufficient to make hesitation in trunk-line electrification seem like criminal negligence.

EFFICIENCY IN EXPORT

For a country which has made such rapid progress in technical matters it is sometimes surprising that the United States has not done more in a scientific development of its export trade. We have the goods, the men to make them, and the money to exploit them, but our export methods have always been characterized by a *laissez faire* policy which has left our manufacturers far behind in the competitive race with the manufacturers of other countries. This policy has affected the small manufacturing companies much more than the large ones. The latter could afford to have their own representatives abroad to develop the field, arrange for bills of exchange, and, if necessary, help to finance the purchase of their products. The result has been, for example, that representatives from the fleet of the Standard Oil Company are seen in practically every important harbor in the world. But with the small manufacturer it has been an entirely different matter. He could not conduct the complicated business of export trade from his home office, which might be perhaps far from the seaboard. As one small manufacturer testified recently before the Federal Trade

Commission: "We have had an exasperating experience with port duties, consular fees, fines for improper wording of bills of lading, improper boxing, and improper net and gross weights, cubic contents and dimensions. For a small concern, business in South America as well as the Orient is an utter impossibility."

The present war in Europe and the change which it has effected in world business conditions, however, have forced a change in our policies in the matter of our business relations with foreign countries. A large part of the world outside of the belligerent countries is looking to us for assistance in the development of its enterprises. The usual channels for the receipt of manufactured and raw materials which these countries absolutely need have been interrupted, and they need money or credit for the development of enterprises already begun. This demand seems bound to continue even after the war is over, because during the reconstruction period in Europe, the manufacturers there will have all that they can do for a long time to come to repair the waste of war. Hence, the general inquiry now being conducted into foreign trade conditions by the Federal Trade Commission and the recent announcement of the formation under the auspices of the National City Bank of a large company to develop the foreign trade of the United States, possesses the greatest significance. It is hoped that through the agency of these two movements a large part of the handicap under which the American manufacturer has labored in seeking foreign business through his lack of training, knowledge and experience in this class of business will be overcome.

It is an especially interesting and significant fact that the board of directors of the American International Corporation, whose organization with a capital stock of $50,000,000 was announced on Nov. 23, contains the names of a number of men who have been prominent in electrical development in this country. This makes the organization of this company of peculiar interest to manufacturers of electrical apparatus as well as to those who have been interested financially in electrical undertakings in this country and are ready to invest in sound enterprises abroad of a similar character. Tramway undertakings in South America and the Orient have been a favorite form of investment for many years by Belgian, British and German capitalists, but practically no money has gone from this country into enterprises of this kind. This has been due to several causes, one of which has been a lack of knowledge on the part of investors in this country as to the character of these investments and another has been a lack of means by which investments could easily be made in them. Nevertheless, the conditions under which these companies operate are in many respects much more favorable than those governing similar enterprises in this country. With the attention which is now being given to the development of foreign trade and foreign enterprises, it is not too much to expect that the various manufacturers and investors who have built up successful electrical undertakings here will be able to extend their enterprise to countries which need undertakings of this kind much more at present than our own country.

AVOIDING INACCURACIES IN STEEL CAR BUILDING

Errors in small details of construction occasionally produce more serious consequences with steel than with wooden cars. In building wooden cars a mistake in measurement can often be rectified without disfigurement or without incurring practical objections by the insertion of a small wooden filler. With steel construction, however, this picture-puzzle method is impossible. Exact dimensions are particularly essential in the construction of parts of steel cars exposed to the weather. For example, special ventilators may be easily and snugly attached to the roofs of wooden cars by the use of screws, whereas in steel cars where riveted or bolted construction is used, if the ventilator fit is imperfect serious leakage of rain water or melting snow may occur. In a recent case, the builders of a number of new steel cars for a well-known railway neglected to furnish the necessary insulating gasket between steel sheets where the ventilators were attached. In addition, they carelessly sheared off too large a portion of the inner ventilating duct and thus caused such a poor ventilator fit that after the car was placed in operation rain leaked in at that point and ruined the interior paneling.

One railway company which discovered that a certain shipment of cars delivered to it did not conform strictly to specifications insured satisfactory results on the following car delivery by warning the car builder in advance that it would dismantle one of the cars when delivered; that if the railway company then should discover any hidden errors in measurements of design, method of assembly or quality of material used, it would immediately refuse acceptance of all the other cars. Although the above admonition was quite successful in that case in bringing the car builder to terms, to dismantle a car would, of course, involve much unnecessary labor and expense. Cannot such trouble be forestalled in a milder way by the exertion of a little more circumspection all around? The car builder for the sake of his own reputation should study close adherence not only to the specifications furnished by the railway and specialty manufacturer, but also to requirements of good car-building practice not expressly "written in the bond," and should endeavor to avoid inaccuracies of workmanship. The manufacturer of special apparatus should be sure to give explicit directions on his blueprints for installing his equipment so as to render absolutely intelligible such details which may not be self-evident from the appearance of the drawing alone. The railway company, in its turn, would be more likely to reap fuller satisfaction from its rolling-stock by sending a competent inspector to the car-builder's plant during the period of car construction, providing the company can financially afford such inspector and the number of cars ordered is sufficiently large to warrant his employment. Observance of the above suggestions should result greatly to the advantage of all three parties concerned.

Electrical and Mechanical Details of the Bay State Car

Outside-Hung, Nose-Suspension Motors and a New Form of Control Are Used, and a Description of These Features Is Published Together with Details of the Body Construction—A Detailed Table of Weights Is Appended

In the ELECTRIC RAILWAY JOURNAL of Oct. 23, 1915, was published a general description of the new convertible car of the Bay State Street Railway, which is characterized by many features of striking originality. The motors, control and air-brake equipment of the car also embody numerous points of interest and these are outlined in the following paragraphs together with a description of the semi-steel body construction.

MOTORS

Four General Electric motors of the design known as GE-247-C are provided. These are similar in general internal design to those used on the low-wheeled cars in New York City and Pittsburgh, having internal ventilation to reduce the weight for a given capacity. They are the first in the country, however, to be designed for outside-hung nose suspension. Each motor has a rating of 35 hp. on 600 volts and 30 hp. on 500 volts, according to the manufacturer's standard of 75 deg. C. rise by thermometer on any part of the windings after one hour's run on the stand with all the covers off.

The frame is of the box type, and the weight of the motor without gear and pinion is 1685 lb. or with gear and pinion, 1941 lb. The motor design includes commutating field coils and the usual modern features that are found in standard practice of the General Electric Company.

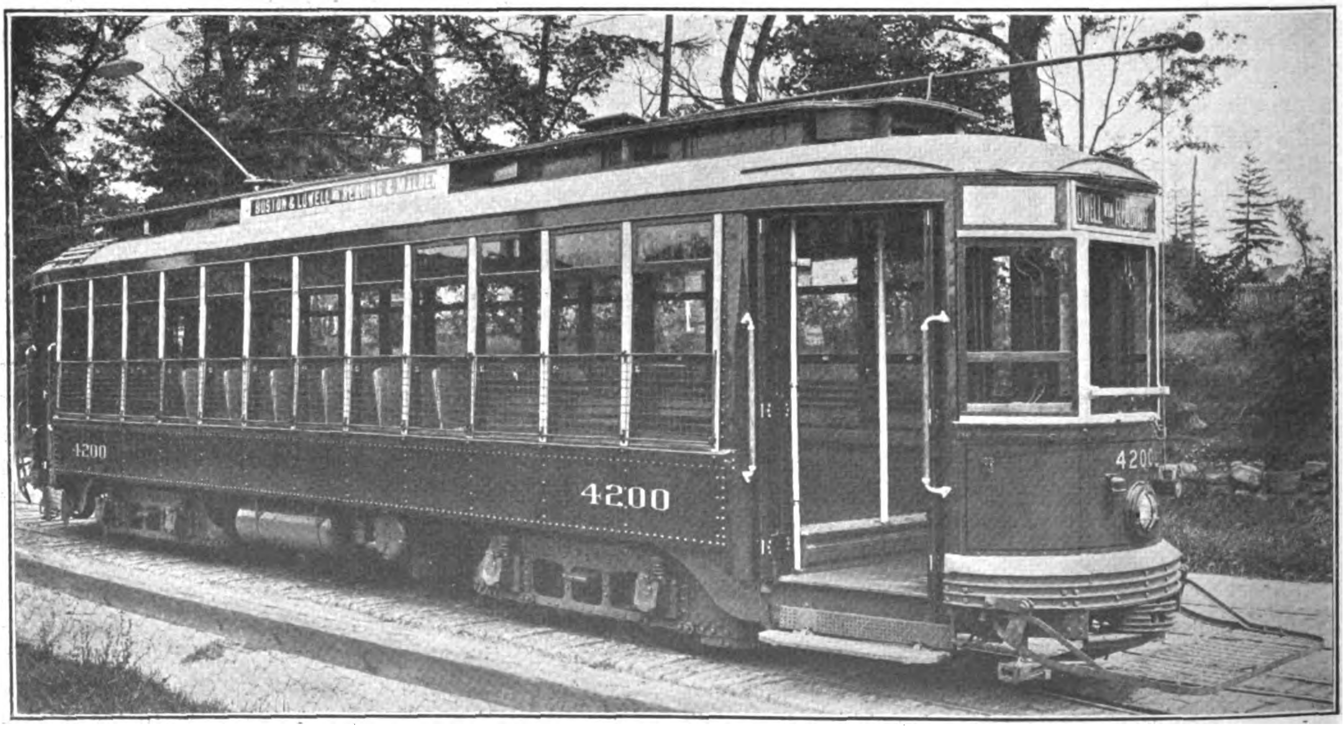
The nose, which is designed for spring suspension of the motor, is cast integral with the magnet frame, but instead of being located in the center of length it is at the center of weight of the motor. The motor is mounted so that the nose comes on the center line of the truck, giving a larger clearance than usual between the gear case and the wheel and adding space for the brake hanger. The gear ratio used on the new car is 20:58, at which a maximum speed of 35 m.p.h. is attained on a level track at 600 volts. The length of the motor over all along the shaft is 41⅜ in., and the depth from the center line of axle to the bottom of the gear case is 11 3/16 in., giving 3 13/16-in. clearance above the rail on a 30-in. wheel. The motor is also adapted to a gear ratio of 15:63 for purely city service. The use of the nose suspension for outside hanging instead of the ordinary bar and bracket suspension cuts 100 lb. per truck from the weight of the complete car, and there is a minimum of strain on the axle bearings, as in ordinary practice with three-point suspension. Under the motor shell the clearance above the rail is 4 9/16 in.

TRUCKS

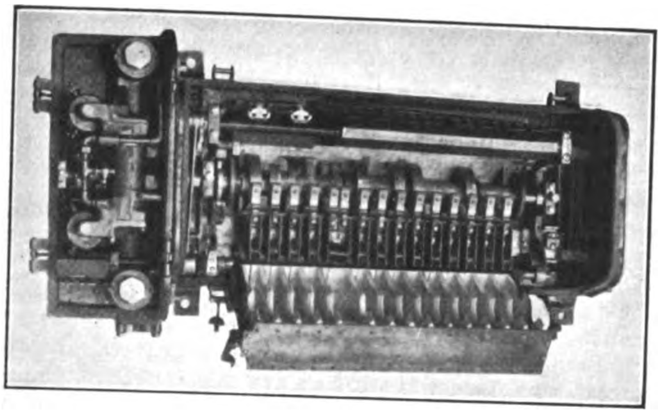
The trucks are the Bay State Street Railway 12-B type, and except in minor details they are similar to the company's 12-A truck, which was designed by the equipment department of the railway and fully described in the ELECTRIC RAILWAY JOURNAL of Oct. 5, 1912. In front of each truck is a pilot board consisting of ¼-in. x 4-in. steel, bent to shape as shown in the accompanying illustration and bolted to lugs attached to the truck frame.

BRAKES

Both hand and air brakes are provided, the former being of the Peacock type, with a specially designed hand wheel for vestibule service which fits closely into the vestibule but allows ample space for manipulation. The hand-brake lever is divided into two independent



BAY STATE CAR EQUIPMENT— GENERAL VIEW OF CAR



BAY STATE CAR EQUIPMENT—ELECTRO-PNEUMATIC CONTROLLER

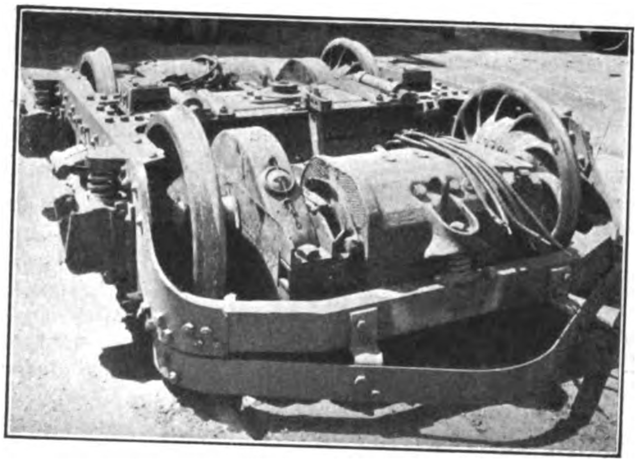
sections which work on each side of the fulcrum. This arrangement keeps the chain taut on the side connected with the end away from the point of application, and facilitates free movement of trucks, motors and other rigging which might otherwise be hampered by slack chain. Pulleys are used beneath the car floor to facilitate free movement of chains.

Straight air-brake equipment with an emergency feature has been installed on the car. This equipment was recently developed by the General Electric Company to meet the requirements. Under these conditions the straight air brake with emergency feature possesses the advantage of securing the maximum brake-cylinder pressure in the minimum time in emergency, thereby shortening the distance required to bring the car to a stop, and adding materially to the safety features of the equipment.

The emergency feature consists of a valve which on maximum application opens a passage directly from the main reservoir to the brake cylinder. A CP-27-B compressor, with a Spencer air purifier is used, this being suspended directly by lugs bolted to the framing, thus eliminating the usual cradle. The main reservoir is 16 in. x 60 in., and there is also a control reservoir 10 in. x 30 in. which provides the air supply for the operation of the doors, and control mechanism. By adding the necessary hose and couplings two-car trains can be operated with all the protection of the automatic air brake and without in any way dispensing with the simplicity, reliability and ease of manipulation of standard straight air-brake equipment.

CONTROL EQUIPMENT

The control apparatus is virtually a General Electric K-35 control cylinder development with balanced air-operated head, pneumatically operated reverser and electromagnetic line breaker. The apparatus provides the features of permitting the use of a small controller on the platform; the installation of all motor current-breaking equipment under the car where any arcing is invisible to the passenger; the use of contactors instead of the controller, to break the main current; the elimination of one piece of main current-carrying apparatus on a double-ended equipment, with resulting simplicity of wiring; the protection obtained by the use of apparatus having a definite time limit for notching up to full parallel position and multiple-unit operation.

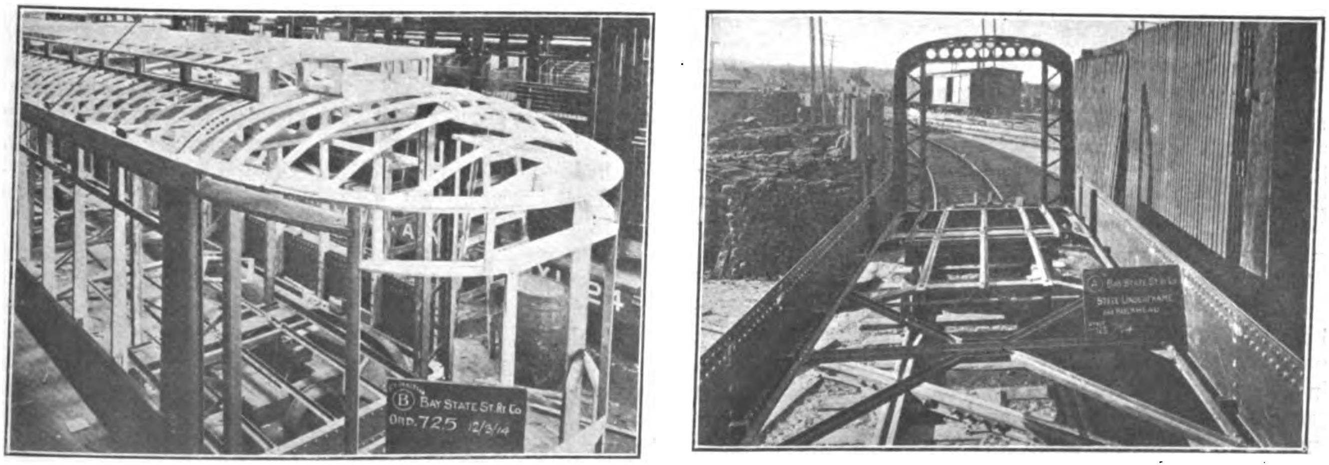


BAY STATE CAR EQUIPMENT—TRUCK FULLY ASSEMBLED

The contactors, with an overload relay, are inclosed in a sheet metal box. The overload relay functions to interrupt the control circuit of the equipment if the line current of the car exceeds the value for which the relay is set. Having once tripped and dropped out the line breaker, the relay locks itself open and must be reset before the line breaker can be reclosed. This relay is reset electrically by the control switch in the motorman's cab.

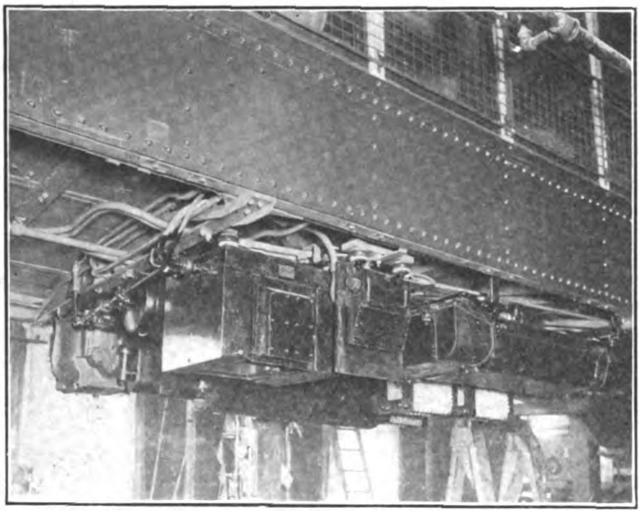
BODY FRAMING

Owing to the low steps and large side window opening to be provided for, a side girder construction of unusual design was used. With the height of floor from top of rail but 34 in. to 36 in. and the height from floor to top of window stool 16¾ in., the side girders had to be extended below the floor 6 in. to provide a pocket deep enough to take the interchangeable window sashes. This gave a 22¾-in. side girder, consisting of a 22-in. x 3/16-in. steel plate to which a pressed member at the top and bottom was riveted. The latter member forms a pocket with a bent up flange for floor support; the top member forms the window stool. Inside the hollow



BAY STATE CAR EQUIPMENT—CONSTRUCTION VIEWS SHOWING ROOF AND FLOOR FRAMING stool an extra stiffener in shape of a 2-in. tire channel is riveted to the plate. The intermediate posts are fastened to the side girders with 4½-in. bolts spaced equal distances apart from center of window stool and down, and fitted into special castings, riveted to the girder at the lower edge of the window stool and in the pocket. At the bolsters this casting runs the whole height of the girder, and the bolster posts are braced with an angle iron bracket from the top flange of the bolster. In place of the usual truss planks, light steel pressings in the form of square pans are placed between the posts, the side flanges of the pans being tied together through the posts forming a continuous truss. The bottom flange is tied in with the inner flange on the girder pocket, and the top flange, finished off, is used as a seat support. These pans are lined with insulating material and hold the heaters and, in addition to the castings at the window stool, they insure proper spacing of the intermediate posts.

The bolsters are of cast steel; the top and bottom flanges are widened to 12 in. at the ends, and fastened with turned machine bolts between two extra wide gussets riveted to the bottom and the inner flange of the girder pocket. These gussets follow the girder to about 20 in. in front of the bolster, where it receives the extended platform supports which again are tied in at the body corner with the end sill, side girder and corner post with a bracket-shaped steel pressing and a gusset plate extended downwards lapping the side of the platform support. The latter is also suspended from the end sill with a U-shaped angle-iron stirrup, whose ends are flattened and bolted horizontally against the end sill, bent over and bolted vertically to the corner gusset to insure proper clamping of the supports. The end sills consist of a 10-in. x 3/16-in. steel plate and two angle-iron stiffeners riveted to the inner edge of the sill at the top, where it receives the body floor supports and the extended threshold plate, and on the outer edge at the bottom where it is tied to the platform supports and receives the platform floor furrings.



BAY STATE CAR EQUIPMENT—VIEW OF UNDERSIDE OF CAR

The platform supports are channel-shaped ¼-in. steel pressings, 10½ in. deep at the end sill and tapered off to 6 in. at the ends, where they are tied together on top and bottom with steel plates edged with angle iron. In the center between these plates the draft rigging, a combination drawhead and spring-cushioned bumper of special design, are carried. The crown piece and the floor are also bolted to the top flange of the platform supports and diagonal cross-braces run from the body corners to the platform support, where they are tied in through the web of the latter with pressed-steel brackets supporting the vestibule corner posts and the upward extended anti-climber bumper, which had to be kept a certain height from the rail to insure interlocking in case of colliding with other cars with higher platforms. The bumper is also braced between the platform supports with triangular-shaped steel pressings, tied to the top gusset plate.

The center construction of the bottom framing is made up of two needle beams and diagonal braces tied together at the side members with pressed steel gussets, and in the center of the car the braces are tied in with a channel-iron center beam by a liberal-sized gusset in such a manner as to give the maximum of clearance for brake rigging, pipes and wire conduits carried above the equipment between the needle beams. The latter are constructed as queen-post trusses, reinforced at the top with a floor furring tied to the side member gussets. This lends stability to the side members and is especially adapted for floor support and to resist the load of the equipment which is suspended between the two needle beams.

Floor support over the motors and wheels is made up of three light T-shaped steel pressings, strung from needle beam to end sill and tied to the top flange of the bolster and bridged across with angle irons, backed with floor furrings. On each side of the bolster an additional T-bar extends from the end sill back beyond the bolster the full length of the longitudinal seat framing, the latter being integral with the floor supports. This construction gives practically a flush floor over the motors and wheels, the floor being laid in between and parallel to the web of the T-shaped pressings. The matting consists of strips of ⅞-in. maple, carried above the floor instead of flush with it, facilitating cleanliness and solidity of floor construction.

Bulkheads were constructed with unusually large openings and disappearing bulkhead doors, the doors being designed to operate in pairs, with one leaf sliding at double the speed of the other. The door pocket is narrower than the longitudinal seat alongside, thus offering no hindrance whatever to the movement of the passengers, whether in ingress or egress. The skeleton construction of the bulkheads consists of a ⅛-in. pressed-steel cornerpost reinforced with a 3/16-in. pressed angle riveted to the side girder and laced up with the door post, a light steel pressing, with 1½-in. x ⅛-in. bars and tied across overhead with a pressed-steel pan shaped to suit the curvature of the roof. This pan with the skeleton frame on the outer edge of the corner posts, consisting of pressed-steel flanged angles, forms the usual pocket for the door hanger, the latter being a ball-bearing hanger of special design.

The side posts are 1½-in. x 4-in. ash, with separate sash runs and facing cap glued and screwed on. The upper sash, which is stationary, is built and runs continuous from corner post to corner post, the rails being halved in with the intermediate posts under the facing. This stiffens the construction as much as would a letterboard 19 in. wide while the actual letterboard is only 6½ in. wide.

There are eleven steel carlines 1½ in. x ¼ in. extending from side to side in one piece tied to the monitor and body roof rafters and bolted down to the side of the body plates.

Agasote headlinings are used and the finish is natural cherry.

The trolley base support is constructed as a short bridge, bolted securely to the rafters and steel carlines, instead of the usual trolley planks.

Appendix—Detail Weights of Bay State Passenger Car, 1915 Type

	Number Per Car	Weight Per Car, Lbs.
ELECTRICAL EQUIPMENT		
Galvanized-iron conduit	..	250.8
Fittings and straps	..	75
B.J.343 junction box and brackets	4	92
B.J.348 control connection box	1	26.5
B.J.348 control hanger and bolts	..	6
Main trolley		
Motor cable		
Resistance cable		
Light wire		
Air wire	..	252.5
Heater wire		
Buzzer wire		
Arc-light wire		
Control wire		
Wire furrings	..	40
Wire moldings	..	48
M.S. 8 switch	2	36
M.S. 14 switch	2	9
M.S. 12 switch	..	5
M.S. 46 switch	4	20
Roof fuse complete	2	23
Line breaker	1	188
Line-breaker hangers	..	9
Resistance box	3	239
Resistance-box hangers	..	41
Porcelain insulators	18	54
Lightning arrester	1	35
Kicking-coil core	1	8.5
M.A. 13 fuse box	1	13.5
M.S. 13 fuse-box suspension	..	5
P. C. motor controller	1	510
P.C. motor-controller brackets	..	55
Master controller	2	180
Master-controller brackets	..	7
Incandescent headlight	2	21
Incandescent-headlight switch	2	8
Arc headlight	1	12
Arc-headlight resistance	1	10
Arc-headlight dasher plugs	2	6
Arc-headlight switch and condulets	2	10
Arc-headlight brackets	2	10
Lamps	..	2
Lamp sockets and shade holders	..	29
Spare lamps and sockets	..	1
Trolley stand support	2	27
Trolley stand	2	260
Trolley pole with harp and wheel	2	60
Trolley-pole hook and anchor	2	5
Trolley-rope guard	2	10
Trolley catchers	2	25
Trolley catchers safety hook	2	2
Cloth and rubber tape	..	5.5
Circular loom	..	15
Brass cleats	..	2
Solder	..	5
Sign-light sockets	2	1
		2,740.3
Trucks	2	12,060
Motors	4	6,746
Gear, pinion and axle collar (4 of each)	..	1,236
AIR-BRAKE EQUIPMENT		
Galvanized-iron pipes	..	148
Galvanized-iron pipe fittings	..	50
Galvanized-iron pipe hangers	..	12
Air compressor	..	618.5
Air-compressor hangers	..	8
Air reservoir	1	109
Air-reservoir hangers	..	10
Air-reservoir auxiliary	1	34
Air-reservoir auxiliary hangers	..	7
Brake cylinder	1	160
Brake-cylinder hangers and bolts	..	27
Brake-cylinder levers	2	52
Brake-cylinder tie-rod	1	23
Brake-cylinder lever steel pins	12	13
Brake-cylinder lever carrier	..	34
Brake-cylinder lever wearing strips	..	10
Truck-brake rod	2	77
Air governor	1	34
Air-governor bracket	..	5
Emergency valve	1	19
Emergency valve suspension	..	10
Reducing valve and strainer	1	2.5
Motorman's valve with one handle	2	25.5
Motorman's-valve bracket	..	5
Safety valve	1	5
Oil strainer	1	11.5
Drain cocks	2	2
Shut-off cocks	3	3
Whistle	2	10
Whistle valve	2	4
Muffler	2	10
Pressure gages	2	6
Strainer	1	4
		1,549
Buzzer system	..	18.5
HEATERS		
Heaters complete	24	356.5
Heater furrings	52	41
Heater switch	1	16
Heater switch, magnetic	1	38.5
		452

	Number Per Car	Weight Per Car, Lbs.
HAND BRAKE		
Hand-brake staff with pawl, ratchet, bushing and plate	2	34
Hand-brake gear box (complete)	2	53
Hand-brake wheel	2	18
Gear-box bracket	4	15
Geared hand brake	2	77
Hand-brake rods	2	48
Sway bar with chains, hangers, bolts and pins	..	154
Sway-bar guides with bolts	2	13
Hand-brake chain guides	2	40
		452
SANDERS		
Sand-box hoppers	2	20
Sand storage	2	30
Sand-box fixtures and spouts	2	60.3
		110.3
FENDERS		
Fenders	2	113
Fender hinges	4	36
Fender springs	8	6
Fender-spring holders and plates	4	8
Fender bolts	20	5
Fender hooks	2	1
		169
DRAFT RIGGING		
Drawbars and shackles (emergency)	2	148
Drawbar hangers and bolts	..	30
Draw bumper, complete	2	261
		439
FARE BOXES		
Fare box	2	68
Fare-box stanchions	2	48
Fare-box balance spring-case and brackets	2	50
Fare-box brackets	2	32
		198
FARE REGISTERS		
Registers (cash and transfer)	2	34
Register-cord hangers	7	13.5
Register-cord sheaves and brackets	2	8
Register cords	..	2
		57.5
SIGNAL BELLS		
Signal bell	2	5
Signal-bell bushings	4	5
Signal-bell cords	..	2.5
Signal-bell hooks and anchors	5	5.5
		18
SIGNS		
Illuminated side sign—destination (complete with compartment)	2	77
Illuminated end sign—destination (complete with compartment)	2	106
Illuminated end sign—special (complete with compartment)	4	35
Advertising signs	2	2
Smoking sign	1	1
Board of health sign	1	1
Regulation sign frame	1	1.3
Flyer hooks	2	.2
Door signs	4	2
Dasher sign bracket	4	12
		237.5
MISCELLANEOUS EQUIPMENT		
Flag racks	2	1.5
Spare lamp and fuse box	2	1
Register-card case	2	.5
Vestibule equipment channel	2	21
Motorman's seat with brackets	1	20
Motorman's gong	2	18.5
Motorman's step	6	4.5
Roof grab handle	2	5
Roof matting	2	14
King pin	2	37.3
King pin covers	2	2
		125.3
SEATS		
Cross-seats, complete	12	831
Longitudinal seat:		
Cushions	4	180
Cushion holders	4	3.8
Cushion guides	1	1.8
Cushion hinges	3	1.7
Cushion butts	9	2.7
Furring	..	10
Panels	4	104
Frame filler	4	60
Frame cover strip	4	9
Front angle	4	33
Legs	12	25
Leg battens	12	15
Leg shims	12	2
Frame clips	12	12
Frame clips	12	5
Back slats	16	18.5
Back slats furrings	16	4
		487.5

	Number Per Car	Weight Per Car, Lbs.
Vestibule side door:		
Seats	4	28
Brace	4	9.5
Adjuster	4	13
Keepers	4	.8
Hooks	4	7
		58.3
CURTAINS		
Body curtains	24	115.8
Body-curtain brackets	..	3
Body-curtain guides	48	6
Vestibule curtains	6	25.5
Vestibule-curtain fixtures	16	4
		153.8
DOOR OPERATING DEVICES		
Pneumatic door engine for vestibule doors	4	859
Air strainers	2	1.8
Vestibule door operating shaft	4	100
Vestibule door operating coupling	8	3
Vestibule door operating collars	16	1
Vestibule door operating handles	20	4.2
Vestibule door operating handles	8	4
Bulkhead-door track and hangers	2	125
		1,098
DOOR TRIMMINGS		
B.H. door threshold extension	4	30
B.H. door threshold	2	155
B.H. door threshold—center bracket	2	10
B.H. door guides	16	10
B.H. door chafe	4	3
B.H. door striker	4	20
B.H. door flush grab	4	3.8
B.H. door plates	4	.5
B.H. door hooks	4	4.5
B.H. door flush lock	2	6.5
B.H. door catch	2	.3
B.H. door weather strips	4	6
B.H. door stops	2	2
Vestibule door chafe	16	16
Vestibule door rubber retaining strips	4	9
Vestibule door rubber holders	4	4
Vestibule door track filler	20	4.8
		285.4
WINDOW TRIMMINGS		
Vestibule sash lifts	8	.2
Vestibule sash springs	12	.4
Vestibule sash strikes	12	1
Vestibule sash adjusters	4	2.5
Deck sash pivots	8	.1
Deck sash openers	6	5
Deck sash butts	16	1
Body sash chafes	96	4.2
Body sash stops in sash	96	5
Body sash stops on posts	48	2
Body sash gravity catch	24	5
Body sash lifts	48	2
Body sash eccentric catch	96	9
		37.4
FRAMING STEEL		
Body underframe		
Side plates	2	812
Side sills	2	524
Side stools	2	218
Side stools reinforcement	2	131
Body bolsters	2	900
Body-bolster gussets (top)	4	76
Body-bolster gussets (bottom)	4	66
End sill plate	2	108
End sill angle (top)	2	43
Gussets (side and end sills)	4	34
End sill angle (bottom)	2	32
Gussets, tee and end sills	14	47
Fillers, tee and end sills	..	12
Floor tee	16	218
Trap angle	4	58
Needle beam (top member)	2	97
Needle beam (bottom member)	2	60
Spool	4	12
Center beam	1	44
Center diagonal braces	2	84
Brace	2	11
Clips	4	5
		3592
VESTIBULE PLATFORM FRAME		
Platform knee	4	532
Platform-knee hangers	4	96
Platform-knee hangers clip	4	12
Platform-knee stiffener	4	12
Platform-knee filler	4	20
Bumper and platform-knee brace	4	76
Bumper and platform-knee angle	8	14
Bumper stiffener	8	16
Bumper top plate	2	50
Bumper bottom plate	2	50
Bumper bottom-plate stiffener	2	22
Bumper anti-climber	2	176
Platform cross-ties	4	66
Platform cross-tie clips	4	5
		1147
BODY AND ROOF FRAME		
Corner-post finish	4	164
Corner-post angle	4	76
Bulkhead angle	4	50
Bulkhead angle	4	38
Bulkhead angle	4	48
Bulkhead lattice	28	21
Bulkhead gusset	4	20
Bulkhead gusset	4	6
End belt	2	60
End-belt angle	2	15
End-belt angle	2	11
End-belt clips	10	8
Carlines	11	93.5
Truss plank	8	75
Truss plank	16	100
Side finish (interior)	16	28
Sash pocket cover	24	48
Sash guides	40	24
Bolster-post brace	4	20
Bolster-post stiffener	4	30
Side-post pocket casting	22	40
Side-post clips	18	4.5
Side-stool space	20	13
Truss spacer	4	10
Body plate and corner post connection	12	5
Inside door post clip	4	1.5
Monitor extension tie-rod	4	1.5
Body-plate anchor bolts	4	4.5
Body-plate anchor clips	4	2
Gusset at bulkhead door post	4	5
		1022.5
VESTIBULE FRAME AND HOOD		
Dashers	2	96
Bumper shield	2	24
Vestibule corner post cover	4	53
Vestibule front post batten	4	42
Vestibule side sash top angle	4	3
Vestibule stool clips	6	5
Vestibule sash clips	6	6
Vestibule panel guides	4	8
Vestibule bead at letterboard	4	24
Vestibule post to window header clip	4	4
Vestibule side sash, upper window stool	4	7
Hood carlines	2	15
Hood carlines	2	21
		308
FRAMING WOOD—BODY		
Body plate	2	155
Monitor frame	2	177
Eaves rails	10	14
Letterboard	2	56
Side post	22	209
Side post	4	36
Body-sill furring	12	55
End-sill furring	2	23
Floor furring	..	125
Floor matting	..	100
Floor-sweeping strips	..	2.5
Body floor	..	693
Body roof	..	253
Upper deck rafters	37	65
Lower deck rafters	70	52
Truss plank	16	15
Trapdoor	4	120
Post covers	26	39
Letterboard sash frame	2	66
Letterboard sash beads	..	1.5
Body sash	48	117
Body-sash guides	48	34
Body-sash beads	..	6
Monitor sash	32	17
Monitor-sash beads	..	.5
Sign-box header	2	40
Card molding	12	10
Curtain molding	2	2(
Monitor-sill molding	..	27
Monitor-plate molding	..	21
End carlines	4	20
Monitor extension	..	53
Letterboard batten	..	39
Lamp furrings	..	20
Parting beads	..	4
Bulkhead board (outside)	..	11
Bulkhead door stiles, rails and panels	..	72
Bulkhead finish and molding	..	60
End belt	2	10
Monitor ventilator frames	..	4
Monitor sill casings	2	17
		2859.5
VESTIBULE		
Hood rafters	..	34
Hood roofing	..	30
Hood furrings	..	33.5
Hood sills	4	50
Vestibule corner post	4	55
Vestibule front post	8	17
Vestibule center stool	2	5
Vestibule center gurt	2	2
Vestibule center frame	4	10
Vestibule side stool	4	9
Vestibule side gurt	4	4
Vestibule side frame	8	10
Vestibule door header	4	40
Vestibule door header	4	8
Vestibule door-header furrings	4	8
Vestibule sash	6	19
Vestibule sash stops	4	6
Vestibule panels	4	22
Vestibule panel Agasote	4	36
Vestibule bands	..	30
Vestibule door stiles, rails and panels	..	147.5
Vestibule sign box sill (center)	2	2
Vestibule sign box sill (side)	4	3
Vestibule upper side sash	4	6.3
Water sheds	6	8
		595.3

	Number Per Car	Weight Per Car, Lbs.
Platform timber	2	110
Platform braces	4	27
Platform floor	..	115
Platform steps	4	46
Platform bumper furring	..	22
Platform furrings	..	4
		324
GLASS		
Side-sash glass	48	126
Letterboard sash glass	24	63.5
Side-monitor sash glass	20	20
End-monitor sash glass	6	4.5
Extension monitor sash glass	6	6
Vestibule sash glass	16	77
Vestibule door glass	24	50
Bulkhead door glass	16	44
		391
MISCELLANEOUS BODY DETAILS		
Upper deck ceiling	4	125
Lower deck ceiling	6	140
Roof canvas	..	66
Roof canvas molding	..	21
Carline covers	22	4.5
Monitor corners	4	1.3
Upper deck roof corners	12	8
Step risers	4	16
Step-riser clips	4	1
Ends for vestibule heaters	4	3
Bulkhead panels (Agasote)	12	25
Vestibule door butts and pins	..	6
Side-pocket cover, pivot sockets	48	2
Strap poles	4	64
Straps	36	17.5
Pole and door operating shaft bracket	24	12
Safety tread	8	40
Vestibule grab handles	8	16
Vestibule grab handle brackets	16	7.5
Agasote for vestibule heater	4	12
Asbestos for vestibule heater	4	3.5
Enameled pipe stanchions in vestibule	4	61
Pipe-stanchion sockets	4	1.7
Pipe-stanchion bracket	4	.5
Pipe-stanchion bracket	4	4.5
Switch panels	6	40
Switch-panel braces	..	3
Motorman's inclosure (complete)	2	87.5
Motorman and conductor's box under longitudinal seat	2	16
Trap lifts	4	2
Bands for jack box	..	6
Bolster side-bearing plate	4	40
Side window screens (outside)	8	116
Side window screens chafe, bracket, and holder	..	6.5
		976

SUMMARY OF WEIGHTS—BAY STATE CAR NO. 4200

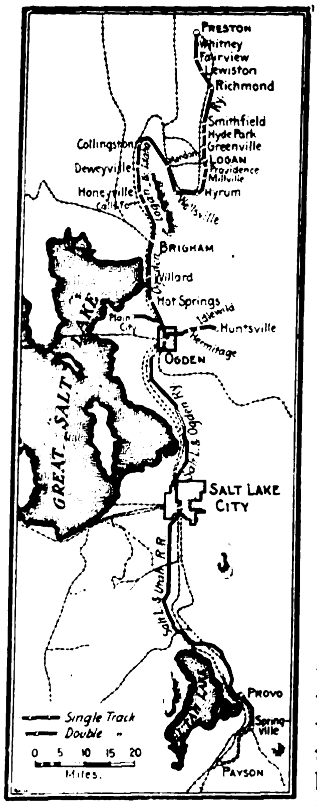
			Lb.
Electrical equipment			2,740.3
Trucks (2)			12,060
Motors (4)			6,746
Gear, pinion, axle collars (4 each)			1,236
Air-brake equipment			1,549
Buzzer system			18.5
Heaters			452
Hand brake			452
Sanders			110.3
Fenders			169
Draft rigging			439
Fare registers			57.5
Fare boxes.			198
Signal bells			18
Signs			237.5
Miscellaneous equipment			125.3
Seats			1,376.8
Curtains			153.8
Door-operating devices			1,098
Door trimmings			285.4
Window trimmings			37.4
Body, bare	Framing—steel	6,069.5	11,746.3
	Framing—wood	3,778.8	
	Miscellaneous body details	976	
	Bolts, nuts, rivets, screws, etc	441	
	Paint stock	90	
	Glass	391	
			41,304
Motorman's seat and two emergency drawbars			165
			41,138.8
Car (as weighed)			41,120
Deduct sand weighed with car			150
			40,960

Safety zones have been marked off for three blocks on both the near and far sides of crossings on Main Street in Joplin, Mo. The zones are 60 ft. long, and 7½ ft. wide from the outside rail, and are painted on the pavement in white. Traffic will be allowed to pass these zones at all times, while the previous rule requiring traffic to stop 10 ft. behind a standing street car will be observed elsewhere.

A 1500-Volt Interstate Interurban Railway

Opening of the Brigham-Wellsville Section of the Ogden, Logan & Idaho Railway Marks Completion of Important Interurban Project

The completion of the last link in the system of the Ogden, Logan & Idaho Railway between Brigham and Wellsville, and the inauguration of through service between Ogden, Utah, and Preston, Idaho, was celebrated on Oct. 27, as noted previously in the ELECTRIC RAILWAY JOURNAL. The closing of this gap makes it possible for a passenger to travel by electric railway from Springville, Utah, to Preston, a distance of 186 miles. The trip is over three independent systems, but it is expected that in time through trains will be run.



O., L. & I. RAILWAY AND CONNECTING LINES

The interurban lines pass through the center of the richest portions of Utah and serve 80 per cent of its population. They parallel for the greater part of their route the steam railway lines serving the same territory. On the north the Ogden, Logan & Idaho Railway runs between Ogden, Utah and Preston, Idaho, a distance of 96 miles. It passes through the northern end of Salt Lake valley, noted for its apples and peaches, and through the southern end of Cache valley, known as the granary of Utah. Its tracks are on private right-of-way throughout most of the route.

The Salt Lake & Ogden Railway operates between the two cities from which it takes its name, the largest two cities of the State, a distance of 36 miles. It serves the fertile territory lying between the Great Salt Lake and the Wasatch range of mountains, the richest and most intensively developed farming section of the State. This line has been completed since 1908, and has been operated by electricity since 1910. Considerably more than half of the line is now double tracked and work is progressing on the remainder.

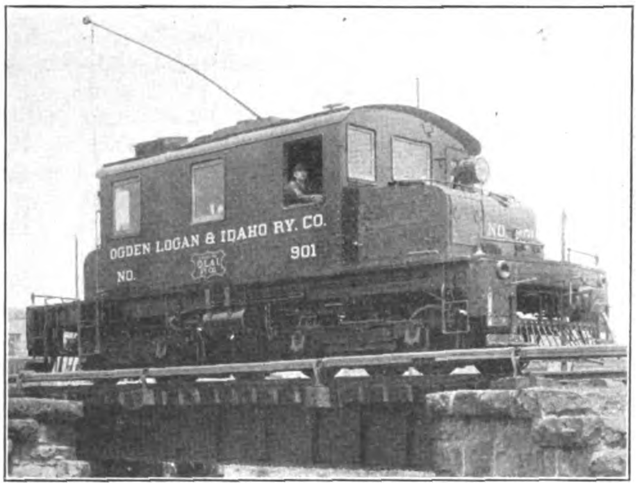
The company operates out of Salt Lake City from a temporary joint depot with the Salt Lake & Utah Railroad. The two companies now have under way negotiations for a site for a joint terminal depot, and as soon as these can be settled and the necessary rights-of-way secured work will be started on an adequate terminal station.

The Salt Lake & Utah Railroad, the southern end of the interurban chain through Utah, operates between Springville and Salt Lake City, a distance of 54 miles. A 6-mile extension to Payson, which is to be the southern terminus of the line, is under construction. This line was first opened under electric operation on July 24, 1914, between Salt Lake and Provo, a distance of 48.5 miles. The line traverses a rich agricultural section in Salt Lake County lying west of the Jordan River which has not hitherto had convenient transportation facilities.

The new line has been designed for high-speed, heavy service. The track is on private right-of-way, this right-of-way averaging 65 ft. in width. Seventy-pound rails and catenary overhead construction have been used throughout. New passenger, freight and express depots have been constructed in practically every town along the line.

The company secures its power from the Utah Power & Light Company's system, consisting of hydro-electric plants with an aggregate capacity of 75,000 kva. and a 20,000-kva. steam auxiliary. This power is transmitted at 44,000 volts to one portable and three permanent substations. Each permanent substation contains one Westinghouse 500-kw. three-bearing motor-generator set, each set consisting of a 1500-volt, compound-wound commutating-pole d.c. generator and a 2300-volt, three-phase, 60-cycle synchronous motor, with exciter. Each of the three transformers of a set has a capacity of 235 kva., and in the bank both primary and secondary windings are connected in delta with taps provided for obtaining reduced voltage at starting. The particular capacity and arrangement of the transformers were selected with a view to operation in open delta in case of damage to one of the three units.

Several new all-steel triple-compartment interurban cars were placed in service on the Logan division of the line before the Brigham-Wellsville line was completed. The new cars, which were built by the American Car Company, are 62 ft. in length over all, and have a seating capacity of seventy-five passengers. The electrical equipment on the cars consists of four Westinghouse 334-E-6, 750-1500-volt motors, each with a nominal rating of 85 kw. On the higher voltage the motors are operated in series so that there is a potential of but 750 volts across each motor. They are geared for a free running speed of from 47 to 50 m.p.h. on the level, with an average of 1350 volts on the trolley.



50-TON LOCOMOTIVE IN SERVICE ON O., L. & I. RAILWAY

The unit switch control apparatus is of the HL type, differing from the standard outfit in the provision of unusually great creepage distances, exceptionally powerful blow-out coils and additional switches connected in series to break the arc.

The air-brake equipment consists of Westinghouse AMM combination straight and automatic air-brake apparatus with M-24-A brake valve. A continuously-running dynamotor furnishes 750 volts for the control and lighting circuits and the air compressor. This compressor is connected mechanically to the dynamotor by means of a multiple-disk clutch, which is normally held by a spring in a closed position. Whenever the air pressure reaches a predetermined value, the governor admits air to a small cylinder, disconnecting the clutch and stopping the compressor, but allowing the dynamotor to continue running.

The lighting equipment for the cars consists of two circuits of seven 56-watt tungsten lamps with Alba shades. Headlights and heaters operate direct on the 1500-volt circuit.

To accommodate the local traffic in the city of Logan, the present four-motor, double-truck, forty-passenger cars have been changed over to operate with straight 1500-volt equipment. Each car is equipped with two Westinghouse 543-A-6, 750-1500-volt motors, connected permanently in series and controlled by R-200 double-end equipment.

Three 50-ton Baldwin-Westinghouse locomotives are used for hauling freight. In these the equalized pedestal construction was employed, permitting the use of simply-designed trucks, with half-elliptic springs and rigid bolsters.

The four motors on this locomotive are type 562-A-6, rated at 75 kw. They are built for forced ventilation, but also have fans on the armature shafts of capacity sufficient for operation at three-quarters load with the blower out of commission.

The present electric interurban system has been accomplished by such men as Simon Bamberger, for many years president of the Salt Lake & Ogden Railroad; the late David Eccles, former president of the Ogden, Logan & Idaho Railway, and his successor, M. S. Browning, and W. C. Orem, president of the Salt Lake & Utah Railroad. P. D. Kline of Ogden, Utah, general manager of the Ogden, Logan & Idaho Railway, formerly had charge of the building of the Salt Lake & Ogden interurban lines from Ogden to Salt Lake, and since that time he has had entire charge of the construction of the new interurban lines of the Logan division of the Ogden, Logan & Idaho Railway and has been responsible for the operation of all the lines of the latter company.

Miami to Open Storage-Battery Line

The Miami (Fla.) Traction Company will begin street railway service with four storage-battery cars early in December, adding trailers as the increase of business may demand. An article describing some features of the road, particularly the rolling stock, was printed in the Oct. 30, 1915, issue of the ELECTRIC RAILWAY JOURNAL, page 920. The following additional facts have since been received from the company. With the exception of an unsuccessful attempt to furnish such service, made about eight years ago with one car, this is Miami's first electric railway. Up to the present time bicycles and automobiles have been largely used on account of the smooth, hard-surface roads which are characteristic of the city and vicinity. The road will comprise about 3½ miles of track laid with 105-lb. grooved rail in the business section and 80-lb. T-rail elsewhere. The railway will traverse the principal streets of the city and, beginning at the corner of Waddell Street and Avenue C in the northern section, in a thickly-settled residential neighborhood, it will run south on Avenue C, parallel with Biscayne Bay to Twelfth Street, the center of the tourist hotel district. Thence the route will lie along Twelfth Street, the principal business thoroughfare, across the Miami River into Riverside, a residential section, through Lawrence Estate to the baseball park. The Boston National League will make this park its winter training ground for the next five years. The terminus of the line is at Sixth Street, just beyond the ball park in the northwestern section of the city, where the carhouse and power house are located.

C. E. R. A. Meeting on November 19

A Joint Folder with Maps and Time-Tables Will Be Issued—There Was an Interesting Discussion on Automatic Substations and the Transportation of Package Freight—Abstracts of Two Papers and the Report on Standard Interchange Rules Follow

Friday's session of the Central Electric Railway Association's two-day meeting at Indianapolis, Ind., held on Nov. 18 and 19, was attended by more than 100 members, and the interest and lively discussions of the first session continued.

E. B. Peck, vice-president Terre Haute, Indianapolis & Eastern Traction Company and chairman of the joint folder committee, submitted the report of that committee. He said that the committee had been at work for more than two years endeavoring to bring the time-tables and maps of all member companies into one folder. For various reasons a number of the companies at first were opposed to this plan, but lately there had been a change of opinion. Active and progressive work and the immediate issuance of a joint folder were now possible. The committee recommended that the folder be issued monthly and that it show all lines and time-tables. As to the demand for the folder, Mr. Peck said that requests had come from all parts of the country for such information. From another standpoint he said the association had taken the lead in many things and should continue so doing by publishing the joint folder. It would induce interline and long-distance travel, and thus afford a means of increasing revenue. Concerning the possibilities of interline travel, he called the association's attention to that at the Indianapolis terminal. One railway company transferred 2714 passengers to two other railways during the month of August. This same road transferred 2272 passengers in September. This, he said, was evidence of the demand for interline travel and the necessity for promulgating information concerning the facilities for transfer at all junction points. To bring about the prompt issuance of a folder, Mr. Peck asked the association for an indorsement of the plan of the committee.

President Henry emphasized the importance of the work of the joint folder committee. At first the committee had met strong opposition, then there was a difference of opinion, and now practically all the railways in the association territory wanted the folder. He said that while the economy feature was attractive, it was the smallest advantage to be secured from the issuance of a joint folder. The advertising of the service, which in turn should induce long-distance passenger travel, was the greatest value of such a folder.

John Benham, International Register Company; F. R. Dunbar, Union Traction Company of Indiana, and S. B. Hutchins, Westinghouse Airbrake Company, also indorsed the recommendation of this committee. Each believed that a joint folder would stimulate traffic. Mr. Dunbar also suggested that this folder should advertise the interchangeable mileage now used by the member companies. At the close of the discussion a motion by E. F. Schneider, Cleveland, Southwestern & Columbus Railway, that the president appoint a committee of five to arrange for and supervise the publication of a joint time-table folder and give the committee full power to act, was unanimously adopted.

At this point W. A. Carson, Evansville Railways, moved that a committee be appointed to take up with experts the matter of general advertising with a view of evolving a plan which the association could adopt. He said he had in mind an advertising campaign such as was being used by the telephone companies, banks and electric appliance companies. If the electric interurban lines were kept before the public, Mr. Carson believed that this would serve as a passenger traffic accelerator. He was of the opinion that such an advertising campaign should be handled by a central committee to reduce the cost. Prepared advertisements and cuts could be used in the local newspapers and on cars. Acting upon this motion, which was approved by the association, the president appointed as members of the committee, W. A. Carson, chairman; A. D. B. Van Zandt, Detroit United Railway; J. H. Drew, Drew Electric & Manufacturing Company; C. J. Laney, Cleveland, Southwestern & Columbus Railway, and R. A. Crume, Dayton & Troy Electric Railway.

AUTOMATIC SUBSTATIONS

Edward Taylor, engineer General Electric Company, then read his paper on "Automatic Substations." In this paper Mr. Taylor defined an automatic substation as one which is operated entirely by the requirements of the system supplied. He pointed out that the determination of the necessity for starting a rotary converter, and the manipulations necessary in starting it, do not require the factor of human judgment. While there are abnormal conditions which arise quickly, each has a physical manifestation which can be utilized in operating suitable relays.

He showed how, under certain circumstances, considerable energy and labor saving can be produced by this type of substation, referring in this connection to the article by C. M. Davis which was abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 9, page 772. Mr. Taylor estimated that in some cases an automatic substation will pay for itself in about two years, and that a 300-kw. substation may show a yearly saving of $4,700 after so doing.

In order to make the paper concrete the author discussed the equipment of the Union substation of the Elgin & Belvidere Electric Railway, which was described in detail in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 18, 1915, page 583. In this substation an important feature is the load-limiting resistance which is automatically inserted to prevent excessive overload. He said that while a similar protection can be accomplished by the use of long feeders this is less economical of power.

Among the points which Mr. Taylor made in favor of the automatic substation and of the application of the same principle to the operation of station units were the following:

The distribution of d.c. power supply from a large number of substations of small capacity, rather than from a small number of large substations, results in a smaller voltage drop in the return system and therefore less danger of electrolysis troubles.

The same distribution results in a smaller line loss or a saving in overhead copper, or both, and may render unnecessary the use of voltages higher than 600 in some cases. The possibility of using automatic substations should, therefore, be considered in the selection of trolley or third-rail voltages.

The load-limiting device used with the automatic substation operates to produce more reliable power supply by eliminating unnecessary opening of circuit-breakers and by reducing the danger of rotary converter flashing.

The use of a motor-driven drum controller insures the proper sequence of operations and the maximum economy of time in performing these operations.

The system is particularly well adapted to the control of motor-generator sets, which can be automatically connected to the line in six or eight seconds.

The automatic control features are applicable to substations containing several rotary converters, not necessarily to the extent of dispensing with all attendance but rather to permit reduction in the force and increase in the station load factor. A schedule of operations could be decided upon in advance and the apparatus adjusted to carry it out. For example, this schedule might be arranged thus: Up to 2000 amp. rotary No. 1 operates alone. After the load has been 2000 amp. for five minutes, or if it suddenly increases to 3000 amp., No. 2 is to be cut in. If the load goes to 4000 amp. for five minutes, No. 3 is to be cut in, etc. A similar routine would be followed in cutting units out of circuit. Such a schedule would be difficult to maintain with manual operation.

In concluding his paper Mr. Taylor discussed the reliability of the automatic substation. While no device is infallible, this apparatus contains fewer moving parts than a multiple-unit train control, it is simpler and more rugged than an automatic railway signal system, and it is less complicated and has fewer parts than a storage-battery and booster set. It contains standard relays and contactors such as are used in steel-mill service. They are arranged so that the failure of any single device would do no more than make the station inoperative until an inspector could give it his attention. The contact-making voltmeter is the same as the one successfully used for years in the Tirrill regulator where the service is many times more severe.

A lively discussion followed, confined largely to inquiries concerning how the automatic substation would meet operating conditions. A. Schlesinger, superintendent of distribution Terre Haute, Indianapolis & Eastern Traction Company, opened the discussion. He wanted to know how the automatic substation would take care of rotary converter buck-overs which, he said, frequently occurred, even when the utmost care was exercised. He also asked what safeguards were provided when work was being done on the transmission lines, and also, in case the machine became defective, what arrangements were made to cut it out of service.

In response Mr. Taylor replied that the automatic substation had limitations but that the new type of circuit breaker would prevent bucking over. In a station where it had been in operation for over a year the commutator was in perfect condition, and in numerous observations no sparking had been observed. In order to prevent the mechanical defects which might interrupt operation frequent substation inspections were necessary. Inspectors should also be on duty when anyone was working on the transmission lines.

G. H. Kelsay, superintendent of power Union Traction Company of Indiana, objected to the inclusion of resistance between the circuit breaker and the line. He was of the opinion that this would add load to the line which would make it impossible to meet abnormal conditions. He thought the resistance would reduce the capacity of the station and lower the voltage greatly. Mr. Kelsay also suggested that while a closer distribution of substations would help line voltage, the hourly service rendered by most electric interurban lines did not lend itself readily to such an economy. He also believed that the use of feeder taps near a substation was false economy. Concerning the elimination of substation attendants, he said that on his road most of the substations were located where the attendant also served as a ticket agent, hence the company could not dispense with his services. Mr. Kelsay also observed that lightning protection would be difficult to care for even though an automatic substation would make better provision for it than had been the case heretofore. He also asked how the automatic control installation would operate in case the old rotaries were used.

In response, Mr. Taylor said that the apparatus was designed to be installed in old stations and would prevent flashing over. The objection to the resistance in the outgoing lines, he said, was rather difficult to answer because the resistance was the same as a long feeder, and in his opinion much better. On the other hand, the resistance was in the circuit so short a time that the power losses were insignificant. Mr. Taylor stated that automatic substations were designed to pull capacity loads at all times, hence the resistance was necessary.

Mr. Kelsay then said that he thought that rotary converters for interurban road requirements should be designed more liberally, particularly as regards the size of the commutator. He believed that better results would be obtained where instantaneous high peaks occurred if the commutator was of 1000-kw. capacity on a 500-kw. rotary.

J. E. Cochran, superintendent of distribution Ohio Electric Railway, expressed the belief that electric interurban roads would be forced to adopt automatic substations as an economy measure. He said that during four hours of the night an attendant was unnecessary at substations in ordinary operation. There were, in addition, two or three hours when only freight trains passed over the line. In case the substation could be brought into service only when required, it would represent a considerable saving. He was rather skeptical, however, regarding switchboard maintenance, being of the opinion that it would be high with the additional apparatus necessary for automatic operation.

PACKAGE FREIGHT ON PASSENGER CARS

W. L. Foreman, traffic manager Louisville & Northern Railway & Lighting Company, continuing the program, then read a paper prepared by J. F. Strattan and himself, entitled "Package Freight on Passenger cars." An abstract of this paper is published on page 1078.

In the discussion which followed, F. D. Norviel, general passenger and freight agent Union Traction Company of Indiana, said that he believed it was good practice to handle package freight on passenger cars. Practically all the lines operating out of Indianapolis pursued that policy profitably. It was also desirable, in his opinion, to set some standard fixing the amount or size of package which passengers should be permitted to carry.

E. F. Schneider said that he was endeavoring to eliminate the carrying of package freight on passenger cars. When freight was carried on passenger cars it was impossible to discriminate against the undesirable classes; therefore, he believed the best policy was to eliminate the practice altogether. He also said that his road did not allow large packages in the racks, and in this way eliminated accidents to passengers from that source.

At this point President Henry closed the discussion with the statement that the meeting had been one of the most profitable in the history of the association. Before adjourning and upon motion, the hotel and arrangement committee was authorized to plan a three-day boat trip for the June, 1916, meeting.

Abstracts follow of convention papers and reports not published last week.

THE INTERURBAN

BY HON. J. F. McCLURE, MEMBER PUBLIC SERVICE COMMISSION OF INDIANA

The introduction of the interurban as an agency of transportation has tended more than any other factor to unify the neighborhoods of the State into the larger community. Formerly the inhabitants of near-by cities were comparative strangers, and by reason of their segregation and lack of intercourse, frequently entertained feelings of hostility for each other. The change in habits, customs and conventionalities of our social condition have been much greater during the lifetime of the older members of the association than during all the time since the discovery of America by Columbus.

There are, in round numbers, 2200 miles of traction lines in Indiana, including city lines outside of Indianapolis. The properties are operated and under the control of twenty-five different companies. The longest mileage of any one company is 428, and the shortest 10. The lines of practically every electric road parallel a steam road. This competitive condition does not exist between interurbans, except in a very few instances between near-by points. The companies maintain hourly service between the more important points, and a two-hour service for rural and smaller points, during eighteen hours of each day.

For the years 1912, 1913 and 1914, complete reports for all companies have been filed with the commission, which show the number of passengers carried per year to be as follows: 1912, 106,355,292; 1913, 113,621,528; 1914, 123,262,730. For the same years the operating revenues were: 1912, $10,546,910; 1913, $11,443,020; 1914, $12,293,622. During the latter part of this period there was a small increase in mileage operated, but not sufficient to account for increase in volume of travel or in receipts. The net revenues for the same years were: 1912, $4,130,304; 1913, $4,564,216; 1914, $4,748,234, and the percentages of net revenue to operating revenue were: 1912, 39.1; 1913, 39.8; 1914, 38.6. The revenues in most instances have been augmented from the sales of current for light and power to municipalities and individual consumers along the lines, and the net revenue is 7 per cent of the bonded indebtedness.

A recent comparison of the revenues of the principal companies, made by their own accountants, show a reduction in operating revenues for the first eight months of 1915, compared with the same months of 1914, of 7½ per cent.

The annual reports of the companies operating lines in Indiana show that there has been issued stock of the par value of $86,458,285, and that the bond issues aggregate $68,417,947. This shows a total average capitalization of more than $70,000 per mile of line, and an average bonded debt of $31,000 per mile of line. This would indicate that the par value of the bonds approximates the reproductive cost of the lines, based upon estimates from time given by men engaged in the business of operation. It would appear that the business of the interurban is not only sound, but is reasonably remunerative.

COMPETITION FROM AUTOMOBILES

Within the past year a new element of transportation —somewhat erratic and undependable—has arisen, which introduces a competitive condition in street railway traffic. It is as yet problematic as to what effect the automobile, as a common carrier, will have upon the transportation question. It undoubtedly will be a factor to be considered, both by the State and by the electric railway companies, in the matter of regulation and as a competitive quantity. It would not seem that it would be a permanent or serious matter; at least, under present conditions. The difficulty of maintaining dependable service at all times of the year is quite out of the question; and, at most, under present-day conditions, it should be limited to a supplemental service to well-equipped and efficient car lines. I take it, however, that it only has an incidental effect upon the interurban, and would not be serious except for the fact that the properties are jointly owned and controlled.

The problem thus presented must be solved by the traction lines by improved service. This is particularly true of city service. The demand for more extended service brought the jitney into the field, and it will remain—under some regulations, perhaps—as long as the demand will justify its use. In fact, it appears that it may be made a useful facility to supplement the street car service.

The interurbans, however, must, we think, meet competitive conditions that arise or are likely to arise with steam roads. The steam lines entering Indianapoiis, with one exception, are paralleled by electric roads for distances from 20 miles to more than 100 miles. Some of these steam lines are already double tracked and could be electrified to compete for the local traffic. It is probably true that the steam carriers under-estimated the competition of the interurban in the beginning, or there might have been greater effort made to keep them out of the field by providing local service along their lines. All the while inventions are appearing, intended to improve the methods and cheapen the cost of tractive power, and it is within the range of possibility that keener competition may develop between the different carriers.

POSSIBLE FUTURE IMPROVEMENTS

The public justly demands adequate service at a reasonable cost of every utility. In the matter of adequacy of service, as applied to the electric roads, it involves frequency of trains, speed, comfort, safety and reasonable fares. The passenger is entitled to be provided with comfortable service. The average interurban car does not, under all conditions, do this. It may be said, I think, that the ventilation of the interurban car is crude and inefficient and that the heating methods employed are equally subject to criticism. Very little improvement has been developed in either of these important matters since the lines have been operated. Business has adjusted itself to all the modern time-saving devices, and the interurban railway is one of the most important devices of this character. This feature of the service is to be commended rather than criticised. Shortening of routes through cities and straightening track will aid in the expeditious movement of trains.

During the last five years the companies in this State —and I think it is true generally—have given to the subject of safety more serious consideration than at any previous period. Automatic block signals have been installed on a large amount of the mileage of the lines, and it is exceedingly desirable to have this equipment extended so that all lines operating opposing trains should be so protected.

In the matter of fare, both the public and the carrier are interested. The traveling public is willing to pay a reasonable charge for the service furnished. It should not be required to pay any more. In all the territory in which the members of this association are located passenger fares are fixed on steam roads, at least, by statute. This operates to keep interurban fares within the limitations of the statutes. The law generally declares the rule to be that the fares, tolls and charges of a public utility shall be so adjusted as to enable the owners thereof to receive a reasonable return on the value of the property devoted to the public use. It is clear that two utilities cannot—operating in the same field under competitive conditions—furnish their service as cheaply as where one company supplies the entire demand, unless it be a telephone utility, which seems to be an exception. With interurban transportation, it is quite apparent that a consolidation of the lines under one management, or, at most, two companies, would be desirable. As between themselves they are not competitive, and therefore no objection to the merging of them could fairly be made. They will continue competitive with steam lines, and they should not be dominated by these interests. The economies capable of being introduced as a result of consolidation would be very great. In the matter of the reduction of power equipment, the increased volume of supplies to be purchased, better financing conditions and other incidental reduction in cost of operation would necessarily reduce the expense of operation and at the same time improve the service.

It is important that the interurban shall be strengthened and extended as a transportation factor. It is essential to the prosperity of the merchant, farmer and laborer. It is best adapted to providing means of transportation locally for the masses and makes the town and country one community, to the advantage of both, and adds, in addition to all these benefits, a large sum to the wealth of the State and aids in bearing public burdens.

PACKAGE FREIGHT ON INTERURBAN CARS

BY J. F. STRATTAN, TREASURER, AND W. L. FOREMAN, TRAINMASTER, LOUISVILLE & NORTHERN RAILWAY & LIGHTING COMPANY

Interurban companies generally have been confronted with the problem of what limit should be placed on the size of packages, other than baggage, which passengers expect to carry into the car with them and have transported free. To a certain extent they have felt that they should extend to their patrons all of the privileges granted by their steam road competitors, and allow passengers to carry packages of almost any size, although the electric roads cannot do this as well as the steam roads, because, as a rule, the electric cars are smaller than the steam railroad cars and are generally run in one-car trains.

We believe that the liability to accident is by far the most important item to be taken into consideration. We are all familiar with the dangers connected with the overhead package rack. While racks are almost a necessity, there is no doubt that in their present form they are a menace to public safety, and a rack which would combine both safety and convenience would be welcomed both by the company and the public. If the package racks were made safe and no restrictions placed on the size of the package carried inside of the car, the aisles and unoccupied seats would at times be filled with merchandise of every description, making entrance and exit very difficult and dangerous, and interfering with the quick and safe operation of the car. We shall try to explain what we have done toward solving this problem.

The Louisville & Southern Indiana Traction Company operates a line between Louisville, Jeffersonville and New Albany, via the Louisville and Jeffersonville bridge. It operates a freight car between these three cities, maintaining freight stations at each point, and it operates a passenger service on a thirty-minute headway throughout the day and on a fifteen-minute headway from Louisville to Jeffersonville during rush hours.

When the line started the cars were equipped with package racks, and no restrictions were placed on the size of any package which a passenger wished to carry free of charge. The cars are equipped with spacious platforms, and passengers were allowed to deposit any kind of package, which they could lift by themselves or with the help of another, onto the platforms. After a few months it developed that some means must be found to regulate this practice, which interfered materially with the operation of the line, increased the accident liability and in many other ways interfered with the transportation of passengers. It was finally decided to abolish the package racks and to make a charge of 10 cents for all packages carried onto the car which could not be conveniently held, provided passengers would place them on the front platform and remove them on arrival at destination. At this time it was not necessary for the package to be way-billed, the amount of the charge being collected by the conductor and turned in at the end of his run with the other remittance.

After this rule had been in effect for some time it was found that there was a demand for a quick express service between the cities served, request having been made by quite a large number of people who did not wish to accompany packages on the car but wanted us to handle them. As there were many teaming companies which operate between Louisville and the other two cities and can cut whatever rates are made at will, it was finally decided that all we could expect to get for packages carried on passenger cars was 10 cents. Packages of this character, it was ruled, must be presented to the freight agent and way-billed in the usual manner. These packages were placed on the front platforms with the motorman, and the freight agents at the different stations met the cars and removed the packages to the freight office, where they were called for by the consignee. By way of further explanation, no passengers were allowed to ride on the front platforms of our cars, and, as stated before, these platforms are spacious, and packages do not in any way interfere with the motorman in the performance of his duties.

We found that this not only increased our revenue without increasing our costs but left more space in the freight car for heavier freight. At the same time it reduced the liability to damage of the lighter packages.

For the convenience of shippers and to meet competition, a collection and delivery system was then inaugurated, and stamps in $5 and $10 books were sold at a discount of 10 per cent, provided that the purchaser would deliver the freight to our terminal for transportation. Advantage was taken of this service by a number of the larger stores in Louisville, which maintained a delivery service in New Albany or Jeffersonville, the traffic grew in volume, and we have always felt that it was very beneficial to us.

The system of having the conductor collect for packages accompanied by a passenger was not altogether satisfactory, as we had no check on how many packages were being carried other than what our inspectors could report to us. It was desirable to change this system, but we disliked to do anything which would make it more difficult for a passenger to travel and transport packages over our line. About this time the war tax stamp act went into effect, and we were obliged to make it a rule that all packages should be presented to our freight stations, everything being way-billed so that we then had a complete check on all shipments offered for transportation.

The operations of this company are more in the nature of a suburban road, although the towns which they connect are larger than those reached by most suburban companies, and it is therefore classed as an interurban road. This is not the case, however, with the Louisville & Northern Railway & Lighting Company, it being an interurban, operating a line from the city limits of Jeffersonville to Sellersburg, with a branch to Charlestown and also a line between New Albany and Louisville. No package freight is handled on this division.

Tariffs are on file, naming rates on package freight carried on passenger cars between all points on the Louisville & Southern Indiana Traction Company, Louisville & Northern Railway & Lighting Company and the Indianapolis & Louisville Traction Railway Company; that is, between Louisville, New Albany and Seymour. These rates are approximately double the first-class freight rate, and there is a minimum charge of 20 cents on the Louisville & Northern to points on its line and a like minimum of 25 cents on the Indianapolis & Louisville for each package handled. No packages that cannot be conveniently held are allowed to be taken into the passenger cars, and all packages of a bulky nature are presented to the freight agent and way-billed in the usual manner. This freight is all handled on local passenger cars, most of which are equipped with baggage compartments, and when this is not the case, with spacious platforms. As 75 per cent of the free baggage carried is handled on limited cars, considerable unoccupied space is left on the local cars in which to handle package freight. These local cars leave Louisville for Charlestown and Seymour every two hours, so that the service rendered is even quicker than that of the old line express companies operated on steam roads, while the rates are considerably less. It must be borne in mind, however, that we do not make house collection and delivery.

Advantage is taken of this service not only by residents of the towns along the line but also by the farmers, who find it convenient to order what they wish from the city by telephone and have it in their possession within a very short space of time. Thousands of berry crates are also shipped to the larger cities each year by our lines, Indianapolis being the destination for the bulk of these shipments. The rate on berries is 50 cents per 100 lb. Early in the season, before enough berries are offered for shipment to make it profitable to operate a through fast freight car, these berries are handled up to 100 crates on the local passenger cars. Formerly the old line express companies received all of this business. This service places berries in Indianapolis in about five hours after they leave the shipping point.

CHARGES FOR REPAIRS TO FOREIGN EQUIPMENT

The report of the committee on uniform charges for repairs to foreign equipment stated that its report had been submitted at the meeting of the association on June 17, 1915, and was submitted at this meeting for definite action. The committee found that a large percentage of the member companies interchanged only freight equipment, although in a few cases passenger equipment is also interchanged. Some members of the association interchange equipment with steam lines, and in these cases the standard M. C. B. rules apply. The committee makes no suggestions with reference to this class of interchange.

An abstract of the recommendations for the interchange of electric freight and passenger equipment between the member roads of the association follows:

Such repairs shall be made of equipment defects as are necessary to return the equipment to the owning road.

All repairs shall be charged for at cost price of labor and material, plus 15 per cent, and an invoice shall be rendered as soon as the repairs are made, showing in detail the cost of the repairs.

CENTRAL ELECTRIC RAILWAY ASSOCIATION
....COMPANY
Uniform Foreign Car Defect and Repair Report
To..........................
(Place)...................., ...
(Date)............, 191..
Attention of Mr. ....
The following defects were reported in your Car. No......,
following our inspection at............on......191..

Defects Found	Repairs Made
....	....
....	....
....	....
....	....
....	....
....	....

Remarks ....
....
Signed.......................

FORM A—FOREIGN CAR DEFECT AND REPAIR REPORT

The operator will devote the same degree of attention in the operation and inspection of foreign equipment, while being so operated, as is regularly accorded to his own equipment.

In the regular inspection of foreign equipment, any defects found which do not necessitate repairs in order to place the cars in service will be promptly reported to the owner on Form A. Any defects found which necessitate repairs of a minor nature before the cars can be placed in service will be repaired by the operator, promptly reported to the owner on Form A and invoiced against the owner. In case any defects are found which necessitate repairs that cannot be executed to advantage by the operator, or as may be mutually agreed upon, the owner will promptly be notified by telephone or telegraph, followed by a confirmation of such report on Form A.

All materials and labor involved in cleaning, coaling, icing, oiling and inspecting cars will be borne by the operator.

All material removed from the cars in making repairs shall be returned to the owning company by freight or on regular way bill, notice and bill of lading of such equipment being forwarded to the owning company, using Form C.

In case of damage to foreign equipment by collision, derailment or fire, the owner will be notified promptly by the use of Form B.

In case of damage to foreign equipment by collision or derailment, the owner will promptly dispatch an inspector to the point where the car is being held, for the purpose of inspecting the car in consultation with the operator's representative, with a view of establishing an estimate of the cost of repairs, together with a

CENTRAL ELECTRIC RAILWAY ASSOCIATION
Uniform Notification of Foreign Car Damage
To..........................
(Place)................., ...
(Date)............, 191..
Attention of Mr. ....

This is to advise you that your Car No.......was damaged by $\left\{\begin{array}{l}\text{Fire}\\ \text{Collision}\\ \text{Derailment}\end{array}\right\}$ at........on......191....at.... $\left\{\begin{array}{l}\text{a.m.}\\ \text{p.m.}\end{array}\right\}$ and is now being held by us at........, pending the arrival of your inspector.

According to the rules and regulations covering uniform charges for repairs to foreign equipment, the estimate of damage, including cost of repairs and length of time required for execution, must be agreed upon within forty-eight (48) hours following receipt of this notification.

Signed.......................

FORM B—NOTIFICATION OF FOREIGN CAR DAMAGE nominal length of the time required for the execution of such repairs, to be used as a basis of settlement by the companies involved. An agreement as to the cost of repairs and length of time required for them will then be made within ninety-six hours following the owner's receipt of the original notification, after which the report may be executed by either the owner or operator, as may be agreed upon. If a satisfactory basic estimate of damage cannot be agreed upon within ninety-six hours, the cars will be repaired by the owner, and the actual cost of material and labor, plus 15 per cent, together with rental charges, will be invoiced against the operator.

In case of damage to foreign equipment by collision or derailment, the responsibility shall be decided upon between the companies involved, and if a conclusion cannot be reached, the case may be placed before a board of arbitration, as hereinafter provided.

In case of damage to foreign equipment by collision or derailment, the operator shall pay the regular per diem charge as established by the Traffic Association to cover the ninety-six hours allotted to the joint inspection of cars and the estimated length of time required for repairs, when such estimates are agreed upon. In the event of a disagreement, the rental charges will cover the ninety-six hours and the time in days or fractions exceeding twelve hours actually required for the execution of the repairs, whether executed by the owner or operator. In the event of agreement, the operator may loan to the owner, and the owner should accept, a car for its use in lieu of the rental charges provided above.

(Front)

To..
....
Attention of Mr. ....
From..
....
Via...

(Back)

CENTRAL ELECTRIC RAILWAY ASSOCIATION
UNIFORM RETURNED MATERIAL TAG
Description.......................................
....
Removed from Car No. ....Date...........191....
Remarks...
....
....

FORM C—FRONT AND BACK OF TAG FOR RETURNED MATERIAL

On the first of each month the operator will forward promptly to the owner a statement of the individual mileage operated by the owner's cars, for its information in connection with maintaining mileage records of cars and car equipment.

Two clauses then follow in the proposed agreement relating to the methods of settling controversies over the interpretation of the rules and the establishment of a board of arbitration.

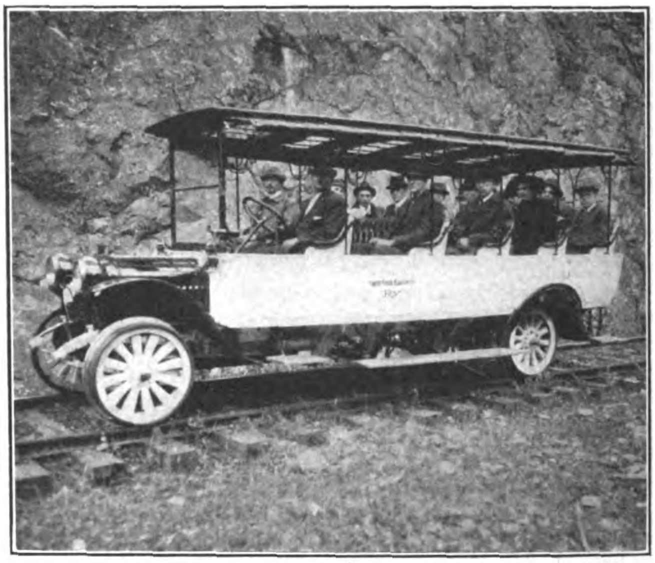
The report was signed by S. W. Greenland, H. B. Cavanaugh and S. R. Dunbar, committee, and also bears the approval of the chairman and secretary of the standardization committee.

The Missouri Public Service Commission has issued Vol. I for the period from April 15, 1913, to Dec. 31, 1914, containing the miscellaneous orders, authorizations, investigations of accidents, general inspections and conference rulings made by the commission during this period.

Gasoline Motor Car on Rails in the Pacific Northwest

When the bottom dropped out of the mining boom in the Monte Cristo district in the Cascade Mountains, 90 miles north of Seattle and 50 miles from Hartford, Wash., the railroad system, operating between Hartford and Monte Cristo, built by the Rockefellers at a cost reported to be in excess of $2,000,000, failed to pay expenses and was virtually abandoned. Some time later the Northern Pacific Railway attempted operation but found the cost prohibitive even for running cars at irregular intervals, and the railroad company turned over the right-of-way, tracks, good will, etc., to Rucker Brothers, timber dealers in Everett, Wash. This concern utilizes the line in logging-off a vast area of timber lands lying adjacent to the tracks.

In the section covered by this line, there are several hundred people who need some sort of transportation service. Rucker Brothers speedily discovered that it would be unprofitable to operate a railway service and instead are utilizing the motor car shown herewith which uses the rails already laid. The car is a $1\frac{1}{2}$-ton White truck chassis, equipped with steel wheels, accommodating twenty-two passengers. The car is a stock model in all respects, with the exceptions that rubber-tired wheels are replaced by 29-in. steel wheels and the wheelbase is lengthened to $157\frac{1}{2}$ in. Three steel trusses were added to the frame to support the extra wide body, and the steering arms were made stationary. The four-cylinder, 30-hp. motor, the four-speed transmission and the axles are regular in every detail.



MOTOR CAR ON HARTFORD EASTERN RAILWAY IN THE CASCADE MOUNTAINS

The front wheels are disconnected from the steering wheel and made rigid by using a long steering arm from a 3-ton White truck attached to the frame. The driver's duties are to collect fares and signal at grade crossings, the latter being done by a whistle attached to the end of the muffler. The cars have a maximum speed of about 30 m.p.h., which can be maintained with a full load over the maximum grades of 2.9 per cent in fourth speed, which is an over drive, geared 2.91 to 1. It is seldom necessary to travel in third speed or direct drive, which is geared 4 to 1. The motor car makes round trips of approximately 100 miles, and a regular service has been established, during the tourist season, of two cars a day.

Regulation of Public Utilities

Leonard A. Busby, President Chicago Surface Lines, Explains Why Electric Railway Regulation Is a Particularly Difficult Problem and Discusses the Factors Involved in Regulation and in Good Service

At a joint meeting of the Chicago section of the American Institute of Electrical Engineers and of the electrical section of the Western Society of Engineers, held at the Hotel Sherman on Nov. 22, Leonard A. Busby, president Chicago Surface Lines, presented an extended address on the "Regulation of Public Utilities." Mr. Busby said, in part:

"With the exception of steam railroads, electric railways are by far the most important of the public utilities that are now attempting to meet problems of regulation. Railroads have been subject to varying forms of governmental control, through constitutions and statutes, since the early seventies. It is only within the last decade that electric railways in our larger cities, including street railways, elevated roads, and more recently lines operated in subways, have fallen heir to about all the ills with reference to regulation that could affect any utility.

"The companies which supply our cities with gas, electric light and telephones render an invaluable service. This service, however, is neither so universally used nor so vitally necessary to the welfare of the community as transportation, nor does the regulation of these utilities present the difficulties involved in the regulation of street railway service. In this city we do not hear much about the regulation of the gas company or the telephone company, except as to rates, and then the agitation usually precedes a mayoralty campaign. Not so with the companies furnishing transportation in large cities. In nearly every large city in this country the traction question at some time has been made a political football, and in no city to a greater extent than in Chicago. This is a factor to be reckoned with in considering the question of regulation.

"True, the agitation, as a rule, is not so much over the rate which is fixed either by statute or by contract ordinance—almost universally at the flat rate of 5 cents —as over the question of service. This question vitally affects in a direct, personal way almost the entire population of our cities, and daily involves the comfort and convenience of almost every citizen. A car is delayed a few minutes by a breakdown on the tracks or a blockade or from some other cause. This will probably inconvenience several persons. If the weather is bad, the discomfort may be extreme. When the blockade is lifted, the first cars must run by the next group of waiting passengers to adjust the headway—another ground of complaint. Then there are the questions of heating and ventilating the cars. One passenger wants heat, regardless of ventilation; another wants ventilation, regardless of heat—more complaints—calling for expert advice on the question of heating coils, thermostats, the merits of ventilating fans and systems of so-called natural ventilation. Then there is the rush-hour problem. The cars are overcrowded—more inconvenience and discomfort, and more complaints. This same problem exists in every large city in this country. Then there are complaints about the non-rush-hour service, of the failure, at times, of trainmen to observe the service rules and regulations of the company, of running by passengers, starting the car too quickly, and other miscellaneous happenings.

"Now, most of these complaints are perfectly natural. No one likes to wait for a car, much less in the rain or extremely cold weather. No one likes to be passed up, or crowded, or jostled, or be obliged to stand up for several miles after a hard day's work, or to be treated discourteously by employees of the company. For some of these complaints the company may be charged justly with responsibility—some can be remedied, some cannot be eliminated entirely. The rush-hour problem has been with us for the last twenty-five years, and will be with us as long as the growth and development of this great city continue.

"But enough has been said to make it apparent that the field for the regulation of transportation utilities in large cities is broad enough to cover in principle about every question that can be raised with reference to any utility, and presents an inviting prospect to the socio-political agitator or reformer, and a very difficult problem to the utility. And with this promising field in sight the opportunity for experimental regulation has not been overlooked. State utility commissions, city councils, boards of control have all taken a hand, and in at least one instance all have tried their experiments on the same utility at the same time in respect to the same matters."

Mr. Busby then enumerated the various authorities which exercise supervision over the Chicago Surface Lines. They include the City Council, with its local transportation committee and transportation supervisor, the commissioner of health, the commissioner of public works, the commissioner of public service, the aldermen, each of whom has the transportation needs of his particular ward to look after as well as the transportation needs of the city, the Board of Supervising Engineers and the State Public Utilities Commission. Occasionally the orders from these different authorities clash and the companies are threatened with penalties if they do not do two opposite and contradictory things. For instance, at the present time the State board has ordered the company to operate trailers which are forbidden by the city ordinance. In this case the city has filed a bill seeking to enjoin the State board from enforcing this order and the company from complying with it. The matter now awaits the decision of the court.

PRESENT STATUS OF REGULATION

Continuing his discussion of the general subject of regulation Mr. Busby said, in part:

"I shall not attempt to trace the history of utility regulation, but shall assume that the prevalent popular opinion is in favor of the necessity of some system of regulation. It is a legal concept that these utility companies have devoted their properties to a public use —that they are engaged in rendering a public service, and are, therefore, subject to be controlled through some governmental agency representing the public. Hence we have State public utility commissions and various local regulating bodies, such as city councils, boards of trustees, committees and boards created by ordinance.

"The American public is insisting year after year upon higher and higher standards of service. The street railway service which the public would have accepted ten years ago would not be tolerated for a moment today. In fact, all of the energy, resources and inventive ability of those who have developed electric railway service have been directed towards providing an improved service. This improvement has taken the course of furnishing the most modern and efficient power plants, the best possible track, roadway and overhead equipment, the best lighted, the best heated and the most comfortable cars which the development of the industry so far has produced.

"But there is another side to this question. While all these improvements have taken place, the fare upon which the companies have been compelled to supply and develop this service has remained stationary. It was 5 cents in the city of Chicago when the first horse car in 1859 was operated on State Street from Randolph Street to Twelfth Street—a distance of a little more than 1 mile. It is 5 cents to-day for a continuous ride within the city limits, a distance of 30.5 miles.

"This situation has not, as a rule, received fair consideration by those who have had to do with the regulation of these utilities. If there have been instances in the past of unfair treatment of the public by the public utility companies, such a policy is the exception and not the rule to-day, and there can be no question that the unfairness and abuses of which some of these utilities may have been guilty in the past have been more than paralleled by the treatment they have received and are receiving at the hands of their regulators. Year after year they are subject to wholly unnecessary interference with the operation of their properties by over-regulation, with all of the expense and embarrassment connected therewith, and, finally, with a constantly increasing pressure towards decreasing the return upon the investments already made.

"Now it is perfectly evident that while these regulators may control, to a large extent, the fate of the capital already invested, there is one element over which they have no control, and that is the prospective investor whose co-operation is absolutely necessary to the development of this utility. Not only this, but the investor of to-morrow will determine his course of action by reference to the treatment accorded the investor of yesterday.

"The electric railway industry in the United States to-day represents a total capitalization of approximately $5,000,000,000; it employs approximately 300,000 men; it disburses in salaries and wages each year more than $225,000,000. In 1912 the business had a gross income of $585,930,517, and expended in operating expenses the sum of $332,896,356. During the same year, 41,064 miles of track were operated. Notwithstanding the amazing increase in this industry in former years, and the enormous capital involved, the last few years have shown a startling change with reference to its development.

"During the five-year period from 1902 to 1907, the capital invested in electric railways increased 63.5 per cent, while during the five-year period from 1907 to 1912 the increase in capital was only 24.7 per cent, and the figures so far available covering the period from 1912 to date show a still further decrease in the amount of capital seeking investment in this business. During the five-year period from 1902 to 1907 the gross income of street railway properties in the United States increased 71.6 per cent. During the five-year period from 1907 to 1912 the increase in gross receipts was only about one-half of this amount, or 36.3 per cent. The capital increase from 1902 to 1907 was $1,466,489,997, or at the rate of $5,640,346 per week. The capital increase from 1907 to 1912 fell to $933,796,045, or an average of $3,591,523 per week—a decrease of more than 36 per cent. While the first period was one of unusual growth, yet the heavy decrease during the last seven or eight years challenges attention and demands an explanation.

"While the rate of fare has remained stationary, almost every factor in the cost of producing the service has increased. In the United States wages of street railway trainmen increased during the period of ten years from 1902 to 1912, inclusive, approximately 20 per cent, and the actual increase in average hourly wage on the Chicago Surface Lines from 1902 to the present time has been approximately 44 per cent. Furthermore, the cost of most items of material and supplies used in construction and operation has increased. The length of haul in Chicago has increased from 13.3 miles in 1907 to 30.5 miles in 1915. The average fare per passenger, taking into account the issuance of transfers for the year ending Jan. 31, 1908, was 3.02 cents per passenger. It was 2.80 cents per passenger for the year ending Jan. 31, 1915. It has only been by the most rigid economy that the companies have been able to make the stationary fare meet the increased operating expenses and higher standards of service. It is also apparent to anyone familiar with operating problems that many of these economies have already been carried as far as they can legitimately go, that the 'irreducible minimum' has about been reached, and that further efforts to reduce operating ratios by decreasing the expenses for maintenance and up-keep of power plants, track and roadway and equipment, afford no real solution of this problem, and only delay the final reckoning.

PURPOSE OF REGULATORY COMMISSIONS

"We now have State public service commissions having jurisdiction over electric railway lines in twenty-six States, exclusive of the District of Columbia or the Philippine Islands. We have State public service commissions having jurisdiction over interurban, but not urban, railway lines in five additional States. We have State public service commissions having no jurisdiction over electric lines but having jurisdiction over steam roads in fourteen other States, leaving but three States, namely, Delaware, Utah and Wyoming, in which there is not a public service commission of some kind.

"An examination of the public utility commission acts now in force shows the following: In thirteen of the States the act requires the charge for the service to be 'just and reasonable'; in five States the requirement is 'reasonable and just'; in two the requirement is 'reasonable'; in one the requirement is 'just and fair'; in one the requirement is 'must be reasonable'; in another the requirement is 'just and reasonable,' with the further qualification that 'no street or interurban railroad is to receive more than 5 cents for one continuous ride within the city limits, excepts when shown that the same is justified,' and another makes no provision as to whether the charge shall be just and reasonable, but says: 'No street railway is to charge more than 5 cents for one continuous ride within the limits of any city or town'; the others make no specific provision on this subject.

"On the question of service, the general provision is that the service shall be 'safe and adequate,' 'reasonably adequate,' 'safe, adequate and sufficient,' 'just, reasonable, safe and adequate,' 'reasonable, efficient and sufficient,' etc.

"The theory of these acts is that a definite relation exists between the service furnished and the charge or price for such service. The theory is economically correct, the unfortunate thing is that it is not applied in practice. The difficulty is that the two factors are not equally considered. There is a definite and a necessary relation between the service standard, or quality of service, and the price which is being paid by the public for the service. This situation results too often in a disregard of the principle that no service can continuously be furnished at less than cost, and that a street railway, or any other utility, in that regard stands in exactly the same situation as any other business.

FACTORS INVOLVED IN GOOD SERVICE

"The people want good service from these utilities. But before we consider how to get good service by regulation, it will be necessary to have a clear understanding as to what factors are involved where the avowed purpose of regulation is to secure good service. There are three controlling factors to be considered in any regulation with respect to service:

"1—*Continuity of Service.* Provision must be made, not only for good service to-day but for good service to-morrow, and thereafter so long as the service is needed.

"2—*Extension of the Service.* Provision must be made not only for the continuance of the service in the territory or community where service is needed to-day, but also for its extension to keep pace with the growth and extension of the community.

"3—*Improvement of the Service.* Provision must be made for constant improvement so as to keep pace with the progress and development of the industry.

"The difficulties which have arisen in attempting to regulate these utilities are largely due, in my judgment, to the failure on the part of the public and its representatives to realize that these three elements are necessarily involved in regulation. The public does not understand, and has not been shown, that no satisfactory regulation or permanent solution can be had otherwise. The fact that the public is not well informed on this subject is partly due to the failure on the part of the utility companies to place these facts fairly and clearly before the public. For that we may assume our share of the blame.

"There is nothing new in this—it seems commonplace—perhaps it is—but it is fundamental. If you think it is not, take the history of any of the bitter disputes concerning regulation that have been waged before commissions, in the courts, in the public forum and in the public press, and see if in the last analysis the disputes did not directly or indirectly involve these factors.

"The main difficulty on both sides has been that each has had too narrow a view of the practical elements involved in this problem of regulation. The question has been viewed from the standpoint of to-day rather than from the standpoint of to-day and to-morrow. A mere order directing compliance with a certain standard of service does not solve the question of regulation nor end the responsibility of the commission or regulating body. Adequate provision for the maintenance of the service in the future must be made. The offer of a utility company to supply service presupposes the existence and operation of a suitable plant and equipment, and this involves the consideration of adequate reserves for maintenance and renewals. Unless these reserves are maintained the service is bound to deteriorate. Efficient and reasonable regulation, therefore, requires that due allowance for these elements be made when any regulation or adjustment of service is being considered.

"Granting that it is necessary to provide for the continuity of the service, why should the extension of the service into new territory in the more or less distant future be considered as a factor in regulation? A little consideration will answer this question.

"Our population is steadily increasing; our cities are expanding. In Chicago, for instance, it is literally true that the cornfield of last year is the site of a new subdivision this year. But before people will move out they want to be assured of the advantages of the service offered by these utilities. Owing to the limited demand for service in the new territory, the service in nearly every case is, for a considerable time, rendered at an actual loss. In many instances these extensions are not voluntary but compulsory.

"The companies, as a rule, have no other means of raising money except their credit. This means that their ability to extend their service must depend absolutely upon their ability to go into the market and borrow money in competition with every other industry seeking new capital. Unless these utilities are able to offer as good terms and as good security as other enterprises seeking investment, they cannot possibly procure the capital needed.

"Nor is it sufficient to consider only the continuity and extension of service. The public demands the benefit of every invention and every improvement in the industry which will benefit the service. The candle, the kerosene lamp, the gas light, the electric light; the horse car, the cable car, the electric car—these words alone sufficiently indicate the development and progress made in the service furnished by these different utilities. These milestones of progress mean that plant and equipment costing millions of dollars have time after time become obsolete and been replaced by new plant and equipment in order to keep pace with progress. Will anyone say that new plant and equipment could have been acquired had it not been for faith in the future and a confidence that the capital invested in the old plant and in the new would be protected? What has happened may happen again. To-morrow some inventor may say: 'Scrap your present plant and utilize my invention, which has revolutionized the industry.' It may be of vital interest to the public that this be done. But it cannot be accomplished unless the credit of these companies is kept at the highest mark, and all doubts as to the security of the investments made and to be made are dispelled.

"The power to regulate carries with it the power to destroy. No fair-minded person, I take it, claims that the public utility commissions were created to destroy these utilities, and no one, I take it, denies that it is the duty of these commissions, in connection with and as an adjunct to their regulation of these utilities, to provide for their preservation and development.

BASIS OF SOUND REGULATION

"By sound regulation I mean regulation that will stand the test of time. I do not mean mere political experimenting, which promises something for the moment and ultimately ends in disaster. There is no magic in this matter of regulation, nor are commissions or other regulators able to obtain service at less than cost any more than a manufacturer is able to sell his product at less than cost and continue in business. It is obvious that if regulation is to succeed ultimately it must be by the application of sound business principles. Without attempting to enumerate all of the elements which should be considered in sound regulation, I submit these:

"1. *Regulation presumes just, reasonable and adequate service requirements, based upon just and reasonable compensation.*

"In the regulation of street railways where the compensation is practically fixed, a problem of constantly increasing difficulty is presented. These companies are now being called upon to face higher and, in some instances, drastic service requirements, together with a constant increase in operating expenses. There are only two sources from which the increased cost can be taken: maintenance and renewal funds, and the income to the investor. If taken from the first source, it means a deteriorated service with a heavy bill to foot in the end. If taken from the second source, to the extent of impairing a fair return to the investor, it means the inability of the company to extend its service or provide for its improvement.

"Where a new contract between a street railway company and a municipality is being considered, another situation presents itself. Assuming that a fair valuation has been fixed and a fair rate of return has been agreed upon and assuming that a high standard of service is desired, the first essential is to provide for using the entire fare for transportation purposes, as by relieving it from the obligations to pave and clean that part of the street occupied by the company's tracks. These items are not unimportant. During the eight-year period ended Jan. 31, 1915, the surface lines in Chicago have expended approximately the following amounts for these purposes:

Paving right-of-way	$8,397,796.46
Maintaining paving	1,550,204.39
Cleaning right-of-way	2,905,391.53
Total	$12,853,392.38

"2. *Regulation must not be so directed as to destroy the incentive to economy and efficiency.*

"A standard of service is prescribed; the utility sets about to meet it. When through additional economies the company has adjusted itself to the new conditions still further burdens are promptly imposed. A utility company is no different from any other corporation. It responds to the same incentives. Its welfare and sound public policy both demand an incentive to further economies and greater efficiency. This incentive must be found in the reasonable hope of some reward for such efforts.

"3. *A reasonable standard of service having been prescribed, the method and detail of providing that service should be left to the utility.*

"The reports of the utility commissions show many controversies arising out of an attempt on the part of the commissions to regulate the details of operation. It is to be presumed that in the operation and management of their property the owners of the utility will themselves bring to their aid the best talent which they are able to procure for the efficient operation of their property. It is quite obvious that such details are better dealt with by the operators and owners of the property than by these commissions or regulating bodies, who could not possibly, under the present system and tenure of office, be expected to have the experience or familiarity necessary to enable them to deal satisfactorily with such questions.

"4. *Unnecessary interference with operation is bad and tends to increase the cost of the service and to increase the cost to the public of maintaining the regulation.*

"Commissions have a strong tendency to exercise the powers conferred upon them, regardless of the necessity or the advisability of doing so. The result has been an increasing tendency to interfere with the details of the management of these utilities. About all that has been effected in this way has been to cause considerable irritation on the part of the utility company, owing to loss of time, extra expense and interference with the operation of the property, and to incur a large amount of additional expense for clerical and other work on the part of the commission, which in the end the taxpayer has to meet.

"5. *The right to regulate these utilities is neither municipal nor State ownership.*

"Our regulators have a tendency to assume many of the prerogatives of ownership but, at the same time, to avoid carefully any responsibility for the outcome of the enterprise. In this the regulators are fixing the price, or prescribing the quality of service, or both, but they have assumed no responsibility for furnishing necessary capital or working out the problems of furnishing the service for the price fixed. There can be no question that all this is a departure from sound business principles, and must in the end work to the injury of the public. The important points that cannot be too often stressed are: That regulation is not management; that no property is of any real value without the beneficial use thereof, and that ownership and management must abide together."

St. Clair Tunnel Electrification Operating Data

Electric Operation During Six Years Has Resulted in Reduced Cost and Has Proved Otherwise Entirely Satisfactory

The Grand Trunk tunnel under the St. Clair River between Port Huron, Mich., and Sarnia, Ont., was electrified in 1908. The electrification was fully described in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 14, 1908, page 1364.

The system is single-phase, 3300 volts, six 66-ton Westinghouse locomotives being used. Two coupled together haul 1000-ton trains up the 2 per cent grades encountered in the tunnel at 10 m.p.h. Electric operation has made it possible to handle fully one-third more trains than was possible with steam operation and has eliminated danger from gas.

Through Walter D. Hall, superintendent of the tunnel, information regarding the results of six years of electrical operation of the tunnel has been made available. He states that the steam engineers who, after a few weeks of training, were put in charge of the locomotives are still operating them and, with two exceptions the same firemen, now called assistants, are with them. Not a passenger or member of the yard crew has been injured by electric shock and but two casualties have occurred to workmen in the electric bay of the shops.

The average cost per year for maintenance of the six electric locomotives has been $11,131 as compared with $21,173 for the four steam locomotives which they replaced. The average cost per car handled through the tunnel, a distance of about 5 miles, was 17.22 cents compared with 26.64 cents with steam locomotives, although the capacity of cars handled to-day is much greater than that of the cars of 1907 and 1908. The electric engines are available for service about 90 per cent of the time. The total yearly locomotive mileage for the six units averaged 208,810, or 34,800 per unit.

The commutators make from 60,000 to 99,480 miles between turnings and the brush mileage is from 40,000 to 60,000. The pinion mileage is from 64,000 to 118,000, and none of the gears has worn out in 254,000 miles of service.

Formerly the greatest mechanical expense was due to flange wear, the average mileage between tire turnings being 25,000. Since the installation of electro-pneumatic flange oilers, the invention of Mr. Hall, some tires have already made 184,000 miles since last turning, and are still in service. Tires which formerly made 12,000 miles now reach 83,000 between turnings.

The few train delays which have occurred were due mostly to insulator failures or flashovers caused by the steam locomotive exhaust. At first some short-circuits were caused by birds which alighted on the arcing tips of lightning arresters, but this cause of trouble was removed by installing porcelain perches over the arcing tips. Such strain and special insulator failures as occurred were apparently due to expansion under the effect of temperature changes. Strain insulator trouble has been overcome by the use of fiber "shrouds" which protect from rain and steam locomotive gases. The tunnel insulator design was also improved by increasing the amount of insulation between wire and ground and making broken insulators more readily replaceable. A steel contact wire was also placed below the copper wire to reduce the rate of wear.

The wood section breakers gave some trouble due to warping. These have been removed and an overlapping arrangement of the contact wires has been substituted. The wire hangers of ¼-in. pipe proved satisfactory except where subjected to steam locomotive gases in the yard. In such places ⅛-in. x 1-in. galvanized or sherardized steel band has been used when hangers needed replacing. A special hanger or universal trolley-wire clamp was devised by Mr. Hall for use in supporting the iron contact wire. This consists of two grooved plates, held together by one carriage bolt with provision for attaching a band-iron hanger by means of which the clamp with attached wires can be supported from messenger wire or insulator.

The average cost of maintenance per mile per year of the 12 miles of overhead construction and rail bonding was $127 for labor and $72 for materials and tools. The saving in the cost of track maintenance in the tunnel alone is estimated at $1,500 per year.

The cost of fuel for the steam locomotives was $42,729 per year, while that for the electric locomotives was $17,186, with the electric locomotives handling a greater tonnage. While slack coal is used in the power plant in place of the hard coal formerly used on the locomotives, fewer tons of the former are consumed. The energy cost given also includes energy supplied for operating pumps, for tunnel, terminal, yard and engine-house lighting and for crane and other motors. The average watt-hours per ton-mile at the generator busbars were 37.6.

An interesting indicating device has been installed in the boiler room to supplement the automatic device used to adjust the rate of fuel consumption to the load. The latter consists of a diaphragm valve in the fan engine line, which controls both the fan speed and the engine speed through variation in boiler pressure. There are times when trains follow each other in such quick succession that it is not advisable to wait for the steam pressure to drop in order to bring in the auxiliaries. A coil was therefore placed around the cable feeding the contact wire and the induced current was utilized for ringing a bell and lighting lamps when a train requiring 800 kw. or more moves out of the yard toward the tunnel. This indicates to the fireman that he should prepare to handle a heavy train up the 2 per cent grade in three or four minutes. He can then cause the fan and stokers to speed up and be ready in ample time to care for a heavy load.

Meeting of Public Utilities Association of West Virginia

This association held its first convention at White Sulphur Springs on Nov. 18 and 19. The papers and discussion related largely to electric lighting and power matters, but the interests of electric railways also received some attention. At the Friday afternoon session S. B. Fortenbaugh, engineer General Electric Company, Schenectady, N. Y., discussed the relative merits of 1200-volt and 600-volt d.c. railway systems, and James Fagan, chief engineer Ohio Valley Electric Railway, Huntington, W. Va., described some special concrete track construction.

ASSOCIATION NEWS

The association has issued in pamphlet form "An Analysis of Ordinances Governing the Operation of Jitneys in Various Cities of the United States and Canada." This is a tabular compilation of data arranged under the direction of W. A. House, president United Railways & Electric Company of Baltimore, Md. It is issued as an appendix to the report of the committee on the operation of motor vehicles. The analysis covers ordinances in eighty-four cities, in thirty-four states and two Canadian provinces.

The association has also distributed copies of the full text of the opinion of the New York State Public Service Commission, second district, dated Oct. 20, 1915, on the petition of W. B. Gray for a certificate of convenience and necessity for the operation of a stage route by auto buses in New Rochelle, N. Y.

PUBLIC SERVICE SECTION

The regular meeting of company section No. 2 was held on Nov. 18 in Newark. The meeting was addressed by F. W. Doolittle, director of the bureau of fare research of the association, and Ernest Kopia, chief of the company's mailing department. Nine new members were received, mostly from the claims and welfare departments. R. E. Danforth, general manager of the company and chairman of the program committee, outlined and explained the tentative program for the session. On the list printed on one of the section's standard data sheets these items appear:

Dec. 16, smoker.

Jan. 20, "Construction of Carhouses and Shops," by C. F. Bedwell, assistant engineer, and R. H. Harrison, mechanical department.

Feb. 17, "Problem of Rerouteing for the Newark Terminal," speaker to be announced.

March 16, "Design and Construction of Rolling Stock," by H. A. Benedict, mechanical engineer.

April 22, "Valuation and Appraisal," by Dean M. E. Cooley, University of Michigan, a continuation of the address abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 30, page 913.

May 18, "Cost of Rush-Hour Operation," by George J. Roberts, vice-president, and H. C. Donecker, assistant general manager.

June, Newark Anniversary Celebration.

September, "Analysis of Operating Costs," speaker to be announced.

It is planned that, beginning with the January meeting, a short entertainment feature will be introduced at each meeting. This will probably take the form of motion pictures, of which advance notice will be given.

In his paper Mr. Kopia explained in detail how interdepartment and outside mail is handled, and he gave interesting statistics showing the magnitude of this work.

Mr. Doolittle's topic was "Psychological Aspects of Street Railway Service," and his talk was based upon one of the chapters of the forthcoming "Studies in the Cost of Transportation Service," which is to be issued by the association before the end of this year. Special studies had been made in Cleveland and Milwaukee to determine some of these psychological aspects, considerable numbers of individuals being interrogated in both cities to learn their attitude toward the service. As a result it was found that the average individual is utterly unable to estimate time or distance, or to set forth with any degree of definiteness the facts which determine whether or not service is satisfactory. Mr. Doolittle showed that many of the factors which the patrons consider as having a bearing on their satisfaction with the service are entirely beyond the control of the railways. If the standards of service were laid down in accordance with many opinions expressed by patrons unlimited service complications would result.

A most important point made was that when a question was worded to suggest discomfort or poor service, this suggestion was reflected in the character of the answer. This susceptibility to suggestion is, therefore, an important factor in such investigations as those described. The amount of weight which is assigned by patrons to complaints published in the newspapers was also studied. As a result it was found that these were not considered as important by the public, although in Milwaukee statements of an official character did have a certain weight.

DENVER TRAMWAY SECTION

The thirtieth regular monthly session of the Denver Tramway Company section was held on Nov. 18. W. G. Matthews, who was recently elected president, gave a brief account of his trip to the San Francisco convention. After this there was a general discussion on the work of the section. One hundred persons attended the meeting.

COMMUNICATION

Preparedness in Transportation

BOSTON, MASS., Nov. 22, 1915.

To the Editors:

I am glad to see that the ELECTRIC RAILWAY JOURNAL is taking up seriously the possibilities of our great network of electric lines as aids to mobilization. With the truly enormous coast line which the United States possesses no practicable defense can be made without facilities for quickly massing men at points threatened. Our present standing army would provide us with about three men per mile of coast without making, even then, suitable provision for manning the fortifications. Consequently a big and peculiarly mobile army is a necessity to defense. Now our electric railway lines greatly increase the available trackage by which troops can be massed over most of the coast. From Maine to Maryland probably not less than 50 per cent extra trackage, both as respects coastwise lines and cross lines from trunk roads further inland, can be added when the electric service is fully utilized.

Take, for example, the stretch of coast from Boston to Portland, Me.; there are two direct railway connections here, one lying close along the coast, the other a few miles inland. There is also a complete electric railway line with ramifications which from several points tie the trunk lines together. In case we are required to mass men at some point between the termini all this railway trackage could be made extremely serviceable. Twenty-five or thirty cars will transport a regiment at at least five times the speed at which it could march, and by properly utilizing cross lines the transport of troops could be greatly hastened.

One advantage which is particularly conspicuous in electric service is the facility with which men can be entrained and detrained at any convenient point, thus relieving the termini of the transportation system from very great stress. For instance, it would not take more than a single division to tangle up traffic in a somewhat inconvenient space like the North Station in Boston so that it would be likely to take hours to get away the necessary trains through the somewhat cramped yardage. But a procession of electric cars in a well-cleared street could take a regiment aboard in a very few minutes and could push it out across country to be detrained at the nearest convenient point to the rendezvous. And, as you very properly say, street railway men are experienced in handling crowds. The efficiency with which a Harvard-Yale football audience half as big as our standing army is hustled away from the Stadium is good evidence that at a pinch the electric railways could send out great masses of loaded cars with promptness and carry them rapidly as far as interconnecting tracks reach.

The information necessary for utilizing the existing facilities is not difficult to obtain. It merely needs to be co-ordinated, as could very well be done by a committee of the association, acting in conjunction with officers of the General Staff. It is needful, first, to know for any point on our coast the direct routes by electric railways and the points of intersection of indirect routes with main railway lines from which troops could be transferred. This is a very simple matter to determine. Second, the ultimate power available for operating cars on each of the sections concerned should be ascertained, first considering the available output of the road's own equipment, and, second, the current which could quickly be made available by existing or easily-made connections with contiguous systems. All these facts are at hand within the knowledge of our skilled electric railway men. Every road superintendent knows how many cars he could swing on a given line with power which is available, also what he could do by borrowing all the power of his neighbor not involved in the scheme of mobilization, for in case of necessity all traffic would be suspended pending the transportation of troops to danger points. Third, it is necessary to know how many open, closed, and freight cars and of what capacity each road concerned in the mobilization at a given point has available, and how many more are available on interconnecting lines not concerned in that particular movement, for, of course, all these would be instantly commandeered for temporary service. Finally, it is important to know in how far the roadbeds, rails and clearances of each electric line considered permit, first, of hauling freight or passenger cars directly switched from the railroads and what effective power is available for drawing them, and, second, in how far the conditions of roadbed, bridges and clearances would permit of temporary use of locomotives drawing trains switched direct from the regular railways.

These last-mentioned matters of interchange of rolling stock may in certain instances be important, although no general interchange is to be expected. Still, at certain points and under certain conditions, the establishment of switching connections between railroads and existing electric railways might prove to be desirable enough to justify carrying out the work, or at least making all the preparations for its execution rapidly in case of emergency. Electric railway curves and grades are often forbidding in the matter of carrying ordinary railroad traffic, but in some instances this is not so, and points of advantage should not be dropped out of sight.

LOUIS BELL.

S. S. Bush, Louisville, Ky., who manages traction properties at Vincennes, Ind., Jackson, Tenn., and Rome, Ga., has adopted a profit-sharing plan to enlist the interest of employees in safety first work that has been very successful. Credits are given for freedom from accidents, and charges made when accidents occur. A man who goes through the year without an accident gets an extra cent an hour on Dec. 15 for the whole time he has worked, while the charges made against this account depend on the character and seriousness of the accident.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

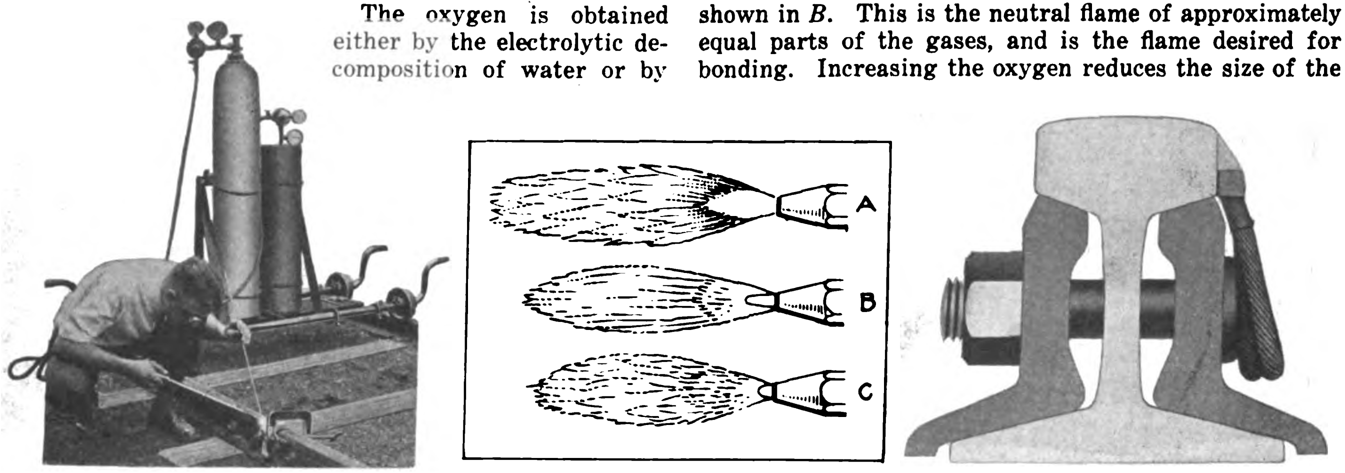
Gas-Weld Rail Bonding*

BY J. ROWLAND BROWN, ELECTRICAL ENGINEER OHIO BRASS COMPANY, MANSFIELD, OHIO

Rail bonds have been welded to rails by the use of the oxy-acetylene flame for years, but only recently have the obstacles to the general use of the process been removed. These obstacles consisted in the lack of an easily procurable supply of pure gases at a reasonable price and of readily portable tanks, in the use of torches not adapted to the particular job, and of copper wire, with its great power of absorbing gases when melted, for the welding material, and in the absence of a properly designed bond. These obstacles have now been overcome, and in the accompanying view is shown a modern welding equipment at work installing a bond.

The gases required for welding are pure, dry oxygen and acetylene, compressed or dissolved. These can be easily and safely handled in cylinders.

The oxygen is obtained either by the electrolytic decomposition of water or by liquefying air and removing the oxygen by fractional distillation. It is compressed in cylinders to about 1800 lb. per square inch pressure. A tank containing 100 cu. ft. of free air is generally used in bonding work as it weighs only between 100 lb. and 125 lb.



OXY-ACETYLENE WELDING—BONDING OUTFIT IN OPERATION—DIAGRAMS OF GAS FLAMES—CROSS-SECTION OF BOND TERMINAL WELDED TO RAIL

Acetylene gas compressed in a tank above 30 lb. per square inch pressure is highly explosive, and between 15 lb. and 30 lb. its action is doubtful. To prevent any possibility of explosion the tanks are packed with asbestos fiber having a porosity not greater than about 75 per cent. The asbestos-filled tank is then charged with liquid acetone to about 40 per cent of the volume of the tank. Acetone has the property of dissolving twenty-five times its own volume of acetylene for each atmosphere of pressure, and as the tanks are charged to 225 lb., or 15 atmospheres pressure, the tank contains about 150 times its own volume of acetylene gas under perfectly safe conditions. A tank of 100 cu. ft. capacity, weighing about 85 lb., is generally used.

A fitting is connected to each gas tank consisting of a pressure gage, a reducing valve and a gage for indicating the pressure in the hose and at the torch. There is a great variety of torches on the market, but they all consist of a tip having an orifice that controls the size of the flame and the rate of consumption of gas, and a mixing chamber with a shut-off valve for each gas. The best torches are simple and light in construction. The tip used for bonding consumes gas at the rate of about 30 cu. ft. per hour of each, with the pressure in each hose from 12 lb. to 15 lb. per square inch. Regulation to the correct flame is done by adjusting the shut-off valves on the torch and not by adjusting the reducing valves. The regulation of the flame is illustrated at *A*, *B* and *C* in the accompanying diagram. The acetylene is ignited first and then the oxygen is turned on. As the oxygen is gradually turned on the flame will appear first as in *A*, which shows an excess of acetylene. This is a reducing flame. Increasing the oxygen will soon produce the distinctly lined bead shown in *B*. This is the neutral flame of approximately equal parts of the gases, and is the flame desired for bonding. Increasing the oxygen reduces the size of the bead slightly as in *C*, and produces an undesirable oxidizing flame which consumes an excess of oxygen.

The proper design of bond for use with this process has only recently received the necessary consideration. In the first place, the weld should be made either to the head or the base of the rail. On account of the intense heat of the flame it is necessary to have a sufficient body of copper in the terminal to conduct the heat and to prevent burning or melting away of the terminal while the rail is being brought to the welding point. It is impracticable to weld the rail and the surface of the original terminal which is adjacent to it because the surfaces cannot be properly heated to the welding point. Therefore the welding wire is built up on top of the initial terminal, forming a new tapered bond terminal. This is clearly shown in an accompanying halftone. The bond now has a tapered terminal which prevents traffic from exerting a destructive shearing action, but causes all wheels or other destructive forces to glance off. Another feature of design is the provision of means for keeping the initial terminal about 1/16 in. away from the rail to allow the gases of the flame to escape and not form a pocket when welding into the corner. The cable or ribbons of the flexible portion of the bond must also be protected for a sufficient distance by a sleeve to prevent burning by the flame.

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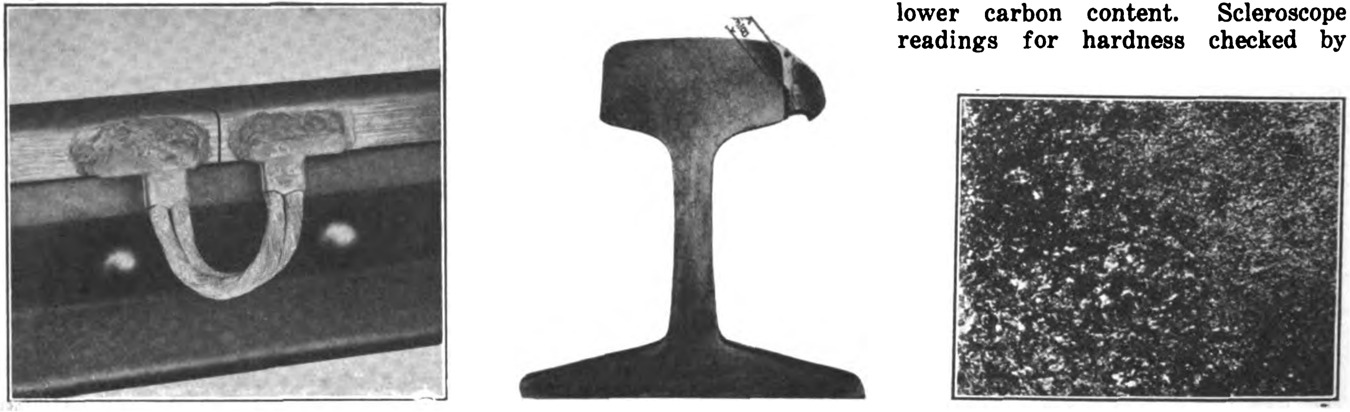
*A paper delivered before the Illinois Electric Railway Association, Oct. 29, 1915. For discussion see issue of ELECTRIC RAILWAY JOURNAL, Nov. 6, 1915, page 953.

Until recently annealed copper wire has been used for the welding wire or filling-in material, but as copper oxidizes and absorbs gases rapidly when melted it is impossible to produce even a fairly non-porous structure for the built-on part of the terminal with pure copper. A flux wire of non-oxidizing alloy containing a high percentage of copper has, therefore, been developed. This produces a more perfect weld free from porous spots, and is much easier to manipulate than copper.

It is not necessary to prepare the surface of the rail for the weld, but by some operators it is considered best to grind the surface. Grinding is an extra precaution to insure a uniform contact with the rail and does not demand as careful work on the part of the operator. On exposed rail, one end of the bond is clamped in position while the other end is being welded, and then the clamp is removed while the other end is welded.

In bonding in paved streets one or two paving blocks are removed and the bond is located by embedding the strand in some loose sand. When the rail is not to be ground the operator first coats the surface of the rail with flux metal, as by this method it is easy to see, from the manner in which the metal spreads over the rail, whether or not the oxide has been burned off. The flux metal is then built in between this coating and the initial bond terminal, producing the beveled terminal shown in the accompanying figures. A little practice will enable an average track man to control the flame and make a good weld by this method.



OXY-ACETYLENE WELDING—BOND WELDED TO RAIL HEAD—ETCHING OF RAIL SECTION SHOWING AREA AFFECTED BY WELDING—MICROPHOTOGRAPH OF ETCHED SECTION IN AFFECTED AREA

It is customary for a man doing welding of this kind to wear a pair of blue glasses, but there is no danger to a spectator and no such eye trouble develops as that experienced when working with or looking at the electric arc.

The connection between the terminal and the rail is very strong mechanically and will resist the shearing strains produced by traffic. In fact, it is impossible to tear the terminal from the rail contact and failure only occurs by fracture through the copper structure. The electrical resistance of the terminal contact is approximately 2.5 microhms, which is slightly more than has been attained by other terminals. This difference is due to the resistivity of the flux metal forming the terminal, which is greater than that of pure copper. This difference, however, is negligible and, as there is no depreciation of the contact, it is electrically very efficient.

During welding the terminals of the bond are heated to a bright red and sometimes the strand becomes a dull red for a short distance from the sleeve. This heating does not injure the bond in any way, as the mass of cold metal in the rail acts as a chill and anneals the copper. A series of vibration tests, comparing new bonds with welded bonds that had been cut from the rail, showed that in no case did the welded bonds break down before the unwelded ones.

A study of the effect of heat on the structure of the steel rail has proved very interesting, and after very careful tests and investigations it can be safely stated that the welding process does not have any detrimental effect. An etched section of the welded portion of a rail is reproduced herewith. The dark area adjacent the welded surface shows that the welding has changed the structure of the steel to a depth of 3/8 in. The affected zone does not extend longitudinally beyond the welded terminal of the bond. Another illustration shows a microphotograph of the etched section on the dividing line between the fine structure produced by the welding process and the normal structure of the rail. On the lower side of the line the normal structure consists of large pearlitic areas and patches of ferrite characteristic of open-hearth steel. On the upper side of the line the grain is finer, showing a fine pearlitic structure, which is the average structure of the area affected by the welding process.

The rail in the samples was open hearth with carbon 0.74 per cent, silicon 0.174 per cent, sulphur 0.025 per cent, phosphorus 0.020 per cent and manganese 1.07 per cent, hence the effect of the heating would show up more prominently than in a steel of lower carbon content. Scleroscope readings for hardness checked by tests with a Brinnell machine show the affected areas to be slightly harder than the rest of the rail.

The investigation showed that the areas affected and having a fine pearlitic structure have been heated to the critical point and were rapidly cooled by the mass of surrounding cold metal. The welding had refined the structure for 3/8 in. from the corner and had increased the hardness, but it had not detrimentally affected the steel. It is inconceivable that it could have affected the wearing properties of the rail or caused fractures or flaking.

A complete welding outfit, exclusive of the truck, which can be home-made, can be purchased for from $50 to $125, depending on the make of the torch and the extra accessories required for shop welding. The oxygen and acetylene consumed per bond cost approximately 10 cents, which cost varies with the distance to gas-charging stations. The flux wire used per bond will cost approximately 8 cents, the price varying with the copper market. The cost of labor with grinding of rail will average 6½ cents per bond on straight work and 4½ cents when no grinding is done.

Where rail grinding is done with an electric grinder, three men are required in a gang, while without grinding only two men are necessary. A gang should average ten to twelve bonds per hour on straight work under average traffic conditions. An average cost of installation, therefore, exclusive of cost of bond but including depreciation and interest on investment, is 25¾ cents per bond with grinding and 23½ cents without grinding.

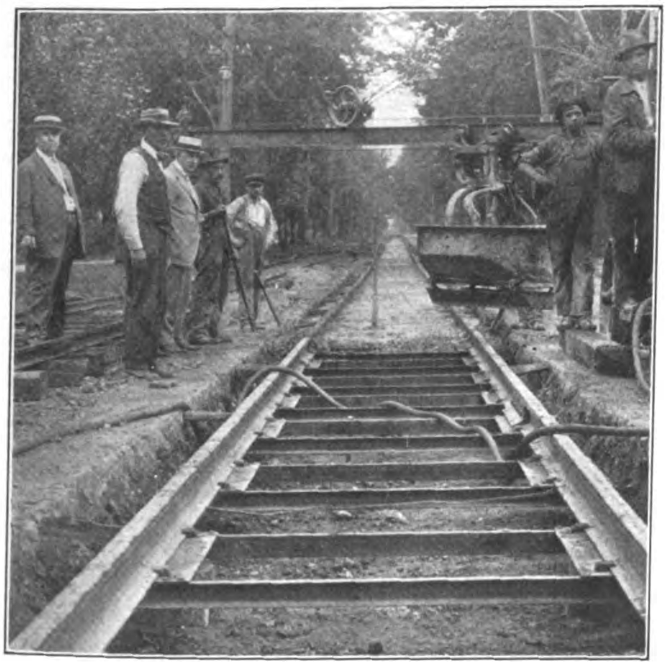
The advantages of this process of welding are as follows:

The investment in apparatus is small, resulting in low interest and depreciation charges. The utility of the apparatus in shop repair work makes it a 365-day-in-the-year machine. The entire equipment is compact and easy to handle and does not necessitate interference with traffic. No electric current is required, a matter of considerable importance in construction work and in a.c., or high-voltage d.c. installations. The welded contact has a high electrical efficiency and is permanent. The bonded joint is moderate in cost and easily inspected. When a length of rail is to be replaced one end of the bond can be cut loose from the old rail and rewelded to the new rail, thus saving the bonds.

Steel vs. Wood Ties in City Track Construction

BY J. A. NESTER, SUPERINTENDENT CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, ELYRIA, OHIO

On account of the scarcity of white-oak ties railway officials have for several years been looking around for something to take their place. As far as getting ties for city track construction is concerned, it seems that the problem has been solved.



TWIN-STEEL TIE INSTALLATION UNDER WAY

About four years ago the Cleveland, Southwestern & Columbus Railway decided to try steel ties in pavement work, and after careful investigation placed an order for International steel twin ties. These ties proved to be very much of a success and during the period since that time we have used them entirely in 6 miles of track in paved streets.

These ties are made of two channel irons, either 3 in. or 4 in. in depth and 6 ft. 4 in. long, connected by a plate 5/16 in. x 13 in. x 3 ft. At each end the plates are riveted to the channel irons, and a bar 5/16 in. x 1½ in. x 3 ft. also connects the channels underneath at each end. The rails rest on the plates and are fastened by means of clips which clamp under the plates and over the base of rail. The clips are securely fastened by iron wedges driven in behind them. Ties with 3-in. channel weigh 140 lb., and those with 4-in. channel weigh 160 lb. The clip holes are punched in plates so as to fit the section of rail being used. We space these ties 3 ft. apart and as the ties are 3 ft. wide this gives us 6-ft. centers. Consequently one tie, which costs about $4, takes the place of three and one-half wood ties. The initial cost is, therefore, not much more than that of wood ties.

The rail joints are placed in the center of the tie plates and concrete is tamped flush under the plates, making a proper support at the joints. The joints in the track that we installed four years ago are still in perfect condition.

The channel irons reinforce the concrete and we have been convinced, as have also the municipalities, that it is not necessary to have as much depth to the concrete base as would be needed with wood ties. We have, therefore, saved more than enough in the concreting and excavating to offset the difference in the initial cost. In addition to the saving in construction, my judgment is that the track will last a great deal longer than that with wood-tie construction. We are using 100-lb. A. R. A., 6-in., T-rail with nose brick.

While the track is in process of concreting it is blocked up to grade with old paving brick, placed under alternate ties, and wooden wedges are used to bring the track exactly to grade. Wooden braces are used to hold the track in proper alignment. The blocking and braces are allowed to remain and the concrete is placed around them, insuring perfect grade and alignment.

Below are given the construction costs of a piece of track 3825 ft. in length. These figures cover 9 in. of concrete below the rail.

640 steel ties, at $4	$2,560.00
1,856 cu. yd. grading, at 45 cents	835.20
779 cu. yd. concrete, at $3.50	2,726.50
Total	$6,121.70

The cost of construction of the same piece of track with wood ties on 20-in. centers, figuring 12 in. of concrete below the rail, would be as follows:

2,295 white-oak ties, at 75 cents	$1,721.25
2,280 cu. yd. grading, at 45 cents	1,026.00
974 cu. yd. concrete, at $3.50	3,409.00
Total	$6,156.25

The labor cost in both cases would be about the same.

Protecting Armature Coils from Cutting on Band Wire

BY W. A. ERNST, ARMATURE WINDER, ST. JOSEPH (MO.) RAILWAY, LIGHT, HEAT & POWER COMPANY

On a number of GE-210 motors in service on the cars of the St. Joseph (Mo.) Railway, Light, Heat & Power Company, a great deal of trouble was experienced because of the fact that the armature coils frequently became loose in the slots and worked against the banding until the coils grounded. As a rule, such armature coils would be damaged beyond repair because of the subsequent high temperature, and to remedy this difficulty it was decided to introduce strips of Peerless paper between the coils and the band wires as a protection to the coil insulation. These strips of paper were 0.062 in. thick and they had a width of

9/16 in. or 1/4 in. more than the band slots in the laminated core of the armature.

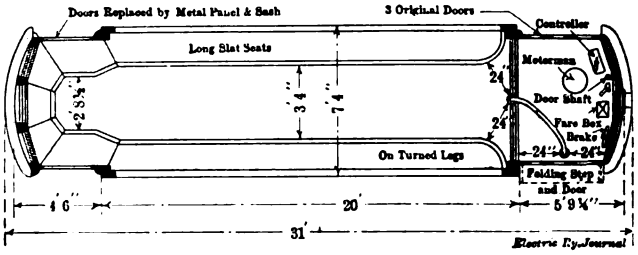
When these strips are applied the armature is heated, after it is completely rewound and is all ready for banding, until the insulation of the coils has become materially softened. The armature is then placed in a banding machine, and the paper strips are wound around the armature, being pulled down by the band wire until the coil is even with the bottom of the band slot. The paper thus forms a thorough protection to the insulation of the coils underneath the banding and it is of interest to note that in none of the rewound armatures that have been treated in this manner has there been any recurrence of the original trouble.

Dubuque Remodels Cars for One-Man Operation

In remodeling eight cars for one-man operation, the Union Electric Company, Dubuque, Iowa, recognized the fact that if the cars were to be an operating and popular success they would have to be equipped with modern devices for the accommodation of the car operator and the public.

The cars are of St. Louis manufacture, 31 ft. long over all with 20-ft. body. In remodeling the interior the bulkheads were removed, circular seating was installed at the rear end and slat seats on turned legs replaced the original boxed-in rattan seating. While the monitor roof was retained, ventilation was improved by fitting each car with four sets of E-4 Automatic intake and exhaust ventilators. These ventilators were installed in the ordinary monitor sash framing without defacing the car in any way.

Easy operation of doors and steps was assured by the use of the National Pneumatic Company's standard manual control of the double-shaft type. In this equipment all doors fold outwardly and extend upward above the header board and below the platform floor for 1 in. to 1¼ in. Therefore, when the doors are closed there is a perfect weather joint to prevent the entrance of cold air. The door shafts are made of rolled steel shafting with die-pressed master panel clips machined fast.



DUBUQUE ONE-MAN CAR—GENERAL PLAN

At the bottom, these shafts are fitted with thrust collars to hold the doors in proper vertical position on the ball bearings, and they are machine-tapered and fitted to operate in unison with the folding step. The use of ball bearings at all frictional points makes this equipment exceptionally easy to operate.

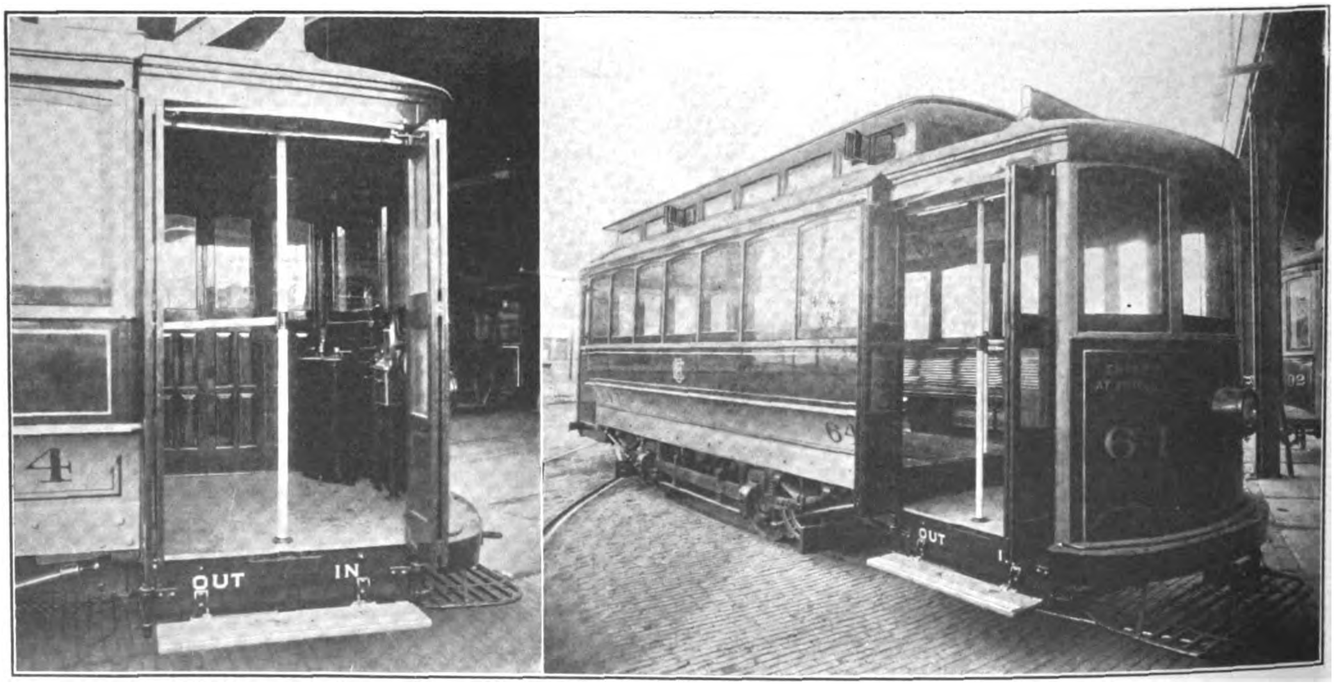
Other means for reducing the operator's duties as a motorman are the provision of the General Electric Company's C-P 25 straight air equipment and the staffless brake of the National Brake Company. The latter is exceptionally compact and light in weight.

To simplify the operator's duties as a conductor, the International Register Company's C-16 fare box is used. The special advantage of this fare box for one-man operation is that it relieves the conductor in large part in making fare collections, that it is accurate in count, and that it permits the passenger to pay the fare and pass into the car quicker than where the fare has to be handed to the conductor.

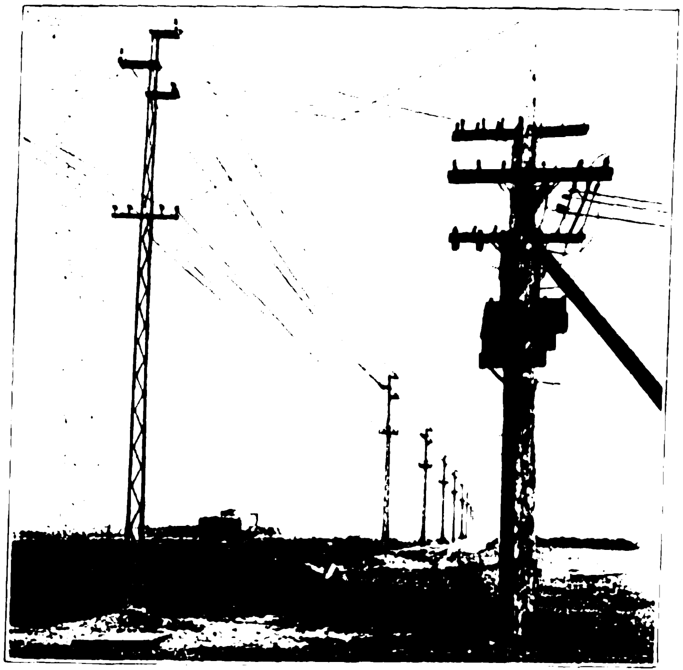
Other additions to these cars are Golden Glow headlights and Railway Utility thermostatic control.

Expanded Metal Poles Replace Two Wooden Pole Lines

At a point on the right-of-way of the Elgin, Joliet & Eastern Railway near East Chicago, Ind., two wooden pole lines carried the 11,000-volt, three-phase transmission lines of the Northern Indiana Gas & Electric Company, and the telephone and telegraph lines of the Chicago Telephone Company and the railway company. To reduce the cost of maintenance and distribute the ex-



DUBUQUE ONE-MAN CAR—FRONT END INTERIOR SHOWING CONTROL DETAILS; VIEW SHOWING VENTILATORS AND OTHER DETAILS pense of installation, these three companies installed approximately 1 mile of 35-ft. Bates Expanded Steel Truss Company's poles. The features of these poles were described on page 370 of the ELECTRIC RAILWAY JOURNAL of Aug. 28, 1915. The transmission line is carried at the top of the pole on cantilever arms made of steel angles, and the telephone and telegraph lines on a single cross-arm placed below these. The poles are set in the ground with portable concrete breast blocks, which make concrete mixing on the ground unnecessary. These blocks are keyed and bolted to the pole at the ground line and at the base, and make as substantial construction as if the poles were set in concrete mixed on the site.



EXPANDED METAL POLES INSTALLED ON ELGIN, JOLIET & EASTERN RAILWAY RIGHT-OF-WAY

Features of Electric Railway in Alsace

In an article in *La Lumière Electrique,* J. Reyval has recently described the electric railway in Alsace, running from Münster to the Schlucht Pass in the Vosges, a district now in the hands of the Germans. An unusual feature of the line is the fact that some of the grades are operated on the ordinary adhesion principle and some by means of a rack-rail. The rack portion is about 1¾ miles long with grades varying from 18 per cent to 22 per cent. Grades as great as 6 per cent are, however, encountered on the other parts of the line. Rolling stock consists of motor cars and trailers. The motor cars sometimes run alone and sometimes draw a trailer; they carry forty passengers and the trailers carry thirty-two passengers.

The speed is at least 10½ m.p.h. on the adhesion section and 4.7 m.p.h. on the rack-rail. The motor coaches are mounted on double trucks, each of which has a motor driving one pair of wheels through single reduction gearings and another driving a spur wheel for the rack through double gearings. There is a band brake on the axle of the rack-driving motor and also block brakes on the four wheels acting at the same time. Another brake acts automatically on the rack-driving mechanism when the speed exceeds the safe limit, and provision is further made for electric braking by short-circuiting the motors. Each motor is of 85 hp. continuous rating or 100 hp. maximum capacity. On the rack-rail sections all four motors are in action and on the other parts only the two driving the ordinary wheels. The four motors are operated from one controller, by which series-parallel arrangements can be made as well as reversing and braking. The current is collected by a flexible bow trolley.

Report on Tramway Company in India

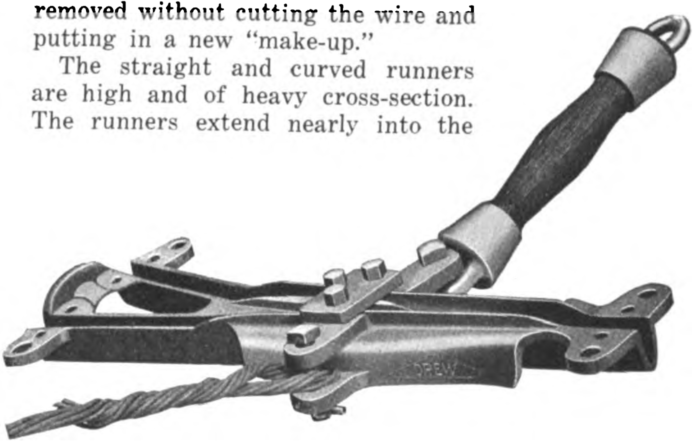
At a recent meeting of the Delhi Electric Tramway & Lighting Company, Delhi, India, it was stated that the net revenue for 1914 was $39,795 compared with $30,479 in 1913, but that both branches of the company had been affected by the war. The gross revenue of the tramways had increased by 10 per cent and that of the electric supply department by 19 per cent. The present unsuitable type of tramcar with its single motor equipment was said to be responsible for heavy annual maintenance charges and abnormal current consumption. Recommendations were made to install on the system cars more suited to the climate and particular local conditions, which would probably increase the receipts per car-mile.

New Double-Ear Overhead Switch

The overhead switch illustrated in the accompanying view has been tried out on a number of railways during the past two years and has given such good satisfaction that the maker, the Drew Electric & Manufacturing Company of Indianapolis, Ind., has decided to put it on the market regularly.

As shown in the illustration, the switch has a double ear or clevis on each side, with a cotter bolt for attachment to the supporting span. When it is necessary to renew either switch or trolley wire the bolts can be removed without cutting the wire and putting in a new "make-up."

The straight and curved runners are high and of heavy cross-section. The runners extend nearly into the center of the pan and take the wear of the wheel, stop "dragging" and tend to produce long life.



NEW DOUBLE-EAR OVERHEAD SWITCH

The Drew tapered, renewable approaches extend 6 in. each way from the frog, giving further protection to the wire and insuring smooth "take" and "leave." The switch pan proper is 20 in. long, the two approaches making the complete switch 32 in. long over all. The cross-bar between runners prevents the trolley harp from fouling.

A number of operating tests of Diesel oil-electric cars were recently conducted in Germany by the State Railways of Saxony, over the line between Dresden, Neustadt and Leipzig. Tests were made on grades up to 11.1 per cent. On one grade of 5 per cent a self-propelled car was able to haul a 47-ton trailer at 25 m.p.h. The greatest speed reached on level stretches was 47 m.p.h. without a trailer and 31 m.p.h. with a 47-ton trailer.

News of Electric Railways

SPECIFIC CHARGES IN McCALL CASE

Twenty Charges on Which Legislative Committee Bases Its Recommendation for Dismissal of New York Commissioner

The specific charges filed with Governor Whitman by the Thompson legislative committee on Nov. 22 against Chairman Edward E. McCall of the Public Service Commission of the First District of New York, and on which the recommendation for his dismissal is based, are as follows:

1. That Chairman McCall's acceptance of his appointment was in violation of law.

2. That he was at the time the owner of stock in a corporation subject to the supervision of the commission.

3. That thereafter he attempted to transfer such stock to his wife.

4. That such attempt was a mere subterfuge and a clumsy effort to evade the statute.

5. That he has participated in the consideration of matters pending before the commission affecting the value of such stock, whether owned by him or by his wife.

6. In various matters pending before the commission from time to time in which one or another of these companies was a party, Chairman McCall has improperly participated in the consideration and determination of questions affecting the value of the stock and has employed his influence for that purpose.

7. That he has neglected and failed to attend scheduled meetings and hearings on important matters pending before the commission.

8. That he has accepted in at least one instance a retainer from and rendered legal services to a corporation seeking to evade in the courts the payment of taxes claimed by the State to be owing by such corporation to the State. The chief owner of the stock of such corporation is also commonly reputed to be a controlling factor in the management of the Interborough Rapid Transit Company, one of the corporations subject to the supervision of the commission, of which he is chairman.

9. That in another case he has accepted a retainer in an action now pending in the Supreme Court, in which action the engineers in the employ of the Public Service Commission will be necessary and material witnesses.

10. That he has favored the public service corporations and that his official actions have been consistently prejudicial to the interests of the people of the city and State.

11. That he has appropriated to his own use an automobile belonging to the city of New York, that he has removed the Public Service Commission plate therefrom, has neglected and refused to make and return a record of the uses to which it has been put, and has monopolized the services of a chauffeur whose salary has been paid by the city, and that the expense of the operation of such automobile for the convenience of himself and his family has been charged to and paid by the city of New York, all in violation of the rules of the Public Service Commission.

12. That he has used his power as chairman to interfere with hearings pending before other commissioners, in order to prevent the conclusion of such hearings, and in the case of the Edison Electric Illuminating Company of Brooklyn he permitted an adjournment of a hearing pending before Commissioner Maltbie to a date subsequent to the expiration of Commissioner Maltbie's term of office.

13. Thereafter, and in the same rate case, before Commissioner Hayward, he exercised his power to permit the introduction by the said Edison Electric Illuminating Company of improper evidence which Commissioner Hayward, the hearing commissioner, was unwilling to admit.

14. That in the matter of the Third Avenue Railway and the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway Chairman McCall has not only neglected to enforce the commission's orders, but has used his influence to prevent the commencement of legal proceedings for the enforcement of such orders, and for the collection of the penalties which the law imposes for the violation of such orders, in violation of the mandatory provisions of the law.

15. That as to a competing company, the Manhattan & Queens Traction Company, he issued an order the effect of which in the event of a failure to comply therewith within the time specified, forty-eight hours, would have operated to cancel and annul the franchise of such competing company, thereby destroying competition beneficial to the city and its inhabitants.

16. In the matter of the certificate issued to the Manhattan Railway, dated March 19, 1913, he failed and neglected to reserve to the Public Service Commission and surrendered the power to supervise the award of the contract for the construction of the additional tracks of the Second, Third and Ninth Avenue elevated lines, and that as a result of such failure the lessees of the Manhattan Railway have entered into extravagant and improvident contracts under which its stockholders and the people of the city of New York have suffered and will suffer large losses.

17. That in the matter of the approval of the contract for the construction of the connecting lines under a certificate issued to the Interborough Rapid Transit Company, he authorized and approved a contract for such construction at an extravagant and exorbitant price and without competition, to the disadvantage of the city of New York and its inhabitants.

18. That in the execution of the dual contracts and certificates he permitted the inclusion of a provision under which the New York Municipal Railway Corporation will be permitted unwarrantably to deduct from the earnings of that company before the division of the net earnings between the company and the city can be accomplished a sum aggregating more than $10,000,000.

19. That in the negotiation and execution of the so-called dual contracts and certificates he surrendered and failed to exercise his powers and duties as a Public Service Commissioner of the State of New York.

20. That by his administration of the office which he holds, by his failure properly to supervise the expenditures of the Public Service Commission, by the extravagance of expenditure which he has permitted and by his failures and neglects as aforesaid, he has demonstrated his entire lack of sympathy with the purposes of the public service commissions law.

ARBITRATION HEARING HELD IN ALBANY

The committee selected to arbitrate the dispute between the United Traction Company, Albany, N. Y., and its employees, which caused a strike last September, heard the testimony of both sides on Nov. 19 and then took the case under advisement. The questions involved are whether it is fair to suspend an employee without giving him a hearing before the sentencing official, and whether the new procedure in discipline is in violation of Sec. 6 of the agreement between the company and the men.

The hearing lasted four hours. It was opened by Lynn J. Arnold, chairman of the arbitration committee. Sitting with him on the committee were William E. Woollard and Mayor Cornelius F. Burns of Troy. The company was represented by Harry B. Weatherwax, vice-president; John E. MacLean, counsel for the company; C. A. Coons, general superintendent, and N. R. Cass, assistant to Mr. Weatherwax. The case for the men was conducted by W. B. Fitzgerald, representative of the international president of the association, and with him were Joseph S. Droogan, president of the Albany local; Joseph H. McLaughlin, president of the Troy local, and Stephen Dwyer of the Albany local.

Chairman Arnold said he thought Sec. 6 was obscure in that it did not fix definitely whether the preliminary hearing should be before the general or division superintendent, and suggested that Mr. Fitzgerald and Mr. Weatherwax fix up the section so that it would be clear. Mr. Fitzgerald reiterated that this could not be done legally until next July, when the present contract expires. The section will accordingly be passed upon in the light of its present wording.

OPPOSITION TO MOON BILL ORGANIZING—OTHER PROPOSED RAILWAY LEGISLATION

The committee on railway mail pay, representing railroads operating 90 per cent of the mileage of this country, has announced that these 264 railroads, with a total of 218,000 miles, have joined in a protest to Congress and to the public against renewal of the efforts to effect the passage of the Moon railway mail pay bill.

This measure was introduced in the last Congress and failed to pass, and the Postmaster General has announced that it will be reintroduced when Congress opens in December. Under the Moon plan the Postmaster General would be authorized to establish the "space plan" of payment, whereby a railroad would be paid no more for hauling a whole carload of mail than for a partial carload. In their protest the railroads say that the Moon bill would empower the Postmaster General to make the rates for carrying the mails, with the only limitation that he could not exceed certain sums. On the other hand, he could reduce the rates with no restraint but his personal discretion.

The railroads contend that the highest rates which are permitted by the bill would be unjustly low, because they would be less than the receipts from passenger carrying, which the Interstate Commerce Commission has decided are unremunerative. They also say that the Moon bill delegates legislative power to the Postmaster General, and would bring the railway mail pay problem into politics. They say that the problem ought to be settled on a business basis, and direct attention to the fact that Chairman Moon of the post-office committee of the House of Representatives in asking support for his bill declared it to be a proposal of the Post-office Department.

The bill to regulate the issuance of railroad securities is another measure which the prophets of railroad legislation regard as sure to come before Congress. This bill is an item of "unfinished business," left over from the Wilson trust program. It has long been advocated by the Interstate Commerce Commission. When the bill was brought before the House on June 2, 1914, for debate and passage, Mr. Rayburn of Texas, its nominal author, declared that it contained three provisions deemed necessary by a majority of the committee. The first of these was greater publicity in the financial transactions of railroad corporations; the second, making it illegal for corporations to issue stocks and bonds "or other evidence of indebtedness" except for certain specified purposes to be approved in advance by the Interstate Commerce Commission; and the third, that within two years after the passage of the act, it should be illegal for one man to hold a directorship or official position in more than one railroad, and for any official to "appropriate, pay or receive as salary or dividends any money resulting from the sale of stocks and bonds." On June 5, 1914, the Rayburn bill passed in the form in which the committee on interstate and foreign commerce had prepared it. The vote was 325 in favor, twelve against, two answering "present," and ninety-four not voting. Going up to the Senate, the bill found its way to the committee on commerce, which reported it on July 23, cutting out, however, the interlocking directorate provision and making several amendments to the text. The session closed with the bill still on the Senate calendar. It was not revived at the winter session.

LITTLE PROSPECT FOR PEACE IN WILKES-BARRE STRIKE

James W. Steese and Patrick Gildea, mediators for the Pennsylvania State Bureau of Labor, continue their efforts to settle the strike of the trainmen on the lines of the Wilkes-Barre (Pa.) Railway. Mr. Steese would not discuss the plans that are being considered. Company officials declare that there can be no settlement which will involve concessions on its part, while strike leaders assert that there can be no peace on a plan which does not bring them a flat wage rate instead of the sliding scale.

Shopmen in the employ of the company ordered out on a sympathy strike refused to obey the order.

One of the most serious attempts at violence occurred when an effort was made to burn the company's bridge over the Susquehanna River between Wilkes-Barre and Plymouth. Mounted men of the State Constabulary extinguished the fire before it had done more than burn several spots in the bridge flooring, which had been saturated with gasoline. While using the northbound tracks to continue on their way when it was found that the southbound tracks were blocked by fallen overhead wires, several men who have replaced the strikers were hurt in a head-on collision on the Nanticoke line. Considerable violence was reported on Thanksgiving Day and service was abandoned in Plymouth.

The company expects to start running on a night schedule on Dec. 1. It is having a second story built under the roof of the Wood Street carhouse for the purpose of providing sleeping quarters for the convenience of the men who are now living there.

DES MOINES FRANCHISE ELECTION POSTPONED TO NOV. 29

Light registration indicates slight public interest in the election of Nov. 29 on the granting of a new franchise to the Des Moines (Iowa) City Railway. The Des Moines Chamber of Commerce, which was instrumental in drawing up the new franchise to the satisfaction of the company and the City Council, is working to overcome the public apathy on the question by sending out letters to voters. These letters explain the franchise draft and relate that it has the approval of every member of the City Council, including the Mayor.

The lack of interest shown by the voters in the election is partially explained by the fact that practically no opposition to the grant is in evidence. A few spasmodic expressions of disapproval have come from scattered and generally uninfluential quarters. Only one of the local newspapers opposes the franchise. Its opposition is of a minimum effect because organized labor favors the franchise. The local street car men's union has approved the franchise and is particularly enthusiastic about the clause which provides for the settlement of labor disputes by arbitration. It was intended originally to hold the election on Nov. 20.

Emil G. Schmidt, president of the company, was explaining the franchise at a recent public meeting when he was questioned as to the effect of the jitneys on the company. He said that the jitneys had cost the company about $25,000 to date, but that he believed they soon would be a thing of the past in Des Moines if the present rate of disappearance continues.

The Chamber of Commerce letter to voters is in part as follows:

"The street car franchise is a Chamber of Commerce measure, drafted by a committee of the organization and recommended by it for submission to the voters. It received the unanimous vote of the City Council after several other measures had been defeated by it.

"It provides for placing service in the hands of a commission, and when the commission cannot agree, arbitration is provided for. It places the capital for service at $4,110,000, which is $390,000 less than the capital offered originally by the City Council for all purposes. Service follows interest on bonds, taxes and depreciation and comes ahead of dividends. The capital is fixed at $5,000,000 for purchase by the city. The State Legislature has not yet given the city authority to purchase or determine a method for acquirement of street car systems by cities. The grant provides for the sale of six tickets for 25 cents, half fare for school children, etc. It also provides for new rolling stock, 8 miles of extensions in three years and $1,500,000 in three years for rehabilitation, etc.

"By the arbitration proviso in the service clause it is sought to take the question of service away from political and speculative influences. It is defined that 'service shall be as good as the best service in cities of the same size and class as Des Moines.'

"Salaries are limited to a per cent of earnings. It provides that stock can be issued only at par and when paid for in cash and that bonds must be sold in the open market. All proceeds from stock and bond sales must be invested in the property."

INTERURBANS ACCEPT KANSAS CITY PLAN

The five interurban electric railways entering Kansas City, Mo., have signed the agreement to accept the terms of the new franchise to the Kansas City Railways, as far as it affects their interests. These companies include the following: Kansas City, Clay County & St. Joseph Railway; Kansas City, Kaw Valley & Western Railway; Missouri & Kansas Interurban Railway; Kansas City Western Railway, and Kansas City, Lawrence & Topeka Electric Railroad.

Section 16 of the new franchise provides that interurban cars shall be under control of and be operated by the Kansas City Railways and its board of control from the time they enter the city limits. The city company shall pay to the interurban companies 15 per cent of passenger revenue on the interurban cars within the city limits. In the event that a central interurban station is built, this 15 per cent is to be paid by the interurban companies to the owner of the station.

Several franchises are pending in the City Council for building interurban electric railway stations. The interurban companies will have thirty days from the time when the new franchise finally goes into effect to agree on a location for such station. Such agreement is to constitute a recommendation to the board of control, which in turn has the privilege of recommending a site to the City Council for establishment by ordinance.

MELLEN RESPONSIBLE FOR NEW HAVEN TROLLEY PURCHASES

Charles S. Mellen, former president of the New York, New Haven & Hartford Railroad, took upon himself on Nov. 15 the responsibility for the New Haven's policy of acquiring electric railways in New England, which the Government in the trial of the eleven former directors of the road charges was a part of the New Haven's alleged plan to monopolize commerce. Mr. Mellen said:

"I told my directors time and again that the road ought to supply the public with its needs, and that meant electric railways, steamship and railroad lines. It was my policy, and I always put it forward, that the public should be supplied with all classes of transportation it demanded."

Sixty-five electric railways went into the New Haven system in pursuance of the Mellen policy, it was brought out, the acquisition of which the prosecution began to establish one by one. The evidence was admitted only conditionally, however, as Judge Hunt said that where the electric railways were shown to have operated within the borders of a single State, as in the case of many of the Connecticut lines, there was doubt in his mind that their acquisition was necessarily a violation of the Sherman law, which applies to interstate commerce.

CINCINNATI TRANSIT COMMISSION APPOINTED

In compliance with the law enacted by the Legislature last spring, Mayor Spiegle of Cincinnati, Ohio, has appointed the members of the commission to prepare plans for the proposed municipal rapid transit railway in that city. This step was taken on Nov. 16 when he announced the following appointments: William Cooper Proctor, president Proctor & Gamble Company; E. W. Edwards, president Edwards Manufacturing Company; William A. Hopkins, former city treasurer and for years connected with the public schools and city library; Edward H. Dornette, well-known architect, and Christian Schott, president Cincinnati Galvanizing Company. Both Mr. Proctor and Mr. Edwards were members of the old commission. The terms of the members range from one to five years, in the order in which their names are given.

City Engineer Frank Krug will be the engineer-in-chief of the commission. It is rumored that Mayor Spiegle, whose term expires at the end of the year, will be selected as attorney. City Solicitor Walter M. Schoenle and former City Solicitor Alfred Bettman will both have certain legal work in connection with the commission's activities.

The first work of the commission will be a careful study of the plans of that commission. Until this work is out of the way Council will not issue any part of the $150,000 of bonds authorized for the preliminary work. The members of the commission are to serve without salaries.

What is known as modification H of scheme No. 4 of the old commission's plan, described at some length recently in the ELECTRIC RAILWAY JOURNAL, will probably receive attention first. The cost of the rapid transit line provided for in this plan was estimated at $5,717,849, or if it is made a subway for the entire length, the cost would be about $12,000,000. Conferences will be held with officials of the various interurban roads to learn just what will be necessary to bring them to the business district.

The Cincinnati, Lawrenceburg & Aurora Electric Street Railway is working out a plan of entry of its own in connection with the West End Rapid Transit Company, which was incorporated some weeks ago. Edward H. Dornette said after his appointment as a member of the commission that an effort should be made to bring the Cincinnati & Indianapolis Traction Company into the heart of the city.

ELECTRICAL PROSPERITY WEEK NOV. 29 TO DEC. 4

On Nov. 20 the Society for Electrical Development sent out the last of the general publicity literature to be issued during the great Electrical Prosperity Week campaign, with the exception of the advance issue of *Collier's Weekly* Electrical Prosperity Week number of Nov. 27. The advance issue was for electrical men only. Of it 25,000 copies were mailed later. The special number of *Collier's Weekly* contains all of the "ads" shown in the advance issue and in addition thereto important articles on electricity—news pictures of what electricity will do and a vast amount of other interesting reading matter. It will have a circulation of nearly 1,000,000. The *Saturday Evening Post* of Nov. 27 also contains a number of Electrical Prosperity Week advertisements of leading electrical manufacturers. *Scientific American* of Dec. 4 and *National Food Magazine*, November issue, are electrical numbers. These magazines will reach fully 10,000,000 people.

With the assistance of leading sales and advertising experts last spring the society planned a large amount of co-operative material to be furnished—much of it free to everyone. The campaign soon became so big that the society reordered material many times—but still the avalanche of requests grew, many coming in at the last minute. For example, based upon every fact of past sales campaigns 5000 window lithographs should have covered the country. Up to Nov. 20 the society had already sent out 30,000. Of the 58,000 street cars in this country, more than 24,000 cars carry the society's Electrical Prosperity Week car cards. More than 5000 billboards are covered with the big eight sheet society design. Electric vehicles, wagons, etc., will carry 10,000 muslin signs. The 5,000,000 poster stamps have been distributed. It is said that never before in trade history has such a tremendous amount of dealer co-operative matter been distributed.

The Society for Electrical Development has been unable to fill orders for last-minute material, so great has been the demand on it. The society has now in preparation a booklet which is to recite the work done for Electrical Prosperity Week. Wishing to make the records complete, it asks that the chairmen of committees in charge of local celebrations send the society photographs, newspaper clippings and stories of the week.

AMENDED BUS PROPOSAL IN NEW YORK

The Fifth Avenue Coach Company placed a new proposal for an extension of its motor bus lines before the Board of Estimate of New York on Nov. 18 in opposition to the application of the New York Motor Bus Company. The Fifth Avenue company now suggests a profit-sharing arrangement, whereby the city shall obtain one-half the net profits after a certain preferential has been set aside, calculated on the cost of operation, the charges for amortization, 6 per cent on the capital invested, and an amount equal to the company's average profits for the last two years. The company is willing to guarantee that the annual payment to the city shall never fall below $75,000, and it asserts that in all probability, under this plan, the city's share would be at present $107,500 a year and in seven years not much under $225,000. The company proposes to charge for all its buses 10 cents, but to have a system of universal transfers. It has adopted many of the lines which the New York

Motor Bus Company has proposed, but has omitted some, to which opposition has developed.

Rhode Island Arbitration Award Postponed.—By agreement of the Rhode Island Company and its union employees the finding of the board of arbitration sitting in the wage case pending at Providence has been postponed an additional thirty days. The decision will probably be announced about Christmas.

Girardville Strike Settled.—The strike of the electrical workers of the Schuylkill Railway at the Girardville, Pa., shops has been settled as the result of a conference between W. S. Leib, general manager of the company, and a committee of employees. All of the latter will get an increase of wages ranging from 25 cents to 50 cents a day.

Strike on Buffalo & Depew Railway.—Demanding an increase in wages of 5 cents an hour, eight motormen and conductors, employed on the 7-mile line of the Buffalo & Depew Railway between Pine Hill and Lancaster have gone on strike. No effort has been made to operate cars, nor to fill the places of the eight strikers. William B. Cutter, Buffalo, president of the company, says the line has never paid expenses and that the company cannot increase the pay of the men.

Strader Finally Obtains His Liberty.—Alfred M. Strader, after having once been denied a pardon from the penitentiary, was finally granted his liberty by Governor Willis of Ohio on Nov. 16. Strader was convicted of having dynamite in his possession for unlawful purposes and placing dynamite on the street railway tracks in Columbus during the strike in 1910. For the first offense he had served five years and he had also served sixteen months of a five-year sentence for the second offense.

Report on Cleveland Bridge Approaches.—Frederick Law Olmsted, Boston, architect employed by the City Plan Commission at Cleveland, Ohio, has filed a report with Director of Public Service Sidlo, in which he objects to the approaches to the new bridge across the Cuyahoga River, as planned by the county engineers. He insists that the vehicle traffic should not cross car tracks at grade at either end of the bridge and this would be necessary under the present plans of the county engineer. Mr. Olmsted favors the subway approach for cars on the east side and is studying a new plan for the west side.

Matters in Status Quo in Detroit.—No question affecting the municipalization of the lines of the Detroit (Mich.) United Railway within the one-fare zone of Detroit may be submitted to the electors before July, 1916, according to the corporation counsel's interpretation of the city charter which prohibits more than two special elections in any one year. Because of this ruling the Board of Street Railway Commissioners has accepted the resignation of its secretary and will close its offices on Dec. 1. All three of the commissioners have indicated that they do not intend to resign from the board, but in a letter to the Common Council they point out that for the next eight months at least their activities will be governed more or less by the Council's requests.

PROGRAM OF ASSOCIATION MEETING

Pan-American Scientific Congress

The preliminary program of the coming Pan-American Scientific Congress, to be held in Washington at the Pan-American Building, Dec. 27 to Jan. 6, is just available. The congress will be divided into nine sections, of which one is devoted to "Transportation, Commerce, Finance and Taxation." L. S. Rowe, president American Academy of Social and Political Science, is the president of this section. Professor Rowe was chairman of the United States delegation to the first Pan-American Scientific Congress, which was held in Santiago in 1908. This section is divided into four sub-sections, namely, (1) Transportation, (2) Commerce, (3) Finance and (4) Taxation. The chairman of the committee in charge of sub-section (1) Transportation, is James S. Harlan, commissioner, Interstate Commerce Commission. The other two members of the committee are B. H. Meyer, commissioner, Interstate Commerce Commission, and Prof. Emory R. Johnson, of the University of Pennsylvania, Philadelphia.

Financial and Corporate

NEW YORK EARNINGS IMPROVE

Current Earnings of All Lines in Metropolis Show Substantial Increases—Outlook Now More Gratifying

According to current reports the elevated, subway and surface lines of New York City are practically all enjoying a marked boom in traffic. This came without warning, starting in October, and the current month is said to be showing capacity traffic. July, August and September, the first three months of the current fiscal year, were normal traffic months. The lines about held their own with last year, and in some cases reported smaller earnings. October was better, but in November the traffic began to show marked increases.

Earnings of the subway and elevated lines of the Interborough Rapid Transit Company are reported to be averaging $7,000 a day ahead of last year at this time. That means that about 140,000 more passengers, daily, are using the overhead and underground lines. The New York Railways is averaging $3,500 a day more than last year, so that the lines owned by the Interborough Consolidated Corporation are doing a daily business $10,500 more than last November.

In the first eighteen days of November, the Brooklyn Rapid Transit System reported total earnings that were $105,642 or 8.9 per cent in excess of the same period of 1914. Surface traffic increased $50,406 or 6.6 per cent, and elevated traffic $55,236 or 13.1 per cent. Frederick W. Whitridge, president Third Avenue Railway, is reported to have said recently that since the beginning of the current year in July there has been a distinct betterment in revenues and the outlook is more gratifying than for some time. The employment department of the company has lately noticed a large falling-off in applications for positions, which fact may be accepted as evidence of a general improvement in business conditions.

Harvey Fisk & Sons, New York, state that the Hudson & Manhattan Railroad is reporting substantial increases in the number of passengers carried. The number of passengers in October was 5,287,429, an increase of 4.48 per cent over October, 1914, while in the first half of November the number was 2,614,706, an increase of 11.3 per cent. Every station in the current month showed an increase except two, and here the traffic remained the same.

Officials of the traction lines unite in attributing the increase in traffic to generally improved business conditions in and around New York. They point to the capacity business of the big hotels as additional evidence, and also assert that the shopping and pleasure traffic, as well as strictly business traffic, is on a decided upgrade.

KANSAS COMPANIES MERGED

The Kansas Public Utilities Commission after an adjourned hearing on Nov. 9 gave its approval to a merger of the street railway and electric light plants in Lawrence, Emporia and Parsons with the Kansas Electric Utilities Company, a Lawrence corporation recently chartered. The plants in the three localities were inspected by commission engineers, and it was decided that the proposed amalgamation would be of general advantage.

In expressing its approval the commission issued three orders. One authorized the Parsons Railway & Light Company, the Emporia Railway & Light Company and the Lawrence Railway & Light Company to sell their franchises to the Kansas Electric Utilities Company. Another granted permission to the new company to operate as a common carrier in Kansas. The third authorized the new company to issue $400,000 of capital stock and $1,500,000 of first mortgage ten-year 5 per cent bonds, the sale of which is to provide funds for taking over the three old companies.

An unusual feature of the arrangement is that the capitalization of the new company will be less than the combined capitalization of the three companies which it supplants. The order issued by the commission provides that the new company will have $871,000 less in securities than the three old ones had outstanding. The commission, however, allowed exactly what the incorporators asked.

ANNUAL REPORT

Spokane & Inland Empire Railroad

The comparative statement of income, profit and loss of the Spokane & Inland Empire Railroad, Spokane, Wash., for the years ended June 30, 1914 and 1915, follows:

	1915	1914	Change in Per Cent
Railway operating revenues:			
Freight	$270,126	$310,930	—13.1
Passenger	401,644	483,191	—16.9
Street railway system	498,977	541,618	— 7.9
Other revenue	72,577	68,728	+ 5.6
Total railway operating revenues	$1,243,325	$1,404,469	—11.5
Railway operating expenses:			
Way and structures	$239,443	$254,400	— 5.9
Equipment	195,378	127,400	+53.4
Power	119,015	119,468	— 0.4
Conducting transportation	368,140	388,461	— 5.2
Traffic	18,936	21,759	—13.0
General and miscellaneous	126,384	150,588	—16.1
Transportation for investment—credit	14	......	.....
Total railway operating expenses	$1,067,284	$1,062,080	+ 0.5
Net revenue, railway operations	$176,040	$342,388	—48.6
Auxiliary operations—revenue	$162,914	$136,840	+19.1
Auxiliary operations—expenses	10,634	10,282	+ 3.4
Net revenue—auxiliary operations	$152,280	$126,557	+20.3
Net operating revenue	$328,321	$468,946	—29.9
Taxes accrued	150,000	150,000	.....
Operating income	$178,321	$318,946	—44.1
Other income	2,456	3,840	—36.0
Gross income	$180,777	$322,786	—44.0
Deductions:			
Interest on funded debt	$235,238	$238,910	— 1.5
Interest on unfunded debt	231,224	214,427	+ 7.8
Miscellaneous	2,108	27	.....
Total deductions	$468,571	$453,365	+ 3.4
Deficit	$287,794	$130,578	.....

The interurban freight business during the year, in common with other business in the territory, especially the lumber business, suffered from the general depression. It showed a decrease in revenue received of $40,803, or 13.1 per cent, as compared with last year's figures. The interurban passenger business shows a decrease of $81,547, or 16.9 per cent, as compared with preceding year. This decrease was caused in some measure by the auto-bus and privately owned automobile competition, but largely by the prevailing depression.

The revenue received from the street railway system of the city of Spokane showed a decrease of $42,640, or 7.9 per cent, as compared with last year. This decrease was principally caused by the jitney-bus competition in the city. The revenue received from other sources shows an increase of 5.6 per cent over last year's figures. The revenue received from auxiliary operations—sale of power—increased $26,514, or 19.1 per cent.

The charges for operation showed a decrease in every department except equipment. The increase in the equipment department was brought about by depreciation being charged this year on all equipment under the new ruling of the Interstate Commerce Commission. Such charges during the current year amounted to $78,315. In addition to this, there were a number of wooden bridges on the Inland Division which were replaced by embankments, and it was necessary, under the rulings of the commission, to dispose of the depreciation on these wooden structures through operating expenses. The charges on that account amounted to $18,418, making a total charge for depreciation during the year of $96,733. As there were no corresponding items in the previous year's report, a comparison of the actual expenses for operation shows a decrease of $91,530.

The taxes of the company in the State of Washington for the years 1911 and 1912 were paid during the last year, a compromise being effected with the County and State officials in which all penalties and interest on account of taxes unpaid were cancelled. The funds necessary to pay these taxes were secured at 5 per cent. The current taxes were also paid.

The total expenditures for additions and betterments for the fiscal year amounted to $32,829. This amount covered payments of land contracts, municipal assessments, paving in the city of Spokane, bridges filled on the Inland Division, new depots at Kiesling and Steptoe and a new substation and equipment at McGuires, Idaho.

ACTUAL COST AND CAPITALIZATION

Judge Stuart in the Circuit Court of Honolulu is hearing an injunction suit brought by the Territory of Hawaii to restrain the Honolulu Rapid Transit & Land Company from making certain increases in its capital stock. The company's franchise provides that it shall not be lawful to increase the capital stock above the actual cost of the property plus 25 per cent thereof. The Territory, however, contends that this franchise provision constitutes merely a limitation, and the capitalization can be based only on the present value of the company's property, plus 25 per cent.

The choice of a valuation basis, therefore, forms the vital issue of this case. Judge Stuart, it is reported, has tentatively ruled in favor of the cost basis. He admitted some evidence regarding value, but indicated that it might be ruled out later. The actual cost of the company, as far as shown, is said to be approximately $2,171,000. On this basis the company might contend that it can issue stock up to $2,171,000 plus 25 per cent, but the present suit is confined to its right to issue stock up to $1,600,000. C. R. Forbes, superintendent of public works, and W. H. Barringer recently completed an investigation as to the company's present value, although their findings have not yet been offered to the court. W. A. Cattell, consulting engineer, San Francisco, Cal., has been retained by the company to investigate its plant and testify as to its proper valuation.

C. G. Ballentyne, general manager, has been testifying before the court in regard to the company's valuation and earnings. Of the sum paid for the franchise of the old Honolulu tramway system, approximately $300,150, Mr. Ballentyne stated that $150,000 was in bonds, $91,000 in preferred stock at par value and the balance in cash. This purchase price, it is asserted, should be included in the cost of the company. The total income from Aug. 31, 1901, to April 30, 1915, was approximately $5,693,032, of which sum $5,563,376 was taken in fares. The expenditures for the same period were $2,171,976.

$50,000,000 CORPORATION TO PROMOTE TRADE

Frank A. Vanderlip, president of the National City Bank of New York, announced on Nov. 23 the details of organization and the objects to be achieved by a new corporation for the promotion of American enterprises, industry and commerce in foreign lands. The name of the new corporation is the American International Corporation. It is incorporated in New York State with a capital of $50,000,000, of which $49,000,000 will be common and $1,000,000 will be managers' shares. The managers' shares will be paid for at par, the same as the common stock, and will have no advantage over the common until the latter pays 7 per cent. Any amount higher than this figure will be divided one-fifth among the holders of the managers' shares and four-fifths among the common shareholders. The managers' shares can be held only by those actively engaged in the management of the corporation. There will be no public offering of any of the stock.

The president of the new corporation will be Charles A. Stone, of Stone & Webster, Boston. Mr. Stone will come to New York to live. R. P. Tinsley, treasurer of the Standard Oil Company, will be secretary and treasurer. Mr. Vanderlip will be the chairman of the board of directors, which will be made up as follows:

J. Ogden Armour, Armour & Company; Charles A. Coffin, General Electric Company; W. E. Corey, Midvale Steel & Ordnance Company; J. P. Grace, W. R. Grace & Company; James J. Hill, Great Northern Railway; Otto H. Kuhn, Kuhn, Loeb & Company; Robert S. Lovett, Union Pacific Railroad; Ambrose Monell, International Nickel Company; Henry S. Pritchett, Carnegie Foundation; Percy A. Rockefeller, Standard Oil Company; John D. Ryan, Anaconda Copper Company; Charles H. Sabin, Guaranty Trust Company; William L. Saunders, Ingersoll-Rand Company; James A. Stillman, National City Bank; Charles A. Stone, Stone & Webster; Theodore N. Vail, American Telephone & Telegraph Company; Frank A. Vanderlip, National City Bank; Edwin S. Webster, Stone & Webster; Albert H. Wiggin, Chase National Bank; Beekman Winthrop, Robert Winthrop & Company, and Guy E. Tripp, Westinghouse Electric & Manufacturing Company.

The purposes of the new company were outlined by Mr. Stone as follows:

"It is organized for the purpose of doing an international business and promoting trade relations with the different countries which will help make a world market for our products; for financing and promoting the development in foreign countries by American engineers and manufacturers of great public and private undertakings; for assisting in financing the rehabilitation of industries in foreign countries; and for undertaking such domestic business as seems advantageous in connection therewith."

American Railways, Philadelphia, Pa.—The board of directors of the American Railways has issued to its stockholders a formal announcement of the details of its merger with the National Properties Company, New York, as described in the ELECTRIC RAILWAY JOURNAL of Nov. 6. In particular the announcement calls for the deposit of the American Railways outstanding common stock at the Continental-Equitable Title & Trust Company, Philadelphia, on or before Nov. 30, in order to be exchanged for new thirty-year collateral trust bonds of the National Properties Company. The depositors will receive negotiable receipts exchangeable for bonds after Jan. 3, 1916, if the agreement becomes operative by the deposit of the 75 per cent of the stock required. All depositors of stock will be entitled to receive the dividend upon the common stock now declared and payable Dec. 15, 1915, whether the agreement of purchase becomes operative or not.

Boston (Mass.) Elevated Railway.—The authorized $3,286,000 issue of 5 per cent gold bonds of the Boston Elevated Railway, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 13 and 20, has been sold at 97 and interest, to yield 5.2 per cent, by a syndicate headed by R. L. Day & Company, Boston. The bonds, dated 1912, are due in 1942.

Buffalo & Williamsville Electric Railway, Williamsville, N. Y.—The Buffalo & Williamsville Electric Railway, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 20, has been authorized to issue $49,000 of 5 per cent forty-year first mortgage bonds at 95, to net $46,550. All of this sum, it is now learned, is to be devoted to the payment of notes and bills payable. An examination of the affairs of the company revealed that while the assets have been less than the liabilities since the sale of its Batavia property, its present properties are being operated profitably. The permission for the present issue of securities is made on the condition that the company not pay dividends until this difference has been completely amortized, meanwhile maintaining a corporate surplus account of at least $10,000.

Cities Service Company, New York, N. Y.—Henry L. Doherty & Company, New York, is offering at 101 and interest five-year 7 per cent convertible coupon gold notes of the Cities Service Company. The notes are due on May 15, 1918, but are callable at 102 and convertible into preferred stock at par. Of the $10,000,000 of notes authorized in this issue, $7,000,000 are outstanding. It is also announced that John C. Mitchell, president Denver National Bank, has been elected a director of this company to succeed the late Dennis Sullivan.

Fort Wayne & Springfield Railway, Decatur, Ind.—I. A. Kalver, Decatur; A. Bornstein, Indianapolis, and A. Fernberg, Muncie, have filed with French Quinn, receiver Fort Wayne & Springfield Railway, a certified check for $5,000, accompanying their bid of $51,647 for the property of the company. It is said that their plan will be to wreck the road, sell the material and hold the real estate. It is not generally believed that the road will go to them, as their bid is much lower than the receiver's certificates and the court costs. The latest preceding item regarding this company's condition was published in the ELECTRIC RAILWAY JOURNAL of Oct. 23.

International Traction Company, Buffalo, N. Y.—Under the plan outlined in the ELECTRIC RAILWAY JOURNAL of Aug. 21, holders of more than 85 per cent of the $5,000,000 of 4 per cent cumulative preferred stock of the International Traction Company have retired their holdings, together with all accrued and unpaid dividends thereon, by the acceptance in exchange on a share for share basis of new 7 per cent cumulative first preferred stock. The company now offers to the holders of the remaining 4 per cent preferred issue the privilege of a like exchange at any time prior to Jan 1, 1916. The new 7 per cent issue will bear dividends from Nov. 15.

Jamestown, Westfield & Northwestern Railroad, Jamestown, N. Y.—The Public Service Commission for the Second District of New York has approved the lease of the Jamestown, Westfield & Northwestern Railroad line between Mayville and the Chautauqua assembly grounds to the Western New York & Pennsylvania Railroad and the Pennsylvania Railroad. The leased line is a 2.6-mile section along the shore of the lake that is not connected or capable of profitable connection with any of the other lines of the lessor. The lease was made last March, but through inadvertence the approval of the commission was only recently applied for.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—The syndicate composed of Lee, Higginson & Company, Boston, and Reilly, Brock & Company, Drexel & Company and Graham & Company, Philadelphia, which recently purchased $7,000,000 of first and consolidated mortgage five-year 5 per cent gold bonds of the Mahoning & Shenango Railway & Light Company, dated Nov. 1, 1915, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 20, has disposed of all the issue at 97.75 and interest to yield about 5.5 per cent. The proceeds of these bonds will be used to retire $4,844,000 of first consolidated refunding bonds maturing on Jan. 1, 1916, and in addition pay a part of the cost of new construction, additions and improvements made during the last few years by the controlling company, the Republic Railway & Light Company.

Middle West Utilities Company, Chicago, Ill.—The Illinois Trust & Savings Bank, Russell, Brewster & Company and McCoy & Company, all of Chicago, are offering at 94.8, to yield more than 6.75 per cent, the remainder of a present authorized issue of $2,000,000 of 6 per cent ten-year collateral gold notes of the Middle West Utilities Company, dated Jan. 1, 1915. A large part of this has already been placed by the three foregoing firms and by W. P. Bonbright & Company and A. H. Bickmore & Company, New York. On June 30, an amount of $1,000,000 was outstanding.

Public Service Corporation of New Jersey, Newark, N. J.—The financial statement issued by Public Service Corporation of New Jersey for October shows an increase in gross business of nearly $160,000. For the ten month period ended with October the gross increase totaled more than $1,100,000. The actual gross increase in total business for October was $159,129, an increase of 5 per cent. The balance available, after payment of operating expenses, fixed charges, sinking fund requirement, etc., for amortization, dividends and surplus was $488,741. The decrease in surplus available for dividends over the corresponding month of 1914 was $32,697. For the ten months ended Oct. 31, 1915, the gross increase in total business was $1,127,841, an increase of 3.83 per cent. The balance available for amortization, dividends and surplus was $2,995,133, while the increase in surplus available for dividends amounted to $161,505.

Sandpoint & Interurban Railway, Ltd., Sandpoint, Idaho.—The stockholders of the Sandpoint & Interurban Railway, Ltd., have decided to issue $20,000 of bonds to take up notes in the sum of $15,000 and to make improvements.

Springfield (Mass.) Street Railway.—The Massachusetts Public Service Commission has authorized the Springfield Street Railway to issue 9472 shares of stock at 110. The proceeds, amounting with the premium to $1,041,920, are to be used to pay off floating indebtedness. The application for this issue was reported in the ELECTRIC RAILWAY JOURNAL of Dec. 12, 1914.

Toledo-Detroit Railroad, Toledo, Ohio.—The Toledo-Detroit Railroad, the successor to the Toledo, Ann Arbor & Jackson Railroad, is now operated by steam. The latter line, which took over the Toledo, Ann Arbor & Detroit Railroad, foreclosed, was organized to operate a 50-mile electric system, and 18 miles of line were constructed before it was sought to change to steam power.

Utah Securities Corporation, New York, N. Y.—All offers to sell Utah Securities Corporation 6 per cent ten-year notes of 1912 up to 89.99 were accepted on Nov. 18 by the Guaranty Trust Company, New York, as trustee. The amount deposited with the bank for the retirement of the notes was $1,000,000. It is now announced that the bank has on deposit an additional $1,000,000, in exchange for which offers of notes at not more than 101 and interest will be received up to Dec. 2.

Worcester (Mass.) Consolidated Street Railway.—The Worcester Consolidated Street Railway has received permission from the Massachusetts Public Service Commission to issue 18,140 shares of stock, par $100, to pay off floating indebtedness. As noted in the ELECTRIC RAILWAY JOURNAL of Dec. 12, 1914, the company had asked approval of an additional $1,880,000 of stock.

DIVIDENDS DECLARED

Manhattan Bridge Three-Cent Line, Brooklyn, N. Y., quarterly, 1¼ per cent.

Norfolk Railway & Light Company, Norfolk, Va., 3 per cent.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1¼ per cent, common.

Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS, PHILADELPHIA, PA.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$467,622	......	......	......	......
1 " " '14	474,478	......	......	......	......
9 " " '15	4,003,518	......	......	......	......
9 " " '14	4,174,705	......	......	......	......

COLUMBUS (GA.) ELECTRIC COMPANY

1m., Sept., '15	$61,827	*$28,479	$33,348	$28,678	$4,670
1 " " '14	59,676	*25,715	33,961	28,791	5,170
12 " " '15	703,587	*324,010	379,577	344,888	34,689
12 " " '14	664,644	*280,648	383,996	313,304	70,692

DALLAS (TEX.) ELECTRIC COMPANY

1m., Sept., '15	$148,154	*$92,680	$55,474	$33,459	$22,015
1 " " '14	173,776	*94,673	79,103	33,357	45,746
12 " " '15	1,880,820	*1,112,887	767,933	400,834	367,089
12 " " '14	2,270,801	*1,345,632	925,169	350,694	574,475

EL PASO (TEX.) ELECTRIC COMPANY

1m., Sept., '15	$78,367	*$42,044	$36,323	$4,197	$32,126
1 " " '14	87,041	*48,718	38,323	4,203	34,120
12 " " '15	971,204	*520,934	450,270	50,355	399,915
12 " " '14	1,015,759	*569,239	446,520	51,300	‡395,226

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m., Sept., '15	$163,019	*$90,393	$72,626	$36,042	$36,584
1 " " '14	195,260	*104,718	90,542	35,921	54,621
12 " " '15	2,007,724	*1,202,491	805,233	433,047	372,186
12 " " '14	2,455,476	*1,351,522	1,103,954	440,562	663,392

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m., Sept., '15	$23,389	*$11,799	$11,590	$5,422	$6,068
1 " " '14	21,298	*14,384	6,914	5,646	1,268
12 " " '15	266,195	*160,828	105,367	66,764	38,603
12 " " '14	283,081	*181,514	101,567	67,106	34,461

JACKSONVILLE (FLA.) TRACTION COMPANY

1m., Sept., '15	$46,942	*$31,301	$15,641	$14,685	$956
1 " " '14	53,567	*38,084	15,483	12,475	3,008
12 " " '15	623,129	*435,080	188,049	172,502	15,547
12 " " '14	729,870	*472,570	257,300	153,004	104,296

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m., Sept., '15	$142,738	*$86,351	$56,387	$27,675	$28,712
1 " " '14	164,778	*89,972	74,806	26,541	48,265
12 " " '15	1,733,222	*1,035,928	697,294	328,970	368,324
12 " " '14	2,151,016	*1,199,189	951,827	307,704	644,123

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

1m., Sept., '15	$23,864	*$14,131	$9,733	$7,475	$2,258
1 " " '14	23,805	*15,612	8,193	7,659	534
12 " " '15	290,265	*181,223	109,042	91,653	17,389
12 " " '14	305,732	*196,394	109,338	91,545	17,793

*Includes taxes. ‡Includes non-operating income.

Traffic and Transportation

ATLANTIC CITY COMMISSION REVERSES ITSELF

Political Expediency Said to Have Governed Jitney Legislation at Coast Resort—Independence Measure Upheld—Ordinances Passed in St. Louis and Logansport

In direct contradiction to an article published in *Commission Government*, the organ of the city officials of Atlantic City, N. J., the City Commissioners absolutely and finally refused to pass proper and reasonable regulation of the jitney traffic. The article in question stated in part as follows:

"For the first time with the authorization of the City Commissioners, jitneys are to be brought under at least a pretense of regulation. An ordinance will be introduced requiring jitney operators to cover specified routes instead of running as they please; to prohibit smoking in the cars; to stop at the far sides of all street intersections, and to pay a license fee of $50 each, instead of $25, the former charge being the amount assessed upon the trolley cars."

After asserting that trolleys are essential to the further development of the resort and maintaining at the same time that the expulsion of jitneys from Atlantic Avenue is out of the question, the official statement says:

"It must be patent to every mind that the Board of Commissioners cannot be called upon to solve the problem of competition. The commissioners cannot be expected nor called upon to protect either the dividends of the electric railway or the profits of the individual jitneys. Both are lawful enterprises, and it is for them to work out the problems of competition. There has been a demand for the bonding of jitneys, but the law department of the city has decided that this cannot be legally done. That it has been done in other cities does not make the act legal."

All matters taken up with reference to the electric railway and the jitneys in Atlantic City seem to have been decided from the standpoint of political expediency on account of the fact that all of the present City Commissioners will be candidates for re-election next May. At the present time the 400 or more jitney operators and their friends evidently loom up as holding the balance of elective power.

The *Ohio Law Reporter* for Nov. 15 contains the text of the decision by Judge Foran in the case of Mike Kaczmarek vs. the Village of Independence et al., decided on July 28 in the Common Pleas Court of Cuyahoga County. The village of Independence last April passed a jitney regulatory ordinance requiring, among other things, a $10,000 bond for jitney owners, and the plaintiff, who was arrested in violation of the ordinance, brought suit claiming that the restrictions were excessive and that the Village Council did not have power to pass the ordinance. Judge Foran held that an irresponsible jitney driver "is as dangerous a menace to the community as a truck load of dynamite in the custody of a drunken driver." He upheld the validity of the ordinance as well as the reasonableness of its provisions.

A bill providing stringent regulations for jitney automobiles was passed by the Board of Aldermen of St. Louis, Mo., on Nov. 19, by a vote of twenty-one to six. The measure requires owners of jitneys to pay a license fee of $25 a year and to give bond of $10,000 to indemnify pedestrians and other persons, excepting passengers and chauffeurs, for injuries to themselves or property in jitney accidents. Jitneys must display signs showing their destination and the fare charged, and are prohibited from being overloaded. No person may ride on the running board or body of the auto, and no higher fare than that specified shall be charged, under penalty of a fine of from $5 to $500. When the top is up after dark the jitney must be lighted.

An ordinance has been passed by the city of Logansport, Ind., to regulate the jitney. The conditions imposed are quite severe. Among other things the measure prescribes a license of $100 a year for each automobile with a capacity of five persons or less, including the driver, $150 a year for a machine of seven passengers, including the driver, and $250 for a machine of more than seven passengers, including the driver; a $10,000 bond; a charge of not more than 5 cents per passenger, and operation subject to regulations as to routes, etc., by the Board of Work.

MILWAUKEE COMPANY WANTS FARE INCREASE

Brief to Commission Shows Burdens of Regulation—For First Half of 1915 City and Suburban Lines Earn Only 1.075 Per Cent on Cash Investment

After a campaign of advertising for several weeks, as previously described in this paper, for the purpose of putting its side of the case before the public, The Milwaukee Electric Railway & Light Company for the city lines in Milwaukee, Wis., and the operated Milwaukee Light, Heat & Traction Company for the suburban lines have petitioned the Wisconsin Railroad Commission for increased fares. A brief filed with the commission cites various reasons why such an increase would now be justified.

In the first place it is stated that under commission orders the rates of fare charges have been repeatedly reduced in various ways—by requiring in August, 1912, the sale of thirteen tickets for 50 cents, by extending the single fare limits, and by forcing the issuance of two transfers for a single fare in spite of franchise provisions. In January, 1914, the commission extended the single-fare limits materially beyond the points provided for in the franchises and established suburban 2-cent zones in connection with certain minimum fares. In October, 1914, the commission ordered the sale of thirty zone tickets for 50 cents, or 1.66 cents per zone, and extended the city fare zone so as to eliminate certain outlying zones. In January, 1915, the commission rescinded the thirteen-tickets-for-50-cents order but left the single fare limits unchanged. In November, 1913, the commission fixed certain standards which are said to have required service in excess of that needed and to have imposed expenditures for construction and maintenance exceeding any possible revenue derived from the change.

In addition to the foregoing burdens, the companies have been required by the municipalities to make large capital and maintenance expenditures for building new lines into outlying districts and making unprofitable extensions, paving streets, sprinkling the streets and removing snow. The building and maintaining of pavements alone cost the city lines $166,856 a yaer. Furthermore, The Milwaukee Electric Railway & Light Company is being subjected to large unremunerative expenditures for separating grades at steam railroad crossings, and proceedings are now contemplated to require the company to clean the streets in Milwaukee. On the suburban lines the Milwaukee Light, Heat & Traction Company has been similarly burdened with heavy paving obligations, and further impositions are sought in requirements to clean, sprinkle and oil the tracks and roadbed. In general, too, taxes and operating costs for material and labor have increased.

On the basis of commission figures the increase in capital expenditures on the city system in the five years from Jan. 1, 1910, to Jan. 1, 1915, was $5,403,237, while the gross revenues in this period increased only $323,394 or less than 6.2 per cent of the capital increase. This sum is less than one-sixth of the amount necessary to cover operating expenses, depreciation and a 7½ per cent return on the capital invested. Moreover, irrespective of the capital expenditures required, the operating expenses during the five years have increased on the average 218 per cent faster than the gross revenues.

The brief mentions the inequalities shown in jitney and railway regulation, and sums up with the statement that the present rate of return is prohibitory of further development. For the first half of 1915 the return secured by the petitioners on the basis of merely the earning value set by the commission was 1.388 per cent. On the basis of the cash investment for the city lines based on the United States Circuit Court decision as of Jan. 1, 1897, with cash additions to date, and the cash cost of the outside lines as stated by the commission with the actual cost of additions since, the return for this half year was 1.075 per cent. On the valuation as determined by the Wisconsin Tax Commission, however, the return was 1.056 per cent.

During the four years ended June 30, 1915, the companies secured returns on the different valuations as shown by the accompanying table. The lines inside and outside the city were forced by too low rates, high taxes and long hauls to earn $1,408,865 less than they were entitled to on the Wisconsin Railroad Commission's rate valuations; $3,124,068 less than the 7½ per cent fare return on the actual admitted cash investments in physical property, and $3,145,148 less than a 7½ per cent return on the tax valuations. These results are held to be confiscatory, and fares and zone limits sufficient to yield a reasonable return are demanded.

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.
(Covering City Lines)

	1912	1913	1914	1915
Tax valuation	$18,191,000	$18,700,000	$20,060,000	$20,740,000
Percentage return..	6.656	5.530	4.237	3.206
Investment valuation	$16,563,559	$17,508,284	$19,071,144	$19,278,353
Percentage return..	7.310	5.906	4.456	3.449
Rate valuation.....	$12,502,836	$13,862,874	$15,265,896	$15,096,096
Percentage return..	9.684	7.460	5.567	4.405

MILWAUKEE LIGHT, HEAT & TRACTION COMPANY.
(Covering Lines Outside City)

	1912	1913	1914	1915
Tax valuation	$5,780,000	$6,900,000	$7,084,000	$7,360,000
Percentage return..	7.505	3.324	4.289	2.996
Investment valuation	$7,781,305	$7,890,635	$8,124,627	$8,315,733
Percentage return..	2.604	2.907	3.739	2.652
Rate valuation.....	$6,184,929	$6,195,208	$6,274,889	$6,281,838
Percentage return..	3.276	3.702	4.841	3.511

RAILWAY ESTABLISHES INTERURBAN BUS SERVICE

The Washington Auto-Bus Company, a subsidiary of the Puget Sound Traction, Light & Power Company, Seattle, Wash., on Nov. 15, inaugurated an auto bus service between Seattle and Bothell, a distance of approximately 15 miles. The Seattle-Bothell line is similar to those which have been operated by the company at Bellingham, Auburn, Edmonds and other points as auxiliaries or feeders to the various electric railways. On the Seattle-Bothell line, transfers are issued and accepted between the buses and the Cowen Park Railway, or at the Seattle terminus of the line, which is located at the Seattle-Everett Station, Fifth Avenue and Pine Street. The first auto-bus leaves Bothell at 6.40 a. m. and arrives at the Seattle terminus at 7.45 a. m. Three cars are in service morning and evening and two during the remainder of the day. The bodies of the cars are glass inclosed and are mounted on Mack trucks. The forward wheels are equipped with pneumatic tires and the rear wheels with block non-skid solid rubber tires. Each car seats twenty passengers, exclusive of the driver. The cars are lighted with electricity and are heated from the engine exhaust.

PACIFIC ELECTRIC CURTAILS PASADENA SERVICE

Paul Shoup, president of the Pacific Electric Railway, Los Angeles, Cal., and J. McMillan, D. W. Pontius and F. K. Hawkins, of the company, have sent a letter to Chairman Hamilton of the City Commission of Pasadena, Cal., setting forth the fact that owing to decreased revenues the company has found it necessary to change its running schedule in Pasadena. The letter follows:

"The Pacific Electric Company has found it necessary because of decreases in its passenger revenues during the last fifteen months to economize in its transportation service, and its new time card will become effective on Nov. 14. The principal point is that the public and railway can get along best without that service which is least patronized.

"Notwithstanding the decrease in revenue between Los Angeles and Pasadena, so far, fortunately, we have been able to get along without increasing the intervals between trains, which we are very loath to do, so it may be said that your most important service is not affected.

"Some changes have been made in your local street car service, about which you have been advised locally, which is only taking off some cars which we voluntarily put on some time ago. Conditions on our local city lines in Pasadena are expressed by comparing September, 1915, with September, 1912. During the former month we operated 130,000 car-miles and took in $19,939, while three years ago we operated 118,000 car-miles and took in $24,700.

"We regret the necessity for these economies and trust that normal conditions in all lines of business, which of course includes ours, will return before long."

One-Man Cars in Everett.—The Puget Sound International Railway & Power Company is operating cars on the North Colby-Rucker extension in Everett, Wash., except between the hours of 4 p. m. and 6 p. m., at which time traffic is the heaviest.

Car Seat Vandals in Buffalo.—Because of the number of car seats damaged by passengers and others cutting them with knives and other sharp instruments, officials of the International Railway, Buffalo, N. Y., have offered a reward of $25 for the apprehension of such individuals. Notices to this effect have been posted in all cars.

"Trolley Topics" a Year Old.—The November issue of *Trolley Topics*, the house organ of the Louisville (Ky.) Railway, is a special number, being the anniversary and Thanksgiving number of the publication and the thirteenth issue, which was published for the first time in November a year ago. The special number contains, with covers, thirty-four pages, printed on a book paper and illustrated. Samuel Riddle, superintendent of transportation, is editor of the publication.

Question of Jurisdiction Settled.—The Appellate Division at Toronto, Ont., has dismissed the appeal of the Hamilton, Grimsby & Beamsville Electric Railway from the judgment in favor of Rev. J. S. Ross and others, Hamilton, Ont. The company contended that the Ontario Railway Board had no jurisdiction to order sanitary conveniences in the company's cars, since the railway had been declared for the general advantage of Canada. It is held by the court that the board has jurisdiction.

Skip-Stop Vote in St. Louis.—It was proposed by the United Railways, St. Louis, Mo., to permit its patrons to vote on Nov. 22 on the question of the continuation of the skip stop there. It is stated unofficially that the stops already eliminated have resulted in a saving of six minutes in the regular schedule of the Broadway line in each direction, making a saving of 7½ per cent, and that three minutes have been clipped from the time in each direction of the Delmar and University lines, making a saving of 7 per cent to the passengers.

Chicago Surface Lines Introduce Fresh-Air Cars.—The popularity of the twelve fresh-air cars being operated on the Elevated Railroads of Chicago, Ill., has led to the inauguration of a similar service, with sixty cars, on the Chicago Surface Lines. These cars are operated five each on twelve different lines and bear conspicuous signs stating that they are fresh-air cars. Like the cars operated on the elevated lines, those on the surface have all the windows and doors open. The cars were placed in service at the request of John Dill Robertson, health commissioner of the city. They will be continued in service indefinitely.

Something New in Railway Bowling.—A series of games between picked teams of the Public Service Railway, Newark, N. J., and the Denver (Col.) Tramway bowling leagues is now in progress. The first three games were rolled by both teams on Saturday, Oct. 23. In order that the play might be made simultaneously, the contest was arranged to begin in Denver at 7 p. m., mountain time, and, in Newark, at 9 p. m. Eastern time. Returns of each game were telegraphed by the teams immediately after the finish. The first series resulted in a victory for Denver, with a total gain of 171 pins. After the games are finished, the losing team will prepare an engrossed copy of the scores, suitable for framing, and will present it to the winner.

Toronto Running Board Ruling.—Judge Winchester, in his judgment in the charge of criminal negligence against the Toronto (Ont.) Railway for operating cars with running boards, delivered on Nov. 19, says: "On the evidence I find the Toronto Railway has been guilty of criminal negligence, and that the charge has been proved. Since the hearing herein an interim order relieving the company from the obligation imposed by Sec. 107 (1) of Chap. 185, R. S. O., 1914, as to all the routes in the city until the application has been finally disposed of, has been made by the Railway Board, that only affects the rights of the parties since its date. While finding the railway guilty of the charge I do not impose any sentence at present, and will wait a reasonable time to permit the company to carry out the provisions of the statute. I will, therefore, defer sentence until the General Sessions of the Peace, to be held in May, 1916. In the meantime, if a reserved case be desired to the Court of Appeal on the above I shall grant it."

Detroit Skip-Stop Campaign.—Some form of skip-stop plan will be tried by the Detroit (Mich.) United Railway within a short time, provided the necessary permission is forthcomng from the city authorities. The company's idea is to conduct the first experiment on the Woodward line, the heaviest passenger line in the city, and if satisfactory to the riders to make the plan effective on other lines. For the last three weeks the company, through its weekly publication, *Electric Railway Service*, has been seeking the opinions of its riders on the skip-stop plan. The response in favor of the idea has been so large and so unanimous that it is believed the time is opportune for the experiment. Congestion in some of Detroit's main thoroughfares has been increasing at such a pace recently that in the rush hour many of the cars cannot average more than 7½ m.p.h. Half trips on some of the lines which are scheduled to be made in thirty minutes are taking from thirty-eight to forty-one minutes. The company's plan, generally speaking, is to have the cars going in one direction stop at every other block and on the return trip stop at the blocks which have been missed in going in the opposite direction.

Campaign in Brooklyn Against Reckless Vehicle Driving.—According to the Brooklyn (N. Y.) Rapid Transit Company there were 434 accidents to vehicles on its lines in September. In 60 per cent of these mishaps the company held the drivers of motor and horse conveyances were to blame. In a statement which it has issued the company says: "We commend these figures to all those who are responsible for the operation of commercial or pleasure vehicles in the streets of Brooklyn. In common with other street railroads we are spending thousands of dollars each year in instructing our operating employees in safety and in following up this safety education by a comprehensive system of inspection and report. Where operating employees are found deficient in their knowledge of safety duties through the occurrence of accidents or other means of disclosure, we see to it that they are promptly and effectively reinstructed and the man who cannot or will not understand such instruction does not remain long in the service." The company announces that hereafter it will have its car crews report the numbers or owners' names of vehicles recklessly operated which may be involved in accidents, and, if such reports are substantiated after investigation, notices will be sent to the owners, advising them of the circumstances.

New Traffic Rules in Louisville.—Traffic regulations which are revolutionary for Louisville have been ordered put into effect by the Board of Public Safety, of that city, and promise to be very effective in remedying traffic conditions on Fourth Street, the principal retail street in that city. From Main Street to Broadway, six blocks, there is always a large amount of traffic, and this stretch of street has been most troublesome for the Louisville Railway. The Fourth Street line is the principal line of the company and, in addition to the through travel, it carries a large number of transfer passengers in the central part of the city. Blockading of traffic here has often seriously interrupted schedules and discommoded passengers transferring from these cars to cross-town cars. The rule promulgated now provides: That no vehicle shall be left standing at the curb on Fourth Street between Main Street and Broadway, or on Walnut and Chestnut Streets between Third and Fifth Streets; that traffic in or out Fourth Street between Main Street and Broadway may not turn across the street to pass into cross streets, *i.e.*, to the left, although traffic from cross streets may turn into Fourth Street; that no vehicle in any of the described squares shall stand within 15 ft. of a fire hydrant and that an additional safety zone shall be established on Fourth Street between Green and Walnut Streets. Authority is given to the police to enforce these regulations and to prosecute offenders in the ordinance court. Another improvement is being installed in the form of a semaphore tower at Third Street and Broadway, the arms to be operated by the officer seated in a signal tower at the corner. This is a very busy corner and it has been selected to make an experiment. If the plan proves desirable here the city will probably make similar installations at other corners.

Personal Mention

Mr. R. E. L. Kolb has succeeded Mr. F. M. Bright as roadmaster of the York (Pa.) Railways.

Mr. Warren Dougherty has succeeded Mr. T. Carman as master mechanic of the Atlantic & Suburban Railway, Pleasantville, N. J.

Mr. H. A. Robson, commissioner of Public Utilities for Manitoba, has resigned to become general counsel for the Union Bank of Canada.

Mr. O. E. McCormick has succeeded Mr. George Otis Spencer as assistant secretary of the Middle West Utilities Company, Chicago, Ill.

Mr. Irving E. Forbes has succeeded Mr. W. W. Forbes as president of the Unanoonuc Incline Railway & Development Company, Manchester, N. H.

Mr. George Grove has been appointed engineer of maintenance of way of the Montoursville (Pa.) Passenger Railway to succeed Mr. P. Hettler.

Mr. W. H. Chesebrough has been elected vice-president of the United Railways Investment Company, New York, N. Y., to succeed Mr. Moritz Rosenthal.

Mr. Henry Malloch has been elected secretary and treasurer of the Navada County Traction Company, Grass Valley, Cal., to succeed Mr. L. W. Pryor.

Mr. L. C. Fritch has been appointed general manager of the Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont. Mr. Fritch is general manager of the Canadian Northern Railway, Eastern Lines, and will now occupy the dual position.

Mr. E. J. Peartree has been appointed superintendent of transportation of the Trenton & Mercer County Traction Corporation, Trenton, N. J., to succeed Mr. C. E. Hart, who resigned some time ago. Mr. Peartree was previously connected with the United Traction Company at Troy, N. Y., for twenty years.

Mr. David M. Bunn, superintendent of the engineering and construction department of the Appalachian Power Company, Bluefield, W. Va., has also been appointed manager of the Bluefield division of the company. The property of the company includes 6.25 miles of electric railway, connecting Graham, Va., and Bluefield, W. Va.

Mr. E. M. Willis, secretary to President Howard W. Elliott of the New York, New Haven & Hartford Railroad at Boston and a director of the Berkshire Street Railway, the Vermont Company, the Hoosick Falls Company, and the Old Colony Railroad, has been appointed assistant to the president, with offices in the south station, Boston. Mr. Willis was assistant chief clerk to Mr. Elliott when the latter was president of the Northern Pacific Railway.

Mr. W. Norris, formerly general manager, chief engineer and purchasing agent of the Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont., has been appointed general superintendent of that road. Mr. A. C. Johnstone has been appointed accountant, and Mr. L. W. Mitchell, Toronto, treasurer and purchasing agent of the Canadian Northern Railway, has also been appointed purchasing agent of the Chatham, Wallaceburg & Lake Erie Railway.

Mr. George W. Burke, who has succeeded Mr. T. R. Crumley as master mechanic of the Evansville (Ind.) Railways, entered electric railway work with the Evansville Suburban and Newburg Railway as a motorman. At the beginning of construction of the Evansville Railway's lines he accepted a position running a locomotive on construction work for the company. On the completion of the line he continued with the company and ran a locomotive in freight service for a period of three years. He was then appointed shop foreman of the company, in which capacity he served four years.

Mr. William B. Graham, for the last nine years superintendent of the Essex division of the Public Service Railway, Newark, N. J., who has been transferred to take charge of the Southern division, with headquarters at Camden, was waited upon by 400 employees of the company at the Roseville carhouse on the night of Nov. 15 and was presented with a diamond ring, the gift of the conductors and motormen of the division. The supervisors of the division gave him a pair of diamond-set cuff buttons. Mr. Graham thanked the men and expressed his regret at leaving the division. He was followed by General Superintendent Newton W. Bolen, who, during the course of his remarks, introduced Mr. Williams, the successor to Mr. Graham on the Essex division. There was an informal program of songs and stories, participated in by representatives of the various carhouses in the division.

Mr. Charles A. Stone of Stone & Webster, Boston, Mass., is to be elected president of the American International Corporation, organized with a capital of $50,000,000, to promote American enterprise, industry and commerce in foreign lands. It is announced that Mr. Stone will remove his residence from Boston to New York. He was born at Newton, Mass., on Jan. 16, 1867, and was graduated from the Massachusetts Institute of Technology in 1888 with the degree S. B. He is a member of the firm of Stone & Webster and is a director of the Stone & Webster Construction Company, Stone & Webster Engineering Corporation, Stone & Webster Management Association and many other corporations, including the Blue Hill Street Railway, Brockton & Plymouth Street Railway, Dallas Electric Corporation, El Paso Electric Company, First National Bank of Boston, Houston Electric Company, Jacksonville Electric Company, Massachusetts Gas Company, Minneapolis General Electric Company, Old Colony Trust Company, Railway & Light Securities Company, and the Whatcom County Railway & Light Company.

Mr. James Forgie, consulting engineer of New York, is awaiting the receipt of a Telford gold medal which was awarded to him by the Institution of Civil Engineers of Great Britain in recognition of his paper on "The Laxaxalpam Aqueduct Tunnels in Mexico" and of his achievement in engineering, the subject of the paper. The award was formally announced at the meeting of the institution on Nov. 2. Among the very few men in this country who have received this honor are Col. W. H. Harts, Mr. William Barclay Parsons, Mr. W. J. Wilgus and Mr. J. V. Davies. Mr. Forgie has for many years been prominently identified with the solution of rapid transit problems in cities; notably in New York the Pennsylvania Railroad tunnels and the Hudson & Manhattan Railroad tunnels under the Hudson River, and is an authority on tunnelling and construction works of a subaqueous character. Twenty years ago he helped to solve the difficulties connected with the growing density of traffic in the first underground electric railroad in London. The experimental train as recommended by Mr. Forgie was a success, and at the annual meeting of the City & South London Railway on Feb. 1, 1915, it was adopted as a remedy to alleviate the crowded conditions at the rush hours.

OBITUARY

Lieut. Cecil G. Weitzmann, traffic manager of the Para (Brazil) Electric Tramways, was killed in action with the Allies in France on Sept. 25.

S. W. Divine, a pioneer in electric railway work in Chattanooga, Tenn., died in that city on Nov. 16. He was sixty-seven years old. Mr. Divine was for many years a director of the Chattanooga & Lookout Mountain Railway and also was vice-president and a director of the Rapid Transit Company of Chattanooga, both of which are now included in the system of the Chattanooga Railway & Light Company.

E. M. Van Frank, president of the Petaluma & Santa Rosa Electric Railway, Petaluma, Cal., died at his home in Santa Rosa on Nov. 13. Mr. Van Frank was born at Quincy, Ill., on Jan. 15, 1866. After graduating from the high school at Quincy, Ill., Mr. Van Frank when a mere boy made a trip to South America. On his return he settled in San Francisco and assumed a position with the General Electric Company. Later he superintended the construction of the Sutro Street railway in San Francisco, also of the power houses of the system and after the completion of the road he became its general manager. When this road was absorbed by the United Railroads, Mr. Van Frank entered the employ of that company. He resigned from the United Railroads in May, 1906, to assume the management of the Petaluma & Santa Rosa Electric Railway. He is survived by his widow.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Summers Street Realty Company, Charleston, W. Va.**—Chartered in West Virginia to construct an electric railway in Charleston. Capital stock, $25,000. Incorporators: J. S. Hill, R. G. Hubbard, Guy A. Porter, R. E. Eskins and G. C. Porter, all of Charleston.

FRANCHISES

Rhodes, Iowa.—The Iowa Railway & Light Company has asked the Council for a twenty-five year franchise to supply electricity in Rhodes. The proposal will be submitted to the voters on Dec. 9.

Methuen, Mass.—The Bay State Street Railway has received a franchise from the Council to construct double tracks on the new river boulevard from Lowell Street to the Lawrence line.

Trenton, N. J.—The New Jersey & Pennsylvania Traction Company will ask the Council for a franchise to double-track West Hanover Street from Green's Place to Calhoun Street.

Portland, Ore.—The Portland Railway, Light & Power Company has asked the Council for a one-year's extension of time from February, 1916, on its franchise to construct a line on Morrison Street from Chapman to Washington Streets. The franchise was granted nearly two years ago and the track should be laid and in operation by February.

Chattanooga, Tenn.—The Central Power Company, recently incorporated, has asked the Council for a franchise to build an interurban railway from Chattanooga to Cleveland, about 25 miles. G. B. Adams, Chattanooga, is interested. [Oct. 23, '15.]

TRACK AND ROADWAY

Fort Smith Light & Traction Company, Fort Smith, Ark.—A tentative agreement has been reached between the Fort Smith-Van Buren Bridge Commission and officials of the Fort Smith Light & Traction Company which is expected to result in the company's early use of the Fort Smith-Van Buren bridge, abandoned last December after the Supreme Court annulled its forty-five-year franchise.

Connecticut Company, New Haven, Conn.—Work has been begun by this company on the construction of an extension of its line on East Grand Avenue to Lenox Street, New Haven.

Sandpoint & Interurban Railway, Ltd., Sandpoint, Idaho.—The stockholders of this company have decided to issue $20,000 of bonds to take up notes in the sum of $15,000, and to make improvements. Among the improvements is a spur track to the Great Northern Railway depot.

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—Cars are now being operated on the new track on Franklin Avenue between Bloomington and Normal. The track was removed from the west side to the center of the street when a new pavement was laid.

***Chicago, Ill.**—A proposed line, about 8¼ miles long, to connect various suburban towns in the southern part of Chicago and villages and cities adjacent to the southern city limits, is meeting with wide favor. A joint committee, representing various commercial and civic organizations in this suburban territory, has gone over the proposed route from Calumet Park to State Line Street, West Hammond. The various organizations interested are the Blue Island Commercial Club, Riverdale Improvement Association, Dolton Civic Club, West Hammond City Club and the Hammond Chamber of Commerce.

Chicago & Milwaukee Electric Railroad, Highwood, Ill.—This company is constructing a bridge over the tracks of the Chicago, Milwaukee & St. Paul Railway just south of Milwaukee. The bridge consists of a 185-ft. skew through girder span, a 140-ft. truss span and a 55-ft. skew deck girder span. The company has built the concrete abutments and piers and the contract for the steel work has been let to the Wisconsin Bridge & Iron Company.

Kankakee (Ill.) Electric Railway.—This company has been repairing its track in the commercial subdivision and cars will soon be running into that part of the city. This plan follows an agreement between the railway and the Kankakee Commercial Club for the opening of the subdivision. The company agreed to operate cars when enough families had moved into the district to cover operating expenses, the entire plan being one designed to enlarge the growth of the city. The ultimate plan will be to construct a loop to connect with the East Court Street line at one terminal and with the Electric Park line at the other.

Indiana Railways & Light Company, Kokomo, Ind.—This company is erecting 12 miles of 6600-volt transmission line connecting its present lines with Hillisburg, Circleville and Kempton, and is installing a distributing system in each of the three towns.

Lafayette & Northwestern Traction Company, Lafayette, Ind.—This company is being reorganized in Lafayette and plans to proceed with the enterprise undertaken by O. L. Brown. Mr. Brown will not be connected with the new company. W. L. Moyer, Rensselaer, is interested. [Oct. 23, '15.]

Fort Madison Street Railway, Fort Madison, Iowa.—Announcement has been made that this company, which is owned and operated by the Mississippi Valley Electric Company, will spend about $50,000 to rehabilitate its line.

Lawrence Railway & Light Company, Lawrence, Kan.—It is reported that this company has offered to pay $1,000 toward the expense of equipment of an ornamental lighting system in Lawrence. About $3,000 will be raised by a special tax.

Wichita Railroad & Light Company, Wichita, Kan.—This company plans to construct a line to the race track to be built on East Thirteenth Street. A bridge will be built across the canal at Twelfth Street, at which point the tracks will extend north alongside the site of the grandstand.

Cumberland & Manchester Railroad, Barbourville, Ky.—Work has been begun on the construction of this company's line from Barbourville to Manchester, 24 miles. It is expected that the road will be completed next spring. M. E. S. Posey, Barbourville, chief engineer. [July 10, '15.]

Holyoke (Mass.) Street Railway.—Plans are being considered by this company to construct an extension in South Hadley Falls on West Main Street to Canal Street, on Canal Street to Taylor Street and on Taylor Street to North Main Street, with a possible loop down North Main Street to the end of the present line.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—Operation has been resumed on this company's beach route from Gulfport to Dubuys.

Lincoln (Neb.) Traction Company.—Work has been begun by this company on the construction of track from the present terminus of the North Sixteenth Street line to the intersection of Sixteenth and W Streets.

***American Sugar Refining Company, Brooklyn, N. Y.**—This manufacturing company is preparing estimates for possible electric operation over the track connecting its plant with freight floaters. Third-rail, overhead and storage battery operation are all being considered, the freight cars to be hauled by one electric freight locomotive. Energy could be supplied from the company's own powerhouse.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The commission has approved the award by the New York Municipal Railway Corporation of a contract to Connors Brothers Company, Inc., for the construction of the second section of the new elevated railroad in Jamaica Avenue, for $726,168. The work will include the erection of the steel work between Walnut Street and Cliffside Avenue. The railway submitted the contract for competitive bidding and received seven bids, of which that of the Connors Brothers Company was the lowest.

Otsego & Herkimer Railroad, Cooperstown, N. Y.—It is reported that this company proposes an expenditure of about $250,000 for betterments.

New York, N. Y.—The contract for track laying on the new rapid transit lines in Queens Borough has been awarded by the Public Service Commission for the First District of New York to the Thomas Crimmins Contracting Company, the lowest bidders, for $204,898.

Interborough Rapid Transit Company, New York, N. Y.—Bids for the supply of special work for the Lexington Avenue subway from its junction with the existing subway at the Grand Central Station to 138th Street, The Bronx, where the east side and west side branches diverge, will be received by the Public Service Commission for the First District of New York on Dec. 7. The special work called for includes all frogs, switches and cross-overs for the line, comprising nineteen separate pieces. Delivery of the articles must begin within two months and must be completed within eleven months after the delivery of the contract. The contractor will be required to furnish a bond in the sum of $5,000.

Manhattan & Queens Traction Corporation, New York, N. Y.—The Manhattan & Queens Traction Corporation, which has a franchise to operate from the Queensboro Bridge through Queens to the city line of Greater New York has succeeded in obtaining an extension of the time in which it agreed in its franchise to complete its lines from Jamaica, where they now terminate, through St. Albans to the city line.

Ohio Service Company, Cambridge, Ohio.—This company has just completed the construction of its transmission lines from Newcomerstown to Dennison and from Dennison to Tippecanoe. Its entire transmission line system from Coshocton to Cambridge and to New Philadelphia has been placed in operation.

Oklahoma & Interstate Railway, Oklahoma City, Okla.—It is reported that this company is considering the construction of an interurban line from Bartlesville to Nowata, 28 miles. Bartlesville proposes to raise a $50,000 bonus, give the company a free right-of-way of practically half the distance to Nowata and a franchise to come in over its streets. If Pawhuska citizens will raise a like bonus and furnish a free right-of-way it is proposed to extend the line to that city, 28 miles from Bartlesville. This company proposes to build a chain of interurban lines that will connect towns in southeastern Kansas, southwestern Missouri and northeastern Oklahoma. John R. Rose, Oklahoma City, president. [Nov. 13, '15.]

Chatham, Ont.—Plans are being considered to construct a hydro-radial line between Petrolia and Chatham.

London & Lake Erie Railway & Transportation Company, London, Ont.—Plans are being made by this company to extend its line from Lambeth to Delaware.

Toronto (Ont.) Civic Railway.—A report is being prepared by R. C. Harris, commissioner of works, on the extension of the St. Clair Avenue line to Avoca Avenue, Toronto.

Toronto (Ont.) Suburban Street Railway.—Track has been laid by this company on its extension from Lambton to Guelph, 46 miles, over the Humber River bridge to the junction with the line on Dundas Street at Lambton Park. Ballasting work is now under way. Contracts for the catenary line equipment will be let in the near future.

Galveston-Houston Electric Company, Galveston, Tex.—This company, with the other lines leasing the causeway across Galveston Bay, consisting of all steam roads entering Galveston, has agreed to bear its pro rata of three-fourths of the cost of constructing a temporary wagon bridge to connect the two ends of the arch bridge with the mainland. Construction work will be started immediately by the engineers of the railroads.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—The work of double-tracking its extension from Orchard to Clinton, 3 miles, has been begun by this company. This extension is only a preliminary step toward connecting up the double track out of Ogden and out of Salt Lake City, thereby giving the road double track all of the way. It is reported that the double track work over the remainder of the route will be pushed as rapidly as possible. Contracts have been let by the company for the erection of two bridges, one at Hunter's cut and the other near Roy. The construction of a viaduct at Lagoon to carry the public highway over the tracks is contemplated but the plans are being held in abeyance until an agreement can be reached with the town of Farmington as to the division of expenses.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—A contract has been awarded to the Wasatch Construction Company, Provo, for grading this company's extension from Spanish Fork to Payson.

SHOPS AND BUILDINGS

Lincoln (Neb.) Traction Company.—The Lincoln Terminal Company has recently been organized with W. E. Sharp, president of the Lincoln Traction Company, as president, for the purpose of erecting a building on a corner of the principal business street in Lincoln, to be known as the Terminal Building. The structure will be 85 ft. x 142 ft., ten stories, and will be of steel, terra cotta and granite. A large room on the main floor of the building will be used as a display room for the Lincoln Traction Company's electric appliances and fixtures. The basement, which will be finished off in marble and tile, will be equipped for the convenience and entertainment of the trainmen when off duty. The third floor will be used as the general offices of the railway company. It is expected that the building will be ready for occupancy by next summer.

International Railway, Buffalo, N. Y.—H. C. Young, superintendent of bridges and buildings International Railway, and Edward E. Franchot, of counsel for the company, presented plans for improving the freight and passenger terminal of that line in Lockport at a hearing before the Public Service Commission on the complaint of certain residents of West Lockport to have the International Railway and the Buffalo, Lockport & Rochester Railway construct a new passenger terminal in the city. The plans of the company call for the addition of a second story to the existing structure and complete remodeling and improvement of the waiting rooms, etc. The Lockport offices of the company will be on the second floor according to plans submitted, and this will increase the size of the waiting room and ticket offices. It is expected the company's plans will be accepted.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has ordered this company to construct and maintain a new local station on the Sixth Avenue and Ninth Avenue elevated line in the neighborhood of 150th Street. Residents and property owners in the vicinity of 150th Street recently petitioned the commission to order a station at that point. The exact location of the station was left open, with instructions to the chief engineer of the commission to report upon the most suitable site. As soon as he makes his report the company will be ordered to begin the construction of the new station.

New Midland Power & Traction Company, Cambridge, Ohio.—This company reports that it is building a new $4,000 carhouse at Dennison.

Toronto (Ont.) Civic Railway.—In compliance with a request of the Board of Control of Toronto for a report on the cost and advisability of building municipal car shops in Toronto, R. C. Harris, commissioner of works, reports that he considers it inadvisable at the present time.

POWER HOUSES AND SUBSTATIONS

Richmond Light & Railroad Company, New York, N. Y.—A report from this company states that it is installing a 7500-kw. Westinghouse turbo-generator in its power plant at Livingston.

Ohio Service Company, Cambridge, Ohio.—This company's power house which was begun two years ago has been completed. A new water wheel and a new head-race are being installed at the hydroelectric plant and the old dam has been repaired. The company's substation at Dennison has been completed. A new 500-hp. boiler is being installed at Coshocton and a new engine and 400-kw. d.c.-a.c. generator will be installed at Hanover.

Mitchell Street & Interurban Railway, Mitchell, S. D.—This recently organized company is investigating the water-power at Great Bend, about 78 miles north of Mitchell, with a view to installing a power plant to supply electricity to the proposed railway and to furnish electrical service to surrounding towns.

Manufactures and Supplies

ROLLING STOCK

Visalia (Cal.) Electric Railroad recently lost by fire one of its passenger cars.

City Light & Traction Company, Sedalia, Mo., expects to purchase eight single-truck, light-weight, one-man cars.

Lake Erie & Northern Railroad, Galt, Ont., has ordered three Westinghouse electric locomotives.

Long Island Railroad, New York, N. Y., has issued inquiries for twenty-five trailer cars for use in its electric zone.

Mississippi Valley Electric Company, Iowa City, Iowa, will order within a week four 28-ft. one-man passenger cars.

Durham (N. C.) Traction Company has ordered three 26-ft. and three 31-ft. semi-steel city one-man car bodies from the Southern Car Company.

New Midland Power & Traction Company, Cambridge, Ohio, has converted its single-truck cars into pay-as-you-enter near-side one-man cars.

Des Moines (Ia.) City Railway is reported as having placed an order for forty front-entrance, center-exit motor cars equipped with multiple-unit control.

Springfield (Mass.) Street Railway is having ten of its fourteen-bench open cars rebuilt by the Wason Manufacturing Company into prepayment semi-convertible cars.

New York (N. Y.) Municipal Railway will soon place orders for 100 additional subway cars for the Sea Beach Line, which will make a total of 400 cars ordered by this company.

Menominee & Marinette Light & Traction Company, Menominee, Mich., has rebuilt twenty single-truck cars and equipped them with door and step operating mechanism for one-man near-side stop operation, with front entrance and exit only.

Interborough Rapid Transit Company, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Nov. 13, 1915, as having issued requests for bids on 311 new subway cars, including 234 motor and seventy-seven trailer cars, has placed an order for these car-bodies with the Pullman company.

Boston (Mass.) Elevated Railway lost by fire seven automobiles at the company's Harrison Avenue garage on the night of Nov. 23, at a loss of $12,000. The blaze was caused by an explosion of gasoline which occurred while a tank was being filled. The company's purchasing bureau will shortly be in the market for new machines.

Pittsburgh (Pa.) Railways, reported in the ELECTRIC RAILWAY JOURNAL of Nov. 20, 1915, as expecting to purchase a large number of cars, have ordered 125 motor cars and fifty trail cars. An order for seventy-five cars was placed with the Cincinnati Car Company and an order for the remaining 100 was placed with the St. Louis Car Company. These cars are all to be of the low-floor type, as described in the ELECTRIC RAILWAY JOURNAL of April 11, 1914.

TRADE NOTES

Baldwin Locomotive Works, Philadelphia, Pa., has equipped three cars of the Ironwood & Bessemer Railway & Light Company, Ironwood, Mich., with Baldwin L-type trucks.

Simmen Automatic Railway Signal Company, Buffalo, N. Y., has appointed W. H. Crawford as Pacific Coast representative. Mr. Crawford will maintain headquarters at 609 Spalding Building, Portland, Ore.

Curtain Supply Company, Chicago, Ill., has received orders to equip with ring No. 88 curtain fixtures and Rex all-metal rollers the three cars recently ordered by the Laredo Railway & Electric Company, Laredo, Tex., and one car ordered by the Walnut Ridge & Hoxie Light, Power & Transit Company, Walnut Ridge, Ark., from the Southern Car Company.

Standard Paint Company, New York, N. Y., manufacturer of P & B insulating tape, has just placed upon the market a rubber friction tape, under its IMP brand. The IMP friction tape will not compete with or in any way displace the P & B tape, which is especially adapted for work in mines and weather-exposed locations. The IMP tape is treated with rubber compound and finished by the friction process. It is suitable for all kinds of wiring work.

Russian Society for Electrical Enterprises, Ltd., Petrograd, Russia, address, No. 5, Marsowo, which controls electric lighting stations in Pawlowsk, Uman, Kamenetz-Podolsk and tramways in Elizabethgrad and Uman, has opened at the present time a branch for resale of electrical machines and apparatus and insulating materials, and also of steam and naphtha engines as well as of water turbines, and desires to enter into relations with first-class factories in the United States producing these goods with the view of becoming their agents in Russia. The company refers to the Russian & French Bank as to its responsibility.

ADVERTISING LITERATURE

A. L. Drum & Company, consulting engineers, Chicago, Ill., have recently published a pamphlet discussing the construction features and advertising advantages of underground plazas to relieve traffic congestion at subway stations in important traffic districts. They show diagrams and sections of such proposed underground plazas at Herald Square and Times Square in New York, at the junctions of the subway systems at those points. These plazas would be constructed about 12½ ft. below the surface of the street, directly over the train platforms of the subways to which they would furnish access. When built simultaneously with the passenger subway station the additional cost would be very slight, while the increased earning capacity of the basement shops facing on the plaza and of shops on city property in the underground plaza will be very large. Thus it is estimated that the additional cost of the underground plaza at Herald Square would be less than $400,000, while the rental value of the shops on the plaza should exceed $100,000 per year, and the additional show-window space to the retail dry goods stores fronting on the plaza would be worth $300,000 per year. Similarly, the additional cost of the underground plaza for Times Square would be less than $200,000, while the rental space would amount to $60,000 per year and the value of the show-window space to the present stores would be at least $250,000 a year.

WORK OF NEW YORK LEGISLATIVE TAX COMMITTEE

The legislative committee on taxation, of which Senator Ogden L. Mills is chairman, has completed its work in New York City and will hold several sessions in cities up-State. The committee expects to return to New York City in December, examine more witnesses and then prepare its report for submission to the New York Legislature next January. On Oct. 16 Senator Mills was quoted as follows:

"If we can work out and solve the personal tax problem, and the Legislature is willing to treat with our suggestion, we can go on, but if what we propose is thrown out of the window by the public and the Legislature, it would be idle to continue. Yesterday's test question seems to have been misunderstood, partly through a suggestion made by me to the effect that it would be possible by means of an income tax running from 1 to 3 per cent to raise some $45,000,000.

"The estimate was not made by me, nor was it in any sense accurate or final, in so far as the income tax proper is concerned. The committee is not committed to the plan either tentatively or finally. As a matter of fact, at the last executive session of the committee the chairman was authorized to prepare two or three substitutes for the personal property tax.

"In view of the misunderstanding which seems to have arisen about an income tax, I desire to state that public service corporations are a separate and distinct class. They enjoy special privileges from the State, and should pay higher taxes. The subject of taxing public service corporations is, however, so vast and intricate that the committee has been and is unable to consider it in the short time at its disposal. A Connecticut commission took some two years to complete this task, while this committee has but six months at its disposal. I hope that the committee at some future date may be able to take up this question, but any discussion at this time on taxation must be understood not to include public service corporations."

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A NOVEL TYPE OF PROTECTED THIRD-RAIL

Through the courtesy of H. M. Hobart we are able to give our readers some interesting details of the novel third-rail installation described in the issue of this paper for July 24, 1915, page 154. This electrification is about ready for operation. Drawings of the rail and contact shoe are printed elsewhere in this issue. In examining these drawings and the pictures given in the earlier article one is inclined to believe that under climatic conditions existing in this country there would be difficulty at times with this scheme due to the collection of ice in the slot. It would also appear to be troublesome to maintain a good contact area between the shoe and the rail with the side-contact scheme owing to sidewise motion of the trucks. On the other hand, it must be remembered that the designer of this novel rail is an experienced steam railroad operating man, and its novel features have been adopted in the light of his expert knowledge of existing electrifications. In this country the tendency has been to use rail sections of a girder shape and often standard sections for the contact rail. A form as unusual as that adopted for the Manchester-Bury section of the Lancashire & Yorkshire Railway would be considered quite radical here from the rolling mill standpoint. All of which goes to prove, as we have contended before, that heavy electrification is in process of flux and experimentation, and each new project involves elements of novelty.

THE ATLANTIC CITY RECEIVERSHIP

The expected has happened in Atlantic City, and the Atlantic City & Shore Railroad Company, which operates the local electric railway system in that city as well as the interurban line to Ocean City, has passed into the hands of a receiver as a result of unregulated jitney competition in that city. Atlantic City is under the commission form of government, but if the purpose of this form of government is to bring greater intelligence to bear upon the problems of city government or administration, it has lamentably failed in this case. We cannot imagine any more specious form of reasoning than that put forth by the commissioners to excuse their failure to adopt a proposed regulatory ordinance covering jitneys, indorsed by a committee representing the Chamber of Commerce, the Hotel Men's Association and the Rotary Club of Atlantic City. The explanation is so unique that we cannot refrain from quoting from it. It says, in part: "That the trolley company has been losing money heavily since the advent of the jitney there can be no doubt, but the company is simply facing a condition that has confronted every means of transportation since history began. * * * The commissioners cannot be expected nor called upon to protect the dividends of the trolley company any more than the profits of the individual jitneys. Both are lawful enterprises, and it is for them to work out the problem of competition." The commission then goes on to compare the competition between the newer jitney and the older electric car with that of modern means of transportation and the oxcart, that between the transcontinental steam lines and the Rocky Mountain stage coach, and that between the sail boat and the steam boat. "And so," the commission continues, "this present problem of competition between the jitneys and the trolleys will work out in time, although it may seem a hard one just now."

THE JITNEY NO IMPROVEMENT

If the jitney represented a real improvement in methods of transportation there would be an excuse for the action of the commissioners. But the jitneys are not doing the work of the electric cars in Atlantic City, and they never can. At present they are giving in the heart of the territory a service which is practically subsidized at the expense of the electric railway company. Until the jitneys have demonstrated that they can supplant the electric car in all of its service, or in the greater part of it, on the same basis of operation as regards schedules, continuity of service, responsibility, the comfort and safety of passengers and taxation, they cannot be considered a substitute for it. That the city could do without the trolley line entirely, the commissioners admit, is inconceivable. Incidentally it develops that last year the Atlantic City & Shore Railroad paid $38,000 taxes to the city, made up of a license fee of $50 per car and about $34,000 as a real estate and personal tax. In addition, when Atlantic Avenue, the principal street of the city, was paved, the railway company, besides paving between its rails and for 2 ft. outside at a cost of about $300,000, paid to the city $150,000 toward paving the balance of the street, and since then it has paid $5,000 annually for the use of the street. The proposed license fee of $50 per jitney would certainly not equalize the taxation burden, and the request of the citizens' committee, rejected by the commissioners, that every jitney owner should file a bond of $2,500 for the proper performance of the obligations and to indemnify the public in case of injury, is certainly a very moderate requirement when compared with the responsibility to which the trolley company is held.

THE AUTOMATIC RAILWAY SUBSTATION

While the automatic substation was fully described in a paper presented before the A. I. E. E. at the San Francisco meeting held in September, the crowded condition of the program of that meeting and the relatively small attendance of electric railway men precluded adequate discussion. In order that the interesting proposition, which had had a commercial trial on a small scale, might be brought to the attention of the electric railways, the ELECTRIC RAILWAY JOURNAL abstracted the paper fully in the issue for Sept. 18 and interested itself in bringing out some discussion. This undoubtedly contributed in a measure to the reception that the presentation of a somewhat similar paper enjoyed at the recent C. E. R. A. meeting, at which real interest on the part of railway operating men was manifested. The general attitude toward the plan was naturally and properly critical while at the same time hospitable. Objections were of two kinds, technical and economic. As far as the former are concerned we have no doubt that they can be overcome as they materialize. The vital question is economic: Under what conditions, if any, will automatic substations yield a substantial profit? The claims made for them along this line are such as to command attention, but railway men have done so much pioneering that they are necessarily more wary of innovations than they were when money was more plentiful. We believe that most companies will wait until there are more data from actual installations of this kind before changing over their own distribution systems.

THE CHICAGO REPORT ON ELECTRIFICATION

If the recommendations of the committee on smoke abatement and terminal electrification of the Chicago Association of Commerce are followed there will be no general electrification of the steam railway terminals there in the near future. The complete report was not available at the time of going to press with this issue, and the official abstracts given out were presumably prepared primarily for the daily press and so rather fragmentary and quite incomplete so far as many of the matters of engineering interest are concerned. But sufficient data are contained in them to indicate that, while the engineering difficulties of electrification are considered surmountable the conclusion is otherwise with regard to the financial ones. No comment on the technical features of the report is possible until fuller data come to hand, but the following points are clear: First, justification for a general enforced terminal electrification cannot be found on the basis of the smoke nuisance, because there are worse offenders than steam locomotives in this regard. Second, the individual requirements and possibilities of the different roads are so great that the enforcement of a general scheme would work many hardships. Third, there is no reason why individual roads should not electrify as congestion and economy dictate, and the selection of a general electrification system which would be acceptable to all roads which might at some time voluntarily electrify is highly desirable. We admit that the amount estimated by the committee as the cost of the entire work, namely, $274,440,620, is a large sum for the roads to raise at this time, but until the complete report is available to explain the basis for the figure comment is idle. It will also be interesting to learn from the report itself the reasons which induced the committee to decide that the single-phase system is best.

SINGLE-PHASE MAINTENANCE COSTS

The seven years' experience of the Chicago, Lake Shore & South Bend Railway with single-phase equipment in eliminating the inherent weaknesses in a new system illustrates the benefit of co-operation between user and manufacturer. In an article published in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 6, 1915, page 940, data were given to show that maintenance costs have now been brought down to about 2½ cents per car-mile, a very creditable figure, especially when the weight of the cars is considered. How this was done is described in the present issue.

When it was built this road was said to be the heaviest and highest-speed interurban electric railway in the country, if not in the world. A very substantial type of construction was employed with a view to giving reliable service under severe operating conditions, including a liberal use of trailers. A quality of performance was therefore expected of the novel a.c. equipment under conditions that would have been severe for the standard d.c. equipment of 1908. In justice to the a.c. motor it is well to remember that the a.c. motor designed years ago now finds itself in competition with a type of d.c. motor which did not then exist, the high-voltage, commutating-pole motor. The single-phase motor was one solution of the problem of reducing power transmission cost while maintaining high transmission efficiency. It was a radical solution involving the speedy commercialization of a theoretically simple but practically complicated design. The difficulties were transferred from the transmission system to the motor. These difficulties have been gradually brought under control, as is reflected in the maintenance costs, until, as in the C., L. S. & S. B. Railway, the costs are comparable with similar ones for d.c. equipment. In motors of later design, such as are used on the New York, Westchester & Boston Railway, the maintenance cost is still lower.

In the meantime, however, another solution of the same problem has been found in the beaten path of d.c. progress, and at present this one seems to be considered the more general solution for interurban lines, offering, as it does, a much simpler control when the interurban car passes upon the lower voltage d.c. circuit in the terminal cities. However the single-phase system must receive credit for a share in the commercializing of the commutating-pole principle which has made d.c. high voltage practicable. Because it was necessary to have compensating windings to neutralize the armature ampere-turns in the a.c. motor such windings were taken as a matter of course. The d.c. commutating pole, different in construction and for a somewhat different purpose but similar in principle, became popular soon after.

To sum up the single-phase situation the following appear to be the salient features: In ten years the structural weaknesses have been eliminated from the compensated series motor; there is now substantial confidence in its reliability; the maintenance costs are reasonable; it finds itself under competitive conditions more difficult than those of a few years ago. The next step, as indicated in the Philadelphia-Paoli electrification, will be in the direction of weight and cost reduction.

ELECTRIC LOCOMOTIVE CAPACITY

The two most recent electric locomotives to be placed in service have been characterized by maximum tractive efforts, or drawbar pulls available for starting, that approximate 125,000 lb., exceeding by some 50 per cent all previously existing figures except for the largely experimental "triplex" type of steam locomotive. That this remarkable advance has been made in a single step makes pertinent the question as to whether electric locomotive hauling capacities are to continue to increase beyond this in accordance with the tendency displayed in the history of steam railroads, and if so, where the limit in locomotive size will be reached in case any such limit exists.

Apparently there is nothing that could hamper the electric locomotive designer in the production of larger and more powerful units should the demand for them exist. With the establishment of the principle of extending the locomotive along the track in a series of short, articulated units, all that is required for greater tractive effort is the addition of a few more pairs of driving wheels, the clearance limitations of height and width being no longer important since the way has been found to get motors of the requisite power for each articulated unit, or truck, within the vertical and transverse space that is allotted to it. The added weight of greater locomotive length would have, of course, an influence upon the bridges, but as regards the track there seems to be no need for special consideration, because past experience tends to show that it is only the long, rigid wheelbase, such as does not appear in the modern locomotive, that is productive of damage. The existing wheel loads are, perhaps, somewhat higher than desirable, but at that they are generally less than those of steam locomotives, and in any event they do not directly affect the possibility of lengthening the locomotive to get more power.

Beyond the question of physical dimensions, however, are limitations in connection with operation that can hardly fail to be felt in case the growth of electric locomotive capacity should continue. Foremost of these, perhaps, is the matter of drawbar strength. With a drawbar pull of 125,000 lb. the elastic limit (or point at which permanent set takes place) of even the new standard M. C. B. coupler is rather closely approached. This design, which was brought out in experimental form by the Master Car Builders' Association only three years ago, was intended to serve as a real universal standard, presumably for many years to come. Its yield point was set by the designers at 175,000 lb. owing to the fact that a limit had to be placed somewhere upon the great size and weight of the parts, and it was considered that this figure should be ample for all normal conditions. It should be said, perhaps, that the coupler does not actually fail under the drawbar pull above mentioned, as the ultimate strength is some three times greater, but permanent set may always be expected to take place under pulls of more than 175,000 lb., and, of course, this is only the preliminary of a failure to operate or to hold properly.

A locomotive drawbar pull of 125,000 lb. matched against a physical strength of drawbar of 175,000 lb. is by no means unreasonable under static load, and under ordinary circumstances the "suddenly applied" load of theoretical mechanics due to uncushioned shocks is hardly a probability in a freight train, although it is a possibility that might occasionally produce the effect of an increase of, say, 50 per cent in the static drawbar pull. Therefore, in a train equipped throughout with couplers of the new standard type there should be no difficulty with locomotives even larger than the latest machines. This, however, is dependent upon a condition that can hardly obtain for years to come. The vast majority of couplers in use to-day are neither so heavy nor so scientifically designed as the new standard, and their strengths range downward at various figures materially less than the maximum herein mentioned. The cars thus equipped obviously cannot be changed over *en bloc,* and until the lighter couplers disappear (a matter practically dependent upon the life of the cars) there are bound to be some couplers in every train which will be hardly able to withstand even the static pull from the largest electric locomotives that are now operating. The possibility of trouble with still larger locomotives than these would be obvious.

It would seem, therefore, that there is at least one serious obstacle in the way of materially larger electric locomotives except, perhaps, under conditions such as on a coal or ore road where special equipment was used and where the number of interchange cars was at a minimum. In addition, there is the matter of train lengths on level divisions, where ordinary modern steam locomotives are able to haul loads of 5000 tons at high speed, and where the advantages of an electric locomotive of greatly increased power would be offset by difficulties in making up and handling the tonnage suitable for its full capacity.

To say that these obstacles are insurmountable would be somewhat daring in the present age of rapid change. Nevertheless they are sufficiently serious in the light of existing conditions to make a further material increase in electric locomotive capacity exceedingly doubtful. In fact, it is safe to say that, according to present experience, the limit of size for the individual unit may be set at a point but little, if any, beyond the figures that have already been established by the remarkable locomotives that have been designed for the electric installations on the Norfolk & Western and on the Chicago, Milwaukee & St. Paul Railway.

Reducing Maintenance Costs on a Single-Phase Railway

The Chicago, Lake Shore & South Bend Railway Has, by Close Study of Operating Conditions, Greatly Reduced Maintenance Costs—Details of Economies Developed Are Given in This Article

The Chicago, Lake Shore & South Bend Railway has had more than seven years of experience with the single-phase system. During this period the defects of the equipment, which were minor in character, have been eliminated. A general description of the road, with maintenance and operating data, was given in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 6, 1915, page 940. The present article takes up in detail the methods by which economies were achieved, with special reference to the collecting devices and to the results of a change in gear ratio.

PANTOGRAPH DEFECTS AND REMEDIES

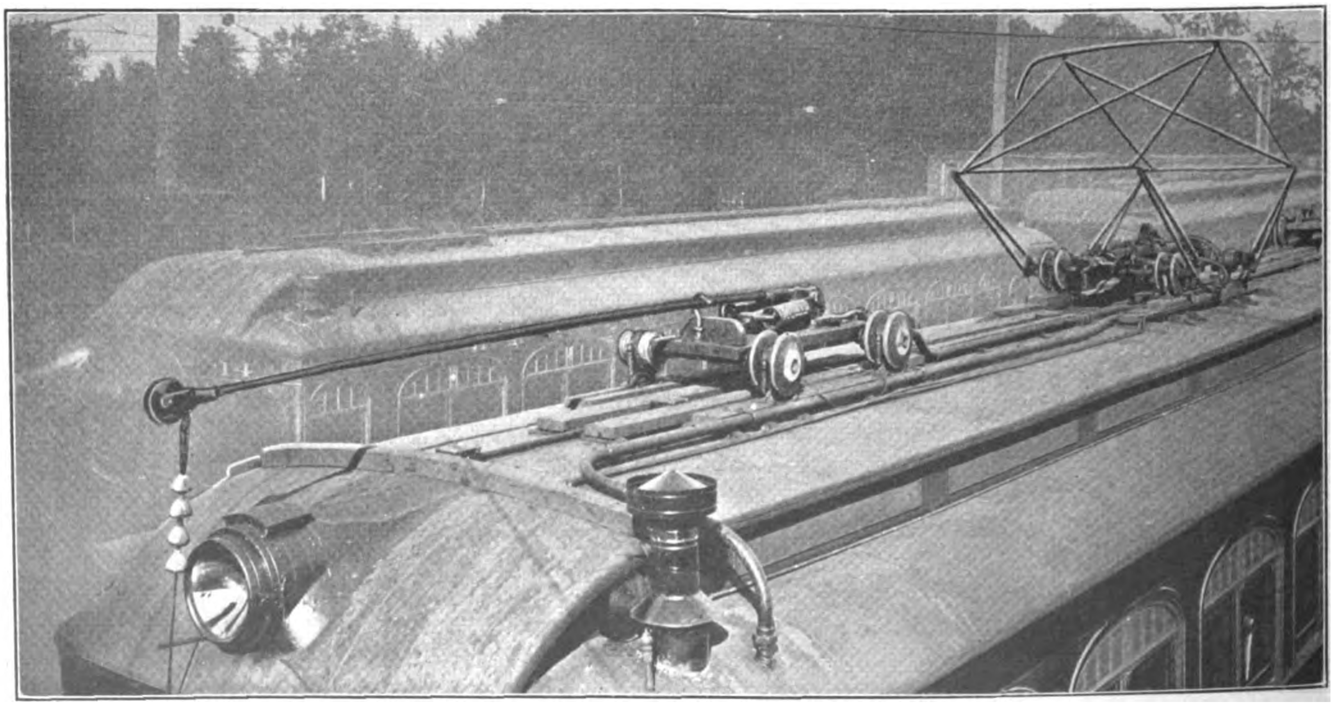
Pantograph troubles have been more or less insignificant in their effect upon maintaining schedules. After five years of service, however, the No. 0000 copper contact wire became so badly worn that breaks occurred quite frequently, and these largely accounted for the damaged pantographs. During the year ended Dec. 31, 1913, seventy-four cases of pantograph trouble were recorded, but in the year following this the number was reduced to thirty-five. The reduction was largely due to the installation of the steel contact wire. About twenty-three breaks occurred in 1913, whereas in 1914 the substitution of the No. 0000 auxiliary steel contact wire entirely removed the cause of troubles arising from this source.

Following the change from a copper to a steel contact wire, excessive wear developed on the No. 12 gage galvanized-iron pantograph shoes, so that a life of only 2500 miles was obtained from them. To increase the mileage two sections of half-oval mild steel, 3/8 in. x 1/2 in., were substituted for the galvanized-iron pan. The cost of this type of shoe, including material and labor, was 45 cents. As the mileage was increased to 9000, the cost with the new shoes was 5 cents per 1000 miles. One of these shoes, riveted and clinched to the 1-in. angle horns, is shown in an accompanying illustration.

Prior to adopting the 3/8-in. half-oval shoe 1/4-in x 1 1/4-in. half-oval mild steel was used for the horns. These horns were too light, for, as wear occurred, the edges tended to turn up and in some cases caught the trolley wire and damaged the pantographs. The trouble occurred particularly at section insulators, where the turned-up knife edges cut the composition runners. With the 3/8-in. shoe this difficulty was relieved, but excessive wear on the composition runners in the section insulators resulted and they became the weakest points in the line. A recent change to a composition known as "Micarta" has materially reduced the rate of wear and entirely eliminated the tendency to deteriorate and split. Deflectors of 1/2-in. round iron placed at the points where the contact wire branches to sidings, also prevented the pantographs from catching at these points.

Lubricated shoes have been tested to increase the life of pantograph shoes and reduce wear on the trolley wire, but were found to be of little value because grease would not remain on the contact strips sufficiently long to produce results. Tests were made with the galvanized-iron pan, and a groove was made in the pan to serve as a grease reservoir. At high temperatures during the summer months the grease melted and ran down on the car roof, marring its appearance and shortening the period during which the lubricant was of value.

Except at railroad crossings, the standard clearance between the top rail and trolley wire is 21 ft. This allows 9 ft. 5 in. between the car roof and the trolley wire, or the normal height of the pantograph in the raised position. The average pantograph pressure against the trolley wire is 10 lb., sufficient to provide good contact



SINGLE-PHASE MAINTENANCE—CAR ROOF WITH TROLLEY POLE AND PANTOGRAPH at railroad crossings where the maximum contact-wire height obtains. At each inspection the contact shoe pressure at the standard height is tested with a spring balance.

All things considered pantograph mechanism defects have been relatively few and largely confined to the supporting porcelain insulators at the roof. Breakage of these insulators was attributed to various causes, the principal one being that insufficient creepage surface caused undue heating of the insulator and its ultimate deterioration. Hair-line cracks in these insulators were the first indication that deterioration had begun, and as a general rule the insulators failed under the surge created when the pantograph was raised to make contact with the trolley wire.

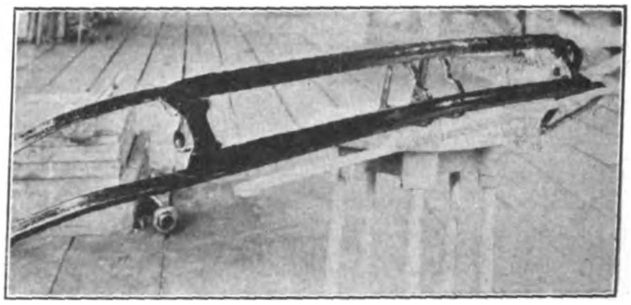
In the illustration on the preceding page the old and new types of insulators are shown. The small spool type was the original one used and the larger insulator with greater creepage surface was substituted for it. Changes in these insulators are being made as defects develop. In connection with the mounting of the pantograph, it is interesting to note that the car roof is covered with 16-oz. sheet copper grounded to the car-body bolster by copper cables. Under this an 8-oz. duck covering thoroughly painted was applied.

RESULTS OF REDUCING THE GEAR RATIO

Undoubtedly the discovery of a gear and a pinion of sufficient strength to withstand the enormous torques of 6600-volt, single-phase motors, as well as the adoption of the correct gear ratio has been of great importance in making this equipment a success. Unusually high speeds were required to meet competition and to furnish the character of service which would obtain the passenger business as well as develop the territory traversed. For a number of years it was deemed inadvisable to attempt to lower the gear ratio below 25:66, because it would entail a reduction in the scheduled speed. The inauguration of the Gary-Chicago service, however, necessitated a reduction in the gear ratio to 21:70 to permit the 500-hp. standard motor cars to pull two trailers. This change also required a reduction in the maximum scheduled speed from 58½ to 48 m.p.h. By a careful balancing of the schedules on the different sections of the line, the reduction in gear ratio has made changes in the time of only two trains.

This reduction in the gear ratio and the change from a standard tooth to a stub-tooth, bull-nose gear with a 16:53 ratio, the equivalent of 21:70, eliminated broken gears. This change largely accounted for the improved results obtained from the electrical equipment, which is quite clearly shown in the reduction in equipment failures from 282 in 1911 to 187 in 1915. During the year 1911 ten gear breaks were recorded, whereas during the year ended June 30, 1915, no breaks occurred. While the breaking of gears and pinions has never been such a serious factor as to diminish the reliability of the service, the result of the changes mentioned has been a profitable one.

The changes made in the types of gears used since the beginning of operation on this road were as follows: At first, standard cast-steel gears with spokes were employed, but the heavy duty required of them and the limited clearances with these large motors and trucks, made the use of heavier gears of this material impossible. A solid-web, cast-steel gear was then substituted, but it failed principally from broken teeth. To eliminate the breaking of teeth a special gear having a cast-steel center and a tool-steel tire with stub-teeth was employed. However, the unusual temperature rise incident to single-phase motor operation and the difference in the coefficients of expansion of the two metals resulted in numerous tire breaks. Flexible gears with spring cushions were then tried, but the composite design with the limited clearances would not permit them to be made sufficiently strong. The next to the last step in solving the gear problem was the adoption of a gear and a pinion manufactured by the Tool Steel Gear & Pinion Company with standard teeth and a 25:66 ratio at 2½ pitch. While these gears and pinions stood the service without excessive breakage, the temperature rises in the single-phase motor due to rapid acceleration continued to cause some failures in the electrical equipment. To eliminate these and to obviate any chance of failure in the gear teeth, the gear ratio was reduced and a stub-tooth, bull-nose gear was adopted with the excellent results stated.

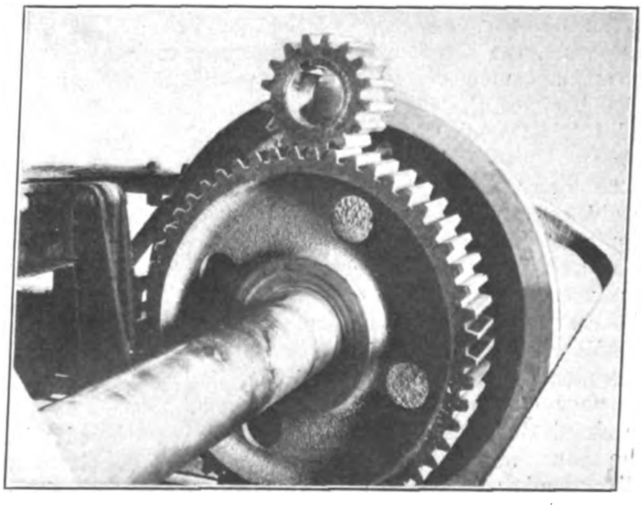


SINGLE-PHASE MAINTENANCE—PANTOGRAPH SHOE WITH HALF-OVAL CONTACT STRIPS

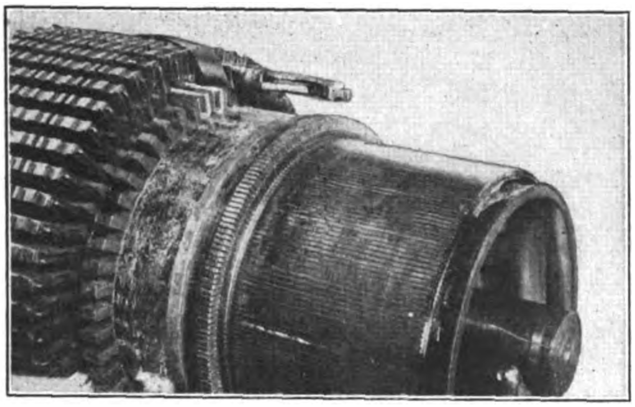
ELECTRICAL EQUIPMENT EXPERIENCE

One of the benefits derived from the reduction in gear ratio which lowered maximum temperatures was a constant diminution in number of motor failures, and of preventative coil and switch-group defects. Relatively few failures in the high-tension wiring on the cars were recorded before the change in gear ratio was made, and none have occurred since. The failures that did occur in the wiring were due to insufficient insulation of the lead-covered cables. This was overcome during 1913 and 1914 when the cars were entirely rewired with cable having a heavier insulation and no lead covering.

Commutator flashovers are exceptionally rare, only one commutator having been lost due to a ground in the eight years of operation. This result was largely attributed to the fact that all commutators were turned and slotted 3/32 in. deep whenever the armatures were brought into the shop. Some mechanical weaknesses developed in the original resistance coils which, when subjected to the severe vibration incident to service on this road, broke in the bend on the coil rest where the leads are brazed. Trouble at this point has been obviated by



SINGLE-PHASE MAINTENANCE—STUB-TOOTH GEAR AND PINION



SINGLE-PHASE MAINTENANCE—TIN CHANNELS AND END OF ARMATURE COIL WITH ASBESTOS TAPE

applying Monel metal tips as a substitute for the original German silver tips.

High temperatures in the resistance coils, combined with the sand-blast action caused insulation failures particularly at the points where the coils cross the air vents. This difficulty has been overcome by the use of a reinforcement between the coil rest and the spider, consisting of a tin trough and molded-mica insulation as a substitute for the fish paper originally used. The use of a tin trough across the air vent has not created any difficulties from eddy currents. Another improvement has been the substitution of ¾-in. asbestos tape in place of linen tape. Whenever an armature is brought into the shop for new coils, the coils are reinsulated from the connection at the commutator to the bend on the coil rest.

In the original construction of the armatures the coils on the pinion end were covered with a brass flanged end bell, and those on the commutator end were covered with an asbestos hood. Under this hood the ends of the coils were covered with Bakelite cement. This cement also filled the openings between the coils and was intended to keep the coils from vibrating. A great deal of trouble was experienced with the loosening of the cement and the forcing out of the asbestos hood, which in turn caught on the brush-holders and was torn loose. On the pinion end, trouble with grounding of the coils on the end bells was also experienced. During the period of reconstruction of these armatures by the Westinghouse Electric & Manufacturing Company, the flanges were machined off of the end bells, the asbestos hoods were discarded and the ends of the coils were covered with ⅛ in. of Bakelite cement, which was finally baked. This practice did not prove satisfactory because it resulted in the retention of the heat in the armature. Also when the armature was in service and extremely warm, the cement cracked and left openings between the coils, back of the neck of the commutator and at the end bell. Carbon dust from the brushes collected in this crevice where it could not be blown out. In course of time so much carbon dust would accumulate that it would cause short-circuits between the windings and result in an armature failure.

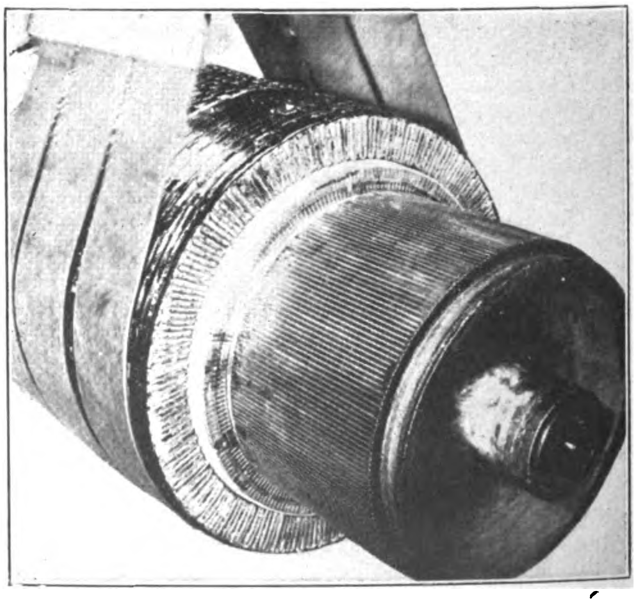
To overcome trouble from this source all of the cement was removed from both ends of the windings and from the crevice between the German silver and the copper windings. This lowered the temperatures of the armatures, at the same time permitting the ready detection of poor connections in the windings. However, the mechanical department was not entirely satisfied with the result, as the Bakelite cement between the German-silver leads would chip off and be thrown out by vibration and by the force due to the high armature speed. Small asbestos hoods were then placed between the leads of the German-silver windings on the commutator end, and between the copper winding and the bell on the pinion end of the armature. All openings or crevices were again filled with Bakelite cement and baked thoroughly. Some of the armatures treated in this manner have been in service for the past year and are still in a perfect condition. Judging from the condition of these armatures it is the opinion of the master mechanic of the road that the hoods will last until the armatures need to be rewound. An armature fitted with these hoods is shown in the illustration below.

Other purely mechanical defects that developed under the service conditions included occasional breaks in the rigid connections on the brush-holder yokes. In the original motors this yoke was made of strap copper which frequently became annealed and broke under vibration. The substitution, two years ago, of standard motor cables with soldered terminals which clamped to the brush-holder supports eliminated this difficulty. Vibration also accounted for a number of broken brush-holder castings in the original motors. As shown in one of the accompanying illustrations, the break in holder usually occurred in the body casting which was improperly designed. Originally these brush-holders were of brass and made in one piece. In the new design the brush-holder proper was made with a cast-steel body and a detachable brass box which was bolted to the body casting with four stud bolts. When one of these holders becomes worn it is only necessary to renew the box, thereby saving practically one-third of the cost of replacement. Moreover, the detachable box, in many instances, is removed and restored to the correct dimensions in a press. The old and new brush-holders and the detachable box are shown in the illustration on page 1111.

Transformer difficulties have been exceedingly rare; in fact, only three transformers have failed in the last six years. These became defective when the support bolts loosened under vibration, allowing the case to open and permitting snow and water to enter. Since the roadbed has become seasoned and more thorough and regular inspections have been made, failures of this nature have entirely ceased.

BEARINGS

Thorough inspection followed by careful lubrication has made hot journal bearings a rare occurrence. The



SINGLE PHASE MAINTENANCE—COMMUTATOR END OF ARMATURE FITTED WITH ASBESTOS HOOD

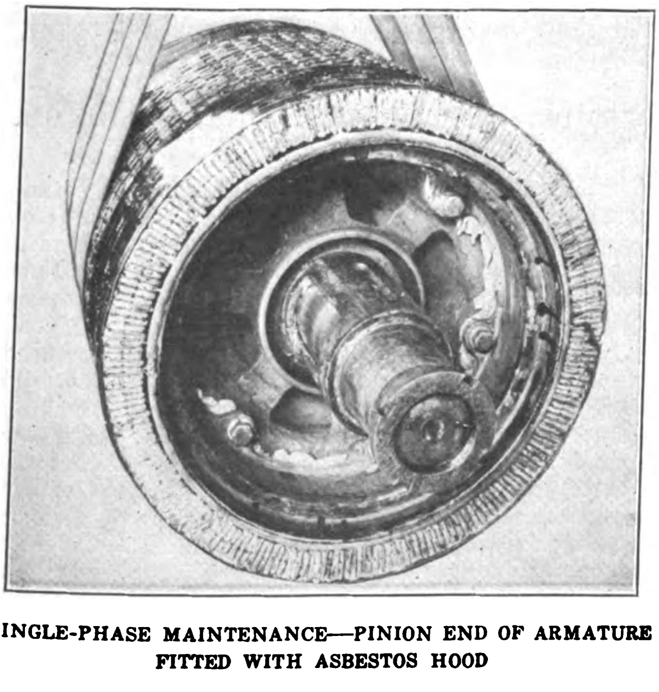
M. C. B. brass is standard, and a tendency to tilt due to braking and rapid acceleration has not been experienced. About four years ago the bronze motor-axle bearings were replaced by cast-steel babbitted shells and considerable saving was thus effected. The bronze bearings, which were not babbitt-lined, cost at that time $6.85 a pair. The steel bearings cost $3.60 new, and during the four years have been rebabbitted twelve times. The cost of rebabbitting was 75 cents per pair, which reduced the cost per shell to $1.05.

Other recent minor improvements to increase the life of equipment parts include the introduction of case-hardened, 1/8-in. chafing plates in the journal-box yokes. As these are renewable, wear on the truck frame proper at these points is eliminated. Similarly, 1/8-in. renewable plates in the brake-lever guides on the circle bars take all the wear and the life of the truck frame at these points is thus prolonged.

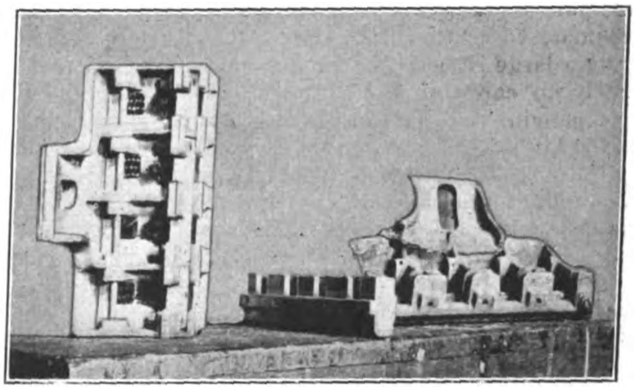
LIGHTING

Recent changes in the car-illumination scheme, which was described in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 12, 1914, page 1308, has materially reduced energy consumption. Seven 60-watt and five 25-watt Mazda lamps were substituted for fifty-two 23-watt lamps. Along this same line the mechanical department has just adopted the Esterline type TR-128 headlamps fitted with Mogul bases, and designed for 6-volt, 18-amp., 108-watt, concentrated-filament Mazda lamps. Until recently all cars were equipped with arc headlamps designed for 25-cycle alternating current. The cost of operation was 18 cents per night for power alone. Tests have demonstrated that the Esterline headlamp will cost but 0.56 cent per night, and it is also assumed that the cost of maintaining lamps will be practically eliminated. Whereas one man was required to keep the arc headlamps in good condition, none will be required exclusively to maintain the new headlamps.

In connection with these new incandescent headlamps small compensators, or transformers, designed particularly for this service have been adopted in the place of resistors to step down the voltage. These are provided with taps so that the motormen, by simply operating a switch, may dim the headlamps when operating in city streets. The dimming effect is obtained by reducing the pressure from 6 volts to 3 volts. A view showing this headlamp installed, as well as the trolley and pantograph mounting on the car roof, is reproduced on page 1108.



SINGLE-PHASE MAINTENANCE—PINION END OF ARMATURE FITTED WITH ASBESTOS HOOD



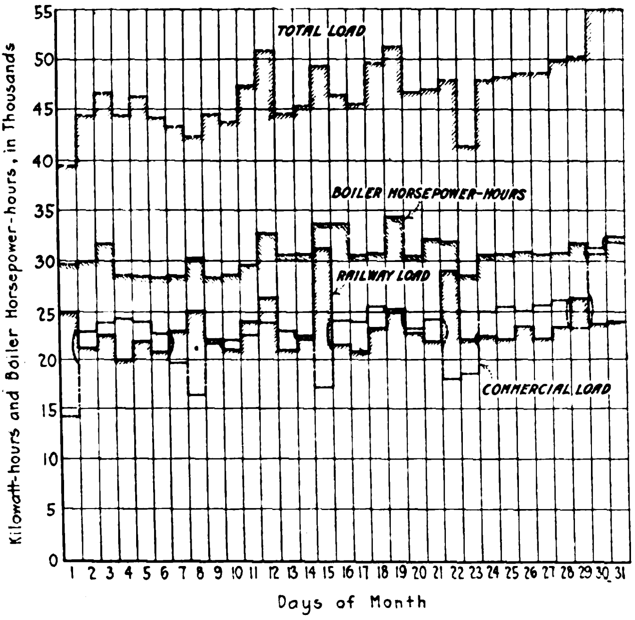
SINGLE-PHASE MAINTENANCE—NEW AND OLD FORMS OF BRUSH-HOLDERS

POWER GENERATION AND DISTRIBUTION

The power plant of the system is situated at Michigan City, Ind., at the upper end of the harbor about 1 mile from Lake Michigan proper. The plant is supplied with fuel by transfer tracks which connect two steam railroads. Eight 500-hp. Stirling boilers, normally rated at 200 lb. per square inch and equipped with superheaters supplying steam at 90-deg. superheat, are contained in the boiler plant. Draft for these is supplied by a 225-ft. stack with a 12-ft. flue, Six of the boilers are equipped with chain-grate stokers and flat ignition arches, while the remaining two boilers are equipped with Murphy stokers. As an economy measure in the boiler plant, all stokers are controlled by a McDonough automatic damper regulator which maintains a uniform steam pressure and at the same time regulates stoker speed to conform to any load demand. This has been found to be a very economical piece of apparatus, particularly where there is considerable fluctuation in the load, and in this plant it has effected a 10-per cent saving.

Three Westinghouse, single-flow, 2250-kw. turbines driving 25-cycle, three-phase, 6600-volt, a.c. generators at 1500 r.p.m., and one double-flow, Westinghouse, 3750-kva. turbine driving a 60-cycle, three-phase, 6600-volt a.c. generator at 3600 r.p.m., compose the generating equipment. Power is generated at 6600 volts and the voltage is stepped up by transformers to 33,000 for transmission. Power is supplied for the line between Michigan City and Pullman over the 33,000-volt transmission line to a substation situated at Calumet, 32 miles from the power house, and for the line between Michigan City and South Bend to Terre Coupee substation, located 21 miles from the power house. A 6600-volt feeder direct from the power-house busbars also connects to the line at Michigan City. In connection with these feeder lines two sets of reactance coils, built for a 10-per cent drop from the normal load, have been installed. These coils are a necessary protection against the severe surges coming in on the generators due to a grounded or short-circuited contact wire.

During a normal year 60 per cent of the station output is 60-cycle, three-phase current, which is wholesaled for commercial purposes, and 40 per cent is 25-cycle, single-phase which supplies the railway. An average power factor of 90 per cent is obtained for the 60-cycle commercial load, and one of 72 per cent for the 25-cycle railway load. Approximately a 55 per cent load factor obtains for the 60-cycle load and one of 45 per cent for the 25-cycle load. Due to the large size of the train units in operation between Gary and Pullman, the maximum momentary peaks on the railway load approximate three times the average load, thus necessitating a large reserve generating capacity in order adequately to care for the maximum demands. In the accompanying illustration is shown the load chart for the kilowatt output and boiler horsepower in service for the month of August, 1915. These are representative of the average conditions prevailing at this plant. In this connection it is also interesting to note that the power load for 1915 for the railway totaled 7,546,000 kw.-hr., while the commercial load was 7,690,200 kw.-hr. Owing to the general business depression the commercial load has not been up to normal during the past year, but it will be seen that it is a large factor in the economy obtained at this plant. Unit results obtained in 1914 were as follows: Total cost per kilowatt-hour, 0.594 cent; kilowatt-hours per car-mile, 6.16.



SINGLE-PHASE MAINTENANCE—LOAD CHART FOR THE MONTH OF AUGUST, 1915

MAINTENANCE OF OVERHEAD AND SIGNAL SYSTEM

The line between Gary and South Bend, 59 miles long, is equipped with Union Switch & Signal Company's type TDB., a.c. track-return semaphore block signals. Power for the signal system is supplied at 60 cycles and 2300 volts, the voltage being stepped down through transformers located in each block to the value necessary for operating the signals. Maintenance and inspection of the signal equipment is done by two men. They proceed over the road in a gasoline motor car of light weight and regularly inspect the signals, overhead, lighting arresters, telephone, switch lamps, bonds and the Egry registering machines used in connection with train dispatching. They make all repairs except those of breaks in the trolley wire or changes of high-tension insulators which is done by the line crew consisting of three men and a line car. These inspectors keep in constant touch with the dispatcher by reporting to him at each siding for emergency assignments.

Owing to the combining of these maintenance duties the average cost per car-mile for labor and material in maintaining the signal system is 0.196 cent. The average cost per car-mile for labor and material in maintaining the pole line is 0.084 cent. The average cost per car-mile for labor and material in maintaining the trolley line is 0.574 cent. These together make a total cost per car-mile for labor and material in maintaining the signal system and the overhead lines of 0.854 cent.

One-Man Cars in Australia

In an article written for the *Electric Railway and Tramway Journal* by P. J. Pringle, general manager Electric Supply Company of Victoria, Australia, it was stated that in the city of Ballarat there are seven tramway routes radiating from the business center and that all of the cars on four of the routes and on the extremities of the three other routes have been operated under the one-man system since October, 1913. In the city of Bendigo also, one-man cars have been in operation since September, 1913, on two of the four electric railway lines in the city.

The motormen on these one-man cars receive a somewhat higher rate than those on standard cars, but where the extremities of the line are operated on the one-man system the motorman is paid a higher rate only for the hours he is actually working on these sections. California type cars are used, the open section being inclosed with chain so that passengers must enter and leave by the front door, and each car is equipped with one fare box, which is temporarily fixed by the motorman at the side of the door in the front bulkhead.

When cars are traveling from the suburbs into the city passengers pay as they enter, when traveling from the city to the outskirts they pay as they leave. The average speed is approximately 8 m.p.h., and the company reports no difficulty in keeping the cars on time. In the beginning a few cases occurred where passengers climbed over the rear gates and left the cars without paying, but a few prosecutions in the courts rectified this difficulty, and since March, 1914, no trouble whatever has been experienced on this score. On the routes run entirely with one-man cars loads of from forty to fifty passengers are very frequently carried without any difficulty.

Variable fares are in force. On one route operated partly on this one-man principle there are several fare values reaching a maximum of 8 cents, and in this case all fares ranging from 3 cents up to 6 cents are paid into the fare box. In the case of 8-cent and 7-cent fares to the city, passengers are given special tickets by the motorman which are collected by the conductor, who joins the car at the boundary of the 6-cent fare zone. Those who are on the car at the time of his entering pay him according to the ticket that they produce and they are then given an ordinary passenger's receipt check. Paper tickets are stated to have been dispensed with and celluloid tokens are used in their stead, these making a very considerable saving in cost, as they are used over and over again.

Fare Increase Conference in Edinburgh, Scotland

The Edinburgh (Scotland) Tramways and the tramways committee of the Council recently held a conference on the proposed increase in fares of the tramway company. On behalf of the company it was pointed out that they had been forced to increase the tramway fares in consequence of the rise in the price of coal, cables and wages owing to the war; that this increased expenditure, which amounted to about $121,750, did not include allowances which the company was making to dependents of employees engaged at the front. The company could not see its way to postpone the increase of fares or to consider any modifications thereof, except on the basis of a reduction in the rent, or of a guarantee by the corporation of profits similar to those of the past three years. The directors expressed their willingness at the end of three months to reconsider the matter if the increased fares were producing more money than was needed for additional expenditure.

Report of Chicago Committee on Smoke Abatement and Terminal Electrification

The Committee's Findings Oppose Electrification on the Score of Expense and Inadequacy as a Remedy for the the Smoke Nuisance, but Favor 11,000-Volt Alternating Current Among Available Systems—The Appointment of a Permanent Pure Air Commission is Recommended

After more than four years of work the committee of investigation on smoke abatement and electrification of railway terminals of the Chicago Association of Commerce has presented its report.* The following synopsis of this report has been prepared from a preliminary statement just made available by the committee. It is expected that a more detailed statement will be issued in a few days and extracts from this will be printed promptly in the ELECTRIC RAILWAY JOURNAL.

The Chicago committee consists of four men appointed by the Mayor, four appointed by the railroads and nine appointed by the association. The detail work has been done by a staff of which Dean W. F. M. Goss of the University of Illinois is chief engineer, succeeding H. G. Burt, who died in 1913. L. H. Evans is terminal engineer; Hugh Pattison, electrical engineer; T. H. Curtis, mechanical engineer, and W. M. Whitenton, operating engineer. The consulting engineers are Gibbs & Hill and George R. Henderson.

WHY GENERAL ELECTRIFICATION IS IMPRACTICABLE

After elaborate investigations the committee concluded that a general electrification of Chicago terminals is inadvisable, basing this conclusion upon the following facts, which were determined or verified during the investigations:

The minimum cost of electrification as a means in smoke abatement would be $178,127,230.

The more probable cost, due to the necessity for improvements and rearrangements, which would be precipitated by electrification, would be $274,440,630.

The least net annual operating deficit produced by electrification would be $14,609,743.

Chicago, under the State constitution, cannot aid in meeting this expense.

An "arbitrary" or tax on terminal traffic to support the capital for electrification would constitute a burden upon the business interests of Chicago.

The cost would be so heavy that no court would uphold an electrification ordinance.

The Chicago electrification would equal the combined electrifications of the whole world, would involve problems never heretofore met, and would be the first ever undertaken for air betterment where terminals were adequate from an operating viewpoint.

Before the steam locomotive is eliminated pollution must first be reduced to a minimum from the three more damaging services, high pressure steam plants, metallurgical and other manufacturing furnaces, and domestic fires.

The steam locomotive stands third among smoke producing services, using but 12 per cent of the fuel consumed, and its elimination would reduce the gaseous pollution of the air only 5 per cent and the solid pollution less than 4 per cent.

Electrification, hydro-electric and other long-distance transmission being inapplicable, would add power house smoke in quantities sufficient to offset much of the gain through elimination of locomotive smoke.

Suburban passenger services, such as those of the Illinois Central and other roads, produce but 1.54 per cent of the total visible smoke, and 1.97 per cent of all the dust and cinders.

Electrification will involve at least 3476.4 miles of track.

Electrification would subtract only 1,291,282 tons of coal from the total of 21,208,886 tons now consumed annually.

All smoke regulation in Chicago and elsewhere has erred in confining itself to the visible aspects of smoke, whereas the really harmful factors are the invisible gases and the solids of combustion, sulphurous gas and mineral dust in particular.

Chicago air is polluted annually by the introduction of 304,391 tons of soot, dust and cinders and of 5,008,111,106,758 cu. ft. of sulphurous and other gases.

Despite the fact that Chicago burns more coal annually than any other large city—8 tons per capita as against 4 tons for Manchester and 1½ tons for Berlin—its air is better than that of most large cities.

Chicago air has the benefit of better sun, wind and rain conditions than that of most other cities.

The loop is the smokiest district, with the stock yards and South Chicago a close second and third.

WHY CHICAGO RAILROADS CANNOT ELECTRIFY

Electrification would ultimately cost		$274,440,630
The 600-volt direct-current (third-rail) system, minimum plan, would cost		197,908,000
The 2400-volt direct-current (trolley) system minimum plan, would cost		191,666,808
The 11,000-volt alternating-current (trolley) system, minimum plan, chosen as the least expensive, would cost, in detail:		
1. Power-station	$10,302,104	
2. Transmission system	1,618,693	
3. Substations	2,024,736	
4. Switching stations	573,073	
5. Contact system	28,141,188	
6. Bridge warnings	1,071,989	
7. Return circuit	4,446,033	
8. Elimination of inductive effects and electrolysis	996,727	
9. Telephone system	272,052	
10. Electric locomotives, multiple-unit equipment, work and inspection equipment	91,703,557	
11. Spare parts	485,343	
12. Changes in overhead structures.	834,261	
13. Changes in wire lines	2,028,007	
14. Changes in signal system	6,111,407	
15. Removal and re-establishment of locomotive terminals and new facilities	37,293,746	
	$187,902,916	$187,902,916
Less salvage on equipment usable elsewhere		9,775,686
Net cost of committee's minimum plan		$178,127,230
Plus added costs due to betterments, improvements and changes precipitated by electrification		96,313,409
Estimated total final cost		$274,440,620
Annual charges on investment of $187,902,916		16,946,436
Annual saving through decreased costs of operation		2,336,693
Annual deficit		14,609,743

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*An account of the official presentation of the report will be found in the news pages of this issue.

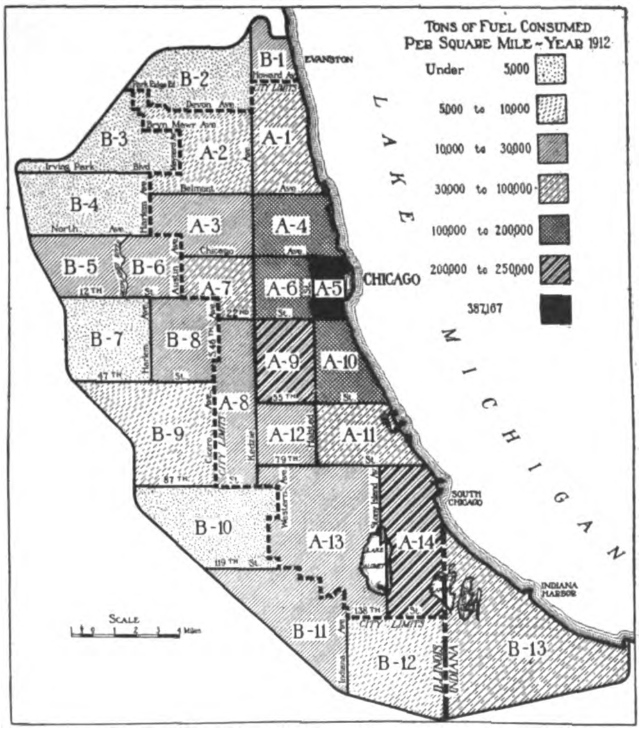
In Chicago air, the products of combustion constitute only two-thirds the total pollution, the other third being due to avoidable and unavoidable dirt from the general activities of the city and from poor municipal housekeeping.

The appointment of a permanent pure air commission with sweeping powers was recommended by the committee as the most feasible plan for reducing smoke, to the production of which the steam railroads are not the heaviest contributors.

GENERAL FINANCIAL PHASES OF THE PROBLEM

As regards the financial practicability of electrification the committee submits these findings:

1. The complete electrification of the railroad terminals as a betterment to be brought about by the railroads through the investment of free capital is, under present-day conditions, financially impracticable.



MAP OF CHICAGO DIVIDED INTO DISTRICTS ON THE BASIS OF COAL CONSUMPTION

2. Any procedure designed to bring about complete electrification which is based upon a financial program involving municipal co-operation is, under present-day conditions, impracticable.

3. Any procedure designed to bring about complete electrification which is based upon the application of an "arbitrary" to traffic of Chicago will constitute a tax which must be borne by the business interests of the city. The practicability of such a tax is a matter which has not been studied by the committee.

4. The preceding conclusions apply to the complete electrification of Chicago's railroad terminals. The financial practicability, under present-day conditions, of electrification as it might be applied to individual roads or to a single service of individual roads, is a matter which has not been investigated by the committee and concerning which no opinion is expressed.

5. The credit of the individual railroads, the properties of which make up the Chicago railroad terminals, differs greatly. This fact cannot be overlooked in estimating what portion of the potential credit of the railroads is available for the purpose of electrification.

6. Certain railroads making up the Chicago terminals operate entirely within the prescribed zone, while for others the great predominance of traffic lies outside the terminal limits. Complete electrification, from a financial point of view, would affect but a relatively small part of the fixed investments of some roads, while for others it would require practically the rebuilding of the property.

7. Electrification is a matter which may present greater advantages in connection with certain classes of service than with other classes of service; for example, the electrification of a railroad having a large suburban business would be more effective in developing opinion favorable to the railroad concerned than the electrification of a road the activities of which are wholly those of freight switching yards. A few only depend upon passenger traffic within the city limits for any considerable amount of their revenue. A larger number derive passenger revenue within the terminals from the movement of through passengers only, while other roads perform little passenger service or no passenger service at all.

8. The extent to which individual railroads have recently made large capital expenditures for terminal improvements, track elevation and enlargement of facilities in Chicago, and the extent to which they are committed to further expenditure for these purposes, must have a material bearing on their ability to make expenditures for new projects.

UNIQUE FEATURES OF THE CHICAGO ELECTRIFICATION PROBLEM

The committee, realizing that many public-spirited citizens will not understand its decision, in the light of reports of electrifications in New York and elsewhere, points out the essential differences between electrification here and those installations that have so far taken place. Nowhere in the world, it finds, as a result of its investigations, has a steam railroad been electrified to avoid the pollution of a city's atmosphere. Nowhere has a terminal been electrified when that terminal from an operating standpoint has been satisfactory. No electrification in existence, either in America or abroad, is comparable, in scope and diversity of service, with that involved in the electrification of the Chicago terminals. A wide gap exists, the committee reports, between that which has been accomplished and that which would have to be done before local electrification would become a success.

Some of the electrifications that have been most widely heralded as such were in fact only a subordinate, though necessary, part of a greater scheme for terminal enlargement. The New York Central, the New York, New Haven & Hartford, and the Pennsylvania electrifications are not alone projects of electrification; primarily they are an essential detail of a new tunnel entry into the heart of New York City. These projects must necessarily stand upon a different basis than the Chicago proposal, where physical conditions absolutely requiring electrification are lacking and where physical conditions and the nature of the traffic would make electrification extremely difficult.

The committee finds that elsewhere steam roads have been electrified for these reasons:

1. Electrification has most frequently been employed in operating suburban passenger service.

2. It has been used for all passenger service in connection with the intensive development of great passenger terminals where underground operation has been involved.

3. It has been used for both freight and passenger operation in tunnels.

4. It has been applied to sections of through lines of route to improve operation of both freight and passenger service on difficult grades.

5. It has been applied to sections of through route lines in anticipation of operating economies through the utilization of water or other relatively inexpensive centralized power.

6. It has been employed by a single railroad in this country in the operation of three switching yards, the work of which must still be regarded as being in an experimental stage.

After studying all electrifications now in existence or planned, both in this country and abroad, the committee finds that of the total of fifteen American installations nine were undertaken because of operation in subways or tunnels, one as an experiment to test out economy in long distance passenger service, two to hold suburban business, one was equipped for initial electric operation because of charter requirements, and two for the purpose of utilizing water power instead of coal.

Of the foreign electrifications all English lines are classed as suburban. None conducts heavy electric locomotive service and none freight service except in a very minor degree. Practically all electric service is confined to suburban and interurban traffic handled by motor cars. In France the Orleans Railway confines its electric locomotive operation to passenger trains through a subway entrance into an underground terminal. It also operates electrically a suburban motor car train service on a line connected with this terminal. The Midi electrification is, in its present stage, experimental only, and for heavy grade lines where hydroelectric power may be substituted for steam.

In Germany no considerable heavy electric main line traction is as yet in operation. The Dessau-Bitterfeld is a short line and has been operated only in experimental service to test out apparatus and methods. The Magdeburg-Leipzig-Halle line, an important extension of which the Dessau-Bitterfeld line will form a part, when completed will represent the first German trunk line electrification, and the Lauban-Königszelt line will represent a second such electrification. Both are predicated upon the production of cheap centralized power either from very low grade coal or from hydro-electric plants. While both of these lines will conduct a heavy electric locomotive passenger and freight service, neither of them will conduct a freight switching service comparable with that which exists in the Chicago terminals. In Switzerland the Loetschberg line and the Simplon tunnel line were electrified primarily because of tunnel operation; other Swiss electrifications are for light multiple unit train service only. All Swiss electrifications utilize cheap water power instead of the more expensive coal fuel. In Italy the Giovi with its branches is the only road which operates heavy electric service. The secondary lines in foreign countries operate a service which is entirely different from American operation. and resembles our interurban.

Thirty-eight steam railroads would be involved in the Chicago project, as against thirty-seven for the rest of the world. Of the Chicago roads twenty-five maintain passenger and freight service and twenty-three are classed as trunk lines, while thirteen perform transfer or switching service only. Eight of the trunk lines have no main tracks within the city limits but operate trains into the Chicago terminals over the tracks of other companies. Twelve railroads operate wholly within the area of investigation.

It was found that the Chicago mileage would be nearly twice that of all other electrically-operated mileage in America, and, exclusive of foreign light service lines, would be about 15 per cent greater than all existing electrifications in the world. The committee's plan involves several times as much yard track mileage as do all existing American electrifications. The number of electric locomotives required would be approximately four times that of all which are now in service in America and two and a half times the number in service in the whole world.

Of switching service, which constitutes 59 per cent of the total locomotive mileage and presents a grave problem in that it has never been attempted electrically on a large scale, it has been ascertained that yard freight switching services, on the basis of car-miles, is more than sixty-five times as great as that on all existing electrified steam roads in America.

No similar service elsewhere, says the report, is handled electrically in any considerable volume except that on the Giovi Railroad of the Italian State Railways and on the New York, New Haven & Hartford Railroad in America. The latter operates, in part electrically and in part by steam locomotives, three freight yards having in the aggregate 72.7 miles of track, requiring about 90,000 electric locomotive-hours per year and handling about 2,500,000 car-miles per year in switching and transfer service. The freight yard traffic of the Chicago terminals aggregates approximately 3,430,000 locomotive-hours per annum and approximately 164,400,000 car-miles per annum in switching and transfer service.

NO SELF-PROPELLED VEHICLE AVAILABLE

As a preliminary to its study of electrification for Chicago steam roads the committee made an investigation into other methods of conducting transportation. It had been hoped that some type of self-propelling motor might be found, and the danger, engineering difficulty and expense of electrification be avoided. But this hope was not justified. The following systems were studied:

Internal combustion motor with mechanical drive, electric drive, compressed air drive, hydraulic drive, direct-connected motor.

Compressed-air motor.

Hot-water motor.

Electric storage-battery motor.

While it was found that progress had been made in adapting the gasoline engine to the requirements of light or special railroad service, the power requirements of heavy and diversified traffic, it is stated, are still beyond the gasoline driven unit. The Diesel oil-burning marine engine has the power, but neither type is self-starting, an imperative requirement for switching work. A new Diesel experimental locomotive was examined in Switzerland. Much had been hoped from it, but the inventor was found doubtful of its success in such heavy yard switching work as would be required here, and limited its future to light express work with constant speeds and infrequent stops.

Much, also, had been hoped from the storage battery, but it was found to lack power, to be too expensive and to share, with electrification, the disadvantage of producing power house smoke. The internal combustion motors are also smoke producing and are regarded as adding a new hazard of operation through their fuel tanks.

Compressed air and hot water motors, also, were found to be impracticable but their use is suggested on those sections of Chicago track that cannot be electrified.

There is available at this time, says the report, no form of locomotive carrying its own power capable of handling the traffic of the Chicago railroad terminals which could be substituted for the steam locomotive, and there is no prospect of the immediate development of any such locomotive.

DETAILS OF THE COMMITTEE'S ELECTRIFICATION PLAN

While the committee does not find electrification feasible, it has prepared a plan which is covered in detail in the report.

The committee believes that the highest degree of efficiency in electrification can only be secured by joint procedure by all the roads. It is inconceivable, says the report, that the different railroads will undertake such a work independently. It may be argued that a course necessary in the case of one railroad may prove quite unnecessary in the case of another, and yet the fullest measure of technical success in the electrification can only be secured when individual interests and preference are subordinated to the requirements of a general plan.

The committee's plan contemplates the electrification of all track within the city limits and the conclusion of electrified trackage on each railroad as close outside the city limits as is practical. The mileage involved by this conception may be summarized as follows:

	Miles
1. Main track	1,475.59
2. Yard track	1,456.64
3. Industrial track owned by railroads	277.19
4. Miles of industrial track owned by industries	229.72
5. Industrial track, railroad repair track and shop track so located in streets at grade, in buildings or under structures employed in industrial processes as to require some type of self-propelling motor	37.26
Total	3,476.40

While in general the committee decided to terminate electrification at the first convenient point outside the city limits, this could not be accomplished on certain roads which conduct a suburban passenger service. It would be impracticable, according to the findings of the committee, to operate these frequent suburban trains part way by electricity and part way by steam. It has hence been decided that certain lines must be partially electrified beyond the limit of complete electrification to the terminals of the suburban service. Through passenger and all freight trains are to be operated by steam on the partially electrified extensions, which will be for use only by multiple-unit suburban trains, resembling "L" trains, but of heavier construction.

As yet no system of electric traction has been developed, the committee finds, which can be accepted as standard for all conditions on all railroads. If it were decided to proceed at once with the electrification of the Chicago terminals, it would be difficult for any group of men, the committee believes, to choose a system which would not be criticised by other men as able as those upon whom the choice of the system developed.

The system selected for Chicago, it is pointed out, must be suitable not only for passenger terminals and through line work, but also for yard switching and transfer work. It must be applicable to the requirements of railroads having a heavy suburban traffic, and also to those roads conducting freight yard and switching service. It must not only be satisfactory in its application to the terminal portion of a trunk line railroad, but it must lend itself to an indefinite extension of the limits of electrification over other and adjoining portions of the road.

Obviously, the report adds, the project must be regarded as too important to permit of the introduction of methods in any way questionable, or of a type of construction of untried value. Furthermore, it is not permissible to consider any methods which might serve to tide over a temporary condition anticipating the later selection of a permanent and stable system.

The committee, after obtaining complete engineering data on these three systems selected the third as cheapest and most desirable:

1. Third-rail contact, direct current at 600 volts.
2. Overhead contact, direct current at 2400 volts.
3. Overhead contact, single-phase current at 11,000 volts.

The third-rail system was given up as the least practical of the three because of the difficulties to be met. Not only would the presence of the third-rail be a danger to employees in the yards and make necessary a large amount of reconstruction, but there would be trouble in operating trains, owing to the large number of gaps in the third-rail due to switches, street intersection and other such obstructions. After ascertaining the extent of this difficulty on six railroads, the committee found that:

Under present methods the six railroads examined would have 3834 gaps more than 25 ft. in length in the third-rail conductor aggregating 56.42 miles. Of these gaps 2216, aggregating 24.06 miles, would be unimportant since they would be short or would occur in places where trains could coast over them. Another class, numbering 881 gaps and aggregating 16.13 miles, could be reduced so that proper operation could be maintained; some of them could be eliminated by rearranging track or, assuming that municipal grant could be obtained, by closing some streets and reducing the width of other streets and roads. The expense of making these changes has not been determined, but it would be large. The remaining 737 gaps, averaging more than 115 ft. in length and aggregating 16.23 miles, or about 1 per cent of the total mileage examined, would require the use of an overhead third-rail conductor, a device that is cumbersome, difficult to install, inefficient, expensive and an obstacle to operation.

It is estimated by the committee that a total of about 75 miles of track in Chicago could not be equipped by the third-rail system.

Another objection to the third-rail is the fact that except in very unusual sleet storms, service through the trolley wire would not be interrupted, whereas both sleet and drifting snow furnish a serious problem with the third-rail. The rail is also a danger to property and life in case of wreck.

The difficulties of trolley installation would also be great, but less, it is believed, than those attending the use of the third-rail. The great trouble found is with low bridges and other structures over the tracks.

Within the area of investigation there are 492 permanent structures which fail to have sufficient clearance over tracks to allow the installation of the overhead conductor at the desired height of 24 ft. 2 in. Of these obstructions, 221 cannot be changed without great inconvenience and expense both to the city and to the railroads. There are 385 structures which have clearances of less than 25 ft.; 163 of these interferences can be changed to provide the desired clearance, but not without material expense, and 222 cannot be changed without great inconvenience and expense. There are seventy of these structures which have less than the minimum clearance of 16 ft. 6 in. permissible where trainmen are excluded from tops of cars. The conclusion follows that a sufficient clearance to permit employees to ride on tops of cars cannot be obtained throughout the Chicago terminals.

The adoption of the overhead contact system would permit the use of either a high voltage direct current or an alternating current of much higher voltage. The use of the first would result in damage to property by electrolysis. The use of the second would "kill" telephone and telegraph wires adjacent to the tracks, through inductive interference. Both conditions could be remedied, though with difficulty and at considerable expense.

The committee finds that it would make no practical difference whether the roads manufactured their own electric power or purchased it from public service corporations.

Electricity would, it is concluded, neither increase nor decrease the dangers of operation. Added dangers would be introduced but compensating safety in other directions would offset these.

INCIDENTAL ADVANTAGES OF ELECTRIFICATION

The committee has made an effort to arrive at the incidental advantages that would accrue to the railroads through electrification. The change would give some increased capacity in existing trackage and terminals. In locations where operation under present-day conditions is congested it would give relief, and in locations where there is at present no congestion, electrification would constitute in effect an enlargement of existing facilities and hence would postpone the day when additional facilities would be required.

Electrification, it is concluded, would contribute to increased celerity and reliability in train movement. It would open the way to more intensive use of railroad property, both in this manner and by making double-decked freight and passenger terminal stations possible. It would also make possible the erection of buildings over tracks, but this value is regarded as speculative and, as a present-day asset, small.

Electrification, it is pointed out, would give the roads an asset in the use of electric service beyond that required for trains. It would benefit the roads through the increased convenience and comfort of passengers and it would also give the roads whatever advantage accrued, entirely indeterminate, through the lessening of smoke.

ELECTRIFICATION COSTS

In arriving at the cost of electrification the committee based its work on 1912 operation, extended to meet conditions if electrification were to begin in 1916 and be completed in 1922. The following accounting statement shows why the committee holds that electrification is financially impossible. The deficit on the minimum outlay of $178,127,230 would be too great:

I—ANNUAL CHARGES		
1. Interest	$8,906,362	
2. Depreciation	7,808,278	
3. Replacement of dissipated assets	231,796	
4. Indeterminate charges	....	
Total charges		$16,946,436
II—ANNUAL REVENUES		
1. Increase in net revenues	$2,336,693	
2. Indeterminate benefits	....	
Total credits		$2,336,693
Balance, annual deficit on investment		$14,609,743

The investigations show that electrified operation for all the railroads taken together and disregarding depreciation and interest would result in a decrease in operating expenses. Under steam operation, those accounts that would be affected one way or the other by electrification show a total of $10,934,064. Under operation by the 600-volt direct-current third-rail system, the total would be $8,442,298, with the 2400-volt direct-current system it would be $7,355,771 and with the 11,000-volt alternating-current system it would be $7,140,495. The installation of these three systems would result in a saving in operating expenses respectively of $2,491,766, $3,578,293 and $3,793,569.

This saving, however, is in part nullified by new expenses, due to the operation of stations that would have to be established at the end of electrified tracks to provide for a transfer of trains from electric to steam locomotives, and also by the waste and consequent loss due to operating over shortened steam railroad divisions, which have surrendered part of their mileage to make the new terminal electric divisions. The engineers' estimates place the added expense under the first item at $1,546,113 and the added expense under the second at $450,000. This would leave the net saving in operating expenses, to follow electrification, at $495,653 for the third-rail system, $1,582,180 for the direct-current trolley system, and $1,797,456 for the alternating-current trolley system.

Following the work of the committee, a number of the Chicago railroads have made a study of the cost which would be imposed upon them in excess of those set forth by the committee. Eight of these railroads have filed with the committee the results of their investigations. The reports thus submitted have been analyzed with results which are set forth as follows:

ESTIMATES OF INTERMEDIATE COSTS OF EIGHT RAILROADS

1. Costs due to an extension of the mileage of electrification over that provided by the committee's estimates	$20,872,500
2. Precipitated costs principally for track elevated	$29,198,400
3. Total cost to the eight railroad corporations in excess of that necessary to electrification under the plan of the committee	$50,070,900
4. The committee's estimate of the cost of electrification for the eight railroads	$92,599,908
5. The excess costs, including costs due to extension of the plan and precipitated costs, in per cent of those which are covered by the committee's estimates	54.07

The committee's estimates of the net cost of electrification for all the roads of Chicago totals $178,127,230. Therefore, carrying forward the same ratio, the committee finds that the total added and precipitated costs for all the railroads would amount to $96,313,400.

Upon this basis, the total capital requirement imposed by electrification would be:

That incident to the development of a minimum plan as estimated by the committee	$178,127,230
That required to cover precipitated costs and costs due to extension of plan	96,313,400
Total	$274,440,630

Individual electrification by various roads, which refuse to join in the committee's plan of common installation and common operation, is also expected to raise the cost above the committee's minimum. One illustration makes this plain:

The committee assigns to the Chicago & Northwestern Railway a proportionate share in the cost of the common power station. The railroad itself, however, assumes at once that it would prefer an individual power station, and its estimates of the cost of the individual facility is $3,894,767. This is $1,683,936 in excess of the committee's estimates.

By far the most important factor in this list of indeterminate costs is that of terminal rearrangement and improvement. The city's terminals have grown up without preconceived plan, additional facilities being added now and then at points further out as the expansion of business and of the city dictated. Many of these changes might not become imperative for a decade, but under electrification would have to be made at once. Track elevations would be extensive in order to avoid grade crossings with trolley lines. Signal systems that are now somewhat out of date but might be continued in operation for a number of years, will have to be altered and it is probable many roads will decide to put in entirely new systems.

SYNOPSIS OF AMERICAN ELECTRIFICATIONS

In its work the committee had occasion to study all existing electrifications, and included in the report the following summary:

The Long Island represents the first complete electrification of a steam railroad on a large scale and is the most extensive example of multiple-unit passenger service in operation. This line is essentially a passenger line serving suburbs of New York City, and at certain seasons operating a heavy excursion business to the seashore. Practically the entire network of lines within a radius of 25 miles of the city, 88 miles of route, has been electrified. The purpose of this electrification was to fulfill the requirements of smokeless operation made necessary by the new tunnel entry into Brooklyn and New York City to the new Pennsylvania terminals. Freight service is conducted by steam locomotives exclusively and on some portions of the electrified system steam locomotives are also used to operate through passenger service.

The New York Central & Hudson River Railroad electrified to eliminate smoke and gases in the long tunnel entrance into the Grand Central Station in New York City. Operation was hampered and accidents made liable by this smoke. The electrification embraces the station yards and 53 miles of route serving a suburban territory. This was necessitated in order to secure continuous electric operation for the suburban trains. The route totals 244.60 miles of track.

The New York, New Haven & Hartford began electrifying because it used the New York Central station and had to follow the change of that road. It has extended this method of operation so as to conform to the Pennsylvania electrification on Long Island. Freight trains are handled by electric locomotives from New Haven to terminal yards located at four points on the Harlem River division. There are, counting switches and other secondary track, 531.68 miles of track involved in this electrification.

The Pennsylvania was forced to electrify in order to go under the rivers and Manhattan Island to its new New York City terminal. The electrification involves 9 miles of main line incidental to the terminal electrification, and 97.49 miles of track.

The West Jersey & Seashore operates 64.6 miles of main line for suburban traffic, the installation having been experimental, the object being to ascertain what main line operating economies would result.

The Spokane & Inland Empire was built for electrical operation because of the high cost of coal and the availability of water power. Total trackage involved is 131 miles. The road is partly an interurban, but also does freight work.

The Butte, Anaconda & Pacific is a copper line with 90.5 miles of track operated by hydro-electric power.

The Erie has 38 miles of experimental hydro-electric main line for suburban passenger use, but through passenger and freight trains operate over this section by steam.

The Southern Pacific has 114.81 miles of suburban track in California under electrical operation. Much of this is in city streets. A large suburban business is handled.

The New York, Westchester & Boston does an exclusively suburban passenger business over 53.56 miles of electrically-equipped track.

The Baltimore & Ohio has 8.4 miles of track under electric operation in Baltimore, made necessary by heavy grades and a long tunnel. This was the first electrification in America for heavy freight and passenger trains.

The Grand Trunk operates electrically through the tunnel under the St. Clair River to Port Huron, Mich. Twelve miles of single track are involved.

The Great Northern has electrically equipped the tracks in its 2.6 miles of tunnel at the Cascade summit. Power is generated by a hydro-electric plant.

The Michigan Central has 20 miles of electrically-operated track through the tunnel approach to Detroit under the Detroit River.

The Boston & Maine uses electricity in the Hoosac tunnel, which is nearly 5 miles in length. Twenty-one miles of track have been electrified.

The Norfolk & Western has electrified 25 miles of its main line which has heavy grades and a tunnel. Electric operation will be confined to coal trains, fast freight and passenger trains continuing under steam power.

The Pennsylvania has equipped for electric operation 20 miles of main line from Broad Street Station, Philadelphia. This change was forced to relieve congestion at the terminal, which cannot be enlarged. Through trains will continue to operate by steam.

The Canadian Northern has electrified 10 miles of double track through the tunnel into its new Montreal terminal.

The Chicago, Milwaukee & St. Paul is electrifying a portion of its main line over the Rocky Mountains, embracing a stretch of about 440 miles. The object is increased speed and track capacity over heavy grades reducing operating costs by the use of water power.

Boston Elevated Library

The Methods of Developing and Indexing the Library and the Duties of the Librarian Are Described

To facilitate the work of officials and their assistants, the Boston Elevated Railway established a company library on Sept. 1 of this year at its main offices, 101 Milk Street, Boston, Mass. The library is designed to be a general clearing house of information for all departments, and is managed not with the idea of amassing a great collection of books and other printed matter, but with the intention of maintaining the most important material, from the company's standpoint, within comparatively small quarters for the present and to keep in close touch with every other available source of information of interest to a transportation organization. The carrying out of this policy is reflected in the sectionalizing of the library and in the development of its general card index.

The library adjoins the executive offices on the fifth floor of the building and is under the general direction of M. C. Brush, second vice-president. There are now about 100 sections classified under such heads as "Investigations and Reports on Transportation Problems in Boston"; "Reports of Boston City Departments," including fire, police, public works, port directors, parks, finance commission, wire department and others; "Massachusetts commissions," including reports of the Public Service Commission, Gas & Electric Light Commission (which has jurisdiction over smoke abatement in Boston); Metropolitan Water & Sewerage Board, opinions of the attorney-general, acts and resolutions of the legislature, reports of the bank commissioner, industrial accident board, Massachusetts Highway Commission, Metropolitan Park Commission, etc. Other sections cover transportation problems in other cities, with special reports of consulting engineers and boards of investigation; the annual reports of electric railways in large cities; reports of public service commissions in New England; reports, pamphlets, etc., on municipal ownership; welfare work; maps of various cities, mounted on pulpboard; labor matters; atlases of metropolitan Boston; current periodicals in bound volumes; proceedings of the American Electric Railway Association, etc.

The card index capacity is 60,000 cards, all within reach of the librarian when seated at his desk. The index is of the so-called "dictionary" type, with alphabetical subject entries and cross-references. The compactness of this arrangement enables inquiries by telephone or otherwise to be answered in the minimum time. Close relations are maintained with about twenty special libraries in Boston, including, besides the great libraries of Harvard University (in particular the business administration library), the Massachusetts Institute of Technology and the Boston Public Library, the libraries of Stone & Webster; Kidder, Peabody & Company; Arthur D. Little, Inc.; Insurance Library Association; C. H. Tenney & Company, and others. By telephone and messenger service material available is made quickly accessible through interchange facilities of the greatest value. In the broader sense, the Boston Elevated library is an intensive index of information, or a clearing house of data and references in which mere duplication is avoided in the interests of efficient service in connecting the seeker and the information desired in the shortest possible time.

The librarian is charged with the duty of caring for and indexing all scientific books, catalogs, pamphlets, essays, trade magazines, commission reports and findings and papers of the company, and of acquainting officials of the company with articles in these which may be of interest to them. So far as he can, he is required to know about new publications of a nature likely to be of interest to officials and to acquaint them with these. The office libraries of company officials are indexed in the library card catalog—a plan which avoids breaking up specialized collections of great local value within departments and bureaus and still preserves first-class accessibility. Thus, the typewritten stenographic records of various street railway arbitration cases are filed in the library of the second vice-president, indexed in the company library, and so made immediately available without encumbering the shelves of the latter, or withdrawal for more than a temporary period from their most useful location.

By use of cards issued by the Library of Congress pertaining to copyrighted books on railway and electrical matters, references to these volumes are deposited in the index automatically within two or three weeks after publication. The library subscribes to a number of journals, including the New York *Times Book Review* and the Annals of the American Academy of Political and Social Science, to the Bureau of Railway Economics, to engineering periodicals, to the United States Catalog of Books in Print, etc. The librarian is in a position to state the name and title of every municipal officer within the Boston Elevated territory, with the dates of municipal meetings. This information is of special value to department heads interested in construction and traffic matters. In every branch of its service the library seeks to act as a most efficient intermediary between the person seeking information and the repository of the desired data. The usual arrangements for circulation of books and periodicals are in vogue.

The questions referred to the library are most varied and include such points as the compilation of references to organization charts on railways, the comparison of different types of third-rail shoes, investigation of the cost of printing transfers, and numerous other topics. Following a recent fire in the company garage, information was sought on the behavior of gasoline when being strained through a chamois cloth into an automobile tank. Co-operative inquiry through the Insurance Library brought forth helpful information upon the possibilities of gasoline ignition through the creating of static charges in straining this liquid in the above way.

Lewis A. Armistead, a member of the company's staff with a varied experience in routine work and special research in different departments on behalf of executive interests, has been appointed librarian of the Boston Elevated Railway. Mr. Armistead is a member of the Special Libraries Association and has a broad acquaintance within the electric railway field. Comprehensive plans for widening the usefulness of the library are being steadily developed, and since its inception early in the fall it has become a valuable adjunct to the company's organization.

The Lesson of the Jitney*

Successful Experience with One-Man Cars Described—Other Suggestions on Economical Operation

BY RAYMOND H. SMITH, GENERAL MANAGER JACKSON LIGHT & TRACTION COMPANY

During the last eighteen months most street railway companies have suffered losses of revenue, the extent of these losses depending largely upon the industrial diversification of the localities served. This condition emphasizes the importance of activity in securing diversification of industries. In times of stress and extraordinary conditions the locality which is dependent upon a single line of industries is just as much affected as is the farmer who is staking his year's work on the success of a single crop.

The falling off of street railway earnings is in general due to one or more of the three following factors: The unusual conditions which have had a depressing effect upon business in general; the ever-increasing number of automobiles used by individuals for pleasure purposes, and the presence of jitney competition. After the war the electric railways will undoubtedly participate in the new era of prosperity which is to follow, but the street railways must look upon future losses of revenue from the privately-owned automobile as a certainty. While the losses sustained through the ordinary use of these machines by the owners and their families is a considerable item, this loss is greatly increased by the very natural desire to give friends a lift. This natural inclination has been greatly stimulated by the advent of the jitney. The effect is destined to grow very much in proportion to the number of cars sold, and the constantly decreasing cost of the automobile is also a factor.

The jitney has cut deeply into the earnings of the street railway, and this in many cases where it has ultimately withdrawn from the field. When operating under laws which have placed upon the jitney even approximately the same responsibilities as are upon the street railway, the tendency of this competition seems to be in the direction of failure, but when the last jitney has been withdrawn from service the community which has passed through the period of jitney craze emerges the loser. It has been such merely because the jitney has been of no lasting benefit to the place, and the street railway, which plays such an important part in the prosperity of a community, has suffered a loss which is bound to hamper it in its efforts properly to perform its duties as a common carrier.

That the jitney has its advantages cannot be well denied. Many who were at first strong in their protest against the unfairness of the competition have succumbed to the allurement that the rapid transit afforded, still, however, maintaining their former position on the equity of the situation. This cannot but bring forcibly home to the street railway operator the fact that patronage is naturally inclined toward the service which offers the greatest advantages, regardless of where the sympathies lie. It therefore behooves street railway operators to adopt any practical means of securing for their systems the good points of their competitor's service.

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*Abstract of a paper delivered before the Mississippi Electric Association on Nov. 12, 1915, at the Hattiesburg meeting.

Transportation facilities which before the advent of the jitney seemed satisfactory will, with its passing, be deemed inadequate. It is coming to pass that street railway service is regarded as good or bad, depending upon whether or not there is a car in sight. Apparently the jitney is not now a success, but the question arises whether or not it can "come back." This must be settled between the automobile manufacturer and the street railway, as it seems to be a question of future first cost and operating cost of automobiles versus service and cost of street railway operation. The question of how much cheaper automobiles will become in the next five years is problematical, but this question does not rank in importance with that as to whether automobile operating expenses will increase or decrease. It is difficult to predict the future trend of these operating costs. The tire expense is now approximately 18 per cent of the total cost of machine operation, and it is not venturesome to predict that some genius will devise a tire which will do away with much of the expense and trouble now experienced from this source. Just what the gasoline or other fuel situation will be in a few years it is also difficult to foretell.

The jitney of the future cannot expect to be relieved of many of the obligations and burdens which many have escaped in the past. New legal restrictions and regulations have been applied to it with caution, and in some cases with reluctance, owing to its infancy, its popularity, and the possible political effect. If the indications point toward the successful and continuous operation of jitneys, many of the burdens of the street railway will be also assessed against it.

There is too much talent and engineering ability in the electric railway industry to permit serious interference with the electric road. But jitney competition has emphasized that quick acceleration, high speed and frequency of service are the demands of the public. It is not enough that large cars, sufficient in capacity to properly handle the traffic, be run. The demand is for more frequent cars and faster operation, and this immediately suggests more and lighter cars, so inexpensive to operate that the railways can afford to reduce the headway.

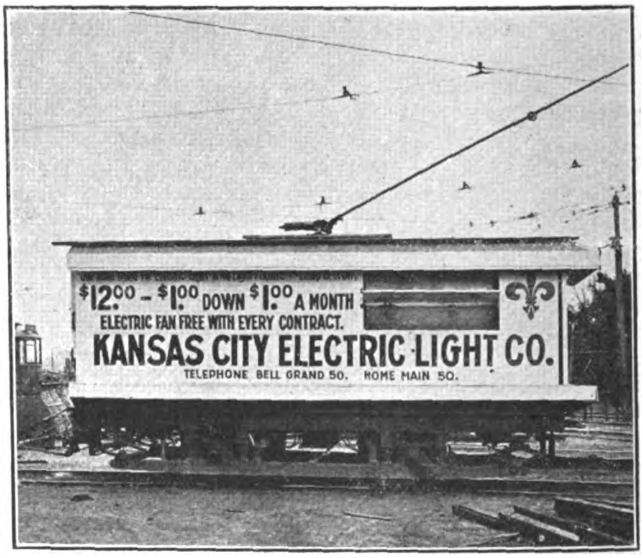
The Jackson Light & Traction Company has recently purchased and put into operation five single-truck, all-steel cars having a seating capacity of twenty-four passengers each. These are 25 ft. long over all and have special trucks equipped with 24-in. wheels. The cars weigh about 12,500 lb., and they are equipped with 30 to 35-hp. motors, the new 17½-hp. motors not being available for service at the time the cars were purchased. These cars are arranged for one-man operation. They have been very satisfactory, and the writer is convinced that cars of this design will gradually replace the larger and heavier rolling stock of to-day.

The writer cannot agree with those who are of the opinion that one-man operation is not adapted to cities of from 50,000 to 100,000 population. Local conditions, of course, determine what is best in any particular case, but the feasibility of one-man operation with the future light-weight car, controlled with the ease of an automobile, will not depend upon population. The ability of one man to look after the business of his car is dependent upon having frequent enough service to reduce the riding per car to a point where one man can conveniently handle it.

In the line of reducing expenses there seems to be no reason why cars should be operated through the streets with a finish like that of a piano. Why should a street car require a highly-polished surface any more than a house? Again, many of us, especially those living in the southern section of the country, may find it possible to do without the extensive carhouses which we now think necessary. Similar cases may be cited in other lines where, if the railway industry is driven to it, economies can be effected. The writer has no fear that the jitney will replace the street railway, and anticipates that a few years hence small electric cars, quite different in design from the present street cars, will be operated over the street railway tracks with the speed, acceleration, control and comfort to passengers of the best automobile of to-day.

Kansas City Advertising Car

The Metropolitan Street Railway, Kansas City, Mo., operated on its tracks this past summer, for the Kansas City Electric Light Company, an illuminated advertising car exploiting the special installation offer of the light company, especially its electric fan feature. The car bore on each side and on the rear end painted signs presenting the offers, the words being lighted by globes concealed at top and bottom and operated by a flasher that caused illumination for about a minute, then darkness for a shorter time. During the period of darkness the flasher caused a small sign, inserted in each side, to revolve exposing alternately opposite sides. On the one side was a picture of a man drenched in perspiration. On the reverse, the same man was enjoying the draft from an electric fan. A small motor operated the flasher and also a hurdy-gurdy.


$12.00 - $1.00 DOWN $1.00 A MONTH
ELECTRIC FAN FREE WITH EVERY CONTRACT.
KANSAS CITY ELECTRIC LIGHT CO.
TELEPHONE BELL GRAND 50. HOME MAIN 50.

KANSAS CITY ADVERTISING CAR

The car was manned by a motorman, a conductor, and an extra man, usually, for the hurdy-gurdy. It traveled 30 miles each clear night, successively on eight routes, which eventually covered the city tracks. It was on the streets two hours, not interfering with the early or late evening traffic. Among the children of Kansas City it was known as "the music car." The wording of the larger signs was changed with the offers of the different months, while the fan cartoons remained.

According to a paper issued by the United States Geological Survey, the value of the production of mica in the United States totalled $328,746 in 1914. The chief mines are in North Carolina.

Bay State Street Railway Valuation

Methods and Results of Eighteen Months' Investigation of Massachusetts Property in Connection with Fare Case Now Being Heard by Public Service Commission

In support of its proposed fare increase, the Bay State Street Railway, Boston, Mass., recently filed with the Massachusetts Public Service Commission a valuation report prepared by Sloan, Huddle, Feustel & Freeman, Madison, Wis. The general preparation of the report involved the determination of the value of the physical property of the company within the State, and the ascertainment of the revenues necessary to meet present operating expenses, provide for depreciation and furnish a fair return. The principal problems concerned the valuation and the depreciation allowance. The actual operating expenses as shown by the books were used, and the fair rate of return, or cost of obtaining money, was put at 7 per cent. No attention was paid to development costs or other intangible values.

INVESTMENT COST BASIS OF VALUATION

As nearly as possible the investment cost of the property as it existed on Nov. 1, 1914, was obtained, this cost being defined as the money actually spent to build up the physical property then in existence. The cost of reproduction of the entire physical property was also ascertained. Before either value had been found, however, it was decided that the one to be used to show the total revenue needed was the investment cost. The only exception was in the case of land, for which item the present market value was used.

The determination of the investment cost of the property was difficult. Present construction cost regulations have been in effect for only a small part of the life of the system, which is composed of properties originally held by more than sixty separate companies, some organized as far back as 1862. Much of the property dates from 1899, when the main portion of the properties was gathered into two large systems, but not until 1907, when the company began doing its own construction work, were detailed construction records obtainable. In general, material purchase records have been reasonably complete since 1904. For ties, rails, poles and copper wire supplementary data for the earlier years were obtained from manufacturers, supply companies and other sources. Actual costs were found for practically all the track special work, and the greater portion of the rolling stock, car equipment and power station equipment. The records for labor were less extensive, being complete only since 1909. Analyses were made to ascertain the average costs of track laying and of installing the overhead distribution system, and these costs were adjusted to comply with the different conditions of earlier years. Grading prices were obtained from a study of the reports of the Massachusetts Highway Commission and a comparison with available contract prices. Actual grading costs were at hand for some large recent jobs.

The unit prices for investment cost included only the cost of labor, materials and immediate supervision. The overhead charges, which were based on the I. C. C. classification, were kept separate. These charges, including engineering and supervision, interest, taxes, fire and liability insurance, organization and legal expenses, and contingencies of inventory and construction, were considered only when incurred during or incident to the construction period. They were not applied to each individual item but were computed as an average cost to be applied to the total material and labor cost.

In spite of the careful taking of the physical inventory, it was certain from past experience that some items were omitted, and that much work was done during the construction period which an examination of the present property would not disclose. Moreover, in examining the construction work orders to arrive at unit prices, there were a number of cases where the analysis showed costs beyond the normal, owing to unusual conditions. To allow for these a small and varying allowance for contingencies was added to the different accounts.

In following the investment theory for overhead charges, the fact that the company is a going concern reduced the allowance necessary for certain of the items. Engineering and organization expenses were less than would be required for a company just beginning construction. The company's credit also made it possible for money to be obtained on favorable terms for construction purposes. The engineers considered only the interest on the money actually needed for construction and did not include commissions or discounts usually paid for the obtaining of construction funds. All the above conditions resulted in the allowance of a weighted average of 12.74 per cent on the cost of labor and materials. The monetary allowance for overhead charges was $4,769,717, and the investment cost including overhead charges amounted to $42,211,810.

COST OF REPRODUCTION OF PHYSICAL PROPERTY

In establishing the cost of reproduction the same inventory of physical property was used as in the case of the investment cost. It was considered that any company starting out to build the system anew would be obliged to do in a few years substantially the same work which was done over a period of many years by the component companies of the system. Four years was deemed the time required. For unit prices the actual costs as of Nov. 1, 1914, were not taken. In their stead an average of prices obtaining for a short term of years preceding this date was used. The units employed did not contain any late prices, which might be abnormal owing to the European war.

The principal changes in overhead charges under the reproduction theory were in the items of engineering, organization and interest during construction. All three of these items are less for an operating company, building its property slowly in the form of extensions, than they would be for a company constructing the property as a whole. The weighted average for overhead charges in this case was 15.80 per cent.

After the values for the entire accounts were determined, it was necessary for later use in rate calculations to apportion the total value to the various operating routes. As previously stated, the value chosen was the investment cost with the one modification in that land was included at the present market price. The actual use of the property by the different routes formed the basis of apportionment. All lines in any one city used exclusively for local service were taken together as one route, but all other lines were considered separately and values found for each route.

DETERMINATION OF ANNUAL DEPRECIATION

In the investigation of depreciation, the engineers computed for each account the annual amount necessary to be set aside so that at the end of the normal life of the depreciable property in that account a fund would be on hand equal to the original investment. The computation was made by dividing the cost new of the property minus its scrap value by the estimated life in years, it being understood that at no time would the fund actually equal the investment cost of the property in any account, as some portion of the items must be renewed constantly. Every effort was made to have the lives used reflect the company's actual experience. No use was made of life data from outside sources, for other than comparative purposes, except for those items whose normal lives could not be determined from the history of the company. Notes on the present condition of the property were made at the time of the field inventory. The number of years that a piece of property had been in use, taken in conjunction with its condition per cent, was the basis for a close approximation as to its probable remaining years of usefulness and thus of its total normal life.

For much of the property the history of renewals for items subjected to varying operating conditions formed the basis for the lives adopted. In the matter of ties, *e.g.*, it was found that for those laid under pavement the life depended largely on the life of the rail being carried. For ties in unpaved track the practice of covering them by back-filling has considerable effect in lengthening the actual years of service. Hence, to account for local conditions, a range of lives was sometimes assigned to items in the same group. For rail, the lives varied from ten to thirty-five years depending on traffic and other conditions. Certain of the property accounts were classified as non-depreciable. Table I shows the lives used in calculating depreciation on the various items.

In the computation of each account the various items were grouped to obtain the total amounts wearing out in the different life periods of ten, twelve or fifteen years, etc., and to these several totals were added the overhead allowances to determine the gross investment. The scrap value, if any, and the non-depreciable overhead were subtracted from the gross investment to determine the depreciable investment. This latter value for a group, divided by the life for that group, gave the annual depreciation, and the sum of all such group totals gave the total annual depreciation for the account. The composite life was finally determined by dividing the net depreciable investment by the annual depreciation allowance. The composite life of the entire Bay State property was found to be 29.26 years, and the annual depreciation required was $1,410,615. Expressed as a percentage of the total investment, it was 3.9 per cent. The composite life of the depreciable property only was 22.69 years and the annual depreciation thereof was 4.41 per cent. The annual depreciation necessary for each property account is shown in Table II.

TABLE II—STATEMENT OF ANNUAL DEPRECIATION NECESSARY FOR EACH PROPERTY ACCOUNT

	Investment	Depreciable Investment	Annual Depreciation, Per Cent‡
504—Grading	$165,374*	$161,078	2.0
506—Ties	1,421,665	1,384,739	5.6
507—Rails, rail fastenings and joints	4,592,294	3,585,926	3.5
508—Special work	2,077,406	1,873,677	5.7
510—Track and roadway labor	2,070,551	2,016,771	4.4
511—Paving	3,415,807†	3,122,719	3.1
512—Roadway machinery and tools	70,010	42,354	4.0
515—Bridges, trestles and culverts	686,699	665,137	3.0
516—Crossings, fences and signs	204,423	199,036	2.0
517—Signals and interlocking apparatus	85,304	82,625	7.2
518—Telephone and telegraph lines	71,478	68,672	6.9
519—Poles and fixtures	836,473	792,228	5.9
520—Underground conduits	176,677	172,047	2.0
521—Distribution system	3,040,700	1,848,971	3.7
Track bonding	397,685	230,788	2.6
523—Shops and car houses	1,715,824	1,662,842	2.3
524—Stations, miscellaneous buildings	68,888	66,783	2.3
525—Wharves and docks	22,072	21,398	1.3
526—Park and resort property	210,959	202,953	3.8
530—Passenger and combination cars	4,642,070	4,438,253	4.6
531—Freight, express and mail cars	120,755	115,248	5.1
532—Service equipment	469,577	446,924	5.2
533—Electric equipment of cars	3,607,136	3,312,547	4.4
536—Shop equipment	227,525	148,830	2.8
537—Furniture	125,680	121,607	2.4
538—Miscellaneous equipment	81,952	74,867	11.0
539—Power plant buildings	996,734	964,220	1.8
540—Substation buildings	84,814	82,221	1.6
542—Power plant equipment	3,678,621	3,421,588	3.4
543—Substation equipment	298,954	270,408	3.2
544—Transmission system	513,705	409,824	3.1
Total	$36,177,812	$32,007,281	3.90
Composite life in years			22.7

*Total investment under account No. 504, including non-depreciable investment, $1,877,854.

†Total investment under account No. 511, including non-depreciable investment, $3,689,683.

‡Annual depreciation divided by investment.

No depreciation was allowed on Accounts Nos. 502, 503 and 505.

The Bay State Street Railway had included all charges for maintenance and depreciation in the one account for maintenance. In order to determine the additional amount required for depreciation, it was necessary to

TABLE I— STATEMENT OF LIVES OF PROPERTY USED IN COMPUTING ANNUAL DEPRECIATION

	Years
Bridges, Culverts and Drains	
Steel bridges over railroads	25
Steel bridges over streams	30
Timber bridges over railroads	15
Timber bridges over streams	20
Timber culverts	20
Dry rubble culverts	25
Masonry and concrete structures	75
Vitrified pipe culverts and drains	30
Cast-iron pipe culverts and drains	60
Catch basins	50
Buildings	
Dependent upon material and type	15-75
Cars and Car Equipment	
Bodies	
D. T. semis	20
S. T. semis	22
D. T. box	25
S. T. box	28
D. T. open	25
S. T. open	30
Express	20
Snow plows	18-20
Trucks	10-20
Motors	20
Controllers	25
Control cable	Life of car
Air-brake compressors	20
Registers	18
Arc headlights	8
Jacks and saws	25
Distribution System	
Poles	
Iron	40
Cedar	20
Chestnut	16
Hard pine	12
Cross-arms	10
Guys and anchors	16
Miscellaneous work on poles	15
Trolley	2-30
Overhead feeder	25-30
Underground cable	30
Submarine cable	10
Furniture	40
Miscellaneous Equipment	
Horses, automobiles, wagons, etc	5-10
Paving	
Asphalt and asphaltina	15-20
Bitulithic	12-15
Bituminous macadam	10-18
Water bound macadam	8-15
Concrete and hassam	†12-25
Grouted brick on concrete base	15-25
Wood block on concrete base	20-30
Wood block on bridges	10-20
Plank on bridges	5
Granite	*20-60
Cobble and cobble mixed	Same as rail
Power Plant Equipment	
Boilers—water tube	25-30
Boilers—fire tube	20
Engines	30-40
Turbo-generators	20
Condensers	20-25
Pumps	12-20
Stokers	15
Heaters	25-30
Coal-handling machinery	25
Piping	25
Generators—d.c.	30-40
Alternators	25
Switchboards and wiring,	Average of generator served
Roadway Machinery and Tools	
Larger pieces of equipment only	15-25
Shop Equipment	
Machine units	15-25
Signals and Interlocking Apparatus	
Hand-thrown signals	10
Automatic signals	14
Signal wire	15
Submarine signal cable	10
Underground signal cable	30
Telephone and Telegraph Lines	
Telephone sets	10
Iron box telephone sets	14
Telephone wire	15
Submarine telephone cable	10
Underground telephone cable	30
Track and Roadway	
Rails, including all fastenings	10-35
Ties	
Paved track—same as rail	10-35
Unpaved track—under good backfill	16
Unpaved track—open to weather	12
Bonds—same as rail to which they are attached.	
Special work	6-20
Track and roadway labor—same as rail or special work where labor was incurred.	
Grading and ballast—not depreciated.	
Underground conduits	50

†Very little near twenty-five years.

*Twice life of rail.

separate from the 1914 maintenance charges the amount, which under the engineers' theory, would have been so charged. The maintenance accounts, which involved both labor and materials, were examined for the last three years available. The material sheets from all storehouses were scrutinized to determine whether or not the material would have been paid for out of the depreciation fund. If the labor charges for the materials so assigned could not be found directly, they were estimated on the same unit basis as in the investment valuation. In this way a comparison of these charges was made for three years and a reasonable deduction made for the year in question. As the actual operating expenses were to be apportioned for the fiscal year 1914, the deduction was made from the depreciation requirements as computed.

WORKING CAPITAL AND REVENUE REQUIRED

Working capital was considered in addition to the investment cost, the amount used being $1,423,555. This was somewhat less than the net average actually required for the last five years. The routes were assigned working capital in proportion to their respective investments in physical property. The total value of all property in Massachusetts having been determined, the revenue requirements were figured, as shown in Table III. To the variable expenses for the fiscal year 1914, including taxes, there were added the amount needed for depreciation and an amount equal to 7 per cent return on the investment cost. The results showed revenue requirements of $10,707,242, or $1,615,165 more revenue than was actually received.

TABLE III—STATEMENT OF GROSS EARNINGS NECESSARY TO MEET THE PRESENT OPERATING EXPENSES AND PROVIDE FOR DEPRECIATION AND A 7 PER CENT RETURN ON THE INVESTMENT COST

Investment cost, total Massachusetts property	$42,211,810
Working capital assignable to Massachusetts property	1,423,555
Total	$43,635,365
Revenue Requirements for Massachusetts Property	
Variable expenses year ended June 30, 1914:	
Maintenance of way and structure	$783,906
Maintenance of equipment	768,887
Traffic	58,353
Conducting transportation	3,381,835
General and miscellaneous	1,000,524
	$5,993,505
Taxes	604,875
Amount needed for depreciation in addition to present maintenance charges	1,054,386
Interest on $43,635,365 at 7 per cent	3,054,476
Total revenue needed	$10,707,242
Total revenue year ended June 30, 1914	9,092,077
Additional revenue needed	$1,615,165
Amount needed as per cent of passenger revenue	18.73

DETERMINING THE COST OF SERVICE

A study of the routes operated indicated that the average cost of the service as a whole, per car-mile, or on any other basis, could not be applied to any city, town or section and fairly be considered as representing the cost of service in that city, town or section. The necessity of ascertaining as accurately as possible the cost of service on each route was therefore apparent. This requires localizing the variable expenses to the several routes, or, if this is impossible, apportioning them upon an equitable basis.

The books and records of the company showed that it was possible, by reference to the detailed records of labor, material and other expenses from which the general accounts were compiled, to localize practically all of the expenses except general, miscellaneous and other overhead items to the sixteen operating divisions. The revenues and variable expenses in the fiscal year 1914 were selected as representing present conditions, although these conditions have been modified by the recent wage arbitration, which has materially increased the cost of operation.

The rule generally followed in selecting the unit of apportionment was to choose for expenses varying with the volume of traffic, a traffic unit such as the car-mile or car-hour; for expenses not affected by the volume of traffic, a stationary unit such as the track-mile. It was therefore necessary to consider each account separately and select the unit having the closest relation to the expense included. The track-mile and the car-mile were selected for the apportionment of maintenance of way and structures expenses. In apportioning the expenses for rails, rail fastenings, ballast, ties, special work and track labor, the influence of traffic volume, weather conditions, length of line and other factors were taken into account according to the best available judgment. The line-mile was selected as the unit for the apportionment of electric line expense for all accounts except track bonding, overhead trolley and those included in power cost. The expense of track bonding and overhead trolley varying more closely with the volume of traffic, the car-mile was used.

The expenses in connection with buildings and structures not included in power cost or pro-rated to other accounts were apportioned as follows: Carhouses, stations, waiting rooms and platforms on the basis of revenue passengers carried. Maintenance of equipment was in general figured on the car-mile basis, with the exception of expense of miscellaneous equipment, which was considered as an overhead charge. Traffic accounts were apportioned on the revenue passenger basis. For apportionment of power expenses two units, designated weighted feeder car-mile and weighted car-mile, were made up, considering the cost of power in districts and principal factors bearing upon it. Transportation expenses were apportioned in part on a car-hour and in part on a car-mile basis, the latter mainly covering supplies. Injuries and damages were apportioned on the revenue passenger basis. All overhead costs, such as superintendence and miscellaneous expense, were duly apportioned and pro-rated. The revenue was also apportioned by routes.

It is believed that these methods enabled the fair cost of service on each route to be determined, including depreciation, maintenance and operating expenses as variable costs, taxes and interest and working capital. The total of these items less the revenue gave the surplus or deficit shown by routes among the exhibits filed with the report. The total charges for the territory north and south of Boston were $10,250,571, and the revenues $8,623,783, leaving a total deficit of $1,626,788. By the scheme of localization worked out, however, each division bore the cost of its own service and was not affected by conditions that might tend to increase or diminish the cost in other divisions or localities.

Parcel Carrying on Street Railways in Lancashire, England

The receipts recorded by the parcel-handling department of the street railways of Lancaster, England, during the past year were $67,500, yielding a net profit of $18,000. The average number of parcels handled each week approximated 24,000. The expense of delivery by horse and wagon approximated $4,500 with a maintenance and depreciation charge of $900, and in consequence, an experiment is under consideration whereby electric battery trucks are to be used in place of the horse-drawn vehicles. Street railway fares of messengers connected with the service amounted to about $200, while general salaries and wages of the department amounted to $35,000 for the year.

1200-Volt Steam Railway Electrification in Lancashire, England

Five-Car Units are Expected to Be in Operation Between Manchester and Bury by the End of December

It is expected that by the end of December the 1200-volt electrification between Manchester and Bury on the Lancashire & Yorkshire Railway will be in operation. Some of the general features of this important project were described in the issue of the ELECTRIC RAILWAY JOURNAL for July 24, 1915, page 154. Additional details have since become available and some of these are given herewith. The accompanying drawings, which are self-explanatory, show the construction of the contact shoe and the method of mounting and electrically connecting it with the wiring system. The method of mounting and inclosing the contact rail was fully described in the article referred to.

The rolling stock for use on this section is under construction in the company's shops. Each unit will be a five-car train consisting of three motor cars and two trailers. The cars are of all-steel construction, and the motor cars are being equipped with four 200-hp. motors each.

While the line now being equipped comprises only about 20 miles of single track it is the first stage in a general electrification scheme for the Manchester district, and the power house is being built with capacity for the future. Two 5000-kw. turbo-alternator sets have been installed to generate three-phase current at 6600 volts. There is also an auxiliary 500-kw. three-phase set.

An interesting feature of the station is the provision for coal supply by gravity, the difference of 35 ft. in level between the neighboring railroad track and the boiler-room floor being utilized to the best possible advantage. The boiler house has been laid out on the unit system, two boilers, two economizers placed directly over the boilers, one induced draft fan, and one chimney forming a unit. Two substations will be used at present, each of these containing three 1000-kw. rotary converters.

As previously stated this electrification has been carried out under the direction of J. A. F. Aspinall, general manager of the Lancashire & Yorkshire Railway. George Hughes is chief mechanical engineer of the road and A. Lund has acted as resident engineer.

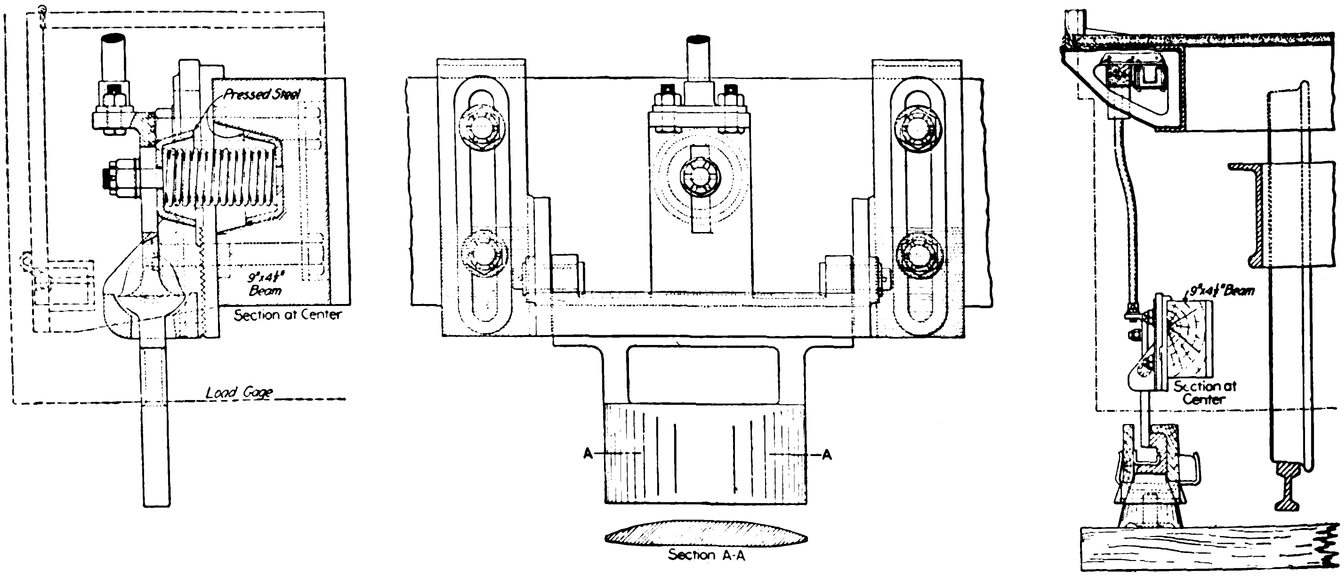
Concrete Waiting Platforms in Los Angeles

The Los Angeles Railway has recently installed about fifty waiting platforms similar to that shown in the accompanying illustration. These are located on Santa Barbara Avenue, Los Angeles, on the "near" side of street intersections, and they are about 25 ft. long, 4 ft. wide and 8 in. thick. The concrete platforms, which are virtually short stretches of sidewalk, are inexpensive, and they serve to keep the pedestrians off the roadway on either side of the track. The platforms are located about 3 ft. from the tracks, so that it is impossible for those waiting upon them to be struck by the car steps.

CONCRETE WAITING PLATFORM IN LOS ANGELES

The residents in this section desired waiting stations of some kind, but it was not found practicable to build waiting rooms on account of lack of space, aside from the expense.

The *Journal-Gazette* of Fort Wayne, Ind., conducts a traction column, in which the news items of the Fort Wayne & Northern Indiana Traction Company, the Ohio Electric Railway and other interurban lines entering the city are summarized in an attractive manner. Special attention is paid to the personalities in charge of the work of the companies.



LANCASHIRE & YORKSHIRE RAILWAY ELECTRIFICATION—DETAILS OF CONTACT DEVICE; CABLE MOUNTING, SHOE AND PROTECTED CONTACT RAIL

COMMUNICATIONS

Major-General Bancroft Thinks Electric Lines Along Shore Useful in Moving Troops and Supplies

BOSTON ELEVATED RAILWAY

BOSTON, MASS., Nov. 24, 1915.

To the Editors:

I have read the article on "Preparedness in Transportation," in the JOURNAL of Nov. 22, and I agree with you that all methods of transportation should be ascertained by the Government and plans laid to utilize them. This would include, of course, electric railways.

I suppose that on our eastern coast from Maine to Virginia there are lines which could be utilized to move troops and supplies for comparatively short distances, yet far enough for the purpose, up and down the coast. For comparatively short distances also, there are, of course, lines running a few miles distant from the coast, which might be utilized to some extent. I suppose, too, that in some parts of the country there are interurban lines which could move troops for a considerable distance.

I am not informed that if it were desired to move troops from the Middle West to the coast, east, south or west, it would be feasible so to do by trolley. That is, the lines are comparatively short, and the accommodations, if for anything more than a few hours' ride, with exceptional cases, are unsuitable. In other words, while advantage should be taken of all the country's resources, it seems to me, without making a thorough study, that the resources of the trolley for any considerable movement of troops would either be unimportant or inadequate. This, of course, is only first blush opinion and I should be glad if wrong.

I should suppose that one of the things the Government would do would be to make a careful study of the street railways of the country, and assign to them such tasks as were feasible of performance. The Government ought to recognize your public spirited suggestion, and I have no doubt will. I should think that in some way, perhaps through the American Electric Railway Association, your suggestion ought to be brought to the attention of the War Department.

WILLIAM A. BANCROFT, President.

Irresponsible Railway Training Schools

SIOUX FALLS TRACTION SYSTEM

SIOUX FALLS, S. D., Nov. 27, 1915.

To the Editors:

Within the last few months we have repeatedly had our attention called to a form of imposition which is being practised on prospective railway employees, and although operating companies are not directly concerned an effort should be made to remedy the evil. We refer to correspondence schools of railway training, which for sums varying from $18 to $25 send a course of instruction. Upon the completion of the courses, which require from two to six weeks, these schools issue attractive diplomas embossed with a gold seal and then refer the graduates to the nearest electric road with the assurance of employment.

During the past six months we have had a number of applicants from different portions of the State who were equipped with diplomas, some coming here in person and others forwarding written applications accompanied by photograph. Within the past two days we have had two personal applications, one from a training school at Kansas City and the other from St. Louis. One man paid $25 and completed the course in two weeks, the other paid $18 and finished in six weeks. Neither of these men had personalities to recommend them as street car operators. Neither had ever had any street car experience, and they were not the class of men we want. I doubt if there is a road in the country that would have considered them for a minute. Both men had been guaranteed employment by the school upon completing its course.

It is apparent that these so-called schools are very keen for business. They buy advertising space in certain magazines regularly and evidently they find plenty of suckers. The legitimate correspondence school may be all right, but the schools that take every Tom, Dick and Harry, get their money, send a diploma and guarantee a job are certainly working a fraud on the public, and their methods should be exposed.

R. C. MILLS, Superintendent.

The Automobile and Hard Times

DENVER, COL., Nov. 22, 1915.

To the Editors:

I have read with interest the editorial entitled "Competition from Private Automobiles" in your issue of Nov. 6. In some communities the competiton is felt more severely than in others. Good roads and mild climate are great factors. The smaller cities and towns have felt the competiton more keenly than the larger cities.

At present the country districts of the United States afford the greatest field for the increased use of the auto, and here will be the scene of greatest development during the next few years.

Street and interurban railways have not been the only sufferers from the increased sale and use of the automobile. Steam railways have felt it, but in a broader sense. Nearly every industry or enterprise not directly or indirectly connected with the automobile industry has suffered, and I believe that the tremendously rapid growth of this great business has had more to do in bringing hard times to the United States than the European war.

According to estimates made by the *Scientific American* in June, 1915, there were in use in the United States 2,000,000 automobiles. Their annual cost of operation was placed at $730,000,000. Add to this the selling price of the year's output of new cars, viz: $450,000,000, and the sum of $1,180,000,000 results. This tremendous sum is not a permanent investment. On the contrary, it represents wealth put into one of the most rapidly depreciating devices that transportation has ever developed. Rubber tires, gasoline, machine and all are gone or worn out within a comparatively short time. If the cost of building and maintaining garages, the cost of damages resulting from accidents and the expense due to the wear and tear of roads and pavement were added to the above expenditure, the grand total would look like a war debt.

According to the last census there were in the United States proper 92,000,000 people. This, divided into $1,180,000,000, shows a present annual expense of approximately $13 per capita, and this amount is increasing rapidly.

A very large percentage of the families owning and using automobiles have certain fixed incomes within which they must live. The auto has proved a new and additional source of expense, and to offset this economies and curtailments have been necessary in other directions. Men buy caps or cheaper hats and inferior clothes, as a good suit gets ruined more quickly apparently in an auto than a cheaper one. Likewise the women wear auto veils and cloaks and get along without so many good hats or dresses. The members of the family cut out the porterhouse steak and eat deviled-ham sandwiches out under a tree or bean soup at home. They spend their vacations on near-by country roads instead of taking a trip on the train. Evenings are spent riding around instead of going to the theater. We might go all along the line, and practically every business man will tell you that he has felt the pinch of hard times, and almost invariably this pinch can be traced to the use of the automobile.

The automobile has come to stay. It will be cheapened and continually perfected. Its life and service will be lengthened and its use will become well-nigh universal. To fail to recognize this is most shortsighted, as it takes no prophet to foretell these conditions, which are virtually upon us now.

The burning question is, what is it going to do to the railway? My firm belief is that in most communities the railway will be as necessary as ever. The volume of business and conditions of traffic may change. These conditions must be met, how, no one at present can say; probably in different ways under various circumstances in different places.

Taxation must be equalized. One form of transportation must not be required to build and maintain its own substantial roadbed and also an additional roadway for its competitor to use practically free. I mean that the street railway that lays its rails for its own use and then paves the street around them for the use of the auto, must be relieved, and that the auto must bear its just share of such taxation.

JOHN A. BEELER.

Pavement Sand Cushion Becoming Obsolete

MINNEAPOLIS STREET RAILWAY COMPANY
MINNEAPOLIS, MINN., Nov. 24, 1915.

To the Editors:

Replying to your editorial on the use of a mortar cushion instead of sand for paving, the writer has not experienced any difficulty with a sand foundation under granite blocks or brick laid in or between street railway tracks. It has been our custom to grout both these types of paving, but we do not think a mortar cushion is necessary with these pavements. In the case of wooden blocks, however, it is desirable. We have used a mortar cushion to some extent with this type of construction and we have obtained better results than with a sand cushion.

There is a small additional expense in using the mortar cushion but, if it preserves the surface of the pavement, the money will be well spent. Pavements, to hold up under heavy traffic, must be built as permanently as practical, and the use of mortar for a cushion will be a help in this direction.

GEORGE L. WILSON,
Engineer Maintenance of Way.

PHILADELPHIA, PA., Nov. 10, 1915.

To the Editors:

Referring to your editorial in the ELECTRIC RAILWAY JOURNAL of Oct. 30 entitled "Pavement Sand Cushion Becoming Obsolete," there has been laid in Philadelphia during the past ten years a considerable amount of both granite block and brick pavement on a dry mixture of sand and cement. This mixture was usually in the proportion of four parts sand to one part cement, spread to a depth of from 2 in. to 4 in. The former depth in case of granite block supported by a sub-base of concrete. After the blocks or bricks had been rammed or rolled the pavement was thoroughly flushed with a hose and protected from travel for a period of from three to four days. The joints between the bricks were then filled with fine dry sand.

Before trying this experiment it was thought that while this construction would permit of the removal of the bricks or blocks without breaking them, the sand-cement base would hold them firmly enough to prevent displacement by traffic. It was also believed that the sand joint would, to a great extent, prevent upheaval of brick pavement by expansion. Results during the last ten years seem to have abundantly demonstrated the efficiency of this type of foundation. The sand-cement concrete, particularly in the case of brick pavement, prevents access of water to the earth sub-base and when bricks have been removed for any purpose they can easily be replaced to the level of adjoining pavement. Brick pavement laid in this manner—that is, on an earth or gravel sub-base, was tried only on streets where travel was comparatively light. On heavily-traveled streets in the business section a concrete sub-base was provided. The cost for maintenance of this type of paving has been very small, and it is perhaps unnecessary to say that it can be laid quite cheaply and very rapidly.

H. B. NICHOLS.

Standardization of Railway Substations

SAN FRANCISCO, CAL., Nov. 26, 1915.

To the Editors:

Recent communications in your columns under the subject of "Cars at Less Than Cost" will serve to introduce another subject, that of railway substations. Having been concerned in the design and construction of this class of structure, I wish to draw attention to a profitable field for discussion in connection therewith.

The letters referred to bring out the idea that there is insufficient standardization in electric railway car manufacture because of the great variety in the demands made on the car builders by the railway companies, comparing unfavorably with the automobile industry, in which one design of automobile will serve for several thousand different customers. If this line of analysis be applied to the subject of railway substations, we will find the conditions still worse. In spite of my general approval of the policy of standardization, I must admit that the difficulties in getting a standard design of substation adopted appear greater than in the case of a standard passenger car. The latter must always run on two rails nearly the same distance apart, but the building may be located in an endless variety of conditions.

Why do we want a standard substation? Is it to save the railway companies the cost of preparing designs and specifications every time they want a new station or a number of them? Such a saving is well and good, but I believe a much greater one can be effected if a standard, or a series of standards, can be agreed upon, as I will explain directly.

Why a series? For this reason: A standard, inflexible design for a substation is something like a standard design for a residence. To build up a town of a lot of residences all exactly alike is, in general, not at all desirable, and absolute uniformity in substations is not practicable. We must compromise.

At the recent convention of the A. E. R. E. A. there was presented for the consideration of the convention a "Study for Standard Fireproof Substation Buildings of About 1000-kw. Capacity," the sub-committee stating "it is their earnest desire that a full discussion be given same on the floor of the convention in order that suggestions may be made for the guidance of future committees, as your committee recommends that this subject be considered again next year." Unfortunately there was not time for the full discussion which the subject deserved, and it appears to me that the columns of the ELECTRIC RAILWAY JOURNAL offer a suitable medium for bringing out further suggestions. I will, therefore, offer some remarks to start the matter.

A large saving to the railway companies could be made if the association should carefully draw up, say, two or three alternative standards, each of which should be carefully designed in connection with the standard sizes of metal forms for concrete now on the market. Then by having sets of these forms placed at convenient centers of distribution, a company desiring to build substations need only go to the nearest distribution point, procure a set of forms for itself or its contractor, and return them after using. By doing so it would at once eliminate all the cost of form lumber and days and days of sawing and nailing in producing an elaborate wooden structure which will be ruthlessly destroyed the minute the concrete has set and seasoned sufficiently. The design submitted shows brick walls, but I believe concrete, under the conditions just described, will be found preferable in a great many cases. I express this opinion as an independent engineer having no connection with cement interests.

Now to the difficulties of fixing upon a uniform design:

1. The degree of spaciousness which is economically permissible is a function of real estate values. The maximum desirable is a matter of judgment. The minimum possible can be found in portable substations, having a few inches around the machine, and walls and roof which are lifted off by a crane when extensive repairs to the machine are necessary. But neither generating stations on cars nor generating stations on ships should be taken as a guide in designing stations on terra firma. Because it is possible to exist under extremely irksome conditions is no reason for imposing them when they are avoidable.

The design submitted to the convention is quite a way above the minimum possible, but in my opinion not quite far enough.

Again, the design shows a residence and station in the same building. Now such a combination would commonly be constructed in a country town or village where real estate is relatively cheap, but where the operators would scarcely be in position to own their homes, for various reasons. In such a case we could afford to put some of the saving in real estate cost into a little more cubical capacity, affording space for disassembled parts on the floor and for working around in making repairs without knocking against apparatus on the switchboard, etc.; also providing a bathroom in the residence part, which should always be done if possible. It is possible for people to live in cramped, inconvenient quarters, but they do it at the expense of greater loss of energy and irritation of temper, reducing their general efficiency.

A cramped design may be necessitated by high real estate values in a city, but I think in this case the residence combination will usually not be required. Therefore in each case, city and village, the design submitted is not suitable.

2. The design assumes certain conditions. But there are other conditions which may be held to just as tenaciously. In some places, with some companies, motor-generator sets will be used instead of the rotary converters shown and will take up greater length on the floor. In some places provision for extension on the unit system must be made, not to speak of having floor space for installing a third machine without having to extend the building. In some places concrete walls will be preferable, in others brick. In slum districts the plainest possible structure will suffice; in wealthy residential quarters the cultivation of a favorable public opinion demands a building harmonizing with the surrounding mansions in architectural merit. In some places no residence will be wanted in the building.

To meet these various conditions, why should not the association get up two or three alternative designs (which should themselves be susceptible of ready modification when necessary), making them to suit standard metal forms and standard form lumber, making the window and door frames to suit accepted mill standards, or metal frame standards; work up complete working drawings, with bills of material, tabulation of concrete reinforcement required, list of standard forms and drawings showing how the forms should be put together, and place all this matter at the disposal of the railway companies at a cost sufficient to cover the expense? Before again presenting the matter, let them make a thorough canvass of existing substations, learning the local conditions and obtaining opinions regarding the suitability of the adopted designs as regards convenience and degree of spaciousness, etc.

This is the kind of work which helps to make the association appreciated. H. J. KENNEDY,
Electrical, Mechanical and Construction Engineer.

What Is the Rail Head?

ROBERT W. HUNT & COMPANY, ENGINEERS
CHICAGO, ILL., Nov. 23, 1915.

To the Editors:

Mr. Haas is to be commended for his excellent analysis of the practice of making rail renewals, published in your issue of July 31, 1915. The subject is a broad one, but the problem is constantly arising and requires careful study, for the reasons so admirably pointed out. There are, however, some phases of the subject which should be firmly fixed at the outset and even prior to a too general adoption of any precise practice. A very important matter in this connection is the determination of what actually constitutes the head of a rail, and this was commented upon in the ELECTRICAL RAILWAY JOURNAL of Nov. 13, 1915.

There seems to be no good reason why the same definition for the rail head should not apply to rails of all sections and be that which has been used for years by the users of all types of standard section rails. As already pointed out, practice has always defined the rail head as being that area lying above the intersection of extensions drawn from the top angle-bar lines. While objections to this may be offered from the standpoint of grooved girder rails, it seems best to the writer to let this time-honored definition stand but to subdivide, by further definition, the head into, say, the lip and the bearing. This is, no doubt, work for the way committee of the American Electric Railway Engineering Association.

The best time to make renewals in general is, after all, perhaps largely a matter of individual opinion. While certain conclusions may be reached by calculation, the old question of the engineer's prerogative will probably still enter and be the deciding vote in any case. With so simple a thing as a steam railroad standard section rail, the limits of wear have never been fixed with anything resembling certainty, or even consensus of opinion. One has but to look at the profile of rails on curves and in yards to realize this fact. But, of course, with electric railway track in paved streets an entirely different problem is presented, and one for which, no doubt, some formula may be devised to indicate closely the desired facts.

C. W. GENNET, JR., Engineer.

Equipment and Its Maintenance

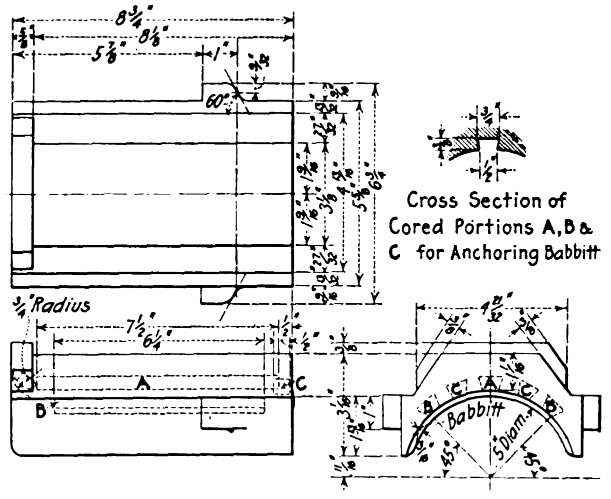
Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

A., E. & C. Semicircular Brass Experience

BY W. J. BOWMAN, MASTER MECHANIC AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

The use of high rates of acceleration and excessive braking pressures on the Aurora, Elgin & Chicago Railroad caused unequal wear on the babbitt linings of M. C. B. brasses. This inequality of wear was directly due to the tilting of the brasses which rolled the babbitt from the bearings and reduced the average life to 12,000 miles. To meet this condition a semicircular brass, the design of which is shown in the accompanying illustration, was adopted. This provided a bearing area when the brakes were set, twice as large as the standard M. C. B. brass for a 5-in. x 9-in. axle. These new brasses have now been in service for one and one-half years and average approximately 95,000 miles between babbitting periods. Prior to their use it was customary to rebabbitt every other day from fifteen to twenty-five M. C. B. brasses for the fifty-nine cars. Rebabbitting is now done once a month, at which time from twenty-five to thirty bearings are handled. Babbitt metal costing 45 cents per pound was used with the original M. C. B. brasses in an effort to produce good results, but it failed. With the semicircular brasses an antimony and lead base metal costing 13 cents per pound is used and the extraordinary results are obtained.


8 3/4"
8 1/2"
5 5/8"
1"
60°
Cross Section of Cored Portions A, B & C for Anchoring Babbitt
3/4 Radius
7 1/2"
A
B
C
Babbitt
5 Diam.

SEMICIRCULAR JOURNAL BRASS

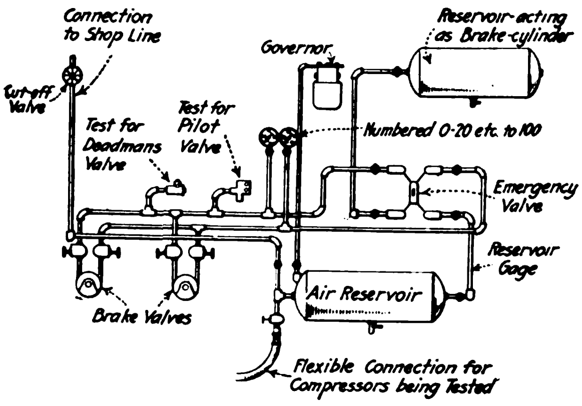
Aside from the practical elimination of hot bearings, journal oil cost has been reduced from 29 cents per 1000 car-miles to 16 cents per 1000 car-miles. The M. C. B. brass for 5½-in. x 10-in. axles weighed 25 lb., whereas the semicircular brass for the same axle weighed 29 lb. At the time the change was made to the semicircular brass it cost $5.49 per bearing as compared with $4.70 for the M. C. B. brass. As the present service records indicate, however, the increased first cost was more than offset by the increased mileage and the decreased cost of labor and material. The total number of hot bearings during twelve months in 1913 was 191. During the same period in 1914 the number of hot bearings was reduced to seventy-six, and for ten months of 1915 the records show only four. The majority of the hot bearings in 1914 occurred during the months of January, February, March and April, when the change was in progress. With the present system of inspection and repacking on a mileage basis, and the reclaiming of oil and waste, hot bearings of all kinds have practically been eliminated.

Outfit for Testing Air-Brake Apparatus

BY R. H. PARSONS, ELECTRICAL FOREMAN

The following description covers a practical and simple equipment for testing all parts of straight and automatic air-brake equipment which are ordinarily taken care of in one place. Repairs to compressors, cylinders, brake valves, reservoirs, emergency valves, "dead-man's valves," etc., are usually done together, and this testing outfit was built to take care of such repairs. Gages, governors, etc., are repaired in other departments and must be tested locally after repair.

Referring to the accompanying illustrations the following points will be noted. The testing equipment is mounted on or near a bench, which is 10 ft. long, 2½ ft. wide and of convenient height. The bench consists of an angle-iron frame on which is a plank top covered with No. 16 galvanized iron. This makes a substantial foundation for the apparatus and provides room for making light repairs shown by tests to be necessary.



BRAKE-TESTING APPARATUS—PIPE LAYOUT FOR AIR-BRAKE TESTING BENCH

Under the bench is hung a reservoir similar to those used on the cars, and at one end are attached strap iron hangers to support the piping and connections for two brake valves. Two connections are provided because frequently two types of valves are used, each of which requires its own pipe connection. Cut-off cocks are provided, as only one valve is in use at a time.

At the left-hand end, on top of the bench, connections are provided for the dead-man's valve and these may also be used for the conductor's emergency valve. Near this connection is another tap in the line which is used in testing the pilot valves for leakage only. The functioning test of the pilot valve is made in connection with the testing of the emergency valve by another means in order to facilitate connections. For this purpose a ⅛-in. pet-cock is coupled to the dead-man's valve at the point where the pilot valve is regularly connected. This can be easily opened and closed and the same results as would occur in practice can be obtained.

Above the bench, within easy reach of the operator, is placed a connection board on which the following pieces of apparatus are located: An electrical switch for controlling the test circuit; a governor; an electrical switch for the compressor circuit; a small ammeter, and two gages. The first switch mentioned is an ordinary 600-volt, quick-break switch. To it is connected a set of test wires in series with which are a number of heaters furnishing resistance sufficient to hold the current to a few amperes. This circuit is used to test the compressor fields and armatures for grounds, and the leads are long enough to reach any reasonable distance to the compressor. The air-compressor switch, governor and ammeter are used for testing the compressor after repairs by putting upon it a load approximating operating conditions as nearly as possible. The governor is connected in series with this circuit, which also contains a low-range ammeter. The reading of the ammeter shows the operator whether or not the compressor is running freely or is handicapped by tight bearings or improper connections in the armature or field circuits. The operator is informed as to the proper current for each type of compressor and therefore knows at a glance when it is operating properly.

The gages on the instrument board are connected respectively in the brake line and the reservoir line.

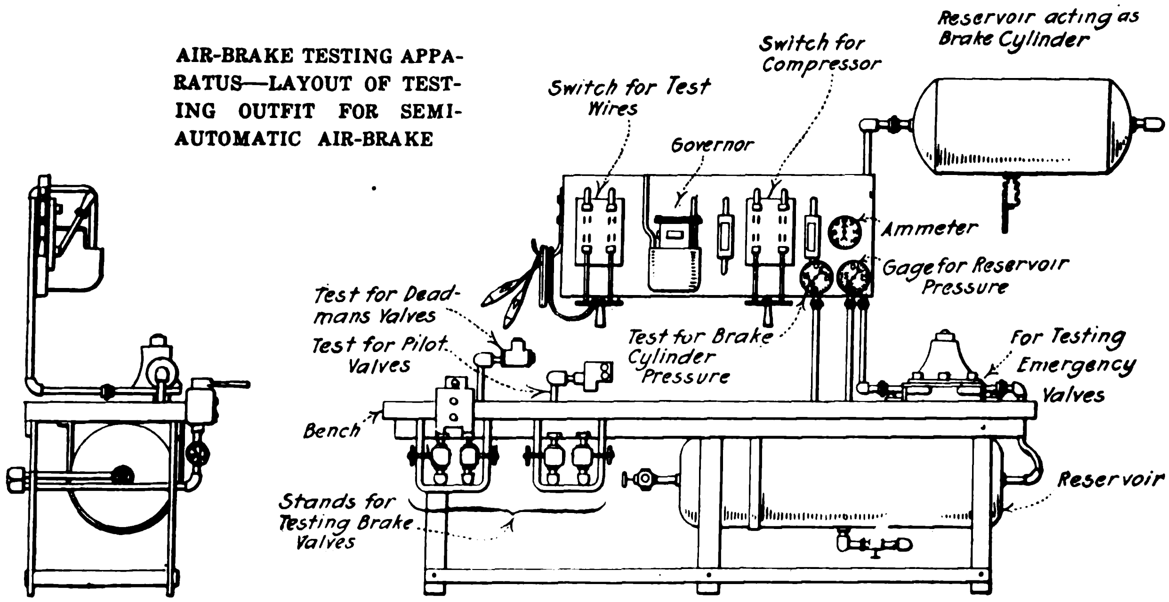
At some convenient point is placed a small reservoir which is used as a substitute for a brake cylinder. The use of this prevents the banging and pounding which would otherwise follow the throwing of a valve into emergency position. At the same time a result equivalent to the making of a brake application is obtained.

At one end of the main reservoir there is a T-connection, one leg of which is attached to a hose running to the compressor under test. The other leg is connected to the shop air line so that pressure can be maintained for testing if no individual compressor is available.

The piping layout is shown in an accompanying illustration.

In testing a compressor the air and electrical connections are made to the testing outfit and the compressor is timed for speed and examined for commutation under load, the reading of the ammeter being noted at the same time. The compressor is allowed to pump air until the governor cuts it out of circuit, and the governor action is repeatedly tested by reducing the reservoir pressure by means of the bleeding cock beneath the reservoir or by reducing the air pressure by using air for testing purposes elsewhere in the outfit.

In the same manner the functioning of all other parts of equipment may be tested under normal conditions. The brake-valve test is particularly effective as the use of a reservoir in place of the brake cylinder provides a perfectly tight receptacle and the gage connected to the brake line quickly shows leakiness of a valve. The emergency valve test is also effective, as its operation can be shown as well under test conditions as if it were actually on the car.


AIR-BRAKE TESTING APPARATUS—LAYOUT OF TESTING OUTFIT FOR SEMI-AUTOMATIC AIR-BRAKE

Reservoir acting as Brake Cylinder
Switch for Compressor
Switch for Test Wires
Governor
Ammeter
Gage for Reservoir Pressure
Test for Dead-mans Valves
Test for Pilot Valves
Test for Brake Cylinder Pressure
For Testing Emergency Valves
Bench
Reservoir
Stands for Testing Brake Valves

The testing outfit can be further used for testing repaired reservoirs or brake cylinders by connecting the compressor hose to the reservoir or brake cylinder and letting in air from the shop line. A slight modification would provide for the testing of safety valves.

The need for some such testing equipment as has been described above is almost self-evident. The ordinary, original straight air-brake equipment required a certain amount of attention and its share of overhauling. After repairs were made a few simple but necessary tests were in order. Repairs for such equipment were oftener made on the car than at the bench. After the work was completed the car was tested to determine the effectiveness of the repairs. This method of procedure, while passable, was not entirely satisfactory.

As the air-brake equipment was improved the number of parts increased and the number of functions performed by the equipment grew. It thus became impracticable to make satisfactory repairs without removing the equipment from the car. While straight-air equipment is nearly standard for surface cars, the semi-automatic is supplanting it to a great extent on account of its flexibility and simplicity, even where single cars only are used. The maintenance of this equipment demands more care and attention than the straight-air equipment, and repairs and overhauling should be attended to at a bench where the parts can be placed and held in easily accessible positions, and repaired, cleaned, lubricated and tested.

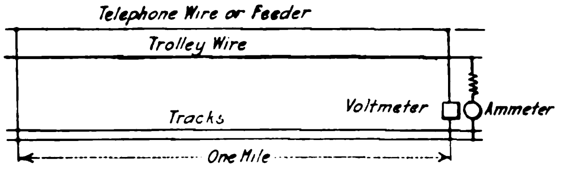
The Orleans, Toulouse, Lyons Railway, formerly a high tension a.c. suburban electric line at Lyons, France, has decided to abandon this system and return to the d.c. system. One of the lines from Miribel to Lyons has already been converted.

Rail Bond Testing—I—Methods Used in Testing

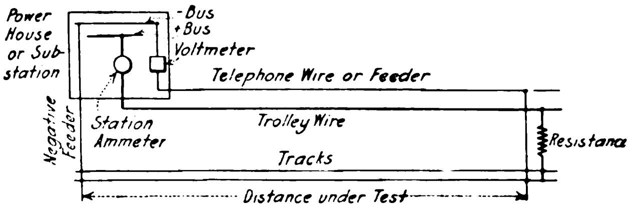
BY H. H. FEBREY, ENGINEER AMERICAN STEEL & WIRE COMPANY, FORMERLY ASSISTANT ENGINEER PENNSYLVANIA TUNNEL & TERMINAL RAILWAY

Bond testing falls short of its proper function when it is conducted only for the purpose of locating high-resistance joints so that repairs can be made. It is frequently argued that the expense of testing is unwarranted, but when conducted in a thoroughly analytical way testing can be made to lead to economies quite commensurate with its cost. Without systematic bond testing there is sure to be lack of knowledge of true conditions and this results in a continuation of wrong practices in matters of selection and installation of the bonds. More real attention to testing would reduce the number of poor installations. This may be seen on lines where extensions are made from time to time. Certain practices become more or less standardized and are used for years, and each year it may be found that a large quantity of bonds are required for general maintenance. Instead of regarding this as a matter of course, the rate of depreciation should be established by testing, and the percentage of failures noted. When it is considered that there are installations where the failures amount to a very small fraction of 1 per cent per year it is obvious that there is room for investigation where the annual replacements amount to much more than that, as is frequently the case. The reasons for bond failures are easily determined, and it can be ascertained by testing whether the installation or the design is faulty.

Suppose that a line is bonded so that a majority of the bonds, a few months after installation, are of low efficiency, i.e., the resistance of a perfect bond to the actual resistance is low. It may be so although it is not necessarily of prohibitive resistance. For the sake of argument, assume that it is not known that the efficiency is low. The bonds, being improperly installed or of incorrect design, will deteriorate and will later reach a point where their resistance becomes detrimental to the service. It may be three or four years before they reach a point where they are noticeably bad without testing and in that time additions to the line may have been made. Through ignorance of conditions the same bonding practice is adhered to and trouble develops on many parts of the system. This may happen, although a test of the system has been conducted shortly after installation, because the joints may have tested to within a certain limit arbitrarily chosen.



BOND TESTING—MEASURING RESISTANCE OF A SECTION OF TRACK



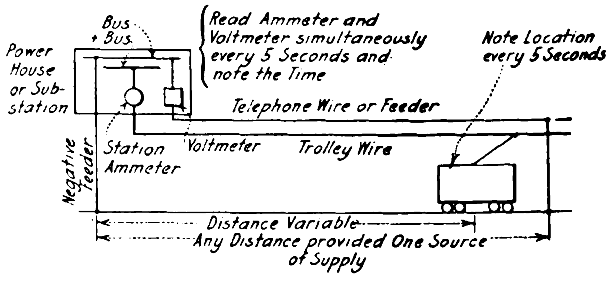
BOND TESTING—MEASURING RESISTANCE OF TRACK FROM POWER HOUSE OR SUBSTATION

It cannot be claimed that more attention to tests would make the poorly-installed bonds good, but if it were known that they were deteriorating before the voltage was seriously affected the same errors on subsequent work could be corrected. Or it would be quite practical with certain types of bonds to improve their contacts without removing them, if this was done before corrosion had set in.

It is not necessary to wait for high resistance to develop. Observation by periodical and systematic testing will enable one to determine the quality of workmanship at the time of installation and the rate of depreciation thereafter. Knowing that the resistance of the bonds is increasing from year to year, the causes will be sought and determined and the incorrect practices discontinued.

A rail joint may be tested by reading the drop across the joint and calculating the resistance from the drop. This is practicable only when the current producing the drop is known. The other, and usual method, is to compare the drop across the joint with that in a certain length of solid rail adjacent to it. This comparison is made by means of portable testing sets, which operate on the principal of the Wheatstone bridge. Where the bond testing car is used the method is also comparative, as will be explained.

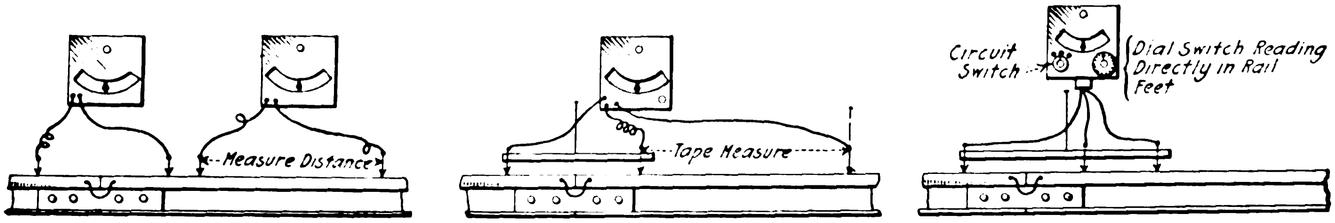
The total resistance of the bonds in a section of track can be ascertained by making the drop test of the entire section between selected points. The total resistance is calculated from this drop and the total bond resistance can be found by deducting the resistance of the total length of uncut rail. It can be determined then whether or not the resistance of the bonds is higher than it should be. The method of procedure in making a test of this kind is to use a telephone wire or spare feeder as one voltmeter lead, and to connect one end of it to the track at the distant point. It is connected to all bonded rails that are cross-bonded, and the other end is connected to either voltmeter terminal. The other voltmeter terminal is connected to the negative bus in the station or to the tracks. By reading the drop and the current flowing in the section under test, at the same time, the total resistance of the negative circuit can be ascertained. To the calculated resistance of the solid rail should be added the resistance of the negative feeders which lead to the station, and parallel negative feeders should be taken into account. To determine the resistance of the solid rail the number of rail joints should be ascertained and the total length of rail which is cut out by the bonds should be deducted from the total length of rail in the track. If the rails are 30 ft. long and the distance between the bond terminals is 3 ft., there will remain 27 ft. of solid rail in each rail length.


Bus
+ Bus
Read Ammeter and Voltmeter simultaneously every 5 Seconds and note the Time
Note Location every 5 Seconds
Power House or Sub-station
Telephone Wire or Feeder
Station Ammeter
Voltmeter
Trolley Wire
Negative Feeder
Distance Variable
Any Distance provided One Source of Supply

BOND TESTING—CONNECTIONS FOR USE OF BOND TESTING CAR

This is a quick means of determining the approximate total resistance of the bonds, but it will not locate the defective bonds, which must be done by testing each joint. The method here described does not give an accurate measurement of the track resistance, on account of the leakage of current to the earth. This results in a smaller drop than would be read during test if there was no current leakage to earth, and therefore indicates that the track resistance is lower than it actually is. On the other hand, such a test is of value if it shows a relatively high resistance. It is best to conduct a test of this kind on short sections, such as a mile or less.

The bond-testing car is equipped with a low-voltage generator with brush contacts on the rails through which current can be sent through the rails at all times for the test. There are two additional brush contacts for each rail, generally spaced 4 ft. apart, which are connected to the terminals of two millivoltmeters. The millivoltmeters record the drop in the 4 ft. of rail on a special paper roll which moves with the car. The drop in the 4 ft. of solid rail is practically constant and makes a straight line on the paper. When the contacts span the rail joint the drop at the joint is recorded and compared with the drop in the solid rail. The paper is graduated with horizontal lines which represent the number of millivolts deflection of the meter needle. The drop around the joint being generally higher than in the same length of solid rail, is shown, in general, on the chart above the line indicating the drop in the solid rail.



BOND TESTING—CONNECTIONS FOR TWO-MILLIVOLTMETER METHOD; CONNECTIONS FOR A. S. & W. CO. TESTER; CONNECTIONS FOR WESTON TESTER

The portable bond testers are mostly arranged so as to read the number of feet of solid rail to which the joint is equivalent. They give very accurate results. Their principle can be explained best by reference to the two-millivoltmeter method. Two points are selected which include the bond terminals between them, and these are connected to the terminals of a millivoltmeter, which shows the drop across the joint. A second millivoltmeter is connected to two points on the rail adjacent to the joint which will register the same drop as that across the joint. The two drops being equal with the same current flowing the resistances must be equal, and all that is necessary is to measure the distance between the points on the uncut rail. This designates the number of feet of rail equivalent to the joint resistance. The two-millivoltmeter method is not used to any great extent because it is cumbersome, and the chances of error in reading both meters at the same time, especially when the current is variable, are considerable.

Another method which is essentially like the two-millivoltmeter scheme involves the use of a differential millivoltmeter. By using two fixed points which span the rail joint and moving a third point until a balance is obtained the resistance of the joint is determined by measuring the length of uncut rail required to make the balance. The drop in the circuit including the rail joint is reduced by the drop in the circuit, including the solid rail adjacent to the joint. When all three points are in contact the indication of the meter needle is the difference between the two drops. It is obvious that when the drops are equal the deflection is zero. This is the most accurate method to use because the resistance can be measured in terms of a fraction of an inch of the rail. By raising and lowering the movable point the correctness of the balance is well established.

This is a very flexible method and by the use of properly calibrated resistances the measurements on the solid rail can be multiplied as desired, thus eliminating the necessity of awkwardly long measurements.

There are other testers which have three contact points at fixed distances apart. By varying resistances in the instrument the drop across the joint is made to equal the drop in the solid rail. The resistances are calibrated to read directly in rail feet. These do not read as close as the movable-point testers but are sufficiently accurate for average use. They have the advantage of being readily handled by a single operator and are consequently more popular.

It can be seen from the foregoing descriptions that all bond testers obtain the resistance of the joints in terms of rail feet. Testing is necessarily comparative under average conditions. After obtaining the reading in feet of rail it is an easy matter to determine the ohmic resistance from data pertaining to the resistances of various rails.

Detroit Center-Entrance Trailers

BY C. L. KELLER, ASSISTANT MASTER MECHANIC, DETROIT (MICH.) UNITED RAILWAY

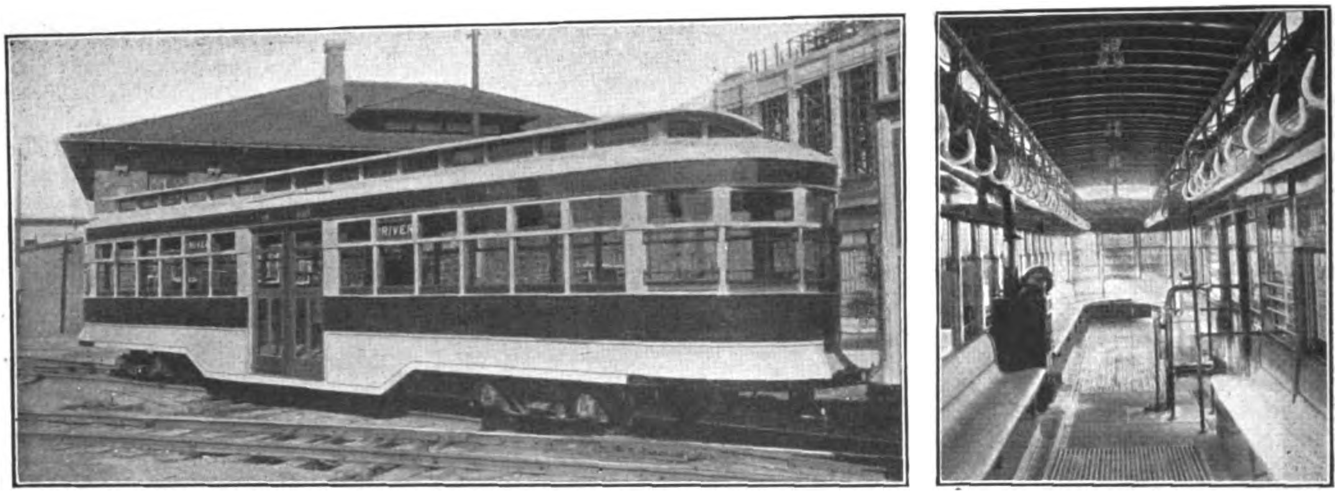
Detroit (Mich.) United Railway patrons are now being given an opportunity to judge the merits of center-entrance trail cars, as the first cars shipped on an order of fifty equipments of this type were delivered recently by the G. C. Kuhlman Car Company, Cleveland, Ohio, and were immediately placed in service.

While it is not possible, at this early date, to gage the general sentiment of the public concerning this innovation, it is anticipated that the increased efficiency of service will bring public approval and that this will repay the company for its thorough study of existing types of trail cars, and the conditions governing their operation, which was made prior to placing the order for the new cars.

The general dimensions of the trail cars are as follows:

Length over all	46 ft. 8¾ in.
Width	8 ft. 2 in.
Car floor above rail	27½ in.
Side sill to top of monitor	8 ft. 11⅝ in.
Truck centers	28 ft. 0 in.
Wheelbase of trucks	4 ft. 4 in.
Weight, without passengers	27,275 lb.

All-steel construction was adopted for the new cars. The outside sills are formed of 5-in. x 3½-in. x ⅜-in. angles with the 3½-in. leg in the vertical position. Entrance and exit facilities were provided in one center opening with two sliding doors, and the sill was bent downward to form a support for the step. All sills are continuous from end to end of the car and are riveted to angle buffers of the same size, bent to a radius equal to one-half the car width, the ends of the underframe being further protected by 5-in. anti-climbers. The cross-bearers are of several different sections, depend-



EXTERIOR AND INTERIOR VIEWS OF DETROIT ALL-STEEL TRAIL CAR

ing on load requirements, and a suitable drawbar anchorage is provided at the front end of the car by the two cross-bearers at that point which are made of 3-in. channels spaced 11 in. back to back and covered top and bottom with ¼-in. plates.

The corner posts are composed of two 1½-in. x 2-in. tees spaced 6 in. apart and covered with a 3/32-in. plate from the sill to the roof. Door posts are of similar construction but with a spacing of 10⅜-in. between members. The window posts are placed at 29¼ in. centers, and are also formed of 1½-in. x 2-in. tees, slightly offset at the bottom to frame flush with sill angles. Below the belt rail these posts are sheathed with a 3/32-in. plate. The belt rail is formed of a Kuhlman standard pressed shape. The top plate is formed of a 3½-in. x 3-in. x 5/16-in. angle and a 1¾-in. x 1¾-in. x 3/16-in. angle which are reinforced over the center entrance by the addition of a 2-in. x 2-in. x 3/16-in. angle. The roof is of the monitor type, but the monitor extends toward the car ends to afford better ventilation at these points. The hoods are built as units and can be easily removed for repairs.

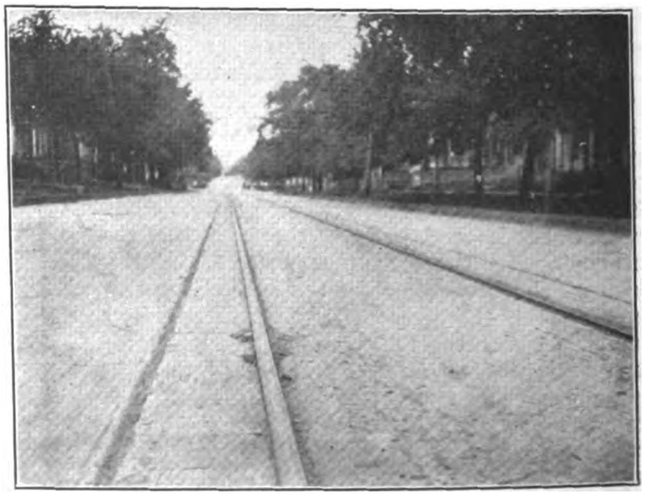
From the rail to the first step is 13 in. and the step is 5 ft. 8 in. long and 15 in. wide. A post in the center divides the step into an entrance and an exit, each 30 in. wide. The second step is 10¾ in. high and is on a level with the loading space, which is of the same width as the entrance. The loading space is 3¾ in. below the level of the car floor proper, and this difference in height is taken up by a ramp leading each way from the entrance well. The aisles are 3 ft. 5 in. wide, and the ramps are 6 ft. 9¾ in. long. The distance between the longitudinal seats is 4 ft. 5 in.

The entrance and exit doors slide into pockets on each side of the center opening and are operated by the National Pneumatic Company's door engines. Sheet-metal longitudinal seats with ½-in. felt padding covered with rattan provide for about fifty-six seated passengers, and fifty-six Rico sanitary hand straps have also been provided for the standing load. Natural, quarter-sawed white oak with no headlining was adopted for the interior finish, the absence of a headlining saving weight and reducing first cost as well as maintenance cost. An interior view of the car in one of the accompanying illustrations shows the effect of this kind of a finish. Tomlinson, spearhead, air and electric connecting, radial drawbars are mounted on the front ends of the cars, and other equipment of interest includes Westinghouse semi-automatic air brakes and Peter Smith forced-ventilation hot-air heaters. The car is mounted on Brill trailer trucks of the arch-bar type equipped with 22-in. wheels.

Sioux City Tracks Paved with Concrete

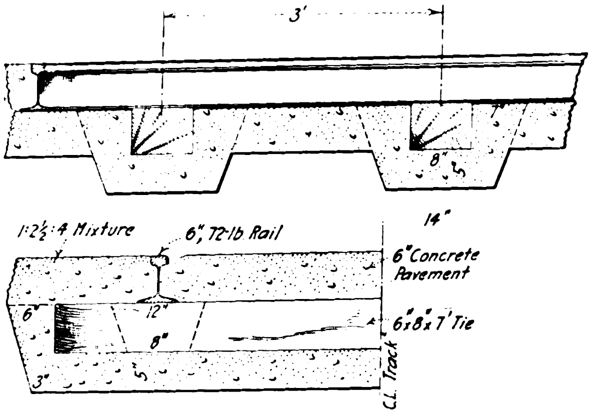
Comparatively few cities or few railway companies have used concrete pavements on so extended a scale as has been done in Sioux City, Iowa. Ten years of service under varying traffic conditions such as would obtain in a city of 50,000 inhabitants, have been so satisfactory as to warrant a more extended use of this type of pavement. In one of the accompanying illustrations is shown 6-in. 72-lb. T-rail track on wooden ties laid in a residential street with a concrete pavement which has been in service more than ten years. Experience with this particular piece of construction has led to some improvements which, it is believed, will increase the serviceability of the concrete pavement. To separate the track allowance from the street pavement, a longitudinal joint extending from the pavement surface to the bottom of the foundation was provided. This was filled with asphaltum and no transverse expansion joints were used.

An examination of this pavement shows that steel wagon wheels following this wide longitudinal joint, have ground off the edges tending to make the joint wider. This damage has been repaired by refilling the joint occasionally with asphaltum. The occurrence of infrequent transverse cracks in the concrete, particularly over the wooden ties, has led to the adoption of transverse expansion joints. In some cases these transverse cracks show considerable wear under vehicular traffic. To retard this form of wear, these cracks and worn spots have been filled with asphaltum. Other defects developed where there was movement in the me-



CONCRETE-PAVED STREET IN SIOUX CITY, IOWA chanical rail joints. Defects of this kind were not particularly serious and any of several measures could be adopted to overcome them. The welding of the joints offers a solution, as well as the provision of an asphaltum-filled pocket around each joint.

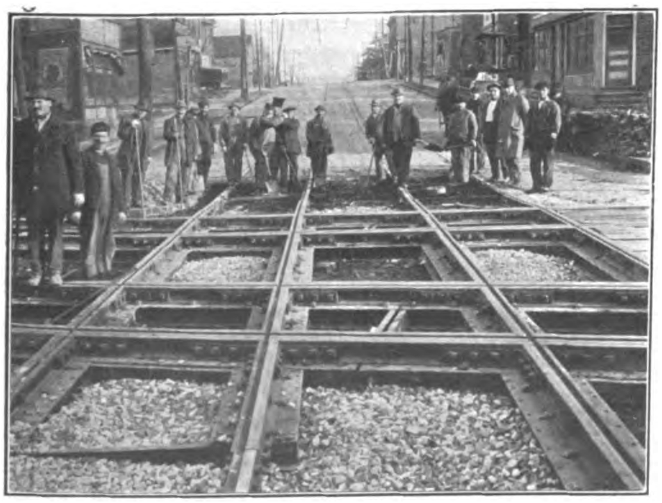
In the transverse and longitudinal track section the construction details are shown. The 6-in. x 7-in. wooden ties are laid at 3-ft. intervals on a 5-in. x 14-in. concrete bearing. These bearings are made integral with a longitudinal prismatic concrete beam, 12 in. wide under the rail and 8 in. wide at the base of the tie. The rails are fitted with ¾-in. tie rods spaced at 5-ft. intervals. The pavement is 6 in. deep and formed of a mixture of 1:2½:4 of cement, sand and crushed Sioux Falls quartzite. Along the gage line of the T-rail the pavement surface is beveled about 30 deg. from the horizontal to meet the under side of the rail head and to form the flangeways. This class of construction requires approximately 315 cu. ft. of concrete per 100 ft. of track.



TRACK CONSTRUCTION IN CEMENT-PAVED STREET

Rapid Crossing Installation in Cleveland

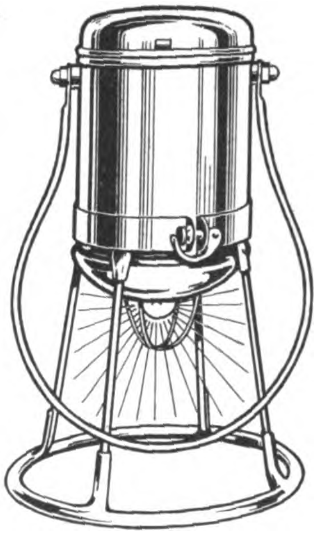
The accompanying halftone shows a crossing at the intersection of the tracks of the Cleveland Railway on Ninety-third Street with the tracks of the Wheeling & Lake Erie Railroad. The crossing rests upon an International Steel Tie Company's crossing foundation. The crossing was installed recently in one night, between midnight and morning. Neither the steam or the electric tracks were cut until 1 o'clock and both trains and street cars were going over the crossing before 4 o'clock. The whole foundation was well tamped with unscreened broken stone and a concrete paving base was put in about flush with the rail base. The street surrounding the crossing was then paved with Medina stone block.



CROSSING INSTALLATION IN CLEVELAND, OHIO

Lantern Which Casts No Downward Shadows

There have been many attempts to make a practical electrical lantern that would be useful in railway service, but an obstacle in the way of its development has been the securing of sufficient battery capacity to give reasonable life. The Federal Sign System (Electric), Chicago, Ill., claims to have overcome this difficulty in its latest type of electric lantern, illustrated herewith, which was invented by F. T. Baird of the Chicago, Rock Island & Pacific Railway. By the use of a high-efficiency, special dry battery and a high-efficiency tungsten lamp, it has been possible to make a lantern which weighs complete but about 2½ lb. and has a battery life of more than sixty hours. By the mounting of the lamp under the battery container, the light is thrown downward without producing any downward shadow, an impossibility with the oil lantern.



ELECTRIC LANTERN

The lantern consists of nickel-plated brass and steel parts; a container for the battery with the lamp base on the under side; a protecting guard and stand, and a bail which also acts as a switch. The battery contains four cells, producing 6 volts by connection in series, and it is supplied in one or two four-cell units. The two-unit, or duplex arrangement, permits the carrying of a reserve battery. The construction of the battery unit is such that it automatically connects itself in the circuit when placed in the container. The wire stand acts as a base for the lamp without interference with the radiation of light, and also protects the lamp. The latter is further protected by a small wire guard. The bail is so constructed that lowering it to one side connects the lamp in circuit while a reverse movement disconnects it. The lamp used is of 1¾ cp. capacity.

The intensity of the light from this lantern at a quarter-mile distance is said to be 30 per cent greater than that of the regular oil lantern, at a half mile 50 per cent greater, at three quarters of a mile 70 per cent greater, and at 1 mile 85 per cent greater. According to tests made by the Chicago & Alton Railroad, and affirmed by the general superintendent, this lantern will give an average service of two or three months on each battery. The lantern is said to be in satisfactory use by train crews in both passenger and freight service. The cost of operating the lantern appears to be about 1 cent per hour.

The State of Michigan has issued a 396-page compilation of the State laws relating to railroads, compiled under the supervision of Frederick C. Martindale, secretary of state. Laws relating to street railways are included in the list, and the various excerpts contain citations of court decisions and bits of legislative history that aid in the interpretation of the law.

Electric Railway Legal Decisions

CHARTERS, ORDINANCES, FRANCHISES

Federal Courts.—Compensation for Property Taken for Elevated Railway.

The property rights of an abutting owner are not taken without compensation, contrary to the due process of law clause of United States Constitution, Fourteenth Amendment, because, in a suit by him to recover for the loss in market value consequent upon the erection and operation of an elevated railway in the street, the trial judge directed a verdict in favor of the railway company, refusing to submit questions of damage to the jury under positive instruction to exclude from market value subsequent to the construction of the railway such enhancement, if any, as resulted from facilities furnished by the improvement itself, where the only testimony relating to market value either before or just after the road was built shows that no change in such value occurred, and there was no evidence as to what enhancement, if any, resulted from the improvement. (E. L. Brand, Jr., and E. Belle Brand v. Union Elevated Railroad, Lake Street Elevated Railroad and South Side Elevated Railroad, 35 Supreme Court Rep., 846.)

Federal Courts.—Gas Rates—Reasonableness—Valuation—Going Value—Reproduction Cost.

The "going value" of a long established and successful gas company was sufficiently taken into account in determining the value of the company's property for the purpose of testing the reasonableness of gas rates fixed by municipal ordinance, where the valuation was based upon a plant in actual and successful operation and overhead charges were allowed for promotion, organization and development expenses.

The expenses of taking up and replacing pavements on streets which were unpaved when the gas mains were laid need not be included when valuing the property of a gas company on the basis of reproduction new, less depreciation, for the purpose of testing the reasonableness of rates fixed by municipal ordinance.

The refusal of a court to enjoin the enforcement of gas rates fixed by municipal ordinance upon the conclusion reached that a return of 6 per cent per annum on the valuation of the gas company's property would not be confiscatory will not be disturbed on appeal, especially where the ordinance was attacked before an opportunity was afforded to test its results by actual experience. (Des Moines Gas Co. v. City of Des Moines et al., 35 Supreme Court Rep., 811.)

Federal Courts.—Contract Exemption from Taxation.

The Federal Supreme Court will not disturb a decision of the highest New York court that the contract exemption from taxation conferred by New York Laws 1894, chap. 752, sec. 35, Laws 1896, chap. 729, sec. 4, Laws 1900, chap. 616, sec. 4, upon any person, firm, or corporation operating the New York city subway, in respect to his, their, or its interest therein under the construction contract, and in respect to the rolling stock and other equipment, does not exempt a corporation formed to operate the subway from a tax measured by capital stock and gross earnings, imposed under the New York tax law, secs. 182, 184 (Consol. Laws, chap. 60) upon the right to be a corporation and to operate as such. (People of the State of New York ex rel. Interborough Rapid Transit Co. v. William Sohmer, 35 Supreme Court Rep., 549.)

New York.—Fares Within City Limits—Connecting Carrier.

The prohibition against charging more than 5 cents for 5 miles or less, contained in one of the grants of the New York & Long Island Traction Company, which operated three different lines, is limited to the services of the defendant as a connecting carrier, and does not apply to the carriage of passengers over its several lines. (Raynor v. New York & Long Island Traction Co., 151 New York Sup., 417.)

Maryland.—Public Service Commission Has No Power to Require Unprofitable Extension.

The public service commission may not compel an electric railway company to construct and operate an extension of its line, where the construction and equipment of the extension in the manner directed by the commission would in the honest judgment of the directors of the company, result in annual loss to it, for the commission cannot so control the discretion of the directors. (Towers et al., Public Service Commission v. United Railways & Electric Co., 95 Atlantic Rep., 170.)

New York.—Reasonableness of Regulations of Public Service Commissions to Order Transfers, Changes in Types of Cars and Installation of Underground Feeders.

An order of the Public Service Commission, Second District, requiring an Albany street railway company to arrange with the Schenectady Railway Company for the giving of transfers within the city to passengers entering the cars within the city, was reasonable.

While the Public Service Commission would not be justified in ordering a street railway to provide larger cars simply for the purpose of conforming to the style of an aristocratic city, if there was evidence before the commission that the smaller cars were not convenient or comfortable and not adapted to the large traffic of a large city, a question of fact was presented for the commission's determination.

Where, after the close of a hearing before the Public Service Commission resulting in an order requiring an Albany street railway company to make certain changes in its equipment and method of operation, and among other changes to purchase forty-two additional cars, the foreign war broke out and the company applied for a rehearing, claiming that it was impossible to raise the necessary money and that the expense of procuring such cars would be great, the portion of the order relative to purchase such cars should not be enforced until a rehearing was had.

Where a city had by ordinance the power to compel a street railway to put its wires underground, and pursuant to such power the company had at considerable expense put certain of its wires underground, the work requiring the tearing up of the streets, which could only be done by permission of the city, the Public Service Commission should not have ordered the company to make material yearly extensions of its underground conduit and feeder system but should have left it to the city to order the wires to be put underground and conduits to be built, as telephone and eleceric light wires could also be placed in the conduits, thus requiring but a single tearing up of the streets. (People ex rel. United Traction Co. v. Public Service Commission of New York, Second District, 153 New York Sup., 542.)

New York.—Rights of Abutting Owner Against Annoyance from Switchyard.

Abutting property owners are without remedy for annoyance caused by the operation of a street railway upon tracks lawfully laid within the street, but a company cannot operate a Y on its private property in such a way as to be a private nuisance to residents of adjoining property. (Davis et al. v. International Railway, 152 New York Sup., 88.)

LIABILITY FOR NEGLIGENCE

Alabama.—Injuries on Car Step—Burden of Proof.

A passenger suing for an injury received while alighting from a street car does not have the burden of proving that the step of the car was in an unsafe condition when she attempted to alight and that the unsafe condition was caused by the negligence of the street railway company or its employees. (Birmingham, Ensley & Bessemer Railway v. Hoskins, 69 Southern Rep., 339.)

Alabama.—Injuries to Persons on Track Between Crossings.

Car tracks in a locality far removed from the business section of a city are not presumptively imbedded in and a part of the street outside of a street crossing, and, in the absence of evidence to show that fact, motormen are not required to look out for persons on the track outside of street crossings or give warning signals of approach to persons who may by chance intend to cross elsewhere than at a street crossing. (Birmingham Railway, Light & Power Co. v. Strickland, 68 Southern Rep., 912.)

Indiana.—Rights of Fire Department.

Where a municipal ordinance gave fire wagons the right-of-way and required street cars, upon signal of any fire apparatus, to stop immediately and remain standing until it had passed, those in charge of a street car may be found negligent where they did not stop upon the giving of the signal, though they did not have actual notice of the signal, for while the violation of the ordinance shows them guilty of negligence, when by ordinary care they could have discovered the fire wagon, the rules applicable to a criminal prosecution do not apply. (Indianapolis Traction & Terminal So. v. Beck, 108 Northeastern Rep., 153.)

Maryland.—Assistance to Passenger in Car.

It is not negligence for a conductor, after inviting and assisting a passenger from one car to another to enable her to get a seat, to fail to assist her down the aisle to a seat, she not being weak or sick, the speed of the train not being excessive or unusual, and the curve in the road, reached while she was walking, not being sharp. (Plummer v. Washington, Baltimore & Annapolis Electric Railroad, 92 Atlantic Rep., 536.)

Massachusetts—Defective Push-Button System.

The company is responsible where a passenger is injured after using a defective push-button system and believed that her signal had been recognized, the car starting suddenly while she was attempting to alight. (Weil v. Boston Elevated Ry. (two cases), 105 Northeastern Rep., 984.)

Michigan.—Liability to Express Messengers.

To exempt a carrier from liability or to limit its liability for injury to an express messenger for injury caused by its own negligence, the contract or release must expressly and plainly so provide. (Cottrell v. Michigan United Traction Co., 150 Northwestern Rep., 857.)

New Jersey.—Injuries to Boy Boarding Car.

Where a boy nine years old attempted to board a moving trolley car on the invitation of the motorman, the act of the motorman in suddenly accelerating the speed of the car before the child reached a place of safety justified a finding of actionable negligence of the street railway company. (Solomon et al. v. Public Service Railway, 92 Atlantic Rep., 942.)

New York.—Employers' Liability Act—Employee Hit by Train.

The guard on an elevated train went upon the tracks at the direction of the conductor to assist the motorman to raise the shoe of a disabled car from the third-rail. The train was between stations. No precautions were taken to flag on-coming trains, and one struck the guard. Held, that the company was liable under the employers' liability act (Consol. Laws, chap. 31, secs. 200-204) it not appearing that the guard was guilty of contributory negligence. (Fay v. Interborough Rapid Transit Co., 154 New York Sup., 154.)

New York.—Failure to Remove Center Poles in Street.

A city which grants to a street railway company authority to electrify a street railway operated under a franchise for horse cars but does not designate the location of the poles, may compel the removal of poles erected in the center of the street, when the poles have become dangerous by change in the conditions and use of the street, and the negligent failure so to do renders the company liable for damages sustained in consequence of the obstructions by persons lawfully using the street. (Stern v. International Railway, et al., 153 New York Sup., 520.)

New York.—Accident to Automobile Covered by Insurance.

Where defendant in an action for damages to plaintiff's automobile, sustained in a collision with defendant's street car, ascertains on cross-examination of plantiff that the damages were covered by insurance which had been paid, it may, under Laws 1914, Chap. 368, Sec. 166, providing that amendments of pleadings may be allowed at any time to promote substantial justice, amend its answer and enter a plea in abatement. (Allen & Arnink Auto Renting Co. v. United Traction Co., 154 New York Sup., 934.)

New York.—Workmen's Compensation Law—Amount of Compensation.

The workmen's compensation act provides for a compensation amounting to two-thirds of the average weekly wages for all disabilities, total or partial, though for longer or shorter periods. An employee sustained injuries resulting in the amputation of one foot and other injuries not shown to be permanent, which in themselves would have disabled him from the time of his injury to the date of an award by the Compensation Commission. The commission awarded two-thirds of his weekly wages for 205 weeks for the loss of the foot. Held, that the commission could not, in addition to such award, make a further award, running concurrently with the first award, for other injuries than the loss of the foot, though at the expiration of the 205 weeks, if disability still existed by reason of other injuries, the employee might be entitled to a further award, it being the plain purpose of the statute that awards shall take effect consecutively, rather than concurrently. (Fredenburg v. Empire United Railways, 154 New York Sup., 351.)

Oregon.—When Person Boarding Car Becomes Passenger.

Where, in an action for injuries to a street car passenger, the evidence was conflicting on the issues whether the passenger attempted to board the car while standing and was thrown off by a sudden jerk of the car, or whether she attempted to board it while in motion, the court should charge that before the passenger could recover, she must show that she intended to board the car and gave notice thereof to the carmen, or that, in the exercise of reasonable care, they knew that she intended to board it, and that if the carmen did not know that she intended to board it, there could be no recovery. (Tompkins v. Portland Railway, Light & Power Co., 150 Pacific Rep., 758.)

Oregon.—Master and Servant—Employers' Liability Act—Trial by Jury.

The general manager and the superintendent of an electric company, both representing it in repair work, were bound to exercise reasonable care to prevent injury to a lineman, and, under the employers' liability act, it was the duty of each to use every care practicable for his safety, and they were liable for their failure to warn him of the fact that a current had been turned on near-by drop wires, as to which he was ignorant, and which, together with their failure to warn, was the proximate cause of his injury.

The Legislature cannot enact a law abolishing jury trials in law actions, nor can a law court arbitrarily refuse to allow a jury to be called in such cases. (Hoag v. Washington-Oregon Corporation et al, 147 Pacific Rep., 756.)

Pennsylvania.—Imputed Negligence—Automobile Passengers—Care Required.

The rule that an automobile passenger is not chargeable with the carrier's negligence does not relieve him from the duty of exercising reasonable care to avoid danger. (Dunlap v. Philadelphia Rapid Transit Co., 93 Atlantic Rep., 873.)

Pennsylvania.—Injury to Infant—Contributory Negligence of Parents.

Where a mother, though seeing a car standing not more than 100 ft. away and likely to start at any moment, sent an unattended child of tender years across a street traversed by a double line of fast-moving electric cars, she was guilty of contributory negligence and the parents cannot recover for injuries to the child from being struck by the car. (Rapaport et al v. Pittsburgh Railways, 93 Atlantic Rep., 493.)

Washington.—Master and Servant—Industrial Insurance—"Extrahazardous Work."

A workman for a city contractor, engaged in constructing a manhole in the street near a railroad track, is not employed in an "extrahazardous work," so as to come within the scope of the state industrial insurance act. (Puget Sound Traction, Light & Power Co. v. Schleif, 220 Federal Rep., 48.)

West Virginia.—Horse Receives "Shock" from Rails—Res Ipsa Loquitur.

Where, as in this case, the evidence tends to show that plaintiff's injuries resulted from the fall of his horse caused by a shock received from one of the rails of defendant's railway, overcharged with electricity and dangerous to persons and animals traveling on the street, and the character of the fall and the injuries to horse and rider and the electrical manifestation on the track at the instant of the fall are not inconsistent with other facts proved and the known and proved nature of electricity so employed when there are defects in the rails or in the bonds binding them, the jury may properly infer, in the absence of evidence showing that the bonds were not broken and that the track was in good repair and condition, that the injury resulted from a defective and dangerous track, and the rule res ipsa loquitur applies. (Macy v. Charleston Interurban Railroad, 84 Southeastern Rep., 893.)

LONDON LETTER

City & South London Railway in Operation Twenty-five Years—Lancashire & Yorkshire Railway Nearing Completion

(From Our Regular Correspondent)

It is twenty-five years this month since the late King Edward, then Prince of Wales, formally opened the City & South London Railway, the first electric railway of note in England, and the immediate forerunner of the tubes that now pierce the subsoil of Greater London in all directions. Although electricity was employed as the motive power from the first, it was originally intended to operate the line by cable. Between the inception of the undertaking and its completion developments in electric traction enabled Greathead to apply it to his scheme with success. The original City & South London Railway between the Monument and the Swan, Stockwell, was a little more than 3 miles long and cost, approximately, £220,000 per mile. The South London line itself extended its southern limit to Clapham Common, while its northern end has pushed on through the heart of the city to Islington, where it has been linked up with the larger system at King's Cross and Euston. After the war it is proposed to enlarge the present tunnels to the size of the other tubes.

The new electrified line of the Lancashire & Yorkshire Railway from Manchester to Bury is now almost ready to be put into service. It is to be operated at 1200 volts, which is a novel pressure for England. On the success of this line will depend a very large conversion scheme of electric traction in the Manchester area, and the power plant at Clifton Junction has been designed to provide power when needed for a large mileage of electric railway. The power station is situated on a lower level than the railway, so that the delivery of coal is extremely easy. Babcock & Wilcox boilers have been installed to furnish steam to 5000-kw. turbo-alternator sets supplied by Dick, Kerr & Company. The turbines are designed to generate three-phase current at 6600 volts, which will be delivered to the various substations which are equipped with 1000-kw. Dick-Kerr rotary converters for transforming the 6600-volt current to direct current at 1200 volts. The switch gear in the power house, much of which includes special features, has been furnished by the British Thomson-Houston Company. The feeders to the substations are, wherever possible, in the form of overhead bare copper conductors carried alongside the railway, but where the conductors pass under bridges or through congested areas three-core Henley cables are employed. The collector rail is of a channel form with a head of such section as to provide a wide contact surface. The rail is fixed upon insulators provided with lugs to prevent lateral movement, and is inclosed with boards of Jarrah timber, the fire-resisting properties of which are well known. The only opening round the rail is a slot at one side of the cover for the accommodation of the current collector, but drainage holes are provided to prevent the accumulation of water in the groove formed between the guard and the collector rail.

The new electric service on the London & South-Western Railway between Wimbledon and Waterloo, via East Putney, has been established. The new trains make the journey between Waterloo and Wimbledon in twenty-four minutes, as compared with thirty minutes under the old conditions. The electric service will enable trains drawn by locomotives to be run express between Waterloo and the boundary of the electrified area. The electric trains run every twenty minutes. The company expects soon to open electric service on the Kingston circular route.

The London County Council is recommended by the highways committee to authorize the employment of women conductors on the tramcars during the period of the war and thereafter so long as conditions are abnormal. It is proposed that they be paid proportionately to the time worked, at 5*s*. a day, a rate equivalent to the present minimum daily rate of pay of male conductors, with the usual increments according to length of service and the war grant of 6*d*. a day. It is also proposed to employ women on unskilled work at the central car repair depot, and as porters in the Council's stores department.

The London United Tramways has decided to employ a number of women as conductors. Preference will be given to the relatives of men already in the company's service or who have joined the forces. Each woman will be paid 4*s*. 6*d*. a day, working six days a week, with an extra war wage of 2*s*., making a total wage of 29*s*. a week. She will wear a dark blue costume, with the skirt bound in leather, a specially designed pair of gaiters, and a waterproof cap. Many women are also qualifying at the company's school of instruction to become conductors. They must be at least 5 ft. 5 in. in height and between twenty-five and thirty-five years of age.

The omnibus and the tramway employees have agreed to accept women as conductors in the London area as an expedient during the war period. Recently the subject was discussed for several hours at the annual delegate conference of the Licensed Vehicle Workers' Union. Ultimately a resolution was agreed to on the terms stated previously. The resolution added that this was only subject to the licenses being issued from Scotland Yard under the same conditions as the licenses which are issued to male conductors, and also subject to the same wages being paid. An additional condition was that the women are to do the same kind of work as the men.

The Glasgow Corporation Tramway Department, it is understood, is considering the possibility of employing women to run the cars. The supply of motormen has run so short in consequence of the many enlistments that sufficient male labor cannot be obtained for the work. The fitness of women for the work has first to be demonstrated. The department has not yet made any experiments which would justify a reference of the question to the tramways committee. It is stated, however, that the women now employed as conductors are being asked if they are prepared to undertake the work of the motormen if such a development is found feasible. It may be recalled that Mr. Dalrymple, the tramway manager, stated in the address which he made in London about two months ago to the Municipal Tramways Association that the most difficult problem which the Glasgow department had to face was the shortage of motormen. He then presented statistics of the number of men who had enlisted, and said that throughout the greater part of the past twelve months the men who had remained in the service had had to work seven days a week, and that despite this the service had to be curtailed considerably last winter.

The Dundee tramways committee has decided to reconstruct the service on account of the depletion of the staff through enlistment. A scheme has been worked out to meet the men's demand for an increase of 3*s*. a week on the ground that the cost of living has increased. The working week is to be increased from fifty-four to sixty hours, and men now earning 27*s*. and over will get 5*s*. extra, and men earning under 27*s*. will get 3*s*. extra, with the war bonus of 1*s*. This proposal has been agreed to on the understanding that the former conditions shall be reverted to on the return of a sufficient number of employees from military duty. It has also been agreed to curtail the evening car service by having the last car leave the center of the city at 10.30 p. m.

Bradford is one of the cities that has not as yet employed any female labor on the tramways. In a report recently issued by Mr. Spencer, the general manager, it is evident, however, that there is a shortage of labor and that immediate action is necessary to avoid serious consequences. The present staff of 1281 employees is considered necessary, and as 818 are of military age, it is reasonable to suppose that under Lord Derby's recruiting scheme many of the men will have to leave the service of the corporation for the time being. Mr. Spencer considers that men more than forty years of age do not undertake with satisfactory results the duties of a conductor, and that the alternative appears to be female labor. In looking into the peculiar conditions of Bradford, however, Mr. Spencer considers the employment of women for driving the cars to be out of the question, and impossible under any circumstances in Bradford. The subject is to be considered by the tramways committee, which will also have to pass upon the question of increased wages for the men.

A. C. S.

News of Electric Railways

VOTERS APPROVE DES MOINES FRANCHISE

Negotiations Extending Over a Period of Ten Years Concluded by Vote Taken on Nov. 29

The people of Des Moines, Iowa, at the special election in that city on Nov. 29, approved the franchise by the Des Moines City Railway. With returns in from all of the forty-eight city precincts, and with all but six of these official, the vote stood 7787 for the franchise and 1883 against the grant. This represented more than 50 per cent of the normal vote. It is expected that acceptance of the franchise will be filed Jan. 1 by the company, and with its filing several of the clauses of the franchise, including the six fares for a quarter rule, will go into effect.

The vote on Nov. 29 terminates negotiations between the company and the city of Des Moines, extending over a period of ten years. A little more than two years ago the Supreme Court decided the company's franchise had expired and it received two years in which to secure a new grant or remove its tracks from the streets. During this time the company, because it had no franchise, could not properly finance itself, and the principal stockholders personally advanced upward of $1,200,000 to protect the situation and give the city adequate service, pending such time as the company could re-establish its right to operate, either by a decision from the court upholding its claim to a perpetual franchise, or by securing a new franchise from the city.

In spite of all the company could do, however, it was impossible to prevent the company from going into the hands of a receiver. Now that a franchise has been granted, all that remains to be done is to dissolve the receivership, made necessary to protect the interests of the bondholders, and raise the money to rehabilitate the property. According to A. W. Harris, president of the Harris Trust & Savings Bank, Chicago, which has been protecting the interest of the bondholders, this should not be difficult to do, in view of the excellent showing the company will be able to make as to earnings and equity.

Since September, 1913, Emil G. Schmidt has been in direct charge of the affairs of the company as president, with offices in Des Moines. It is generally accepted that it was largely through his efforts that the passage of a workable franchise was secured and that sentiment favorable to the company was created which is regarded as a most valuable asset to the company in the future. That this is so is attested by an editorial in the Des Moines *Tribune* which was concluded as follows:

"The vote was more than an expression of weariness and more than an appreciation of changed conditions. It was a testimonial to the urbanity, perseverance and intelligent generalship of Mr. Schmidt, who ought to look upon it as a vote of personal confidence. The city believed that if given his head Mr. Schmidt would make a street railway system everybody would be proud of and glad to pay a nickel to ride on. Mr. Schmidt should look upon this vote as a very urgent invitation to him to give up all notions of Ohio or Michigan and make Iowa and Des Moines his permanent home. The city and the State need men of his energy, confidence, enterprise, and persistence. Des Moines really voted for Schmidt yesterday."

President Emil G. Schmidt of the company said:

"I want to prove to the people that they have not made a mistake in voting for the new franchise. Formal acceptance of the new ordinance will be made on Jan. 1 and the provisions of the new measure will then be in effect. Our fiscal year begins at that time. All old litigation will be disposed of before then. We will pay off the bonds and issue a new mortgage to borrow the money which we need for the rehabilitation of the system. The receivership will be disposed of by Jan. 1, and the new fare rate of six rides for a quarter will then go into effect. We shall contract this winter for work to begin next spring and we plan to spend $750,000 in improvements during the spring and summer. Forty new cars, to be ordered at once, will be in service early in the spring."

Mr. Schmidt estimates that ten years of litigation over the franchise has cost the city and company more than $250,000. He thanks the Chamber of Commerce, the Federation of Labor, and the employees of the company for their loyal efforts in bringing about the adoption of the new franchise.

A summary of the principal provisions of the ordinance was published in the ELECTRIC RAILWAY JOURNAL of Sept. 11, page 461. It is proposed to review the terms of the grant at greater length in a subsequent issue of this paper.

ST. PAUL TO BEGIN ELECTRIC OPERATION DEC. 8

A. J. Earling, president of the Chicago, Milwaukee & St. Paul Railway, Chicago, Ill., has announced that everything will be in readiness by Dec. 8 to make a trial run over the electrified division between Three Forks and Deer Lodge, Mont. Following the run over this 113-mile division, complete electric operation will be started. President Earling and C. A. Goodnow, assistant to the president in direct charge of electrification, accompanied by a staff of railroad officials and representatives of the General Electric Company, expect to be present at the beginning of electric operation.

DECISION FAVORABLE TO COVINGTON FRANCHISE

Federal Judge A. M. J. Cochran on Nov. 17 granted a perpetual injunction against the city of Covington, Ky., to prevent it from carrying out the terms of an ordinance passed on July 13, 1914, which provided for the sale of a street railway franchise through public bids. At the same time he decreed that the South Covington & Cincinnati Street Railway has a perpetual franchise from the city of Covington on certain streets.

The petition and evidence in the case included a history of the franchise from the time it was granted in 1869 down to the present time. The franchise contained no provision as to its duration and it was claimed that all actions of the Common Council and all approvals of the changes that have taken place by which the franchise and rights were acquired by the present company tacitly assumed that it is perpetual. In 1913 an ordinance similar to that of July 13, 1914, was enacted by Council, but the company secured an injunction to prevent the city from receiving bids.

In the trial of the case City Solicitor Blakely contended that the charter of the city gave it power to grant a perpetual franchise, but it did not grant any expressly and it could not be said by implication that a perpetual grant was made. He argued further that when a franchise is silent as to the term of years the length of the period is to be construed in favor of the public.

Judge Cochran held that the granting of a franchise under the ordinance of July 13, 1914, and the construction of a railway in accordance with its terms would be a material interference with the franchise and contract rights of the plaintiff on the streets mentioned and a violation of the terms of the franchise and an impairment of the rights. The passage of the franchise ordinance, the advertisements for bids and the threatened acceptance of bids constitute a cloud on the franchise and rights of the company. Further proceedings would result in a multiplicity of suits and an interruption of the public service of the plaintiff, as well as irreparable damage to the property. The court said:

"The defendant is perpetually enjoined from carrying out the terms of the ordinance of July 13, 1914; from advertising for any further bids thereunder; from accepting any bids for making a grant thereunder; from interfering or attempting to interfere with the plaintiff in the maintenance or operation of the street railway lines upon defendant's streets, and from acting in any such form or manner as would alter, impair, limit, infringe or destroy the title of the plaintiff in its grant, rights and franchises above described, and the plaintiff's title in or to same and all of them is forever settled and quieted hereby."

City Solicitor Fred W. Schmitz has announced that the case will be appealed to the Supreme Court.

CHICAGO ELECTRIFICATION REPORT PRESENTED

The formal report of the committee on smoke abatement and railway terminal electrification of the Chicago Association of Commerce, abstracted on pages 1113 to 1118 of this issue, was formally presented by the committee to the association on Dec. 1. The event was celebrated by a dinner in the Gold Room of the Congress Hotel, Chicago, last Wednesday evening. Charles L. Dering presided, and after explaining the purpose of the gathering, presented Harry A. Wheeler, vice-president of the Union Trust Company, and a member of the committee, who briefly told the history of the report and described the smoke abatement problem and sources of air pollution as found by the committee's engineers. Harrison B. Riley, president of the Chicago Title & Trust Company, the next speaker, then discussed the necessity for electrification as the means of smoke abatement and its engineering and financial practicability. Judge Jesse Holdom, of the Illinois Appellate Court, chairman of the smoke abatement committee, then formally presented the report to the association.

The points especially emphasized by the speakers were that the report was primarily a smoke abatement report, and that the question of the electrification of the steam railroad terminals in Chicago was considered as the only means of relieving air pollution from that source. For this reason complete electrification of all of the steam railroad trackage in Chicago only was considered, and the estimates were based upon thoroughly tested electrical equipment as it existed in the state of the art in 1912. Hence, the estimates should not be considered as applying to recently developed and more efficient, though untried, equipment. The speakers also brought out the point that where electrification afforded an operating economy it should be adopted. Nothing in the report was intended to indicate that the electrification of certain roads was not feasible and financially warranted.

OBJECTION TO TOLEDO PAVING CHARGES

At a meeting of a sub-committee of the committee on railways and telegraph of the Council of Toledo, Ohio, on Nov. 24 Councilman Hein's resolution, calling for a settlement of the city's claim against the Toledo Railways & Light Company for paving between its tracks on certain streets was discussed. Henry L. Doherty, chairman of the board of the company, asserted that the fare paid by the people now is just about sufficient for maintenance. The Heine resolution provided that the company should not be allowed to operate cars on the streets concerned until it had paid the paving bill. Mr. Doherty said that the people of Toledo seemed to think that a franchise was valuable only to the company.

A second meeting was held on Nov. 26 when the matter was again discussed. Mr. Doherty said the company objected to paying the full cost of the paving, which will last about twenty years, without assurance that it will be allowed to use the streets for a portion of that time, but had no objection to paying its pro-rata share of the cost of paving in accordance with the time it is allowed to use the streets in question. Mr. Doherty said he would endeavor to have his views embodied in a letter to be presented to the City Council at its next meeting.

WILKES-BARRE STRIKE UNCHANGED

With the exception of intermittent riots of small proportions, the strike situation at Wilkes-Barre, Pa., has undergone no material change.

In an attempt to end the strike Martin Freeman and Louis Frank, representing the Chamber of Commerce of Wilkes-Barre, discussed the strike situation with Governor Brumbaugh, Attorney General Francis Shunk Brown and Commissioner of Labor William Price Jackson at Harrisburg and mapped out a peace program in which the Governor and the Attorney General have offered themselves as conciliators to hear both sides.

In connection with these efforts, P. J. Shea, the strike leader, said: "We will confer with anybody on earth on this strike situation."

T. A. Wright, general manager of the Wilkes-Barre Railway, said: "Although it would of necessity be a matter that I would have to submit to the board of directors, I should not think of refusing an invitation to a conference from the Governor."

The company also reiterated that it has always stood ready to submit to the courts the legality of the board of arbitration reversing its original decision.

CINCINNATI TRANSIT COMMISSION ORGANIZED

At an informal meeting at Cincinnati, Ohio, on Nov. 24 E. W. Edwards, Christian Schott, William A. Hopkins and E. H. Dornette were sworn in as members of the Rapid Transit Commission by City Solicitor Schoenle. William Cooper Proctor was unable to be present. It was decided to have City Engineer Frank Krug, who is also the commission's engineer, arrange conferences with each of the nine interurban roads which will use the rapid transit belt, discuss plans and the cost of making connections with the proposed line, and then report to the commission.

Some of the roads were built to broad gage to correspond with the tracks of the Cincinnati Traction Company. Since the rapid transit road will be constructed with standard gage tracks, it will probably be necessary to standardize all the roads.

The City Council will be asked to issue $100,000 of bonds to provide funds for the initial expense of the commission.

ORDINANCE AUTHORIZING CHICAGO TRACTION COMMISSION SUBMITTED

The creation of a commission to report on the operating, engineering and financial problems involved in the proposal to consolidate the Chicago surface and elevated lines and construct a subway has advanced to the point where an ordinance authorizing the employment of the commission has been approved by the local transportation committee and submitted to the City Council. The terms of the ordinance authorizing the employment of three engineers to serve on this commission, were mentioned in the ELECTRIC RAILWAY JOURNAL of Nov. 20, page 1050. As stated at that time, one of the engineers selected must be from Chicago and be familiar with its local transportation problems, and the other two must be familiar with the efforts made to solve the transportation problems in New York, Philadelphia and Boston. The ordinance requires that the commission report by April 1, 1916, so that an ordinance authorizing the consolidation and a general scheme of improved transportation can be submitted at the June election. The ordinance also gives the committee authority to compensate these engineers with money taken from the traction fund.

TOLEDO PLANT FORCED TO SUSPEND

The Water Street power plant of the Toledo Railways & Light Company, Toledo, Ohio, was forced to suspend on the evening of Nov. 26 and for an hour almost every car in the city stood still. In explaining the accident, William Richards, superintendent of the electrical department of the company, said:

"The short-circuit at the manhole, caused by a defective feed cable, produced a surge in the power station which caused one of the largest generators to short-circuit. This resulted in a blow-out. There is no way of determining the cause, as all the evidence was destroyed in the accident. Almost the entire system was at a standstill for a time as the result of the accident. It was the most complete shutdown since the construction of the plant in 1896."

SPRINGFIELD ELECTROLYSIS REPORT

C. V. Wood, president Springfield (Mass.) Street Railway, has received a report on the electrolysis situation at Springfield from the Stone & Webster Engineering Corporation, Boston, Mass., following a study of local conditions requested by the company. Earlier in the year the United States Bureau of Standards investigated the electrolysis problem at Springfield, recommending the conversion of the Margaret Street generating plant into an alternating-current station, with the inauguration of direct-current distribution from substations. President Wood stated that the plans proposed by Stone & Webster for the improvement of conditions were substantially the same as those discussed in the government report. The various interests concerned and a bureau representative will confer on the matter.

WESTCHESTER BARRED IN NEW HAVEN SUIT

All the testimony relative to the purchase of the New York, Westchester & Boston Railroad by the New Haven system was stricken from the record on Dec. 1 by Judge Hunt in United States District Court in the trial of eleven former directors of the New York, New Haven & Hartford Railroad on the misdemeanor charge of conspiring to monopolize transportation in New England. Judge Hunt said:

"The Government has thus far failed to show that there was intent on the part of any of these defendants to conspire to monopolize the interstate traffic of New England in so far as the purchase of the Westchester road was concerned. Although the original projectors of the Westchester line may have had in mind a road to do an interstate business, the Government has failed to show that the Westchester was used by the New Haven in interstate traffic."

The New York, Westchester & Boston Railway is a high-speed single-phase line operated out of New York from a connection with the subway as far east as New Rochelle and as far north as White Plains.

CHAIRMAN McCALL BEFORE GOVERNOR ON DEC. 3

Chairman Edward E. McCall of the Public Service Commission for the First District of New York obtained a postponement from Nov. 30 to Dec. 3 of the hearing before Governor Whitman on the charges filed against him with the Governor by the Thompson legislative committee. Mr. McCall in a letter to the commission refused to present before the committee his account with the Bankers Trust Company, but said that he would permit the Governor to examine all records, official or otherwise.

On Nov. 29 the committee questioned Commissioner Wood with respect to his connection with both the American Sanitary Towel Company and the Northwestern Construction Company and went over the transfer of title to $5,000 of stock in the former company to John A. Maher for a consideration of $1 and in the latter to his brother. On Dec. 1 the committee inquired of Mr. Wood about the contracts for signals for the Fourth Avenue subway. On the same day Commissioner Williams was questioned regarding his accounts in various banks and trust companies.

GIVING RAILWAY LINES AWAY

Press dispatches report that J. D. Sugg, president of the San Angelo Power & Street Railway Company, San Angelo, Tex., has offered the 3.5-mile railway system in that city to the City of San Angelo as a gift.

Gilbert F. Myer, president of the Realty Company, McKeesport, and general manager of the Port Vue Street Railway, McKeesport, has offered to the Borough of Port Vue the 1-mile line of the railway with all equipment if the borough will agree to operate the railway for five years.

Trackless Trolley Line Abandoned.—The Merrill Railway & Lighting Company of Merrill, Wis., has sold its trackless trolley bus. The company reports insufficient patronage to warrant its operation.

Chicago Can Build Subway by Assessment.—An opinion rendered by the city law department states that the Chicago board of local improvements has the power to obtain funds for subway construction by levying assessments against the property owners which would be benefited by the subway.

Valuation of Toledo Properties Proposed.—Councilman John Mulholland introduced an ordinance in the City Council of Toledo, Ohio, on Nov. 22 which provides that a valuation of the property of the Toledo Railways & Light Company be made by three experts to be chosen by a committee consisting of the president of the Council and the city solicitor, a third city official to be chosen by these two.

I. C. C. Grants Extension of Time.—An order has been entered by the Interstate Commerce Commission extending, for a period of twelve months from July 1, 1916, the order commanding the railroads to equip all cars in service in accordance with specific regulations laid down by the commission in an order issued March 13, 1911. These regulations provided for the equipment of freight cars as to their physical safety.

Penalty Action Begun in New York.—The Public Service Commission for the First District of New York has instructed its counsel to begin an action against the Third Avenue Railway and the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway to recover the statutory penalty for failure to obey the commission's order of May 21, 1915, requiring the companies to make certain repairs to their tracks.

Decision in Alien Labor Law Case.—The Supreme Court of the United States on Nov. 29 sustained an opinion of the New York Court of Appeals and a verdict of the Court of Special Sessions of New York City, both of which upheld the validity of the New York law against the employment of aliens on public works. The law led to far-reaching disturbances in connection with work on the New York subways. Afterward it was amended to permit employment of aliens when Americans were unavailable, but the cases settled on Nov. 29 already had been instituted.

American Employers' Profit-Sharing Plans.—The National Civic Federation, New York, N. Y., will have ready for distribution about Jan. 1 the results of its investigation of the subject of profit sharing between employer and employee, referred to in the ELECTRIC RAILWAY JOUNAL of Nov. 20, page 1052. It was originally expected that the report would be ready by Dec. 1. The report will contain an analysis of more than 100 plans now in operation in this country, as well as a description of many abandoned ones and the causes of their failure. The views of employees and the attitude of labor unions will be set forth.

Seeking to Make Seattle Municipal Line Profitable.—Councilman Oliver T. Erickson of Seattle, Wash., has introduced a resolution in the Council calling upon Corporation Counsel Bradford to prepare the necessary papers and outline a method of procedure to obtain common user trackage privileges for the Seattle Municipal Railway over the tracks of the Seattle, Renton & Southern Railway on Fourth Avenue and Fourth Avenue South, to a terminus at Second Avenue South and Washington Street, in the business districts. It is hoped that by this means the business of the line, which is now operated at a loss, may be increased.

Objection to Clay County Bond.—It is said that the Interstate Railway, which secured a verdict of $1,500,000 against the Kansas City, Clay County & St. Joseph Railway for alleged usurpation of right-of-way, will file a motion in the Supreme Court for the increase of the appeal bond of the defendant. This bond for $3,400,000 was approved by the court. It is understood the plaintiff considers the bond insufficient. If such a motion is filed, it is expected that opportunity will arise for presenting the interests of the public, as protected by the Public Service Commission, in any burdens placed upon the utility. If the case takes the ordinary course, it will not be heard for perhaps three or four years.

Vestibules and Changes in Fenders Recommended.—In a report submitted to the Public Service Commission of Maryland by Transportation Expert Duer and Chief Engineer Phelps recommendations are submitted advocating the vestibuling of all cars in Baltimore and such changes in the construction of the fenders and wheel guards as will, it is claimed, afford more protection to the general public. The point is made that while there is no serious criticism of the present fenders being used, they could be so constructed to make them more effective. It is recommended that the United Railways & Electric Company be ordered to close 560 cars at once, the work to be done in eighteen months by vestibuling thirty-one cars a month.

Final Argument on New York Bus Franchise.—Final pleas against granting a franchise to the New York Motor Bus Company, which seeks to operate buses on new routes, were heard on Nov. 29 by the franchise committee of the Board of Estimate of the City of New York. The chief plea against granting the franchise was by William H. Page, counsel for the Fifth Avenue Coach Company, which operates the present bus lines. Briefs were put in on behalf of the Interborough Rapid Transit Company and the New York Railways Company, in which the argument that the buses would cut down the profits of the new subways was put forward. The Third Avenue Railway Company also put in a brief opposing granting the franchise.

Basis of Renewal of Bridge Operating Contract.—In a report to the transit committee of the Board of Estimate of New York City, Bridge Commissioner F. J. H. Kracke suggests that in place of the old contract for operation on the Williamsburg Bridge, which expired on Aug. 31, a new contract be entered into with the Brooklyn Rapid Transit Company and the New York Railways with increased rental for operating cars over the bridge. Mr. Kracke says: "I would advise the making of new contracts with the companies now providing through service on the Williamsburg Bridge, as being in the best public interest in view of the large mileage they control in Brooklyn and Manhattan, provided that suitable terms of such nature as to leave no doubt of their adequate protection of the city's rights, be agreed to by the said companies." The companies have been operating since Aug. 31 under a permit which expired on Nov. 30.

Seattle Needs Appraisal Expert.—Ralph S. Pierce, assistant corporation counsel of Seattle, Wash., recently advised the finance committee of the Council that the legal department of the city must have expert help in the preparation of its case against the Puget Sound Traction, Light & Power Company in which the company is seeking to be relieved of certain franchise requirements. At the hearing before the Public Service Commission, at which the company's application will be considered, a valuation of the properties will be introduced. Mr. Pierce states that it is important that the city have an expert engineer to testify, as the valuation fixed at the hearing will be the basis of any action that the company may bring to discontinue transfer privileges or increase fares. The company is seeking to be relieved of provisions in its franchises compelling it to pave between tracks, pay 2 per cent of its gross revenues to the city, etc.

Seattle Heating Franchise Rejected.—The Puget Sound Traction, Light & Power Company, Seattle, Wash., has informed the franchise committee of the Council that the company cannot agree to carry passengers on its lines on transfers issued from the Seattle Municipal Railway upon payment by the city of Seattle of 1 cent for each passenger so transferred, in exchange for a steam heating franchise. The company is willing to accept the franchise requirements imposed by the city with this and one other exception. The company asks that the life of the franchise extend to 1934, instead of 1925. Last February the company applied to the city for a renewal of its steam heating franchise, and at this time Councilman Erickson suggested that the grant be made contingent upon the willingness of the company to transfer passengers between Division A and Division C on payment by the city to the company of 1 cent for each passenger transferred.

Toronto Engineers Not in Favor of Subway.—The commission of engineers which has been engaged in the preparation of a scheme for the solution of the traffic problem in Toronto, Ont., has completed its labors and, as stated previously in the ELECTRIC RAILWAY JOURNAL, will make its report to the city within the next week. It is known that the engineers are not in favor of the construction of a subway system. The proposals of the engineers will have a direct bearing on the hydro-radial system, of which Toronto must be the center. The question of submitting the scheme to a vote of the people at the forthcoming municipal elections is considered out of the question. The same applies to the suggestion that a by-law be submitted to the people for their sanction to the raising of $2,000,000 or $3,000,000 for the purpose of enabling the city to start preliminary work on the project. Sir Adam Beck has admitted that the Hydro-Electric Power Commission had for a year been negotiating for the purchase of all the radial railways now entering the city.

Changes in Engineering Personnel of District Commission.—As the work of valuing the properties of the public utilites in the District of Columbia nears completion it becomes evident that it will be necessary for the Public Utilities Commission of the District of Columbia to have on its permanent staff a man who has had considerable experience in this class of work and one who is thoroughly familiar with the details of these particular valuations. On account of the limited funds available for the employment of a force under the commission it will be necessary to combine this position with that of engineer of the commission. J. Kappeyne of the valuation bureau has been selected to fill this position, and his promotion will take place this month. H. C. Eddy, who since the creation of the commission has occupied the positon of engineer, will be employed by the electrical department of the District of Columbia, if his services can be procured, for the purpose of working in conjunction with the commission on an electrolysis survey of the District of Columbia.

Salary of Chicago Surface Lines' President Approved.—At a recent meeting of the Chicago City Council an order was introduced to the effect that the salary of L. A. Busby, president of the Chicago Surface Lines, should be reduced from $60,000 a year to $18,000 a year, the same as that received by the Mayor. Under the contract ordinance between the surface railways and the city, the latter has the right to regulate the salaries of the officers. This question was submitted to the Board of Supervising Engineers, Chicago Traction, which reported that under the terms of the ordinance the president's salary was not excessive. The ordinance provided that in arriving at the permissible salary which could be paid a railway officer, the compensation paid for like service in other industries must be taken into consideration. Upon this basis the Board of Supervising Engineers found that the salaries of the presidents of eleven railways, not named for publication, were larger in terms of per cent of the gross receipts than that paid the president of the Chicago Surface Lines. These salaries varied from 0.147 per cent of the gross income to 0.54 per cent, Mr. Busby's salary of $60,000 represents 0.18 per cent of the gross income. The local transportation committee, acting upon the recommendation of the board, dismissed the order.

PROGRAMS OF ASSOCIATION MEETINGS

American Association of Engineers

Engineering welfare and the advancement of engineering opportunities will be discussed at the first convention of the American Association of Engineers to be held at the Hotel La Salle, Chicago, on Dec. 10 and 11. The program includes addresses by F. H. Newell, professor of civil engineering at the University of Illinois; T. B. Lambert, power engineer of the Chicago Telephone Company; Richard Yates, ex-governor of Illinois, and J. H. Prior, chief engineer of the Illinois State Public Utility Commission. The association has 260 members. Through the association's clearing house service 100 engineers have been put in touch with positions in the last two months.

American Society of Mechanical Engineers

Among the papers of direct interest to electric railway operatives to be presented at the annual meeting of the American Society of Mechanical Engineers in New York, Dec. 7-10, are the following:

"A Novel Method of Handling Boilers to Prevent Corrosion and Scale," by Allen H. Babcock.

"Turbines vs. Engines in Units of Small Capacities," by J. S. Barstow.

"Proportioning Chimneys on a Gas Basis," by A. L. Menzin.

"Operation of Parallel and Radial Axles of a Locomotive by a Single Set of Cylinders," by Anatole Mallet.

"Four-Wheel Trucks for Passenger Cars," by Roy V. Wright.

A report will also be presented on a code for abrasive wheels.

The entertainments will include a reception and tea to the ladies, members and guests on the afternoon of Dec. 8, a smoker on the evening of Dec. 8, and a dinner and dance on the evening of Dec. 9. The plan this year will be to have a few excursions of exceptional interest, rather than a multiplicity of less important trips. It is proposed to visit the power and elevator plants of the Municipal and Woolworth Buildings and the Seventy-fourth Street station of the Interborough Rapid Transit Company, in which turbines of 40,000 hp. capacity, the largest units running at the present time in a railway plant, have been installed.

Financial and Corporate

ANNUAL REPORTS

Chicago Elevated Railways

The combined statement of income, profit and loss of the Metropolitan West Side Elevated Railway, the South Side Elevated Railroad and the Northwestern Elevated Railroad, which are controlled by the Chicago (Ill.) Elevated Railways, is as follows for the year ended June 30, 1915:

Gross operating revenue		$8,045,265
Way and structures	$163,679	
Equipment	334,928	
Power	911,094	
Conducting transportation	2,042,388	
Traffic	6,479	
General and miscellaneous	411,738	
Total operating expenses		$3,870,306
Net operating revenue		$4,174,959
Taxes, city compensations and other items		700,243
Operating income		$3,474,716
Non-operating income		*117,906
Gross income		$3,592,620
Interest and rents		*2,188,409
Net income		$1,404,211
Dividends		1,105,373
Surplus		$298,838

*Inter-company rentals deducted.

On account of the new classification of accounts issued by the Illinois Public Utilities Commission for the first year to end on June 30, 1915, the figures for the year ended June 30, 1914, are not generally comparative with the foregoing figures. An exception, however, is the gross operating revenue, which for the preceding fiscal year amounted to $8,182,861. Hence the gross operating revenue for the last fiscal year decreased $137,596 or 1.7 per cent.

United Railways Investment Company

The statement of net income applicable to the common stock of the United Railways Investment Company, San Francisco, Cal., based on the assumption that this company and its controlled companies are one, is as follows for the year ended June 30, 1915:

Gross earnings	$32,574,111
Operating expenses and taxes:	
Operating expenses	$17,166,109
Taxes	1,482,416
Total operating expenses and taxes	$18,648,525
Net earnings	$13,925,586
Other income	474,821
Gross income	$14,400,407
Deductions from income (rents, miscellaneous interest, etc.)	3,691,471
Net income before deducting fixed charges	$10,708,936
Fixed charges—interest on bonds, notes, etc., held by the public	*6,240,101
Net income after deducting fixed charges	$4,468,835
Dividends on preferred stock held by public	†1,536,977
Balance available for improvements, etc., and dividends on common stock	**$2,931,858
Improvements, etc., charged against income by the several companies	860,434
Balance available for dividends on common stock	‡$2,071,423

*Includes $358,771 interest on series "B" second mortgage 5 per cent bonds of Sierra & San Francisco Power Company, payable in like bonds up to and including Jan. 1, 1916.

†Includes $799,130 for dividend on United Railways Investment Company preferred stock, although none was declared during the year.

**Proportion applicable to common stock of United Railways Investment Company, $1,369,789, or 6.715 per cent.

‡Proportion applicable, as before, $828,705, or 4.062 per cent.

It should be noted that the foregoing statement includes no charges for depreciation as such, and no amounts charged against income for sinking fund requirements. Moreover, the results included for the Philadelphia Company and its affiliated companies are for the year ended March 31, 1915. The report states that the 6 per cent serial notes of 1908 have now been reduced from $3,500,000 to $700,000 and $2,800,000 of the notes cancelled. During the period covered by this report $600,000 was paid on the principal of the notes and on Aug. 16, 1915, $200,000 more was paid. The 6 per cent convertible gold bonds of 1910 have been reduced from an original issue of $1,229,000 to $790,000. A total of $1,066,000 par value of the 5 per cent collateral trust sinking fund gold bonds has been purchased out of earnings and is now held by the trustee of the sinking fund. During the six months ended June 30, 1915, the floating debt was reduced $79,000, and to date $149,000. The United Railroads of San Francisco has paid $50,000 on account of its notes held by the United Railways Investment Company, thus reducing the amount now in the treasury to $740,000.

The statement of income, profit and loss of the subsidiary United Railroads of San Francisco, controlled through the California Railway & Power Company, for the year ended June 30, 1915, follows:

Gross earnings:	
Passenger	$7,968,094
Advertising	56,000
Total	$8,024,094
Operating expenses and taxes:	
Maintenance of way and structures	$633,943
Maintenance of equipment	435,826
Transportation	3,129,801
General	558,255
Total	$4,757,826
Taxes	516,000
Total operating expenses and taxes	$5,273,826
Net earnings	$2,750,268
Other income	208,058
Gross income	$2,958,326
Income charges	522,147
Net income before deducting bond interest	$2,436,179
Bond interest:	
United Railroads' bonds	$954,160
Underlying bonds	674,492
Total	$1,628,652
Net income	$807,526
Surplus at beginning of year	1,018,632
Profit and loss credits	154,146
Profit and loss—gross surplus	$1,980,305
Profit and loss charges	961,649
Profit and loss—surplus, June 30, 1915	$1,018,656

The total earnings of the United Railroads of San Francisco decreased from $8,506,725 for the year ended June 30, 1914, to $8,024,094 for the last fiscal year, an amount of $482,631. This decrease took place entirely in the passenger earnings, which fell off 5.7 per cent. The operating expenses, however, increased from $4,722,737 to $4,757,826, an amount of $35,089 or 0.74 per cent, while the taxes showed an increase from $503,800 to $516,000, an amount of $12,200 or 2.4 per cent. The net earnings of the company therefore suffered a loss of $529,920 or 16.1 per cent. The other income of the company increased $22,421, income charges increased $99,323 and bond interest decreased $16,058, so that the net income showed a decrease of $590,765. After the profit and loss credits and debits, however, the surplus at the end of the last fiscal year was very slightly larger.

The decrease in the passenger earnings for the year is said to be essentially accounted for by the jitney competition and by the general depression. At the present time it is stated that, notwithstanding the jitneys, the earnings are running ahead of last year. During the fiscal year there was a decrease of $135,631 in "railroads, properties and franchises," while the additions and betterments totaled $202,174. The reserve for depreciation increased $426,198 during the year. Since June 30, 1914, $205,000 of underlying bonds have been retired.

The business of the Sierra & San Francisco Power Company, outside of the sale of power to the United Railroads of San Francisco, which business at June 30, 1914, amounted for the year to $397,963 or approximately 35 per cent of the gross receipts, increased at June 30, 1915, to $455,276 or approximately 39 per cent of the gross. The gross income of the Coast Valleys Gas & Electric Company showed a reduction of less than 1 per cent, notwithstanding the heavy and continuous rains lessening the demand for electric energy for irrigation purposes, and also notwithstanding the reduction in rates required by the commission.

JITNEYS CAUSE RECEIVERSHIP

Atlantic City & Shore Railroad Suffers Unbearable Losses Because of Unrestricted and Unfair Jitney Competition

Clarence L. Cole on Nov. 26 was appointed receiver of the Atlantic City & Shore Railroad, Atlantic City, N. J., by Judge Rellstab in the Federal Court at Trenton. The main cause of the receivership was the losses brought about by jitney competition, the growth of which has been described from week to week in the Traffic and Transportation department of the ELECTRIC RAILWAY JOURNAL.

During the five years preceding 1915 the company's net profits aggregated $200,000, all of which was invested in extensions and road betterments. With the growth of the jitney traffic the company's gross receipts for the current year were reduced by $100,000, so that instead of closing the year with a profit, as heretofore, it was confronted with a deficit of $80,000. The jitneys were permitted to pick up the best part of the traffic without regulation or restrictions, thereby creating an unfair competition which the company could not meet. An appeal was made to the authorities of Atlantic City, requesting the enactment of regulations which would protect the company, but the request was denied.

Mr. Cole after his appointment issued the following statement:

"There will be neither suspension of service nor any material curtailment of cars for the immediate future at least. I will confer with officials of the line, counsel for bondholders and others, and proceed to map out a policy. How it will succeed experience alone will tell. Ultimately if rehabilitation should be impossible under the conditions the court may order the sale of the line."

The application for the receivership was made in behalf of H. F. Bachman & Company, Philadelphia, who have a claim of $12,682. In addition, it was set forth that the company owed the West Jersey & Seashore Railroad $35,000, and that it would be unable to pay $23,875 due to the Girard Trust Company, Philadelphia, as December interest on a bond issue of $950,000.

CO-RECEIVERS FOR EMPIRE UNITED

C. Loomis Allen is Appointed by Court to Act with H. S. Holden in Receivership of New York Line

C. Loomis Allen was on Nov. 27 appointed co-receiver of the Empire United Railways, Inc., to act with H. S Holden. This action was taken at a hearing before Justice W. S. Andrews to show why Mr. Holden's temporary appointment, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 13, should not be made permanent. Not a single dissenting voice was raised to the appointment of the two permanent receivers instead of one.

Alexander H. Cowie, who represented the bondholders' protective committee and was also empowered to represent the trustee, the Columbia Trust Company, New York, proposed Mr. Allen's name. Mr. Cowie stated that on Nov. 1, when the road went into the hands of the temporary receiver, there was a feeling of uneasiness among the bondholders of the subsidiary Rochester, Syracuse & Eastern Railroad, and a committee was appointed to protect their interests. Bonds of $4,896,000 were outstanding, and about $2,041,000 have already been deposited. Mr. Cowie went on to say that under the mortgage provision covering these bonds the trustee could apply within thirty days for a sole receiver to operate the property behind the mortgage. The committee felt that this was too drastic a measure and suggested that a co-receiver be named at this time, but if such were not done the trustee would probably ask for a separate receiver.

William Nottingham for the company stated that it only desired an amicable readjustment of affairs with as little expense to the company as possible. He said that the bondholders above mentioned would have the right under the mortgage to divorce the Rochester, Syracuse & Eastern Railroad from the Syracuse, Lake Shore & Northern Railroad and the Auburn & Northern Railroad, which, with the former, make up the Empire United Railways, Inc. He did not believe, however, that this would be to the advantage of the consolidated property, as the Rochester, Syracuse & Eastern Railroad would then have to pay a large rental for trackage as before the consolidation. He therefore stated that the company acquiesced in the naming of a co-receiver, and Deputy E. H. Lewis, representing the attorney general's office, also agreed to the appointment.

OAKLAND-ANTIOCH REFINANCING APPROVED

California Railroad Commission Authorizes New Securities for Capital Debts—Deferred Interest Unpaid and New Stockholders' Loan to Be Funded in 1918

The California Railroad Commission has approved a plan to refinance the Oakland, Antioch & Eastern Railway, Oakland, Cal., through the issuance of $1,195,000 of first mortgage bonds and $262,200 of promissory notes. The proceeds of both bonds and notes sold are to be used solely for the company's debts for capital expenditures, represented by notes or accounts payable. The bonds are to be sold to bondholders or stockholders for cash, or issued in payment of bond interest earned, at not less than 80 per cent face value. The $262,200 of 6 per cent notes maturing on Jan. 1, 1918, are to be issued to stockholders for cash at face value. Of the bonds, $328,000 may be pledged as security for the $262,200 of notes, stockholders being obligated in case of non-payment of principal or interest to accept the pledged bonds in full compensation at 80 per cent of face value. Bondholders who have not signed the present agreement may participate at any time just as the signers. The application to the commission was noted in the ELECTRIC RAILWAY JOURNAL of July 13.

The company stated before the commission that its stockholders had paid assessments amounting to $1,215,000 and incurred a deficit of almost $456,774, and after two years of operation they had found their indebtedness and their interest obligations beyond their ability to pay. Over one-eighth of the capital stock, or 12,600 shares, was forfeited for non-payment of assessments. The company told the commission that another assessment would bring still greater forfeiture with a possibility of a general refusal to support longer the growing burden of debt. On June 30, 1915, there was due $1,027,657 of outstanding indebtedness, secured by $1,493,000 of pledged bonds. There was due on July 31, 1915, accounts payable of $219,643, or a total of $1,247,300 of pressing obligations. In addition $317,500 of gold notes will be due on Feb. 1, 1918. The company thus faced receivership or a temporary readjustment, pending demonstration of its earning capacity.

Under the plan now approved as a remedy for this condition the bondholders' agreement calls upon the bondholders of the Oakland, Antioch & Eastern Railway and the two controlled lines, the Oakland & Antioch Railway and the San Ramon Valley Railroad, to deposit their interest coupons maturing during 1915, 1916 and 1917 with the Union Trust Company of San Francisco. Before Jan. 1, 1918, the Oakland, Antioch & Eastern Railway agrees to deposit with that trustee as many first mortgage bonds, dated Oct. 1, 1911, as at 80 per cent shall equal the face value of all interest coupons deposited and unpaid by Jan. 1, 1918. Moreover, in the interim, the railway agrees to pay 6 per cent interest on the deposited coupons. On Jan. 1, 1918, the trustee is to distribute the deposited bonds, the bondholders surrendering for cancellation their receipts showing the face value of the deposited coupons. The stockholders' agreement calls upon the stockholders to lend the Oakland, Antioch & Eastern Railway $3 a share payable at different periods before July 1, 1916. The railway agrees to deposit with the trustee promissory notes equal to the stockholders' payments and first mortgage bonds double the face value of the notes. On Jan. 1, 1918, the deposited bonds at 80 per cent are to be distributed to the stockholders in payment for their loans.

Commissioner Edgerton, who wrote the decision, stated that he could not authorize bonds to be issued for bond interest payments, but if the security holders of the railway desired to make a total sacrifice of $510,000 they should be permitted to do so, in so far as the bonds and notes represent capital expenditures. Yet, if any holders declined such a sacrifice, it was their privilege and right.

American Railways, Philadelphia, Pa.—It is reported that a single holding company will take over the control of the American Railways and the National Properties Company. The plan for the amalgamation of these two companies was described in the ELECTRIC RAILWAY JOURNAL of Nov. 6. The main feature was the purchase by the National Properties Company of the American Railways common stock, payment being made in new collateral trust bonds of the former company. The formal call for deposits under such an arrangement, first noted in the issue of Nov. 27, has been extended until Dec. 15.

Baton Rouge (La.) Electric Company.—An initial dividend of 2 per cent has been declared on the common stock of the Baton Rouge Electric Company, payable on Dec. 1 to holders of record on Nov. 22.

Citizens' Traction Company, Oil City, Pa.—An initial dividend of 1 per cent, or 50 cents, has been declared on the common stock of the Citizens' Traction Company, payable on Dec. 1 to holders of record on Nov. 22.

Clarksville & Dunbar Cave Railway, Clarksville, Tenn.—A. C. Murray, formerly president of the Clarksville & Dunbar Cave Railway, is now operating this 5.5-mile line as receiver. This change in condition was caused by automobile competition.

Kansas City Railway & Light Company, Kansas City, Mo.—The depositaries for receiving claims and stock under the Kansas City Railway & Light Company reorganization plans, primary and supplemental, are as follows: In Kansas City, Mo.—New England National Bank, First National Bank, Fidelity Trust Company, Southwest National Bank of Commerce, City Center Bank, Commerce Trust Company, Gate City National Bank, Pioneer Trust Company, National Reserve Bank, Commercial National Bank and Western Exchange Bank. In Chicago, Ill.—Continental & Commercial Trust & Savings Bank. In Louisville, Ky.—National Bank of Kentucky.

Lima-Honeoye Light & Railroad Company, Avon, N. Y.—It is reported that the Lima-Honeoye Light & Railroad Company, operating a 6-mile line between Lima and Honeoye Falls, is now in the hands of a receiver. A previous note in regard to commission refusal to allow the separation of the light from the railway business was published in the ELECTRIC RAILWAY JOURNAL of July 3.

Minneapolis, Anoka & Cayuna Range Railroad, Minneapolis, Minn.—The Minneapolis, Anoka & Cayuna Range Railroad has completed the last step in the reorganization which has been under way since Jan. 26, 1914, when F. H. Hunter was appointed receiver for the old Minneapolis & Northern Railway, which built the line. Mr. Hunter managed the property until Jan. 27, 1915, when Charles P. Bratnober and his associates acquired the title by lien foreclosure. Mr. Bratnober then sold the line to the Minneapolis, Anoka & Cayuna Range Railroad, and the property was finally cleared of outstanding obligations on Nov. 13, 1915, when the receiver was discharged and deeds of conveyance were filed.

Monongahela Valley Traction Company, Fairmont, W. Va.—At special meetings of stockholders of the Monongahela Valley Traction Company and the Fairmont Gas Company on Nov. 24, the sale of the gas company to the traction company was ratified. The details of this proposed sale were published in the ELECTRIC RAILWAY JOURNAL of Nov. 6.

Republic Railway & Light Company, New York, N. Y.—Reilly, Brock & Company, Philadelphia, Pa., have sold at 97.75 and interest, to yield more than 5.75 per cent, the unsold portion of the $3,000,000 of 5 per cent three-year secured gold notes of the Republic Railway & Light Company. The purchase of these notes was mentioned in the ELECTRIC RAILWAY JOURNAL of Nov. 20. The proceeds will be used to pay off the $3,000,000 of 5 per cent notes maturing on Jan. 1, 1916. The new notes are dated Dec. 1, 1915.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The San Francisco-Oakland Terminal Railways has asked the California Railroad Commission for authority to issue promissory notes to banks as follows: $36,569 to each of the following: Central National Bank of Oakland, Bank of California, National Association, Savings Union Bank & Trust Company, Anglo & London Paris National Bank, and Oakland Bank of Savings; a note for $29,520 to the Central National Bank of Oakland, and a note for $6,089 to the First National Bank of Oakland. All these notes are payable one year from date and bear interest at 6 per cent. They are to redeem notes, now due, which have been partly paid.

Southern Public Utilities Company, Charlotte, N. C.—The Illinois Trust & Savings Bank, Chicago, and Wm. Morris Imbrie & Company, New York, are offering for sale $3,250,000 of first and refunding mortgage 5 per cent gold bonds of the Southern Public Utilities Company. The bonds are dated July 1, 1913, and due on July 1, 1943. The authorized issue is $30,000,000 and the above-stated amount represents all the outstanding securities. They are redeemable on any interest date beginning with Jan. 1, 1916, at 105 and interest. A large portion of the issue has already been placed with investors, but the unsold balance is being offered at 95.5 and accrued interest, to yield about 5.3 per cent.

Taunton & Pawtucket Street Railway, Taunton, Mass.—In accordance with the recent opinion handed down by the full bench of the Supreme Judicial Court, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 16, Judge Wait of the equity session of the Superior Court on Nov. 23 entered a decree directing the foreclosure of a trust mortgage held by the Federal Trust Company, securing a total of $200,000 of bonds issued by the Bristol County Street Railway. The court also appointed as receivers of the property covered by the mortgage Thomas T. Robinson, Dedham, Mass., John Lovejoy, Rockland, Me., and John A. Arnold, Pawtucket, R. I. The receivers of the old Bristol street railway sold the property to the Taunton & Pawtucket Street Railway subject to the above-mentioned mortgage. The purchasing company has maintained in a long legal fight since 1909 that the mortgage and the bonds secured thereby were illegal and invalid and did not constitute a lien upon the property it had acquired. The foreclosure now ordered, however, forms the final decision against this contention, and the bondholders are now in a position to realize upon their holdings through the foreclosure of the street railway property.

Virginia Railway & Power Company, Richmond, Va.—W. J. Parrish has been elected a director of the Virginia Railway & Power Company, the board being increased to fifteen members.

Washington (D. C.) Interurban Railway.—The property of the Washington Interurban Railway, including the single-track electric railway from Fifteenth and H Streets, Washington, D. C., to Berwyn Heights, Md., a distance of 8.5 miles, is to be sold at foreclosure on Dec. 23 at the latter place. It is said that the foreclosure is made under the first mortgage of the Washington, Spa Springs & Gretta Railroad, the predecessor company, under which mortgage $232,000 of twenty-year 5 per cent bonds are outstanding. The court authorization of the sale was noted in the ELECTRIC RAILWAY JOURNAL of July 31.

Washington-Oregon Corporation, Vancouver, Wash.—The reorganization plan of the Washington-Oregon Corporation permits every creditor to participate in the North Coast Power Company, which recently purchased the corporation's properties, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 13. The holders of first mortgage bonds of the corporation will receive 40 per cent of first mortgage bonds of the power company and 60 per cent of preferred stock, while the holders of second mortgage bonds will receiver 49 per cent of common stock and an option to buy the balance of preferred and common stock.

Washington Water Power Company, Spokane, Wash.—The maturity of $3,336,000 of 6 per cent notes, due on Feb. 2, 1916, has been provided for by the Washington Water Power Company through the sale of $1,700,000 of two-year 5 per cent notes, dated Feb. 2, 1916, and $1,700,000 of first refunding mortgage 5 per cent bonds, due in 1939. The first issue was sold largely to holders of maturing notes. The bonds were purchased and resold at par and interest by White, Weld & Company and Lee, Higginson & Company, New York.

DIVIDENDS DECLARED

Baton Rouge (La.) Electric Company, 3 per cent, preferred; 2 per cent, common.

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1½ per cent.

Citizens' Traction Company, Oil City, Pa., 50 cents, common.

Frankford & Southwark Passenger Railway, Philadelphia, Pa., quarterly, $4.50.

Indianapolis (Ind.) Street Railway, 3 per cent.

Louisville (Ky.) Traction Company, quarterly, 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '15	$71,401	*$35,961	$35,440	$17,450	$17,990
1 " " '14	69,099	*29,159	39,940	17,323	22,617
12 " " '15	783,707	*387,671	396,036	211,970	184,066
12 " " '14	777,721	*372,008	405,713	208,868	196,845

BATON ROUGE (LA.) ELECTRIC COMPANY

1m., Sept., '15	$16,446	*$8,685	$7,761	$2,193	$5,568
1 " " '14	14,332	*9,384	4,948	2,087	2,861
12 " " '15	185,470	*109,269	76,201	25,527	50,674
12 " " '14	177,278	*115,159	62,119	25,182	36,937

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., Sept., '15	$33,639	*$18,184	$15,455	$6,594	$8,861
1 " " '14	27,773	*17,817	9,956	6,396	3,560
12 " " '15	344,372	*207,270	137,102	79,196	57,906
12 " " '14	367,115	*210,435	156,680	76,218	80,462

CITIES SERVICE COMPANY, NEW YORK, N. Y.

1m., Oct., '15	$411,505	$14,323	$397,182	$40,833	$356,349
1 " " '14	300,212	10,391	289,821	40,833	248,988
12 " " '15	4,232,915	163,503	4,069,412	490,000	3,579,412
12 " " '14	3,940,940	103,057	3,837,883	396,666	3,441,217

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m., Sept., '15	$68,914	*$33,426	$35,488	$8,710	$26,778
1 " " '14	59,970	*33,179	26,791	8,601	18,190
12 " " '15	679,441	*379,186	300,255	104,940	195,315
12 " " '14	650,066	*398,404	251,662	100,388	‡162,810

GRAND RAPIDS (MICH.) RAILWAY

1m., Sept., '15	$100,771	*$68,404	$32,367	$14,002	$18,365
1 " " '14	108,327	*74,706	33,621	13,690	19,931
12 " " '15	1,195,379	*824,876	370,503	164,282	206,221
12 " " '14	1,288,300	*833,073	455,227	159,440	295,787

PENSACOLA (FLA.) ELECTRIC COMPANY

1m., Sept., '15	$22,013	*$12,187	$9,826	$7,061	$2,765
1 " " '14	20,510	*13,666	6,844	7,272	†428
12 " " '15	246,989	*146,777	100,212	86,639	13,573
12 " " '14	280,441	*176,742	103,699	86,334	17,365

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., Oct., '15	$2,219,105	$1,232,080	$987,025	$816,614	$170,411
1 " " '14	2,097,100	1,195,274	901,826	807,938	93,888
4 " " '15	8,066,754	4,530,010	3,536,744	3,264,763	271,981
4 " " '14	7,910,776	4,557,958	3,352,818	3,234,036	118,782

PORTLAND (ME.) RAILROAD

1m., Sept., '15	$102,069	*$57,291	$44,778	$19,250	$25,528
1 " " '14	95,122	*53,522	41,600	19,555	22,045
12 " " '15	1,050,120	*654,855	395,265	261,197	134,068
12 " " '14	1,038,223	*641,664	396,559	256,549	140,010

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Sept., '15	$454,856	*$258,679	$196,177	$184,165	$12,012
1 " " '14	483,313	*262,257	221,056	184,666	36,390
12 " " '15	5,639,948	*3,081,249	2,558,699	2,210,355	348,344
12 " " '14	6,511,485	*3,319,816	3,191,669	2,148,892	1,042,777

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m., Sept., '15	$609,782	*$387,575	$222,207	$182,823	$39,384
1 " " '14	683,557	*399,925	283,632	177,816	105,816
12 " " '15	7,690,014	*4,775,166	2,914,848	2,165,430	749,418
12 " " '14	8,623,412	*5,054,890	3,568,522	2,108,802	1,459,720

REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.

1m., Oct., '15	$276,355	*$166,411	$109,944	$58,915	‡$51,135
1 " " '14	251,893	*164,016	87,877	57,143	‡31,056
10 " " '15	2,511,277	*1,538,926	972,351	577,046	‡396,595
10 " " '14	2,500,002	*1,550,746	949,256	564,505	‡386,729

SAVANNAH (GA.) ELECTRIC COMPANY

1m., Sept., '15	$64,018	*$42,693	$21,325	$23,127	†$1,802
1 " " '14	65,201	*42,779	22,422	22,800	†378
12 " " '15	799,977	*520,751	279,226	278,358	868
12 " " '14	848,945	*565,072	283,873	274,218	9,655

TAMPA (FLA.) ELECTRIC COMPANY

1m., Sept., '15	$78,756	*$39,265	$39,491	$4,371	$35,120
1 " " '14	80,755	*42,738	38,017	4,258	33,769
12 " " '15	976,210	*498,552	477,658	52,751	424,907
12 " " '14	964,417	*525,974	438,443	55,559	382,884

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

SKIP STOP DENIED IN MILWAUKEE

Popular Vote, After a Three Months' Trial of the Skip Stop, Is Against the Plan

The Wisconsin Railroad Commission has decided not to authorize the general introduction of the skip stop on the system of The Milwaukee Electric Railway & Light Company. A test of the system has been made, with the authority of the commission, on three of the lines of the company during the past three months. The trial was authorized at the request of the city of Milwaukee and on Nov. 20, at the direction of the commission, a vote was taken of the patrons of the line to determine how popular the plan was with them. To secure an indication of the relative convenience or inconvenience to patrons living at different distances from the business center of the city, each line was divided into six zones, and during the week in question ballots by which passengers could state their preference were distributed and collected by inspectors of the commission working in groups of two. The ballots were so arranged that by tearing off one corner the preference of the patron could be easily indicated without the inconvenience of writing while on a moving car. The ballots were issued when the passengers paid their fare and were collected when they left the car. The returns were separated by zones. Approximately 45,000 ballots were distributed, and of these 36,040 were returned to the inspectors.

Of the total votes cast, 41.6 per cent were in favor of the plan and 58.4 per cent opposed to it. The votes by zones showed that a larger percentage of the patrons in the zones farther from the business center favored the plan than in the zones nearer the center of the city. In the nearest zone the votes in favor of the plan, on the three lines, were respectively only 38.2 per cent, 39.5 per cent, and 31.8 per cent, whereas in the farthest zone they were 49.8 per cent, 48.1 per cent and 36.6 per cent.

As a result of this study the commission has decided that the plan "would cause material inconvenience to a majority of the patrons, and that this inconvenience would more than offset the advantages of speed and operation to be gained." In consequence, the plan was discontinued on Dec. 1.

In commenting on the defeat of the plan a representative of one of the political parties in Wisconsin is quoted as saying that in his opinion much of the opposition arose from the idea that the benefits from the skip stop accrued primarily to the company rather than to the public.

James D. Mortimer, president of The Milwaukee Electric Railway & Light Company, expressed the belief that if the trial had extended over six months instead of three months the patrons would have had a better chance to realize the advantages to them of the quicker service and the vote would have been different. He also said that the company had encountered practically as much antagonism when it had introduced the near-side stop in Milwaukee, but that as the merits of this improvement became more familiar to the people all opposition had disappeared.

SCOPE OF ILLINOIS TRACTION SERVICE

Company Issues Pamphlet Showing Interchange of Freight with More than Eighteen Steam and Electric Roads in Eight States

The Illinois Traction Company, Peoria, Ill., has issued a circular in which is set forth the broadened scope of services which it is performing for shippers in the St. Louis and East St. Louis district. In the pamphlet are listed names of stations in Illinois, Indiana, Minnesota and the Dakotas reached by the McKinley System and its connecting steam railroads. It also gives routeing instructions and tariff references, which commercial traffic managers and shipping clerks will find useful. There is an account of the equipment owned and operated by the company.

The McKinley System has its main freight station in St. Louis, at Twelfth Street and Lucas Avenue, and in addition substations for package freight, to which drayage is absorbed, at the receiving stations of the St. Louis Transfer Company, the Columbia Transfer Company, Fidelity Transfer Company and Beck Drayage Company.

H. H. Wylie, general agent of the Illinois Traction System at St. Louis, is quoted as follows:

"St. Louis shippers, and travelers generally, have not been fully initiated into the workings of a big interurban system. Every day there come up incidents of this. The idea prevails that we handle passengers and a little express business, but relatively few merchants and manufacturers realize what the system is doing in the way of freight distribution. With the municipal loop agitation, and effort being made by St. Louis to secure the entry of other interurbans, the proposition of educating the people in the benefits of interurban service is an important one. In a small way we are trying to do something along these lines with the pamphlet 'Specific Services.' The McKinley System interchanges freight with more than eighteen steam and electric railroads in Missouri, Illinois, Indiana, Iowa, Michigan, Minnesota and North and South Dakota, and it has combination rates and services with many boat lines on the Mississippi and Illinois Rivers, and Lake Michigan."

In addition to the location of the St. Louis team tracks and substations, the pamphlet enumerates those in East St. Louis, Granite City, Madison and Venice. According to the pamphlet, the Illinois Traction System offers special advantages for the movement of merchandise or package freight, which is transported on express time at freight rates. The time of transit to many places within 200 miles of St. Louis is reduced to the utmost minimum. Package cars are forwarded daily to points in Illinois, Iowa, Minnesota and the Dakotas.

FAVORABLE SKIP-STOP VOTE IN ST. LOUIS

The skip-stop schedule on trial on the Broadway and the Olive Street lines of the United Railways, St. Louis, Mo., was indorsed by the patrons of the lines by a majority of more than three to one in a referendum on Nov. 22. The total vote was, "yes" 67,588, "no" 21,395. Richard McCulloch, president and general manager of the company, discussing the result of the election, is reported to have said:

"The company is pleased with the outcome and feels that many of those who did not vote are for the 'eliminated stop' schedule, because those who were opposed to the new system were active in their objection. Although only half of the patrons of the lines voted, we feel that the public has shown considerable interest in the question."

Putting this question to passngers grew out of the application of the United Railways for a permit to eliminate several hundred stops, including all of its lines. The Public Service Commission, while declining to grant the permit, did authorize the company to eliminate 101 stops along its Broadway and Olive Street lines, during three months, to find, through such a test, whether the proposed plan was popular. The company, after making the experiment, asked passengers to pass upon the matter.

STATE SAFETY FIRST CONFERENCE

A safety first conference, called under the auspices of the State Department of Labor, was held in Oklahoma City, Okla., on Nov. 17 and 18. Nearly 200 representatives of different industries were present to listen to various speeches on safety work and to examine safety exhibits.

The chairman and speaker at the first session was George W. Knox, second vice-president and general manager of the Oklahoma Railway. Mr. Knox described the purposes of the meetings and discussed safety first work in general. The best definition of safety first that he had ever seen was "the exercising of ordinary care and the elimination of taking chances." He believed that the idea of indemnity insurance is wrong and that this method constitutes a premium-offering scheme for carelessness. To his mind the problem of how to prevent accidents is the easy part of the whole proposition, but the difficult part is to get people to think and act in a precautionary manner. Mr. Knox felt that a precautionary system of education should be devised and established in all schools and colleges, particularly for the elementary grades when the young mind is most susceptible to impressions. This method would result in inculcating thoroughly and absolutely all of the essentials for so shaping one's acts that all causes of danger will be eliminated to the fullest degree possible.

At the last session of the conference the Oklahoma Safety First Council was definitely organized. Oklahoma is said to be the first State to form such an organization. The body will be patterned to a certain extent after the National Safety Council, and the by-laws of the national organization will be used as far as possible. The purpose of the organization is to secure an energetic representative in every leading industry of the State to perfect smaller organizations in the industry. The latter, in turn, would perfect local organizations in the towns. A central committee, consisting of representatives from several different lines of industry, was named, with W. G. Ashton, State Commissioner of Labor, as chairman. More members are to be added as rapidly as possible. This winter it is planned to have a campaign for arousing meetings in every town. Motion picture films and stereopticon slides will be utilized.

RAISED SAFETY ZONES FOR DETROIT

Detroit will experiment with the raised safety zone in an endeavor to protect street car patrons from vicious and reckless automobile drivers who now drive heedlessly through the chalk-marked safety zones in the streets. The experiment will be made at Woodward and Adams Avenues, two blocks away from the most congested crossing in the heart of the city. The raised platform will be built of concrete. Police Commissioner Gillespie will be in charge of the experiment.

When safety zones for street car riders were first laid out on Detroit streets the ends of the zones were protected by standards. So many of these were knocked over at night, however, by automobile drivers, that the police department eliminated the standards and marked the ends of the zones with round disks. These do not furnish any obstruction to a driver wanting to drive through the safety zone, and as a result many street accidents have occurred within the zones. The determination to elevate the surface to an extent that will compel motorists to observe the zones is a kind of desperate last hope of the police department.

Officials of the Detroit United Railway have not looked with particular favor upon the kind of raised zone which is proposed, although they have expressed themselves as content to abide by any experiment which will decrease street accidents. It is the contention of the street railway operators that Detroit's climatic conditions in winter will make a concrete platform close to the car tracks dangerous for passengers. It is their idea that the cities cited as examples of the value of the raised zone are not confronted with the winter conditions which exist in Detroit. They fear that in the rush hour with crowds endeavoring to get upon a narrow concrete platform passengers may be shoved or slip in front of the car wheels.

Six-for-a-Quarter Tickets Discontinued.—The Lincoln Railway & Heating Company, Lincoln, Ill., has abolished the custom of selling six tickets for 25 cents.

Early Shopping Card.—The Buffalo, Lockport & Rochester Railway, Rochester, N. Y., is displaying in all its cars an early shopping sign. The card reads "Christmas Is Coming —Do Your Shopping Now." The card carries a picture of St. Nicholas.

Interurban Increases Fare.—The Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., announced an increase from 1¾ cents to 2 cents per mile, effective on Dec. 1. The 10 cents extra fare for limited cars will be continued.

Massachusetts Fare Increase Suspended.—The Public Service Commission of Massachusetts has suspended until May 1, 1916, the proposed increase in fares by the Massachusetts Northeastern Street Railway, Haverhill, Mass. The commission has fixed on Dec. 14 as the date for commencing the hearing in the case.

Gates on All Seattle Cars.—The work of installing safety gates on cable cars of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has been completed, and every car the company now operates has gates. The electric cars were equipped first, the cable cars being the last to remain with open gates and running boards.

Installing Thermometers in St. Louis Cars.—In compliance with the orders of the Public Service Commission of Missouri the United Railways, St. Louis, is installing thermometers in its 1400 cars. Under the ruling of the commission the temperature inside the cars must be at least 45 deg. Fahr., and not more than 70 deg. Fahr., when the outside temperature is 35 deg. Fahr., or less.

Complainants Fail to Appear at Fare Hearing.—None of the plaintiffs appeared at the hearing before the Public Service Commission of the Second District of New York on the complaint of L. L. Amidon and others against the Warren & Jamestown Electric Railway, in which they seek a reduction of the fare between Frewsburg and Jamestown, N. Y., from 10 cents to 5 cents. The hearing has been adjourned indefinitely.

City and Company to Confer on Car Type.—The Ontario Railway & Municipal Board on Nov. 22 directed the city of Toronto and the Toronto Railway to confer immediately as to the best type of car to be substituted for the running board vehicle. They have thirty days to agree on a type of car. If at the end of that time they fail to come to a complete understanding the city will have fifteen extra days to suggest an alternative type of car, with final appeal to the railway board.

Increase in Wages in Manchester.—The Manchester (N. H.) Street Railway, Manchester & Derry Street Railway and the Manchester & Nashua Street Railway have increased the wages of their trainmen to the following scale: First year, 23 cents an hour; first half of second year, 24 cents an hour; second half of second year, 25 cents an hour; third year, 26 cents an hour; fourth year, 26½ cents an hour; fifth year, 27 cents an hour; sixth year, 28 cents an hour; seventh year, 29 cents an hour; after seven years, 30 cents an hour.

Illinois Commission Jurisdiction Suit on Dec. 14.—In the suit in the Circuit Court of Cook County in which the city of Chicago questions the authority of the Public Service Commission of Illinois, the court, acting upon the joint application of the Attorney General for the State and the Corporation Counsel for the city, has decided to hear arguments on Dec. 14. Counsel having agreed not to enforce the service order until the case has been argued, the court has not acted on the prayer of the complainant for a temporary order to restrain the commission from putting the service order into effect. The terms of the order of the commission fixing service standards were reviewed at length in the ELECTRIC RAILWAY JOURNAL of Oct. 20, page 931.

Rates Advanced in Missouri.—The Missouri Public Service Commission recently granted an increase from 2 cents to 2½ cents a mile for passenger fares, with somewhat lower rates on round trips and mileage books, and an increase of about 5 per cent in freight rates. The commission held that a former state reduction from 3 cents to 2 cents a mile in the passenger rates was not accompanied by a sufficient increase of business to offset the lower income. In granting a general increase to the petitioning carriers the commission said: "When it is considered that we are asked to fix one schedule of rates that will be reasonable for fourteen railroads serving territory dissimilar in cost of construction, in destination and character of traffic, some containing large commercial centers and forming valuable connections with other carriers, while others do not, it is apparent, however well informed the commission should be as to the value of the property upon which the carrier is entitled to earn a reasonable return, no adjustment of the rates could be expected in which equal results would follow as to the return received by each carrier."

Buffalonians See the Liberty Bell.—The presence of the Liberty Bell in Buffalo on its return to Philadelphia after its circuitous transcontinental trip from San Francisco presented one of the most difficult traffic problems handled by the International Railway, Buffalo, N. Y., in some time. During the hour that the bell was on exhibition in Buffalo, it is estimated that at least 60,000 persons tried to view it, and that 75 per cent of those who inspected the historic relic rode on the street cars. The ease with which the problem was handled by the railway without delay or extreme overcrowding delay was commented upon by the police and city officials. Nelson H. Brown, general superintendent of transportation, and T. W. Connette superintendent of the Buffalo city lines, took personal supervision of the car movement. Cars of almost every route in the city were looped through Main, Exchange, East Seneca and Michigan Streets, within less than 500 ft. of the bell, so the need for transferring from one line to another in congested downtown centers was almost entirely eliminated. The superiority of the controlled entrance type of near-side pay-as-you-enter cars over the old type cars was again demonstrated.

Skip Stops Begun in Detroit.—Starting on Sunday, Nov. 28, the Detroit (Mich.) United Railway began the operation of skip stops on the Woodward Avenue line, the heaviest passenger traffic line in Detroit. The skip stops are not effective within the heart of the city. In so far as possible the stops have been made at alternate blocks, cars running in opposite directions not stopping at the same intersection except at transfer points. Stops have been marked by poles painted white. The company was moved to immediate action following the receipt of a letter from Commissioner of Police Gillespie, in which he urged the establishment of the skip stops. Briefly, his reasons for asking for the new plan of stops are: The addition of trailers on Woodward Avenue has practically blocked east and west traffic in many of the short blocks; the contemplated action of the Common Council in compelling motorists to stop with the street cars will be made more practical; the belief that the plan will make possible the putting on of more cars, thereby affording greater accommodations for the public, especially during the rush hours. If the experiment on Woodward Avenue proves satisfactory to the authorities and the public the skip-stop plan will be extended to other lines in the city.

Ohio Supreme Court Decides Fare Case.—The Ohio Supreme Court on Nov. 19 handed down a decision in which a 5-cent fare is established on the line of the Interurban Railway & Terminal Company between Pleasant Ridge and Fountain Square, Cincinnati. Pleasant Ridge, then an independent village, granted franchise rights on competitive bidding as to fares in 1901. The Rapid Transit Company was the successful bidder. It offered a 7-cent fare with transfers, with the proviso that the fare would be reduced to 5 cents should the village be annexed to the city of Cincinnati. The franchise was afterward assigned to the Interurban Railway & Terminal Company. Subsequently the village was annexed to the city. Suit was filed to enforce the terms of the franchise and the decisions of both Courts of Common Pleas and Appeals were in favor of the city. The company made the defense that it did not own the lines through Norwood and is compelled to pay the Cincinnati Traction Company 3 cents out of each fare for the use of its tracks. It contended further that the village ordinance was invalid, for the reason that it attempted to fix the rate of fare outside its own limits. The court held that the acceptance of the franchise constituted a binding contract between the two parties.

"Safety" Motion Picture Films Available.—The use of motion picture films in educational work is becoming more common every day, and perhaps in no other branch of education have they proved more effective than in teaching workmen and the public generally about the causes and remedies for accidents. Three electric railway companies which have had made for their own use series of films showing accidents common in electric railway operation and the means of avoiding them are the Chicago (Ill.) Surface Lines, Pittsburgh (Pa.) Railways and Pacific Electric Railway, Los Angeles. It is interesting to learn that arrangements have recently been made by the National Safety Council of Chicago by which these films are available to other railway companies. The National Safety Council held its last annual convention at Philadelphia on Oct. 19-21. This meeting was reported on page 905 of the issue of this paper for Oct. 30. The members are largely steam railroads and industrial corporations, although a number of electric railways were represented at the Philadelphia convention. H. A. Bullock, of the Brooklyn (N. Y.) Rapid Transit Company, was elected at that meeting a member of the board of directors and chairman of the membership committee of the electric railway section, and hopes to interest other electric railway companies in the important work being done by the Council.

Personal Mention

Mr. C. F. Bruce, auditor and purchasing agent of the Tulsa (Okla.) Street Railway, has resigned to become secretary and treasurer of the Southwest Mortgage & Investment Company, Tulsa.

Mr. A. Ludlow Kramer, president of the Electric Properties Corporation, New York, N. Y., has resigned in order to take a rest after an operation. Mr. Guy E. Tripp, chairman of the Westinghouse Electric & Manufacturing Company, has been elected to succeed him temporarily.

Mr. C. Loomis Allen, chairman of the board of the Maryland Electric Railways, vice-president of the Syracuse & Suburban Railroad, president of the Newport News & Hampton Railway, Gas & Electric Company, and formerly president of the American Electric Railway Association, has been appointed co-receiver of the Empire United Railways, Inc., Syracuse, N. Y. Mr. H. S. Holden, Syracuse, was appointed receiver of the company on Nov. 1.

Mr. J. S. Pevear, president of the Birmingham Railway, Light & Power Company, Birmingham, Ala., a subsidiary of American Cities Company, whose time has been largely engaged in connection with the administration of the United Gas & Electric Engineering Corporation in New York, took active charge of the Birmingham property on Dec. 1. Mr. J. P. H. De Windt will remain with the Birmingham property in the capacities of vice-president and general manager.

Mr. H. C. Kendall has resigned as traffic engineer with the Portland Railway, Light & Power Company, Portland, Ore., to accept a position with the Denver (Col.) Tramway, of which Mr. F. W. Hild, former general manager of the Portland Railway, Light & Power Company, is now vice-president and general manager. Mr. Kendall was engaged about three years ago to make a traffic survey and work out rerouting plans for the Portland Railway, Light & Power Company. Prior to coming to Portland he was connected with the Illinois Traction Company. Mr. Kendall is a graduate of Massachusetts Institute of Technology.

Dr. W. F. M. Goss, chief engineer of the Chicago Association of Commerce committee on smoke abatement and electrification of railway terminals, has been dean of the college of engineering of the University of Illinois since 1907. For two years past he has been absent on leave from the university to permit him to devote his entire attention to the work of the committee, an abstract of the report of which appears elsewhere in this issue. Dean Goss is well known in the fields of steam railroading, mechanical engineering and education, to each of which he has made notable contributions. Immediately after completing his studies at the Massachusetts Institute of Technology in 1879 he organized the department of practical mechanics at Purdue University. He was identified prominently with Purdue for a long period, occupying the positions of professor of experimental engineering, dean of the schools of engineering and director of the engineering laboratories. In this connection he co-operated with the steam railroads in making tests of locomotives and of parts of railroad equipment, which work has been continued at Illinois. He recently served as president of the A. S. M. E. and has held numerous other positions in technical societies. He is the author of several books, principally on locomotive topics. At Illinois he was instrumental in establishing the department of railway electrical engineering, which is coordinate with those of railway mechanical and railway civil engineering. These three departments form a special school which has exceptional facilities for their work.

DR. W. F. M. GOSS

Mr. Nathan A. Rumney, the newly appointed general freight and express agent of the Detroit (Mich.) United Lines, was born in England on June 16, 1878. When he was eleven years old he moved to Detroit, Mich. After completing his education in the public schools of that city, he began work with the Michigan Central Railroad in 1894. In October, 1901, he joined the late George W. Parker, his predecessor, in organizing and developing the express and freight service on the Detroit United Lines. His first position with this company was in the general freight department, and he afterward filled various traffic positions until he was appointed traveling freight and express agent in 1905. As general freight and express agent, Mr. Rumney will assume charge of a department handling the heaviest electric interurban express and freight traffic in this country with the possible exception of the Pacific Electric terminal at Los Angeles, Cal. The Detroit freight terminal alone receives and delivers more than 1,000,000 lb. of freight daily. The system of the Detroit United Lines comprises more than 850 miles of track.

NATHAN RUMNEY

Mr. G. H. T. Shaw recently succeeded Mr. C. A. King as general manager of the Lee County Central Electric Railway, Lee Center, Ill. From 1887 to 1889 Mr. Shaw was connected with the Lake Shore & Michigan Southern Railroad as a rodman and assistant engineer on the line between Cleveland and Buffalo. In 1890 he served as assistant engineer in charge of field work on building the section of double track for the Chicago & Northwestern Railroad from Rochelle to La Fox, Ill. In 1892 and 1893 he was engineer in charge of a party in the location of the Ferrocarrille del Cauca from Buenaventura to Cali, Colombia, South America. From 1893 to 1905 Mr. Shaw established himself as a consulting engineer with offices at Dixon, Ill. During this period he had charge of large works in swamp drainage in Illinois, Wisconsin and Indiana and irrigation projects in California and Oregon. From 1905 to 1910 Mr. Shaw was located at Toluco, Mexico, in charge of extensive surveys for the location of 1100 km. of railway from Mexico City to Acapulco. From 1910 to 1913 Mr. Shaw was manager for the Balsas & Pacific Railway, with offices in London, England. This company had started to build a railway along the route of surveys made by Mr. Shaw, who called in the surveying parties in 1913. Since then Mr. Shaw has been located at Lee Center. The Lee County Central Electric Railway is now the owner of a part of a system of interurban electric railways started in 1903 by Mr. Shaw and his associates and projected to extend from DeKalb, Ill., to Rock Island, Ill. Mr. Shaw was president of the three companies. The old companies are all defunct, but it is the hope of the present company to build the system along the lines which were formerly in view.

OBITUARY

P. E. Huber, one of the founders of the Oerlikon Works in Switzerland, died at Zurich, on Oct. 4, at the age of seventy-nine. He was a native of Zurich and received his education in the local Polytechnic High School, of which Mr. Alfred Escher was at the time president. After practical experience with the Sulzer firm in Winterthur and with Escher, Wyss & Company in Zurich, Mr. Huber in 1863 founded the firm of P. E. Huber & Company at Oerlikon, which, after various changes, in 1876 took the form of the Maschinenfabrik Oerlikon. Mr. Huber continued to be the active director in charge until 1894, and from then until 1911 remained as president of the advisory council of the firm, of which he was a member at the time of his death. He also served as president of the Aluminum-Industrie A. G., Neuhausen.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Evanston (Ill.) West Side Railway.**—Incorporated in Illinois to own and operate electric railways. Capital stock, $10,000. Incorporators: Bertram W. Rosenstone, Henry J. Myerson and Oscar A. Ross.

***Lawrence, Topeka & Western Railway, Lawrence, Kan.**—Incorporated in Kansas to construct an electric railway from Lawrence to Topeka. The line will be on the north side of the Kaw River. Capital stock, $100,000. Incorporators: Former Governor W. R. Stubbs, J. D. Bowersock, J. E. Stubbs, A. Henley, C. E. Dutton and C. R. Hosford, all of Lawrence.

FRANCHISES

Long Beach, Cal.—The Pacific Electric Railway has received permission from the Council to abandon its line beginning at Seventh Street and Pine Avenue and extending westerly to Seventh Street and Riverside Drive.

Belvidere, Ill.—The Elgin & Belvidere Electric Company has accepted the ordinance adopted by the Council of Belvidere on Sept. 2 which provides for the abandonment of the city lines. The line on West Lincoln Avenue and the tracks on South State Street south of Logan Avenue are to be taken up and the poles removed within thirteen months and the tracks on the State Street line north of a point just south of the Chicago & Northwestern Railroad within two years.

Buffalo, N. Y.—The International Railway has asked the Council for a franchise to construct a double-track extension on Washington Street between Ohio and Perry Streets; also on Ohio Street from Washington to Main Street. This extension will connect with the new terminal station being built by the Lackawanna Railroad, the Cleveland & Buffalo Transit Company and the Detroit & Cleveland Navigation Company at the foot of Main Street at Ohio Street.

Salt Lake City, Utah.—The Utah Light & Traction Company has asked the Council for a franchise to extend its Capitol Hill line along Second North Street across the front of the capitol, thence north on West Canyon Avenue to a point east of the capitol building.

Seattle, Wash.—The franchise committee of the Council has recommended that the petition of the Puget Sound Traction, Light & Power Company to operate a shuttle service in the circuitous route of the Ballard Beach line be granted. The company proposes to operate the Ballard Beach cars direct to the city and to operate a one-man car over the shuttle line. The committee, however, recommended that the company issue transfers to and from the shuttle line on a 4-cent ticket, and the company has agreed to this provision.

TRACK AND ROADWAY

Pine Bluff (Ark.) Company.—Material has been received for the reconstruction of this company's line on Cherry Street from Sixth to Twenty-sixth Avenue. From Sixth to Sixteenth Avenue the line will be double tracked, and to the end of the line at Twenty-sixth Avenue a concrete foundation will be laid and the track rebuilt.

San Diego (Cal.) Electric Railway.—Plans are being made by this company to extend its line on University Avenue to Euclid Avenue.

Municipal Railways of San Francisco, San Francisco, Cal.—The Board of Works has approved the city engineer's plans for the construction of the Church Street municipal railway between Eighteenth and Twenty-second Streets. This section of the road will run through Mission Park from Eighteenth to Twentieth Street and over a right-of-way the city has bought between Twentieth and Twenty-second Streets. The specifications provide for the removal of buildings, grading and track construction. Bids will be received by the Board of Works on Dec. 8.

Belleville & Mascoutah Traction Company, Belleville, Ill.—During 1916 this company plans to build 10 single-track miles of line between Belleville and Mascoutah.

Chicago, Milwaukee & St. Paul Railroad, Chicago, Ill.—Operation will be begun by this company on its electrified division from Deer Lodge to Three Forks, Mont., on Dec. 8. The complete electrification will consist of four divisions extending across the Rocky Mountains, comprising 650 miles of single track. Construction crews are now working on the second division from Three Forks to Harlowton.

Illinois Traction System, Peoria, Ill.—Efforts are being made to have this company build a line from Edwardsville east to Marine and to Highland.

***Washington, Ind.**—Plans are being considered to build an electric railway between Washington and Linton through Bicknell, Frelandville, Pleasantville and Dugger. Options on the right-of-way, it is understood, have been taken. A. L. Brocksmith, Bicknell, is interested in the project.

Charles City (Iowa) Western Railway.—An extension from Charles City to Colwell, 8 miles, has been completed by this company.

Tri-City Railway Company, Davenport, Iowa.—This company is considering the extension of a line into territory to the southeast of Moline.

Fort Scott & Pittsburg Railway, Fort Scott, Kan.—A report from this company states that negotiations are now under way with a construction company to build its line from Fort Scott to Pittsburg, 36 miles. The line will connect Fort Scott, Garland, Arcadia, Mulberry, Frontenac and Pittsburg. H. A. Cooper, Redfield Building, acting secretary. [Sept. 4, '14.]

Arkansas Valley Interurban Railway, Wichita, Kan.—A report from this company states that operation will be begun this week on its new 29-mile line to connect Halstead and Hutchinson via Burrton.

Berkshire Street Railway, Pittsfield, Mass.—It is expected that this company's Lee-Huntington extension will be in operation from Lee to Otis within a month. The company recently filed with the Public Service Commission an application for a certificate of operation covering that portion of the new extension, built two years ago, but not yet placed in operation.

Electric Short Line, Minneapolis, Minn.—Tracklaying has been begun by this company on its 45-mile extension from Winsted to Hutchinson and it is expected to have the new line in operation by January, 1916. The company expects to build about 50 miles of new line during 1916.

Fallon (Nev.) Electric Railroad.—This company reports that it expects to begin operation early next spring.

Interborough Rapid Transit Company, New York, N. Y.—Bids for the installation of tracks on the White Plains Road extension of the Lenox Avenue branch of the existing subway were opened last week by the Public Service Commission for the First District of New York. This line extends northerly from the terminus of the existing road at Bronx Park through White Plains Road to 241st Street, near the northern city line. It is to be a three-track elevated railroad, and will be operated in conjunction with the present subway system by the Interborough Rapid Transit Company. The steel structure for the new line is rapidly approaching completion, and the contract for station finish work has already been awarded. The two lowest bids for the work were received from the Coast & Lake Contracting Corporation, at $53,930.50, and the Southeastern Construction & Engineering Corporation at $101,205.86. Bids were opened on Nov. 30 by the Public Service Commission for the First District of New York for the construction of Section No. 2, Routes Nos. 19 and 22, being a part of the Southern Boulevard and Westchester Avenue branch of the Lexington Avenue subway. The line, which will be elevated, extends on Whitlock Avenue and Westchester Avenue from Bancroft Street to Eastern Boulevard. Unofficial totals of the two lowest bids are: Lawrence C. Manwell, 1665 Eighty-second Street, Brooklyn, $2,063,877; A. L. Guidone Company, 131 East Twenty-third Street, New York, $2,072,700.

Manhattan & Queens Traction Corporation, New York, N. Y.—This company reports that during 1916 it expects to build 4 miles of single track.

Westchester Street Railroad, White Plains, N. Y.—This company is improving its White Plains-Tarrytown line. Practically the entire roadbed is being changed or raised to conform with the grades of the Tarrytown-White Plains State Road improvement. The tracks on Benedict Avenue, Yonkers, are being removed from the side to the center of the street. Tracks will also be laid in Elmsford.

Grand Forks (N. D.) Street Railway.—This company reports that during 1916 it will construct about 1 mile of new track in Grand Forks.

Ohio Valley Traction Company, Portsmouth, Ohio.—This company reports that it expects to build 21 miles of single track during 1916 to connect Ironton and Portsmouth. All materials have been purchased and all contracts let. The line will be completed about May 1, 1916.

Oklahoma (Okla.) Railway.—This company reports that during 1916 it expects to construct a 16-mile single-track extension from Edmond to Guthrie.

Oklahoma Union Traction Company, Tulsa, Okla.—This company reports that during 1916 it expects to build 15 miles of new interurban line between Tulsa and Sapulpa.

Sombra, Ont.—Plans are being discussed for a hydro-electric radial line for the river front to touch all the points of population from Wallaceburg to Sarnia. W. A. Scott, Bickford, Ont., clerk.

Portland Railway, Light & Power Company, Portland, Ore.—This company is seeking the abandonment of two short pieces of its line, one of which is on Burnside Street from Fifth to Washington Street at Sixteenth Street, and the other on Maryland Avenue from Shaver to Prescott Street. The company contends that both of these lines are little used and are operated at heavy expense.

Panama (Panama) Electric Company.—A report from this company states that plans are being made to build an extension to Fort Amador. The power plant being constructed by the company is nearing completion.

Harrisburg (Pa.) Traction Company.—The Council of East Berlin has granted right-of-way to this company into East Berlin for the maintenance of a trackless trolley line between East Berlin and Dover. The Council of Dover has already granted this permission. The line will carry both passengers and freight. It is expected that work on the proposed route will be begun in the near future.

Highland Grove Traction Company, McKeesport, Pa.—This company reports that it proposes to construct an extension from McKeesport to East Pittsburgh.

Slate Belt Electric Street Railway, Penn Argyl, Pa.—During 1916 this company expects to construct 15 miles of new line between Wind Gap and Stroudsburg.

Rhode Island Company, Providence, R. I.—Track has been laid by this company on Broad Street, Central Falls, to connect with the new Blackstone River bridge.

Chattanooga (Tenn.) Traction Company.—Grading has been begun by this company on its extension to Hixon. It is stated that grading will be completed in ninety days and the laying of track will be begun, the order for the rails having been placed some weeks ago.

***Cleveland, Tenn.**—H. M. Linn, Cleveland, is agitating the project of an electric railway from Cleveland to Chattanooga, Knoxville and Ocoee. In this connection he is quoted as stating: "Officials of the Tennessee Power Company recently went to Benton, where they recorded a charter for operation of an electric railway from a point on the Louisville & Nashville Railroad, near Ocoee, to Parksville. The company now operates between 5 miles and 6 miles of steam railway between these points and proposes to convert this line into an electric road for both freight and passengers. Every move thus far points to the development of a pleasure resort at Parksville."

Nashville Railway & Light Company, Nashville, Tenn.—This company has filed an amendment to its charter, authorizing it to construct a branch line from the Nineteenth Street line between Lillian and Rothschild Streets into Shelby Park.

Beaumont (Tex.) Traction Company.—Plans are being considered by this company to extend its Sabine Street line on Doucette Street to Grove Street, Beaumont.

Temple & Marlin Interurban Railway, Temple, Tex.—Formal organization of this company was completed at a meeting held at Marlin on Nov. 24. The following officers were elected: G. W. Glass, Marlin, president; George Harter, Temple, first vice-president; J. J. Waits, Durango, second vice-president; W. W. Turner, Marlin, secretary; T. A. Cheeves, Marlin, treasurer, and S. D. Hanna, Temple, chief engineer. The company expects to have the line in operation within the next eighteen months. [Sept. 25, '15.]

Bingham Canyon, Utah.—As soon as franchises in Bingham and through the county can be secured work will be begun on the electric line between Bingham and West Jordan, where the line will connect with the Salt Lake & Utah Railroad. Surveys have been completed and the capital for construction, estimated at $250,000, is available at once. Harry S. Joseph is interested. [Aug. 7, '15.]

Monongahela Valley Traction Company, Fairmont, W. Va.—H. L. Lambert, vice-president of the Undercurrent Company of America, has been in consultation with officials of the Monongahela Valley Traction Company in regard to the installation of a car line without poles or overhead trolley wire to operate from Clarksburg's business center, across the new concrete bridge to the Baltimore & Ohio Railroad station in Glen Elk, testing out the patents of the Undercurrent Company of America.

Weston & Glenville Electric Railroad, Weston, W. Va.—At a meeting of this company held on Oct. 30 it was decided to discontinue business as a corporation and surrender its charter and corporate franchises. Notice of the dissolution of this company has been sent to the Secretary of State of West Virginia. [July 10, '15.]

SHOPS AND BUILDINGS

Illinois Traction System, Peoria, Ill.—The Jacksonville Railway & Light Company, Jacksonville, Ill., a subsidiary of the Illinois Traction System, has purchased the building occupied by the Jacksonville National Bank. The first floor of the building will be equipped for a salesroom and waiting station for this company.

Boston (Mass.) Elevated Railway.—This company is completing extensive alterations and additions to its freight and trolley terminal property at Copps Hill Wharf. The company has recently purchased from the New Haven Railroad a tract of 1 acre of land adjoining that owned by the elevated. The enlarged terminal will include about 2 acres. It will have three freight sheds to one now used. Seven automobiles and property to the value of about $12,000 were destroyed on Nov. 23 when an explosion of gasoline set fire to the garage in the Boston Elevated yards on Harrison Avenue.

Laurel Light & Railway Company, Laurel, Miss.—This company is demolishing the old building at the Laurel-Ellisville Park and is erecting a moving picture theater with other attractive structures.

***Dallas, Tex.**—It is reported that interurban electric railway interests centering in Dallas have reached an agreement for the construction of a large system of terminals and a Union station. Stone & Webster Engineering Corporation, Boston, is interested.

POWER HOUSES AND SUBSTATIONS

Connecticut Company, New Haven, Conn.—This company has applied to the Council for a permit to rebuild and enlarge its power station on Commerce Street, Hartford. Four 1000-hp. boilers and a coal conveyor will be installed. The station will be equipped with smoke consumers. The cost of the proposed improvements, it is estimated, will reach the sum of $197,000.

Sapulpa & Oil Field Railway, Tulsa, Okla.—This proposed railway is contemplating the installation of a power plant at Shamrock to supply electricity for operating machinery in the oil fields and also for railway use. High-tension lines will be used. J. A. Frates, general superintendent of the St. Louis & San Francisco Railroad, St. Louis, is president of the company.

Manufactures and Supplies

ROLLING STOCK

Oakwood Street Railway, Dayton, Ohio, is reported as preparing plans for the purchase of new cars.

Dayton, Springfield & Xenia Southern Railway, Dayton, Ohio, it is reported, will rebuild three of its cars shortly.

Springfield (Mo.) Traction Company during the year rebuilt four double-truck and two single-truck cars in its own shops.

Salt Lake & Ogden Railway Company, Salt Lake City, Utah, is reported to be in the market for six large open trail cars.

Alton, Granite & St. Louis Traction Company, Alton, Ill., has rebuilt two cars in its own shops for limited service between Alton and St. Louis. The company is now rebuilding another car.

Pittsburgh (Pa.) Railways has ordered fifteen center-entrance interurban cars from The J. G. Brill Company, in addition to the order for 175 city cars reported in the ELECTRIC RAILWAY JOURNAL of Nov. 27.

New York (N. Y.) Municipal Railway, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 27, as expecting shortly to buy 100 more cars for its subway system, has issued requests to carbuilders for bids on this equipment.

Lewiston, Augusta & Waterville Street Railway, Portland, Me., has ordered from the Laconia Car Company seven 35-ft. flat cars with diamond arch bar trucks. This order is in addition to that ordered by the same company in October for five flat cars with trucks.

Worcester (Mass.) Consolidated Street Railway has converted two double-truck closed cars and one double-truck open car into the prepayment type. The reconstruction of nine double-truck open cars into the prepayment type is also under construction and is expected to be completed before the end of the year.

Chattahoochee Valley Railway, West Point, Ga., has ordered one 32-ft. 9-in. Edison storage battery car from the Railway Storage Battery Car Company, New York, N. Y. The car, which will be built by The J. G. Brill Company, is somewhat similar in general type to the two storage battery cars now operating on the Long Island Railroad between Valley Stream and Mineola. It will have double folding doors at each platform opening and will have two compartments, with a partition door in between, for separating whites from negroes.

TRADE NOTES

Westinghouse Traction Brake Company, New York, N. Y., has received an order to equip with straight air brakes two passenger cars of the Bush Terminal Railroad, Brooklyn, N. Y.

Spray Engineering Company, Boston, Mass., has adopted a new trademark and also the trade name "Spraco" to apply to all its products, including air washers, nozzles and cooling systems, etc.

I. R. Nelson Electrical Manufacturing & Repair Works, Newark, N. J., have moved into larger quarters in Newark. The new factory is located on Bond Street, where two buildings are being equipped with modern machinery for the manufacture of field and armature coils and general electrical repair materials for traction and industrial motors and generators. A system of vacuum drying and impregnating apparatus is also being installed.

Western Electric Company, New York, N. Y., announces that on Nov. 18 all of the assets of the Western Electric Company of Illinois were acquired by transfer to a company chartered under the laws of the State of New York, to be known as Western Electric Company, Inc. The stockholders of the Western Electric Company came to the conclusion that it was desirable that the company should have two classes of stock, common and non-voting preferred. As the statutes of Illinois do not provide for such classifications it was decided that the company should change its legal domicile. No change in the policies, operations, or management of the company is involved. The same board of directors and officers still continue. The Western Electric Company, Inc., under the laws of New York will have $15,000,000 of 6 per cent cumulative preferred stock and 150,000 shares of common stock at no par value, but with $5 paid in, making a total of $750,000. The Western Electric Company has changed its Detroit headquarters from 263 Franklin Street to Kirby and Dequindre Streets. The new building is two stories high and has a frontage of 150 ft. and a depth of 130 ft. adjoining the Grand Trunk Railway in the section that forms a part of the inner belt railway of Detroit. The total floor space is 50,000 sq. ft., and the yard with an area of 54,000 sq. ft. is large enough to accommodate stocks of cross-arms, clay conduit and poles.

ADVERTISING LITERATURE

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued Bulletin No. 24 describing its complete line of small motors.

Chicago Patented Tools Company, Racine, Wis., has issued a card illustrating its "Potstada" drop forged steel shear for cutting steel plate up to ⅛ in. in thickness.

Harrison Safety Boiler Works, Philadelphia, Pa., have issued a reprint of a paper entitled "Establishing and Maintaining Boiler Room Economy," which was presented before the Ohio Society of Mechanical, Electrical & Steam Engineers by George H. Gibson.

Pelton Water Wheel Company, San Francisco, Cal., has issued sheets in the Spanish, Portuguese and English languages, which are intended to direct the attention of machinery users to the possibility of using Pelton water wheels for every class of apparatus.

Dick, Kerr & Company, Ltd., London, England, have just published a well illustrated pamphlet showing the character and scope of the work recently undertaken by them. At present they have large engineering works at Kilmarnock and at Preston, England. The former are devoted to the production of narrow gage steam locomotives, electric locomotive bodies, dump carts for contractors and similar material, while at Preston heavy electrical machinery is made, including generators of all types from 1000 kw. up, with direct connected turbines, converters, transformers, railway motors, etc. At these works, also, metal filament lamps have been manufactured during the past three years, and the Britannia works at Preston can turn out 8000 a day. Among the turbo alternators built at Preston recently are three of 1875 kva. for Madras, one for 2500 kva. for St. Helen's and one for 5500 kva. for the London & Southwestern Railway. Among the machines of lower speed designed for use of the reciprocating steam engines or water turbines are four of 1500 kw. for the Japanese State Railways and three of 8900 kva. for the British Columbia Electric Railway. Dick, Kerr & Company were responsible for the equipment of the Bury & Holcombe Brook line of the Lancashire & Yorkshire Railway with a direct current overhead system at a voltage of 3500. The concern also takes contracts of a civil engineering character.

RECENT ENGLISH DEVELOPMENTS

For many years the matter of connecting the populous district to the east of Middlesbrough by means of a tramway has been considered, and despite numerous setbacks the project is at last nearing realization. Within the next few weeks trackless trams will be running from North Ormesby, through Cargo Fleet and South Bank to Grangestown, and from South Bank to Normanby. For the immediate future, the system will have terminals at the Middlesbrough end of Smeaton Street, North Ormesby, near the Market Place, Grangestown, and the junction with the Redcar Road at Normanby. The standards have been erected along practically the whole of the route, and the cable is now being put into position. A large shed has been erected on the Middlesbrough side of South Bank to accommodate the cars, which will be similar in type to those which are running so successfully in Bradford and Leeds.

To meet the depletion in the municipal service occasioned by men undertaking military duties, women tramcar conductors were recently introduced on a section of the Nottingham electric car routes, a limited number, mostly related to men who have gone to the front, being at first engaged. It is intended to increase the number if the experiment proves successful.

Electric Railway Journal

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JUDGE McCALL'S REMOVAL

Few people, we believe, will find fault with Governor Whitman for his action this week in removing Chairman McCall of the Public Service Commission of New York, First District. The charges which form the basis for the removal are quite different in character than those which were presented against the late chairman and certain other members of the commission last spring. It is difficult to understand how a man of Judge McCall's undoubted ability and experience could have neglected to comply with a perfectly proper provision of the public service law, which was certainly violated in the spirit if not in the letter. The Governor was justified in this removal, but it remains to be seen whether he will exercise equally good judgment in the appointment of a successor and with the other appointments for public service commissioners which will come up during his term. Any further appointments should be made purely on the basis of fitness for office. Such a qualification includes knowledge of the needs of the public utility companies and of the public in the way of public utility service, a judicial ability to decide conflicting claims dispassionately and correctly, a standing in the community which will give these decisions weight, and a temperament which will withstand adverse criticism when the possessor knows he is right. The last appointment made by the Governor to the commission in the first district was said to be based upon "personal" reasons. We hope that the appointment of a successor to Judge McCall will be based on the fitness to office only of the appointee. The responsible nature of the duties demands this.

REWARDING REAL DIRECTORS

Much attention has been paid to the new $50,000,000 American International Corporation, formed to open up safely and intelligently a way for American investments in foreign markets and to finance and operate new projects in developing the resources of foreign countries with which trade is desired. A notable work, truly, but the very magnitude of the proposition has caused many to overlook one interesting feature of the corporation that is in reality the best earnest of successful operation. We mean the allowance to the directors of $1,000,000 of managers' "preferred" stock, which although only one-fiftieth of the total stock will participate to the extent of one-fifth in all excess profits after the dividends on this stock and the common stock up to 7 per cent have been paid. This method of giving directors a share in the profits is new in this country, but very common abroad, where it has been found of great advantage in securing the service of capable men and their steadfast attention to increasing the profits of the corporation. Its efficacy, of course, largely depends on whether the holding of the managers' stock is rigidly restricted to those actively engaged in the work of management. It must be remembered that the plan constitutes simply a monetary inspiration, and if excessively large boards of directors and the membership of names only are still desired, American corporations in general will not secure many benefits by emulating the American International Corporation. In other words, the plan constitutes a reward for efficient management, but this reward is susceptible of sure and unerring application only when all inefficient and useless deadwood in the directorate is thoroughly eradicated.

"PLAIN TALKS TO OUR STREET CAR PATRONS"

What is publicity from the electric railway standpoint? This is a question that the ELECTRIC RAILWAY JOURNAL has endeavored to answer a good many times. But just what electric railway publicity is—what it consists of; what it looks like, and how it is handled—remains obscure in a great many minds. For this reason we commend to the attention of the industry a pamphlet under the above title issued by The Milwaukee Electric Railway & Light Company, containing reprints of sixteen articles printed in the local newspapers. Twenty-two of these have been printed and others will follow. The articles show how losing rates and excessive taxes prevent the giving of the best service; explain the size and usefulness of the system; show how the city of Milwaukee broke its agreement with the company and prevented the earning of a fair return under the conditions fixed by the original bargain with the city; how the earnings per passenger have declined; how money that should be spent on electric railway service is diverted to other purposes; explain how the company is taxed by the State on more than $5,600,000 of actual values, the existence of which for earning purposes the State refuses to recognize; indicate how politicians trying to win favor by baiting street railways, whittle down wages and cripple the service; prove that rising costs and falling revenues justify prompt action for the relief of the company; and in conclusion they meet squarely the question, Why higher fares? We know of no better concrete example of what electric railway publicity means than is embodied in these articles. Their effect upon the public has been very satisfactory. Although it was for the information of its patrons rather than for the industry as a whole that these articles were prepared, we feel quite safe in saying that copies of them will be gladly sent to any railway man who asks for them.

FUNDAMENTAL RATE ISSUE PASSED UPON

The recent decision of the Missouri Public Service Commission in increasing railroad passenger rates from 2 cents to 2½ cents, even with certain restrictions on mileage book rates and the like, will undoubtedly be considered a surprising development in railroad rate-making. This is not so much on account of the size of the increase as on account of the fact that in making its decision the commisison in the face of a State-wide notorious unfriendliness to common carriers has dared to express itself quite candidly on a fundamental issue heretofore usually dodged. In its two big rate cases the Interstate Commerce Commission each time evaded the issue of a general advance in railroad rates, with the objection that such an advance might mean the accumulation of excessive profits by some lines. Now, however, the Missouri commission has placed on record a definite attack on this point of view that must sooner or later be fully and openly met in the tribunals of highest resort.

On the unassailable premise that railroads need advanced rates in order to be able to meet their obligations and maintain dividends in such a manner as to encourage further investments, the commission has granted a general increase. The reasons advanced in support of this act form the noteworthy part of the decision. Considering that it had been asked to fix one schedule of rates that would be reasonable for fourteen railroads serving dissimilar and not equally advantageous territories, the commission proclaimed that, however well-informed it might be as to the values upon which the companies were entitled to earn a fair return, it could not adjust the intra-state rates so as to produce an equality of earnings through district or line discriminations. Moreover, it justified this refusal to tinker with the rates of individual companies by emphatically declaring that differences in conditions respecting operating efficiency, economies of capitalization, and favorable routes and locations, are all elements that might with justice be reflected in differences among the various companies with regard to the profits secured from operation.

This basing of rates so that each company honestly constructed and operated can acquire a reasonable return, without a confiscation of profits in the case of the companies that under more favorable conditions and economy of operation have proved profitable, is quite at variance with the usual desire of the demagogue to cut down the profits of every prosperous company by passing maximum rate laws without regard to how these laws may affect the return of companies not so favorably situated. Thanks to recent rate decisions, such state laws can no longer be operative when they run into conflict with interstate rates, but the fundamental question involved in the Missouri decision still remains fairly up to the federal and other state commissions. If the Missouri commission finds it inequitable and even impossible to equalize profits by basing rates on values established, what will the Interstate Commerce Commission do with its enormously costly federal valuation figures? Does anyone contemplate that these valuation figures and a reasonable return thereon will be used in fixing different rate standards for separate companies so as to equalize the profits? If so, it would be well to look ahead and see whether the fundamental idea of the Missouri commission can be rebutted or whether it must be accepted as leading to the most equitable solution of the rate problem. If the Missouri decision can move the national authorities to meet fairly and squarely this fundamental issue raised, it will fulfill an inestimably greater need than the mere increasing of the Missouri rates, deserved as this was.

CLOSING THE TRACK RENEWAL LOOPHOLE

No street railway manager will disagree with the statement that one of the most urgent needs of the industry is a better public understanding of electric railway problems. In line with that thought, would not public attention directed to the unnecessary waste of materials and labor in making premature pavement and rail renewals aid in stopping one of the leaks in street railway operation? In other words, is not the decided stand taken by the Puget Sound Traction, Light & Power Company, Seattle, Wash., for relief from wasteful franchise obligations, mentioned on page 1005 of our Nov. 13 issue, suggestive of similar action by other companies? Perhaps in the first instance it would be unnecessary to resort to the public service commission, and certainly not in communities where the relations of the public and the railway company are otherwise satisfactory. Where companies are obliged to comply with wasteful ordinance requirements this field offers a fruitful opportunity for curbing unnecessary expenditures. Reference to the communications from engineers discussing rail renewals, published in recent issues, shows that municipal requirements rather than the exigencies of the case frequently preclude consideration of renewal problems from an economy standpoint. This condition is especially true of the pavement. Doubtless there are many instances where the waste is so inconsiderable as not to warrant serious objection on the part of the railway company. On the other hand, there are cases where the railway company could profitably afford to bring to the attention of the public the money lost in premature rail renewals.

Loopholes such as these have done much to reduce the railway company's net earnings, and an increase in rates to offset this loss in most communities is strictly out of the question. A diplomatic campaign of education continuously conducted whenever the railway is confronted with premature renewals should produce results. Sometimes these renewals may be treated as betterments and charged to capital account, but properly most of them should be paid out of operation. If the rate of increase in the depreciation fund has been such as to make the time elapsed insufficient to accumulate money to pay for an unnecessary renewal, where else can funds be obtained? No legitimate source, other than taking it out of the earnings, is afforded. Manifestly, if money spent in this manner could be saved it could be used on parts of the property where it was rightfully required. Summing up, we are of the opinion that an educational campaign to close these apparent loopholes will do much good and will materially aid in giving adequate protection to the integrity of electric railway securities.

CHICAGO ELECTRIFICATION AS AN ECONOMIC MEASURE

The complete report of the Chicago committee on smoke abatement and railway terminal electrification has come to hand this week, and an abstract of a number of the points not covered in the initial statement published last week is given elsewhere in this issue. The report is a volume of more than 1200 pages. Briefly, the portion on smoke abatement shows that the steam railroads are responsible for but 12 per cent of the total fuel burned in the city so that if all of these railroads should be electrified the reduction in the total smoke pollution of the atmosphere would be comparatively negligible. The second part of the book may be epitomized into three statements: (1) that the work will be much more difficult and costly than anything of its kind that has heretofore been undertaken; (2) when completed, the interest on the investment would bring about a heavy deficit annually, and (3), that the constitution of Illinois forbids participation by Chicago in any part of the heavy expense of this work.

Of course, the discovery that the railroads' smoke is almost a negligible fraction of that produced by other sources is by no means an argument against the importance of the subject under all circumstances. Steam locomotive smoke in particular locations is still going to constitute a reason for the substitution of electric power, and although the benefits accruing from the change may be indeterminate they will none the less be valuable. Locomotive smoke is in many instances a nuisance of more concentrated nature than that caused by domestic fires or factories. To the city at large it may be of minor importance, but it is not to be denied that in the immediate vicinity of a terminal in a large city, property values may be affected to an enormous extent.

An illustration will be found in the district in New York City that is reaping benefits from the electrification of the New York Central and New Haven railroads. Here an area two blocks in width extending from Forty-second Street to Fifty-sixth Street, which was at one time a veritable pest hole, has now become one of the most attractive portions of the city for business and amusement purposes, and, still farther north from the terminal, Park Avenue has become the most popular location in New York for high-priced apartment structures.

Undoubtedly the problem is one of great magnitude and difficulty, but the world would have stood still from the day of Adam if progress had not been made in overcoming obstacles of this kind. Is not this a time for the citizens of Chicago, acting through the municipality on the initiative of the Association of Commerce which instituted this original investigation, to see what they can do to help in this work? They are to be the chief beneficiaries in the increase in real estate values, in the advertisement which would come to the city from the completion of a work and from satisfactory terminal facilities. At present it is said that the constitution forbids the participation of Chicago itself in any way, but such things have been known as the bringing about of changes in constitutions. If the work of electrification cannot be undertaken at once the city of Chicago would do well to put itself in a position so that it can financially assist some of the more important companies to electrify if they cannot figure out a net direct saving from a railroad standpoint when all of the factors are taken into consideration.

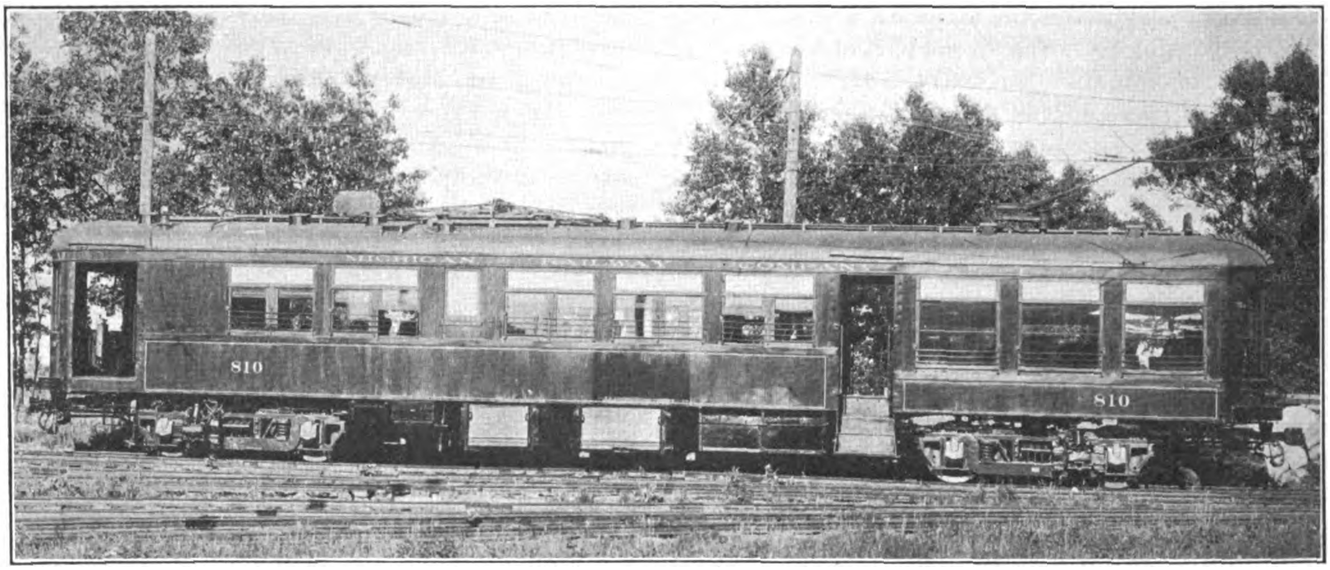
It is not too much indeed to expect that the results obtained by electrification in New York would be repeated, at least in part, on many of the existing steam railroad terminals in Chicago. A glance at the map of the city shows a number of terminals right in the heart of Chicago, where there is a great deal of property which would be most desirable if it did not abut on railroad entrance tracks and switch and freight yards. We wish that the committee in its exhaustive study of the smoke abatement problem and detailed analysis of the cost of electrical conversion had also given at least an estimate of the returns to the owners of this property and to the city at large for railway terminal electrification. It is true that the railroads themselves would derive directly only a small portion of the benefits thus obtained from the abolition of smoke and the greater track capacity, but the citizens of Chicago would undoubtedly derive in annual returns many times the annual deficit, even although it should be as high as the estimate of $15,000,000.

From the railroad standpoint there are distinct economies which accompany the use of electric power, but the railroads should not be asked to make the change where these direct returns are insufficient to pay at least the interest and depreciation upon the investment. If this is not the case, there is no incentive to the railroad to make the change. The Chicago report gives no indication that there may not be economic advantages with some individual roads, but simply that on the basis of the estimates of costs made it is not profitable for the roads as a whole. The question as it stands at the present day is larger than one of the exact and detailed costs of the proposed installation. Whether the committee has possibly been too conservative in its figures of cost for the entire installation is largely a matter of detail. We hope that a careful analysis of the situation as it applies to individual roads will show that even on the basis of net profit in dollars and cents certain roads will find the change warranted. The electrification of a few roads will constitute the best proof possible of the indeterminate benefits of electric operation, and it may induce the city to meet part of the expense for those railroads which cannot afford to electrify. If a precedent is needed it will be found in those States where the community now defrays part of the expense necessitated by the elimination of grades.

Steel Cars for Michigan Railway

Special Types Have Been Designed for Limited, Local and Express and Freight Service—The Electrical Equipment Includes 600-2400-Volt Motor Groups with Auxiliary Control and Lighting System Operated by Storage Battery

The all-steel passenger and express cars recently placed in service by the Michigan Railway Company on its new 2400-volt, third-rail line, which was described in the ELECTRIC RAILWAY JOURNAL for June 19, 1915, are remarkable in many respects. They are equal in appointment and provisions for the passengers' comfort to the finest steam railroad coaches, and they are the first cars to carry 600-2400-volt electrical equipment operated from a third-rail, possessing also the specially notable feature of storage-battery operation for the lighting system, control and all auxiliary equipment. Three types of cars have been provided for the different services—limited, local, and express, or freight—and the features of each type are outlined in the following paragraphs.



MICHIGAN RAILWAY'S CARS—VIEW OF LIMITED CAR SHOWING BEADED STEEL CAR SIDING

LIMITED CAR ARRANGEMENT

The motor cars for limited passenger-train service are, without doubt, the finest in interurban service in this country. They are of the side-entrance type, a feature adopted to provide exclusiveness for the parlor-observation compartment which occupies the rear end. The principal dimensions are as follows:

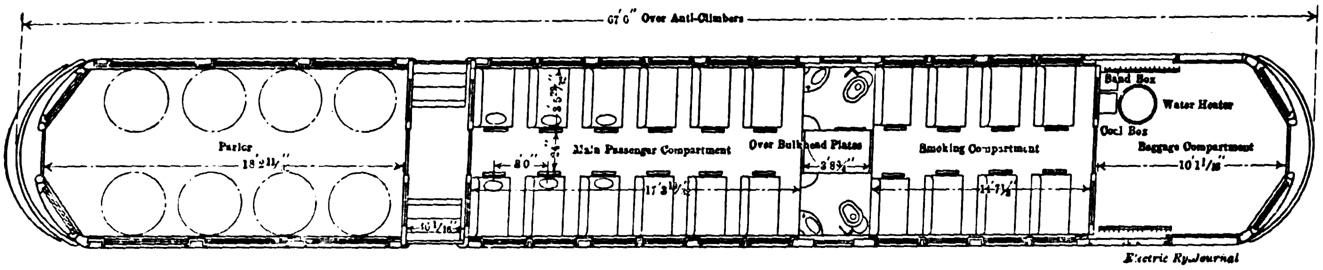
Length over all	67 ft. 8 in.
Length over vestibules	6 ft. 10 in.
Length parlor compartment	18 ft. 2 in.
Length passenger compartment	17 ft. 3 in.
Length smoking compartment	11 ft. 7½ in.
Length baggage compartment	10 ft. 1 in.
Width corridor at side entrance	3 ft.
Width over sheathing	9 ft. 6 in.
Height rail to top of floor	4 ft. 4 in.
Height rail to top of roof	13 ft. 7 in.
Truck centers	42 ft. 2 in.
Wheelbase	8 ft.
Wheels	37 in. diameter
Journals	6 in. x 11 in.

STRUCTURAL DETAILS

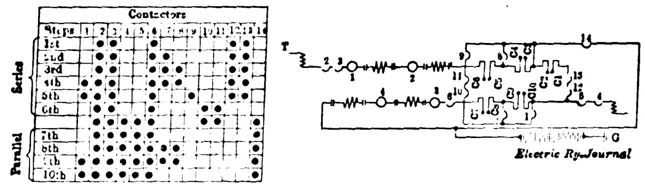
Undoubtedly the most unusual structural feature in these cars is the fish-belly girder type of underframe, which was necessitated to simplify the framing for the side entrances and for the large windows in the parlor section. Relatively light cross-bearers and side sills transfer all the load to the center sills, which also absorb buffing and pulling strains when the cars are operated in trains. The space between the sills is utilized to carry the conduits and some of the brake rods. The maximum depth of the center sills is 26½ in., tapering off to a depth of 8 13/16 in. inside the bolsters and to 7 13/16 in. at points just inside the corner posts. They are made up of 5/16-in. open-hearth steel plates with 3½-in. x 5/16-in. x 3-in. angle flanges, and they are spaced 20 in. face to face of web plates, the top cover plate being 30 in. wide by 3/16 in. thick. The intermediate sills are formed of 3-in., 6.7-lb. Z-bars, and the side sills of 8-in., 11¼-lb. channels. The Z-bars are supported on 4-in., 6¼-lb. channel cross-bearers. Riveted to the tops of the side, intermediate and center sills is a No. 14 open-hearth steel plate, upon which is placed two courses of ½-in. Salamander hairfelt for insulating purposes. Over this, and fastened to ⅞-in. x 1-in. nailing strips, is Keystone flooring, which in turn is covered with Flexolith.

Pressed-steel U-sections of ⅛-in. metal form the panel and single window posts. These are framed into the side sills and the 5-in. channel side plates. The posts were arranged for six double windows, two large parlor compartment windows, the side entrances and one baggage door. The side sheathing below the windows is 3/32-in. sheet metal, over which is riveted Pullman beaded-steel car siding, and just inside the sheathing is a ¾-in. layer of Flaxlinum insulation. The inside finish is of ⅛-in. open-hearth steel backed by 3/16-in. Agasote insulation. The belt rail along the bottom of the windows is formed of a 3-in. x 2½-in. x ⅜-in. angle on the outside, riveted to a 2-in. x 2-in. x 3/16-in. angle on the inside. In the transverse section of the car body it will be noted that all rivets in the inside and outside finish are covered with pressings, which in some instances were spot-welded in place.

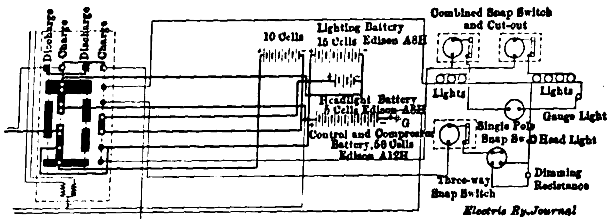
The roof is of the plain-arch type and is formed of 1¾-in. x 1¾-in. x 3/16-in. angles joined at the center


67' 0" Over Anti-Climbers
Parlor
18' 2 1/2"
Main Passenger Compartment
Over Bulkhead Plates
Smoking Compartment
Sand Box
Water Heater
Coal Box
Baggage Compartment
10' 1 1/8"
Electric Ry. Journal

MICHIGAN RAILWAY'S CARS—FLOOR PLAN OF CAR FOR LIMITED SERVICE


Contactors
Steps
1st
2nd
3rd
4th
5th
6th
7th
8th
9th
10th
Series
Parallel
Electric Ry. Journal

MICHIGAN RAILWAY'S CARS—MOTOR CIRCUIT CONNECTIONS

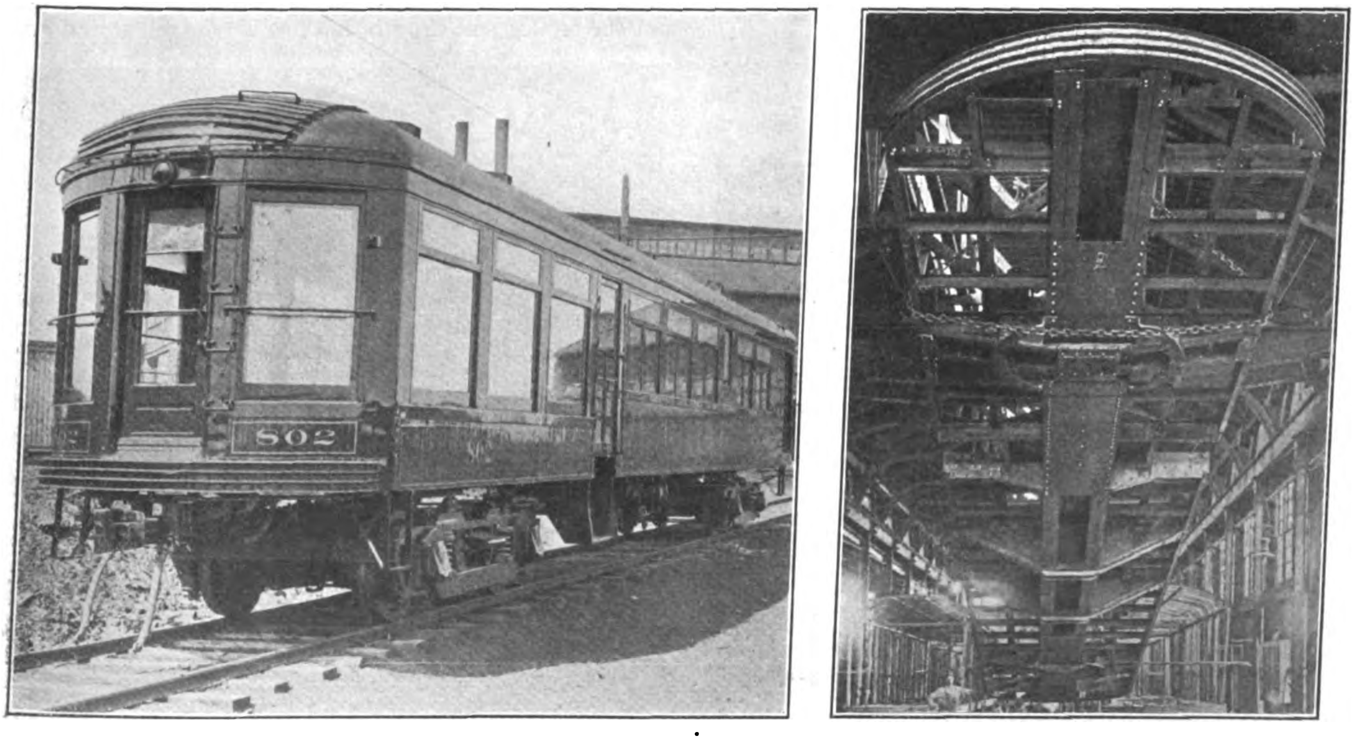

Discharge
Charge
Discharge
Charge
10 Cells
Lighting Battery 15 Cells Edison A8H
Combined Snap Switch and Cut-out
Lights
Lights
Headlight Battery 5 Cells Edison A8H
Gauge Light
Control and Compressor Battery, 56 Cells Edison A12H
Single Pole Snap Sw.
Head Light
Three-way Snap Switch
Dimming Resistance
Electric Ry. Journal

MICHIGAN RAILWAY'S CARS—LIGHTING CIRCUITS

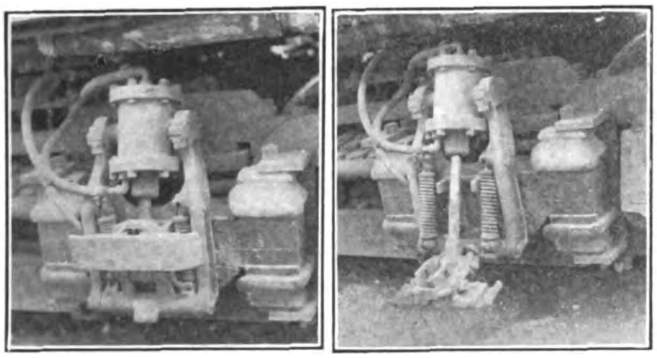
and quarter points with 3¼-in. x 3/16-in. x 12 and 8-in. gusset plates respectively. Fireproof Agasote ¼ in. thick and covered with No. 6 duck forms the roof covering, and 3/16-in. Agasote was adopted for the headlining. In order to give additional rigidity to the roof, longitudinal rafters consisting of 1¼-in. x 1¼-in. x ⅛-in. angles were installed just above the side plates, and 1½-in. x 1½-in. x 3/16-in. angles 16 in. each side of the car-body center line. These are continuous between bonnets and reinforced by additional longitudinal members over the side entrances and at the supporting points of the trolley and pantograph. Steel finish, except for the window frames and stools, obtains throughout the entire car body.

The doors in the partitions are all hinged and equipped with door checks. Each end of the car is provided with a center-end door, and to facilitate handling the trolley, the rear door has a brass hand rail. O. M. Edwards balanced trapdoors with foot latches are provided at the two side entrances and are covered with interlocking rubber tile. The steps are formed of steel pressings with the treads covered with Pullman standard peerless rubber treads. Other specialties included in the car's equipment are O. M. Edwards sash locks and storm strips, Tuco friction curtain rollers with Pantasote curtain material, Ohio Brass sand traps and valve, Tomlinson automatic M.C.B. radial drawbars, Ackley drum-type hand brakes, General Electric nitrogen filled mazda headlights, Pyrene fire extinguishers, Baltimore ball-bearing center-bearing plates and Everwear mats.

Sixteen Peerless exhaust-type ventilators are installed in the roof with brass registers on the inside of the car. These combined with a Sorocco blower provide a satisfactory ventilating system for the several compartments. An especially-designed hot-water heating system was furnished by the Peter Smith Heater Company, equipped with a double-circulating system through a central tank. This supplies eight 1½-in. coils supported on racks just above the floor line on each side of the car and assures efficient heating at the low temperatures prevailing during the Michigan winters. With the exception of a change of the type of ventilators, this heating and ventilating system is the same as



MICHIGAN RAILWAY'S CARS—OBSERVATION END OF CAR FOR LIMITED SERVICE—STEEL UNDERFRAME



MICHIGAN RAILWAY'S CARS—THIRD-RAIL SHOE RAISED AND IN OPERATING POSITION

that used in the Michigan United Traction Company's steel cars described on page 108, of the July 18, 1914, issue of the ELECTRIC RAILWAY JOURNAL. An inside width of 9 ft. permits the use of stationary seats 3 ft. 5 29/32 in. in length, practically equal to the standard seat width for steam railroads. The parlor compartment is furnished with four revolving chairs and seven upholstered armchairs.

AUXILIARIES OPERATED BY STORAGE BATTERY

Aside from the design and the exterior and interior finish of this limited car, the most notable feature is the storage-battery operated auxiliaries and lighting system. The method of charging the storage batteries is different from that used in the lighting system on the steel cars of the Michigan United Traction System, described on page 106 in the July 18, 1914, issue of this paper. The storage battery on this car consists of two groups, one with fifty cells of Edison A-12-H and the other with thirty cells of Edison A-8-H divided into three groups, five cells for the headlight and twenty-five cells for the car-lighting system. The group of fifty cells supplies energy to operate the control, compressor, third-rail shoe, pantograph and trolley, and other auxiliaries. The battery is located under the car where it is arranged for ease of inspection.

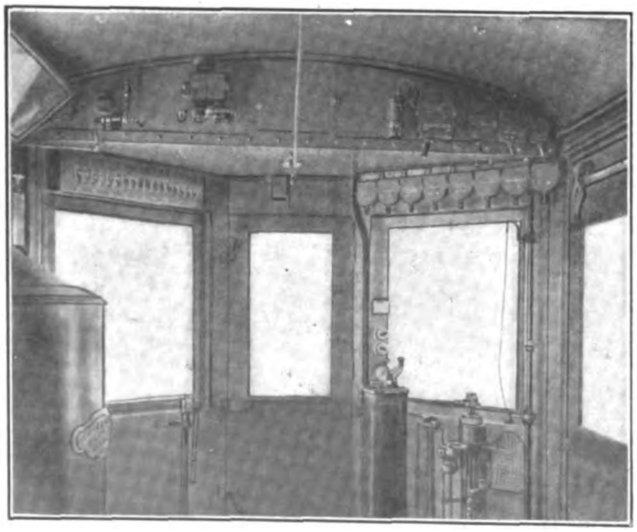
The control is of the Sprague-GE non-automatic type, giving six steps in series and four in series-parallel. Fourteen contactors, designed to interrupt the 2400-volt current at their main contacts, are employed. Control cables are installed on all cars to provide for operation in trains as traffic requires. Switches are located in the operator's cab for changing from 600-volt to 2400-volt operation, for raising and lowering the pantograph, and for operating the third-rail shoes of the entire train.

The storage batteries are charged by taking current from the ground side of the 1200-volt motors. The auxiliaries are operated at 60 volts, the car lighting at 30 volts and the headlight at 6 volts. The feature of this installation is that the battery is charged from a high-voltage circuit and takes current continuously in accordance with the operating requirements. The lighting battery is in series with the main battery and is on charge during the day and cut off during the lighting period, at which time it is discharged direct to the lighting circuits without a regulating device. The lighting system control is of the multiple-unit type operated from a switch in the cab. All batteries in the train lighting system are changed over simultaneously from charge to discharge, or the reverse. Battery circuits are arranged to meet any emergency, it being possible to supply the lighting-system energy from the main battery should the batteries in the lighting system have been completely discharged or disabled. Such a contingency, however, has never occurred, although the cars have now been in operation more than one year.

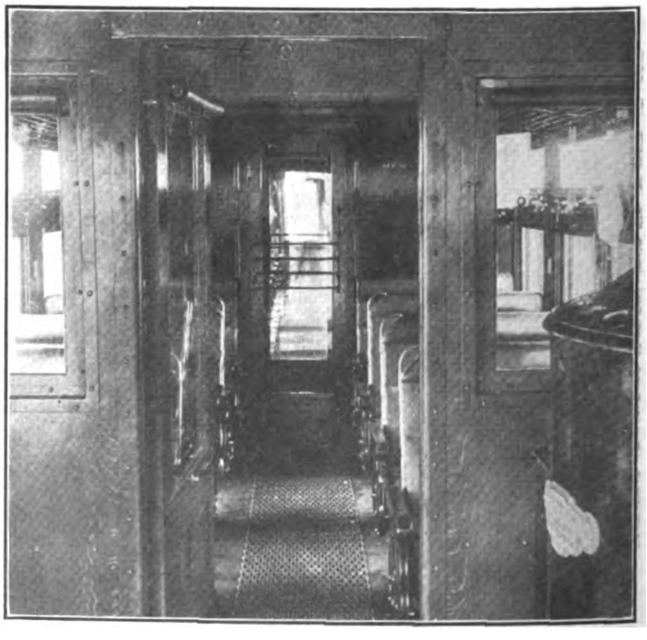
Operation of auxiliaries by the storage battery was considered advisable in order to confine the 2400-volt d.c. energy to the motors and controller. All auxiliaries, including the operating switches, the third-rail shoes, the pantograph and the trolley pole are controlled by the multiple-unit system. Provision is also made for charging the batteries when the cars are operating over either 2400-volt or 600-volt lines.

CURRENT COLLECTION AND OTHER DETAILS

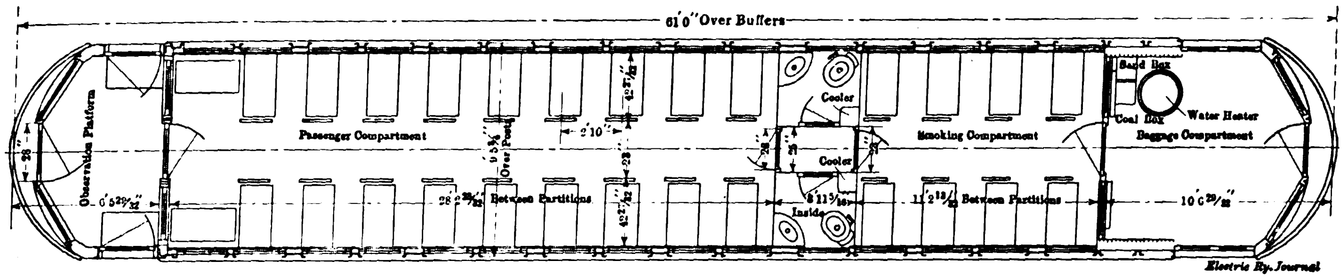
Energy is supplied to the electrical equipment on these cars from both a third-rail and an overhead trolley. The third-rail conductor is charged at 2400 volts, and when the entrance to a city street is approached the energy supply is obtained from an overhead trolley also charged at 2400 volts. In the city streets, however, a 600-volt trolley is installed. On the 2400-volt trolley the pantograph serves as the current collector, while on the 600-volt trolley an ordinary pole is used. The two types were necessary to provide for high-speed operation where overhead trolley was provided in the villages along the route or in car-storage yards. The pantograph and the trolley pole are pneumatically controlled and are



MICHIGAN RAILWAY'S CARS—CONTROLLER AND OVERHEAD SWITCHES IN MOTORMAN'S CAB



MICHIGAN RAILWAY'S CARS—INTERIOR VIEW OF LOCAL CAR, SHOWING STEEL FINISH



MICHIGAN RAILWAY'S CARS—FLOOR PLAN OF CAR FOR LOCAL SERVICE

so interlocked that it is impossible for both to be raised at the same time. This avoids any possibility of short-circuiting the 2400-volt direct current through the car to the 600-volt line at the section insulators. The pantograph is fitted with copper wearing strips and operates at 15-lb. pressure. The trolley pole is equipped with a Wasson pneumatic base, which permits it to be interlocked with the pantograph-raising mechanism.

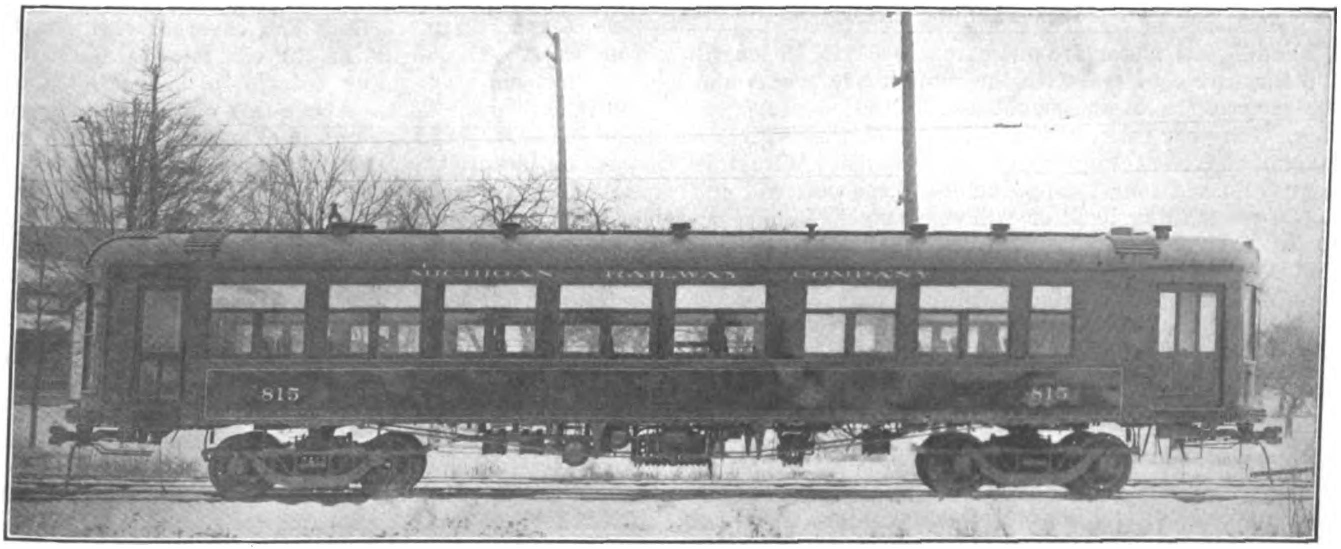
The third-rail shoe is also raised and lowered pneumatically. Owing to the fact that a 32-in. clearance is allowed between the third-rail and the near track rail on private right-of-way, the third-rail shoe projects outside the car-body clearance line too far for safe operation in city streets. Accordingly, the folding shoe which is shown in one of the accompanying illustrations was adopted, this having a machine-steel contact shoe that is bolted to the shoe mechanism. In ordinary operation two compression springs hold the shoe on the over-running third-rail. These springs also hold the shoe in the raised position, so that air is required only to raise and lower the shoe. Should it be necessary to cut sleet during the winter months, the machine-steel contact shoes are removed and a special shoe with steel inserts substituted. When this is done the air cylinder is employed to obtain greater pressure than afforded by compression springs, and pressure up to 750 lb. is available.

In connection with the over-running, 2400-volt, third-rail installation an interesting phenomenon occurred during the past winter. Only one sleet storm was experienced, at which time about 3/4 in. of ice formed on the top of the rail. Delay in substituting the sleet-cutting shoes for the ordinary shoes developed the fact that although this much sleet was on the top of the rail no difficulty was experienced in collecting sufficient energy to operate the car at full speed. This was believed to be due to creepage of the 2400-volt current from the side of the rail to the shoe over the ice coat on the rail-head. Whether this condition will always obtain is not known, but it did occur during the only sleet storm in the winter of 1914-1915.

Special Baldwin Locomotive Works trucks were necessary for these cars, and they are probably the heaviest trucks ever used in electric interurban service. Each weighs 17,800 lb. and is constructed for a 50,000-lb. center-plate load, a special design being required to provide sufficient clearance for the 600-2400-volt motors. The motors are General Electric No. 239, having 150 hp. capacity, four of them being installed on each limited car. The motors are rated at 1200 volts and are connected two in series. When running over the 600-volt city lines they operate at half speed. The motors are longitudinally ventilated, of a type especially developed for heavy, multiple-unit cars. "Tool steel" gears and pinions with a gear ratio of 33:39 are installed, this giving a free-running speed of 75 m.p.h. The actual schedule between the city limits of Grand Rapids and Kalamazoo calls for a 49-mile run with one stop to be made in fifty minutes. The total weight of all electrical apparatus was 37,000 lb., exclusive of the storage battery, which weighs 4000 lb. The car body proper weighs 66,000 lb., and this weight, together with the trucks and electrical equipment, makes the total weight of the car 142,600 lb.

The air brakes are of the combined straight and automatic type, air being furnished by a C.P. 28 compressor with motor wound for 60 volts. This compressor is capable of delivering 25 cu. ft. of free air against 90 lb. per square inch tank pressure. This capacity of compressor is ample as no air is required for whistles, electro-pneumatic horns being provided for giving warning signals. Each limited car has an 18-in. brake cylinder, two 16-in. x 60-in. main reservoirs, a 20½-in. x 36-in. supplementary reservoir, and a 16-in. x 33-in. auxiliary reservoir.

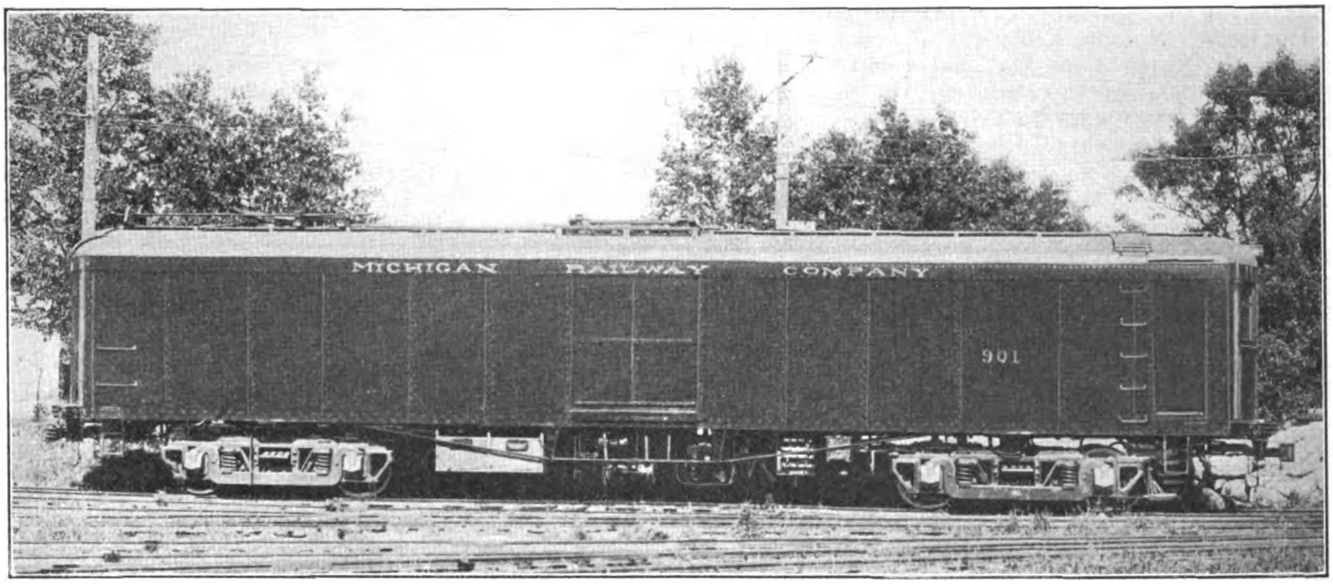
Essentially, the local all-steel car is a replica of the Michigan United Traction Company's steel passenger



MICHIGAN RAILWAY'S CARS—CAR FOR LOCAL SERVICE cars described on page 106 of the ELECTRIC RAILWAY JOURNAL for July 18, 1914, the principal dimensions being as follows:

Length over bumpers	61 ft.
Length over vestibules	59 ft. 7½ in.
Length passenger compartment	28 ft. 6½ in.
Length smoking compartment	11 ft. 1½ in.
Length baggage compartment	10 ft. 2¼ in.
Rear vestibule	5 ft. 9¾ in.
Width over sheathing	9 ft. 6 in.
Truck centers	36 ft.
Length of seats	41 in.
Center to center of seats	2 ft. 10 in.
Width of aisle	26⅞ in.
Seating capacity	56

The local cars are equipped with the same type of motor as the limited cars, but a two-motor equipment instead of a four-motor equipment is used, both motors being mounted on the front truck. The gear-ratio for these motors, however, is increased to 27 : 63, which gives a maximum free-running speed of 42 m.p.h. All the electrical equipment, including the lighting system and the auxiliaries, is operated by a storage battery, which is essentially the same as that on the limited cars.



MICHIGAN RAILWAY'S CARS—ALL-STEEL CAR FOR EXPRESS AND FREIGHT

The weight distribution of the local cars is as follows: Trucks, 25,000 lb.; electrical equipment, 22,600 lb.; body, 46,000 lb.; storage battery, 3000 lb.; air brakes, 2500 lb.; total weight, 99,100 lb.

STEEL MOTOR FREIGHT CARS

The all-steel motor freight cars are 61 ft. in length and they are equipped with the same heavy trucks and the same electrical equipment as the limited passenger cars. The gear ratio, however, is 23 : 67, which gives a maximum free-running speed of 38 m.p.h. With this gear ratio and four 150-hp. motors, these cars will pull a 500-ton trailing load, or will comfortably handle ten loaded freight cars. The body is arranged for single-end operation with 6-ft. sliding-door openings on each side at the center, a steel swinging train door at the center of the rear end and a swinging steel door on the right-hand side of the motorman's stand. The general dimensions of this car are as follows:

Length over bumpers	61 ft.
Truck centers	36 ft.
Width over sheathing	8 ft. 11 in.
Width inside	8 ft. 4⅜ in.

The most unusual feature of these freight motor cars is found in the arrangement of the underframing, which consists of six longitudinal sills continuous from bumper to bumper with transverse members only at the body bolsters and needle beams. In other words, the underframing is made up with relatively few transverse members and no diagonal bracing. The center sills are formed of 7-in., 17½-lb. I-beams, the intermediate sills of 7-in., 14¾-lb. channels and the side sills of 7-in. x 3½-in. x 9/16-in. angles. All these frame into the bumpers which are formed of 7-in., 14¾-lb. channels bent to a 5-ft. radius. The front end of this underframe is fitted with a ⅛-in. x 48-in. steel plate securely riveted to the bumper and the longitudinal members. This plate extends back from the bumper to the first cross-bearer and is employed as a reinforcement against buckling in collisions. The needle beams are formed of 8-in., 18-lb. I-beams spaced at 8-ft. centers and riveted to the lower flanges of all longitudinal beams.

The body framing includes continuous side posts and carlines formed of 3-in., 5½-lb. I-beams. These are sheathed on the outside with 3/32-in. patent-level steel plates, each sheet of which extends from the bottom of the side sill to the top of the letterboard. The latter panel is formed of ⅛-in. x 8-in. patent-level steel plate in a continuous piece from corner post to corner post. The vestibule sheets are also 3/32-in. sheet steel securely riveted to the body framing. The roof, which is of the plain arch type, is covered with ¼-in. fireproof Agasote bolted to the I-beam carlines and covered with No. 8 cotton duck. The inside of the car is sheathed with ⅛-in. steel plate extending from 6 in. above the floor to 48 in. above the floor. Above this plate and between it and the letterboard are two steel battens, ⅛ in. x 7 in. in section, securely riveted to the body framing. The car body is floored with 1¾-in. yellow pine and the doorways are fitted with 3/16-in. steel threshold plates. Other specialties in these freight cars include Tomlinson M.C.B. radial drawbars, condulets and steel shades of Crouse-Hinds manufacture, and General Electric automatic air brakes with C. P. 35 compressor. Completely equipped and ready for service this freight car weighs 110,000 lb.

In all the Michigan Railway has ordered eight cars of the limited type, six local cars and four freight cars. They were designed by the mechanical department of the Michigan United Traction Company, under the supervision of R. C. Taylor, master mechanic, and J. F. Collins, vice-president and general manager, and were built by the St. Louis Car Company, St. Louis, Mo.

Estimated Costs of Chicago Terminal Electrification

Those Sections of the Report of the Committee on Smoke Abatement and Electrification of Railway Terminals Which Deal with First Cost of the Introduction of Electric Operation Are Abstracted in Detail

The report of the committee of investigation on smoke abatement and electrification of railway terminals in Chicago was abstracted in last week's issue to show the committee's findings and to give in general the broad financial considerations involved by the project of electrification. In the following paragraphs those parts of the report that deal with the estimated costs are outlined in greater detail, so that an idea may be obtained as to bases used by the committee in arriving at its conclusions.

Three systems of electrification were considered throughout in the report; namely, the single-phase system, the high-voltage d.c. system and the 600-volt system. Neglecting the latter, as it is now generally recognized as impracticable for long-distance electrifications, the final costs on the two others are so close together that the choice between them may be said to be not worth considering in connection with the purposes of this abstract. For this reason, and to simplify the presentation, only the data that apply to the single-phase system will be reproduced.

BASIS OF ESTIMATES

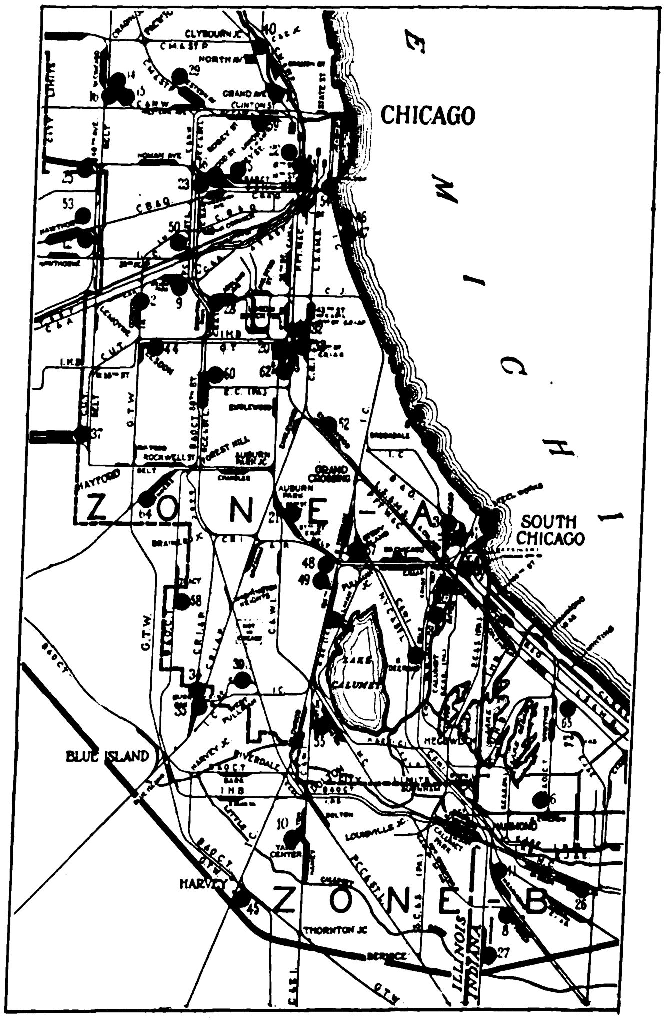
The committee's detailed analyses, underlying the estimates, of the cost of labor and material for electrification, are based upon statistics for the year 1912. Since the extent of trackage and the volume of traffic are increased each year the actual cost will depend to some extent upon the period which may elapse between the committee's statistical year and the beginning of construction, as well as by the duration of the construction period. A program of construction has therefore been assumed whereby actual work of electrification would begin in December, 1916, and would end in December, 1922. In the development of estimates of cost the values of material and labor necessary to meet conditions prevailing in 1912 have first been set forth. The estimates have then been increased to cover growth in traffic and trackage, contingencies, engineering and interest, insurance and taxes during construction, as controlled by this program of construction.

The rate at which Chicago's railroad trackage and traffic are increasing is established by the committee through records of previous years. The percentage used in extending the estimates provides for the continued growth of certain items up to the time when complete electric operation is to begin; namely, the end of the year 1922. Other aspects of the work may be assumed to be unaffected by the growth of the terminal after electrification has once been determined upon, but so long as the terminal is looked upon as a steam-operated terminal, structures will be built which serve only to accommodate steam locomotives and their trains, and the development will continue without much regard to the requirements of electrification. All such increase, however, should cease when the date of the initial work of electrification is once determined. This date, under the program governing the estimate, has been assumed to be Dec. 31, 1916.

The item entitled "contingencies," which appears in the estimates, is designed to cover incidental expenditures which may arise from sources difficult to anticipate, as well as costs arising from exceptional causes, such as future increases in the price of labor and materials. Another item included in the estimates is that of engineering, design, supervision and administration, the fact being generally recognized that the allowance for engineering may properly be differentiated for the several major items. An item also appears to cover interest, insurance and taxes during the period of construction, experience having shown that a flat rate of 1.75 per cent per annum for the entire period is justified in work similar to that contemplated.

Except in the case of land as a site for a central power station and of land for transfer yards, it has been assumed that there will be neither cost nor credit arising from transfers of real estate. The removal of steam locomotive terminals from the territory to be electrified makes available certain areas which may be sold or put to other uses by the railroad companies owning them. On the other hand, the necessity for establishing substations, inspection sheds for locomotives and multiple-unit equipment and other structures incidental to electric operation, will require land which in many cases is not now available.

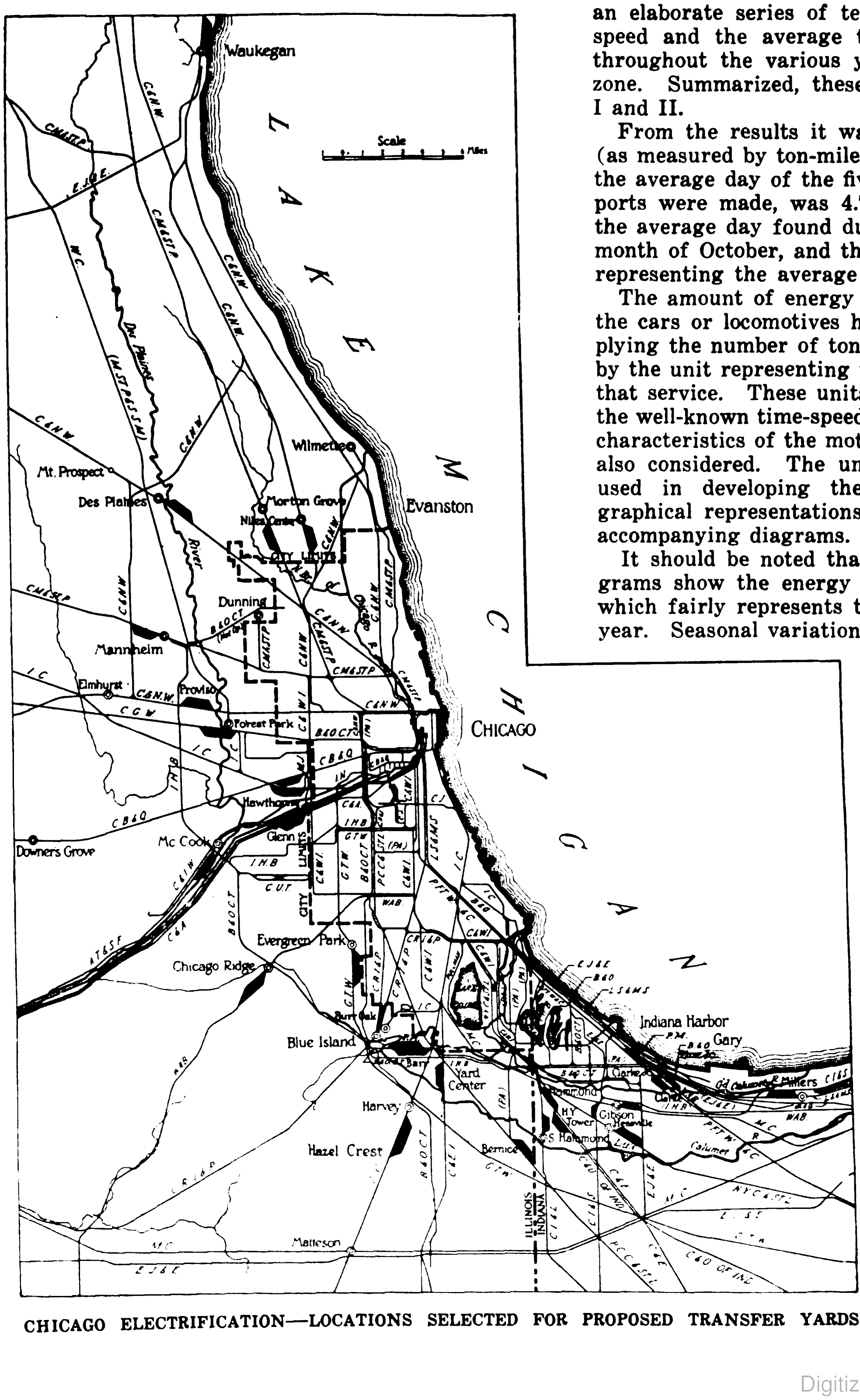
In the development of the estimates it has been



CHICAGO ELECTRIFICATION—PARTIAL MAP SHOWING EXISTING STEAM LOCOMOTIVE TERMINALS assumed that traffic will not be materially hindered and that the entire burden of cost imposed by local conditions will be borne by the work under construction. Also, no separate item has been entered to cover the cost of preliminary or experimental operation, as it is assumed that the contingency factor will cover this item. The trackage to be electrified includes 6.7 per cent of the total that is owned by local industries, but the costs as presented in the several summaries do not differentiate between the cost of equipping privately-owned tracks and those owned by railroads.

ENERGY REQUIREMENTS

The determination of the amount of energy required has been based upon a knowledge of the total volume of traffic to be handled within the proposed limits of electrification, and this knowledge was obtained by the committee through the results obtained by actual records of the railroad companies in combination with results obtained from tests. The records obtained from the railroads covered five separate weeks during different months of the year, the week of Oct. 8-14, 1912, being covered in greater detail than the others, as hourly records were made in addition to the daily totals. From these records data were obtained covering the locomotive-miles, the locomotive-hours, the weight of train in tons, the number of cars handled and the weight of coal consumed by every locomotive operating within the area covered by the investigations. The total of ton-miles, except in yard service, was determined directly from these reports. For determining the locomotive mileage and ton mileage of yard engines, recourse was had to an elaborate series of tests to determine the average speed and the average train load of switch engines throughout the various yards included in the electric zone. Summarized, these results are given in Tables I and II.


Waukegan
Scale
Miles
L A K E M I C H I G A N
C&NW
CM&StP
EJ&E
W.C.
Des Plaines (M StP&SSM)
River
Wilmette
Evanston
Mt. Prospect
Des Plaines
Morton Grove
Niles Center
CITY LIMITS
Dunning
B&OCT
Mannheim
Elmhurst
Proviso
I.C.
C.G.W.
Forest Park
CHICAGO
CB&Q
I.H.B.
Hawthorne
Mc Cook
Glenn
Downers Grove
C&A
AT&SF
C.U.T.
GTW
PCC&StL
C&WI
LS&MS
WAB
PFtW&C
Evergreen Park
Chicago Ridge
CRI&P
Burr Oak
Blue Island
Barr
Yard Center
Harvey
Hazel Crest
Bernice
HY Tower
S. Hammond
Hammond
Gibson
Hessville
Indiana Harbor
Gary
Clarke
Millers
Calumet
Matteson
ILLINOIS
INDIANA
M.C.
C&O of Ind
NYC&StL
C&EI

CHICAGO ELECTRIFICATION—LOCATIONS SELECTED FOR PROPOSED TRANSFER YARDS

From the results it was found that the total traffic (as measured by ton-miles in all classes of service) for the average day of the five periods for which these reports were made, was 4.7 per cent less than that for the average day found during the report period in the month of October, and this has been accepted as fairly representing the average day for the year.

The amount of energy in kilowatt-hours required by the cars or locomotives has been determined by multiplying the number of ton-miles in each class of service by the unit representing the watt-hours per ton-mile in that service. These units were determined initially by the well-known time-speed-curve method. Curves of the characteristics of the motors of the type and sizes were also considered. The units shown in Table III were used in developing the loads in various services, graphical representations of these being shown in the accompanying diagrams.

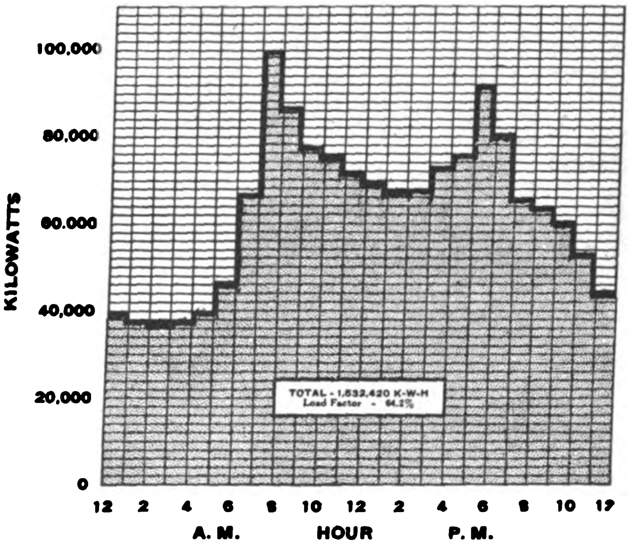
It should be noted that the energy-consumption diagrams show the energy for the average October day, which fairly represents the average day for the entire year. Seasonal variations in the flow of traffic are not of great import, and calculations based on the daily records show that the load variation on a ton-mile basis for the average week is substantially 5 per cent above the average day, the record for Sunday being 23 per cent lower than the average day. In general, the maximum hourly loads for the various week-days are practically the same, and the difference in total daily loads is due only to a variation in the load factor. The ratio of the sum of the maximum hourly load of all the roads is 109,258 kw.-hr. and the maximum hourly load of the same roads operated jointly is 99,207 kw.-hr. The ratio between the two is 110 per cent, and this represents the diversity factor.

DIRECT COSTS

As a matter of convenience in developing the estimates

TABLE I—SUMMARY OF TRAIN MOVEMENTS AND COAL CONSUMED BY STEAM LOCOMOTIVES AT CHICAGO

	Yard Service	Road Freight Service	Freight Transfer Service	Passenger Transfer Service	Passenger Service
Locomotive-hours of service for the average day	8,828	644	1,778	138	1,263
Locomotive-hours of service for the year......	3,231,047	235,703	650,748	50,508	462,258
Locomotive-miles for the average day	28,604	6,026	10,127	1,067	23,769
Locomotive-miles for the year, millions	10.469	2.205	3.706	0.390	8.699
Ton-miles for the average day, millions	12.173	6.927	10.380	0.462	8.638
Ton-miles for the year, millions	426.28	242.47	363.33	16.19	302.03
Coal consumed for the average day, tons.....	3,635	665	1,261	59	1,167
Coal consumed for the year, tons	1,330,410	243,390	461,526	21,594	427,122
Coal consumed per locomotive-hour of service, pounds	824	2,065	1,418	855	1,848
Coal consumed per locomotive-mile, pounds...	254	221	249	111	98
Coal consumed per 1000 ton-miles, pounds.....	597	192	243	255	270



CHICAGO ELECTRIFICATION—ENERGY REQUIREMENTS AT TROLLEY FOR ALL SERVICES

of first cost the whole problem of electrification has been divided into a series of studies, beginning with that of the power station.

Estimates have been based upon the use of water-tube boilers of 650 hp., these being equipped with automatic stokers capable of operating the boilers at a rating of from 200 per cent to 240 per cent of the normal rating, the peak loads requiring operation at a rating of 200 per cent. Seven steam turbines of the single-unit type will be provided, these operating at 1500 r.p.m. The generators will be of the 11,000-volt, 3-phase type, and transformers will raise the generator voltage to 33,000 volts. Reactance will be provided for feeders.

The average power station load for the maximum hour is approximately 115,000 kw. with an estimated power factor of 70 per cent, and the provision of seven 20,000-kw. turbo-generators, or an installed capacity of 140,000 kw. based on the usual maximum continuous rating, will allow the plant one spare unit. The power station characteristics and the load, assuming the use of the 11,000-volt, single-phase system of traction, are set forth in Table IV.

The estimated cost of this power station, excluding all allowances for contingencies and for engineering are as follows: Real estate, foundations, intake and discharge tunnels, and buildings, complete, $1,931,000; Boilers, stokers, pumps, chimneys, coal-and-ash-handling plant, and other boiler plant accessories, $1,571,000; Turbo-generators, condensers, switch-boards, exciters, transformers and other turbine-room accessories, $2,425,000. This makes a total cost for the plant of $5,927,000. The cost based upon an installed capacity of 140,000 kw. is $42.34 per kilowatt, and if an amount of 10 per cent is added for contingencies and 10 per cent for engineering, the cost becomes approximately $50 per kilowatt.

TABLE II—SUMMARY OF RESULTS RELATING TO OPERATION AND TRAFFIC WITHIN AREA OF INVESTIGATION

Average of	Yard Service	Road Freight Service	Freight Transfer Service	Passenger Transfer Service	Through Passenger Service	Suburban Passenger Service
Weight of locomotive and tender, tons	119	162	134	118*	174*	103*
Trailing load, tons......	306*	988	811	335*	350*	167
Speed while in motion, miles per hour........	5.4*	14.9*	8.1*	7.15*	27.1*	22.6*
Schedule speed, miles per hour	3.24*	9.37	5.66	4.82*	19.57	19.00
Ratio of time in motion to time in service, per cent	60.1*	78.4*	65.7*	67.5*	88.5*	87.9*
Length of run, miles....	0.119*	2.80*	0.376*	0.22*	3.58*	1.21*
Weight of car and contents, including empties, tons	...	34.3	34.2	...	52.5*	27.8*

*Information from tests.

TABLE III—ESTIMATED UNIT CONSUMPTION OF ENERGY AT PANTOGRAPH

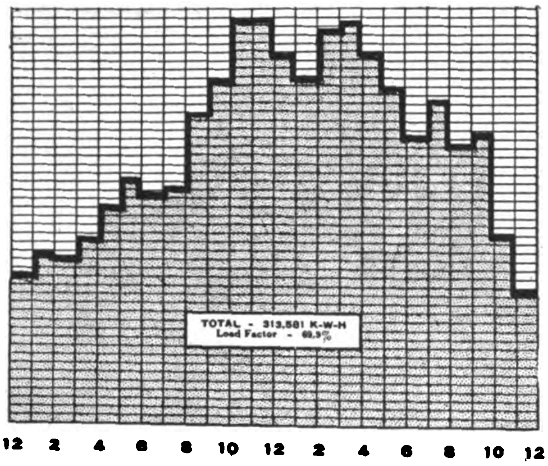
Service	Watt-Hours per Ton-Mile
Yard	60
Road freight	28
Freight transfer	38
Passenger transfer	30
Through passenger	37
Suburban passenger with locomotives..................	63
Suburban passenger with multiple-unit cars...........	71
Make-up and put-away	30

However, the estimated total cost of the power station for the electric operation of the Chicago terminals is based upon the cost of labor and materials as determined for the year 1912. If these costs are extended in accordance with the system that has been adopted in connection with the estimates, as previously mentioned, there should be added, (1) to cover growth in traffic and mileage of railroads from December, 1912, to December, 1922, 30 per cent; (2) to cover contingencies, 10 per cent; (3) to cover engineering, design, supervision and administration, 10 per cent; (4) to cover interest, insurance and taxes during construction for six years from 1916 to 1922, 10.5 per cent. The values thus derived may be accepted as the total cost on the basis of the requirements of the year 1922, so that the above-mentioned cost of $5,927,000 would be increased to $10,302,104 as the cost of the power station considered in these estimates.

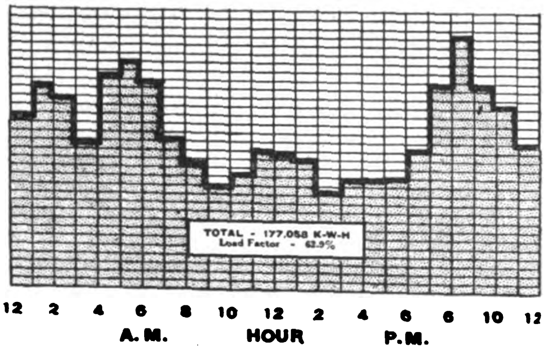
For the transmission system between the power station and the substations located throughout the electrified district, the estimates are based upon the following general specifications: A voltage of 33,000 on all circuits; duplicate circuits to all substations; interconnection of substations with transmission lines to a reasonable extent; overhead open wire constructions located on the rights-of-way of the railroad transmission conductors supported on the structures of the contact system.

TABLE IV—POWER STATION CHARACTERISTICS AND LOAD

Peak load, one hour, kilowatts..........................	114,600
Estimated power factor..................................	.70
Load factor, per cent...................................	64.2
Output per day, kilowatt-hours..........................	1,765,200
Output per year, kilowatt-hours.........................	646,063,200
Number of generator units installed.....................	7
One hour continuous capacity of unit, kilowatts.........	20,000
Maximum overload capacity of unit, kilowatts............	27,000
Rating of six units in service on maximum load, kilowatts	120,000
Loading of generators during maximum hour, per cent.....	96
Total installed capacity, kilowatt......................	140,000
Installed capacity of step-up transformers, kilovolt-amperes	112,000
Maximum capacity of transformers for five minutes, per cent overload	200

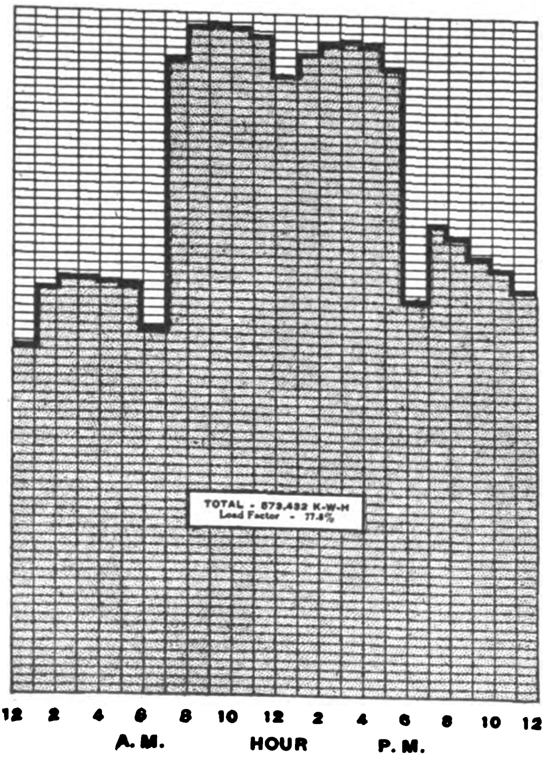


CHICAGO ELECTRIFICATION—ENERGY CHART FOR FREIGHT TRANSFER SERVICE

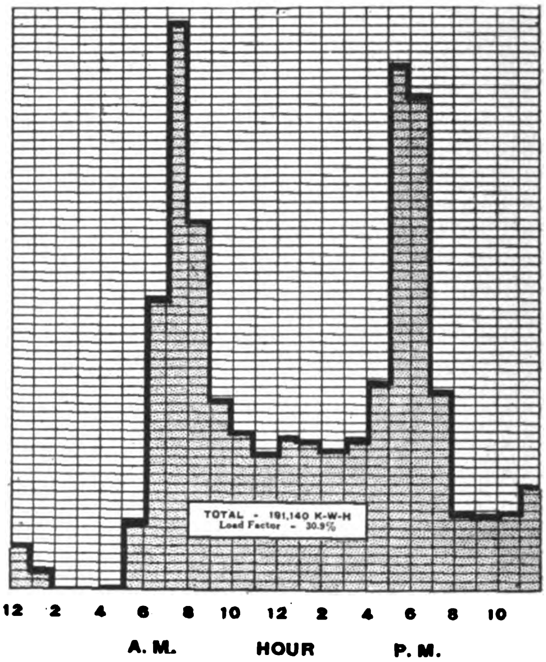


CHICAGO ELECTRIFICATION—ENERGY CHART FOR ROAD FREIGHT SERVICE

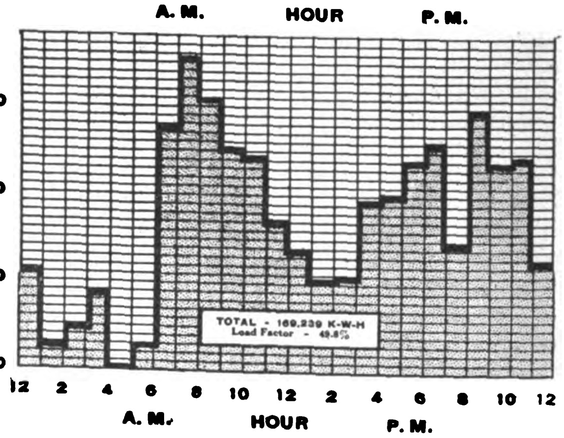
The make-up of the transmission system, allowing 5 per cent for sags, special crossings, etc., involves 950 miles and 2,036,000 lb. of wire. Approximately 500,000 lb. each of 250,000 circ.-mil. wire, No. 00 wire, and No. 1 wire are included in this total, the remainder being of intermediate sizes. The steel supporting structures for the overhead contact system are designed for the joint load imposed by the transmission line and overhead ground wires in addition to that of the contact system, duplicate circuits, where run, being carried on opposite sides of the track. The estimates of the contact system therefore include the



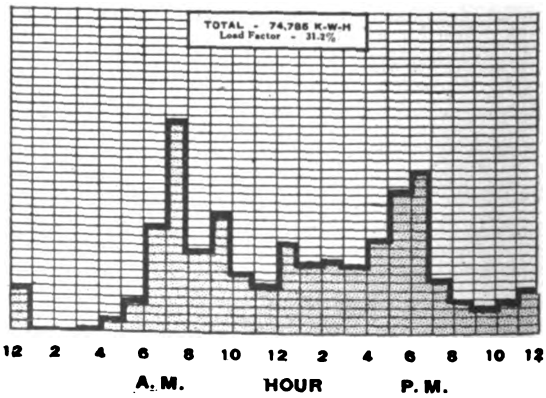
CHICAGO ELECTRIFICATION—ENERGY CHART FOR YARD SERVICE



CHICAGO ELECTRIFICATION—ENERGY CHART FOR SUBURBAN SERVICE WITH MULTIPLE-UNIT CARS



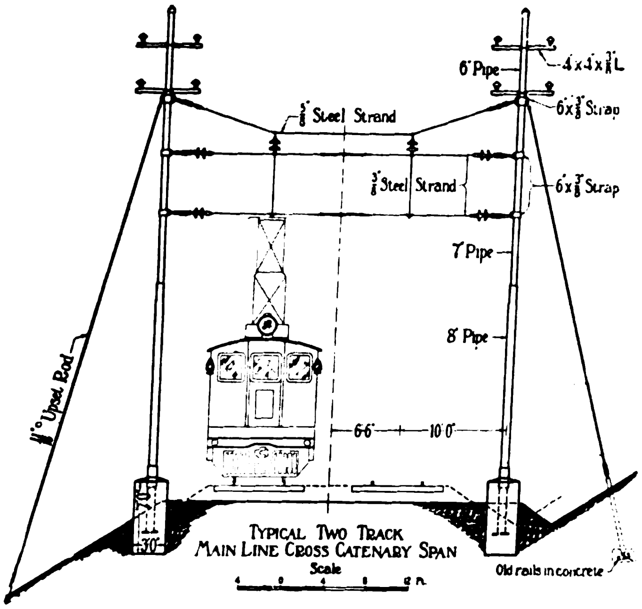
CHICAGO ELECTRIFICATION—ENERGY CHART FOR THROUGH PASSENGER SERVICE



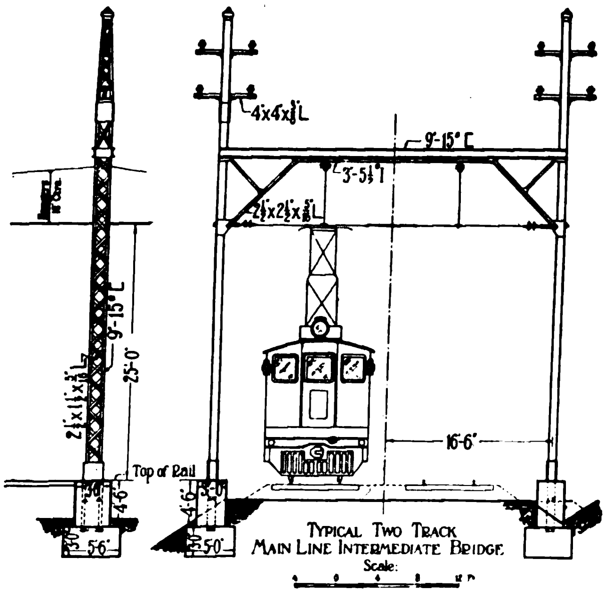
CHICAGO ELECTRIFICATION—ENERGY CHART FOR SUBURBAN SERVICE WITH LOCOMOTIVES cost of a considerable amount of steel and concrete chargeable to the transmission system, but no attempt is made in the estimates to distribute this amount or to provide credit where the supporting structures do not carry transmission lines. A small mileage, 3.87 miles, of construction for independent supporting structures has been provided for in the estimates, the poles being spaced at intervals of 300 ft. with the lowest wire 30 ft. above the ground. Across navigable waters transmission towers giving a minimum clearance of 120 ft. above high water are provided for, there being twenty-nine of such locations within the electric zone. The estimated costs for this transmission system are given in Table V.

The estimated cost here given, amounting to $853,660 is, however, extended in the manner that has been followed throughout in the estimates by the addition of 30 per cent to cover growth of traffic, 20 per cent for contingencies, 10 per cent for engineering and 10.5 per cent for interest, insurance, etc. The introduction of these factors increase the above mentioned amount by approximately 90 per cent, or to $1,618,693, which price is entered in the estimate as the cost of the transmission system.

The estimates provide for thirty-one substations varying from 3000 kva. to 15,000 kva. The buildings are of brick and are located along the railroad right-of-way. Switches will be arranged for remote control from an adjoining signal tower or other building where some employee will normally be on duty, the cost of this being based on the assumption that the distance between the substation and control point will not average more than 1000 ft. Of the substations, sixteen are to be arranged to act as tie stations for the transmission lines. Altogether 207,500 kva. capacity of transformers will be needed on the basis of the year 1912, the cost being $1,164,870. However, when this sum is increased 30 per cent to cover growth and traffic, 10 per cent to cover contingencies, 10 per cent to cover engineering and 10.5 per cent to cover interest, insurance, etc., the total estimated cost for substations becomes $2,024,736.



CHICAGO ELECTRIFICATION—OVERHEAD CONSTRUCTION PROPOSED FOR GENERAL USE



CHICAGO ELECTRIFICATION—CONSTRUCTION PROPOSED FOR NARROW RIGHT-OF-WAY WHERE GUYS CANNOT BE USED

Switching stations have been provided for in the estimates at various points throughout the terminals for sectionalizing the overhead conductors of the contact system and thus allowing conductors to be isolated in case of disorder due to overload, short circuit or other causes. The cost of this item comes to $329,700, but when the usual factors of extension are applied it rises to $573,073.

OVERHEAD CONTACT SYSTEM

The type of overhead construction for main track which has served as the basis for estimates of cost consists of ⅝-in. stranded steel messenger cable, supported by structural steel bridges in cases where local conditions prevent the use of guys, and by cross-catenary spans similar to those used on the Norfolk & Western Railroad and described in previous issues of the ELECTRIC RAILWAY JOURNAL under normal conditions. These bridges, which are shown in the accompanying illustrations, are spaced normally at intervals of 300 ft. From the primary messenger cable a secondary messenger of No. 0000 steel wire is suspended by hangers spaced at intervals of 10 ft. and a No. 0000 grooved, solid-copper, contact wire is suspended about 2 in. below the secondary messenger, which supports it by clips placed midway between the hangers. For yard track a ⅜-in. stranded steel messenger cable is used, and from this a No. 00 grooved, copper contact wire is suspended by light hangers spaced at intervals of 15 ft. Over busy tracks a No. 0000 contact wire is used. The messengers are normally supported by cross-catenary spans located at 300-ft. intervals. Industrial tracks are provided with a 7/16-in. stranded steel messenger cable from which a No. 00 copper contact wire is suspended by ¼-in. hangers spaced at intervals of 15 ft., wooden poles spaced at intervals of 150 ft. being used for the supporting structures.

The quantity of the material and the cost of labor and the material required for the overhead contact system have been estimated for each class of track and the average cost per mile of track has been determined as a basis for estimating the total cost. In general, the cost of labor for erecting all main track longitudinal wire systems was estimated at $866 per mile of single track. The complete unit costs for labor and material for the overhead contact construction per mile of track are shown in Table VI.

For the yard construction it was necessary to make special estimates for ten different classes of yards and the estimated unit costs per mile were then applied to the various yards to be electrified in accordance to the

TABLE V—ESTIMATED COSTS OF TRANSMISSION SYSTEM

Copper wire	$377,000
Insulators	52,000
Erection of wire and insulators	84,000
Ground cables, material and erection	158,660
Structural steel and concrete in addition to that provided for contact system	22,000
Towers and foundations where bridges cross over tracks	15,000
Towers and foundations at river crossings	145,000
Totals	$853,660

TABLE VI—ESTIMATED UNIT COSTS OF LABOR AND MATERIAL FOR OVERHEAD CONTACT CONSTRUCTION PER MILE OF MAIN TRACK

		Cost per Mile of Single Track				
Type of Support	Length of Span, Feet	Two Tracks	Three Tracks	Four Tracks	Five Tracks	Six Tracks
1	2	3	4	5	6	7
Cross catenary, tubular poles, track in cut or on fill	300	$5,430	$4,800	$4,500	$4,370	$4,330
	250	6,014	5,160	4,914	4,780	4,708
	200	7,174	6,100	5,672	5,440	5,295
Intermediate strut bridge, track in cut or on fill	300	6,120	5,620	5,390	5,230	5,080
	250	6,821	6,257	5,956	5,737	5,579
	200	8,500	7,747	7,201	6,767	6,403
Intermediate strut bridge, supported in retaining walls	300	6,700	6,100	5,780	5,480	5,270
	250	7,518	6,817	6,419	6,097	5,809
	200	9,369	8,477	7,780	7,187	6,690

TABLE VII—MILEAGE AND ESTIMATED COST OF OVERHEAD CONTACT SYSTEM

	Mileage	Estimated Cost
Main track	1,475.59	$7,975,170
Other tracks	1,733.83	5,965,951
Private industrial tracks	229.72	899,869
Total for all tracks	3,439.14	14,840,990

particular class to which they belong. The estimated unit prices for yard construction range between $2,900 per mile and $5,600 per mile. Industrial tracks were covered by estimated unit costs which depended upon the length of spans and the length of spurs, a 1000-ft. spur involving costs that range between 70 cents per foot and $1.10 per foot, depending upon whether the length of span was 90 ft. or 45 ft.

By the application of these unit costs to the total mileage involved in the electrification it was determined that the total cost for labor and material for the overhead contact system would be as shown in Table VII.

To these costs are added the amounts involved by the introduction of the previously-cited factors of extension, which in this case are 30 per cent to cover growth in mileage, 20 per cent to cover contingencies, 10 per cent to cover engineering, etc., and 10.5 per cent to cover interest, etc., during construction. This increases the above-mentioned estimated cost to a total of $28,141,188 for the overhead contact system.

To protect employees riding on the tops of freight cars bridge warnings have been considered necessary wherever the contact wire has had to be depressed below the standard height of 25 ft. to clear an overhead obstruction. On high-speed lines an automatic device has been provided for, whereby the usual hanging ropes or rods will be raised by the action of the track circuits as the locomotive approaches and will be dropped back into position as soon as the pantograph has passed. For slow-speed tracks rods of light bamboo or similar material which may be deflected but not injured by the moving pantograph may be used. It is estimated that the automatic device should cost $500 per track for one side of an obstruction, and that the non-automatic warnings should cost $50. The cost of such devices for all necessary locations within the electrified zone was estimated to be $656,200, but this figure is raised to $1,071,989 by the addition of the customary factors of extension, which in this case are 12 per cent to cover growth in mileage from 1912 to 1916, 20 per cent to cover contingencies, 10 per cent for engineering, 10.5 per cent for interest during construction.

Bonding is provided for in the estimates on the basis that all bonds are to be of the protected type, installed under new splice bars with new bolts. The length of a bond is assumed at 24 in. in all cases, and expanded terminals in drilled holes are figured on throughout. Both rails will be bonded for main line tracks, but only one rail for yard and industrial tracks. Two bonds per joint are used in all cases, of a size ranging from 83,000 circ.-mil for 70-lb. rails or less, to 105,500 circ.-mil for rails between 85 lb. and 100 lb. in weight.

Cross bonding is to be installed at intervals of 1 mile on main tracks. The report states that yard and industrial tracks are to be cross bonded at intervals of approximately 1000 ft., although only one rail is to be bonded. Cross bonds will be of bare copper cable of 500,000 circ.-mil. size for main track and 200,000 circ.-mil. size for yard and industrial track.

The cost of joint bonding on this basis is estimated to be $385 per mile of main track and $190 per mile of yard and industrial track, the respective costs for cross bonding being $10 per mile and $17 per mile. To this is added the cost of substation connections at a unit price of $15 per mile of main track. Including the usual factors of extension, which in this case are applied at the rate of 30 per cent to cover growth, 20 per cent to cover contingencies, 10 per cent for engineering and 10.5 per cent for interest during construction, the total cost of the return circuit is estimated to be $4,446,033.

In connection with the return circuit the conclusion has been reached that inductive effects can be prevented by providing rather liberal bonding of track rails, by careful arrangement of feeding points, and by installing booster transformers in the railroad circuits. Neutralizing apparatus will not be required in the telephone and telegraph circuits. It will not be necessary for telephone and telegraph lines to be cabled or moved from the vicinity of the railroad circuits to any extent greater than that required to prevent physical interference. By locating substations at intervals of from 5 miles to 8 miles, the tracks will be divided into sections fed by substations at each end and the current drawn by trains in any one section will be confined to that section, the inductive disturbances being largely balanced out.

Booster transformers are to be located about 1 mile apart on main lines having heavy traffic and 1½ miles apart on main lines having light traffic. On this basis it is estimated that 325 booster installations will be necessary throughout the electrified zone, the cost of these being $525,650. To this figure, however, is added the usual factors of extension, which in this case are 30 per cent to cover growth in mileage, 20 per cent to cover contingencies, 10 per cent for engineering and 10.5 per cent to cover interest during construction. This makes a total cost of $996,727.

A complete telephone system has also been provided in connection with this electrification because it is considered essential that all elements of the electric installation be in close communication with one another. All of the line and equipment for this service will be installed and maintained by the local telephone company on a rental basis. However, radiating from certain important substations there are to be telephone patrol lines which will be installed and owned by the railroad company to provide for prompt transmission of reports concerning defects or troubles found by the men who will patrol the electric lines. Two stations per mile are to be provided along the electrified right-of-way and it is estimated that the average cost will be $300 per route mile. With the usual factors of extension the cost of this telephone patrol line will be $272,052.

ELECTRIC LOCOMOTIVES AND MULTIPLE-UNIT EQUIPMENT

In connection with the estimates of cost of electric locomotives the various locomotive services have been classified as yard, road-freight, freight-transfer and

TABLE VIII—CHARACTERISTICS OF THE STEAM LOCOMOTIVES IN SWITCHING SERVICE IN CHICAGO

Weight on Drivers, Pounds	Average Weight on Drivers, Pounds	Average Rated Maximum Tractive Effort, Pounds	Per Cent of Total Number of Locomotives
50,000 to 75,000	66,700	19,880	0.72
75,000 to 100,000	94,700	20,000	12.72
100,000 to 125,000	120,000	23,230	30.47
125,000 to 150,000	138,400	30,140	33.16
150,000 to 175,000	166,700	37,420	11.11
175,000 to 200,000	182,500	40,450	8.24
200,000 to 225,000	203,900	42,850	3.58
Average	135,900	28,790	100.00

through-passenger. The locomotives for yard service that are now in operation are of characteristics in accordance with table No. VIII. From tests made in sixty-six yards of thirteen railroads, however, and covering over 800 locomotive-hours of service, the average weight on drivers of the locomotives in service was found to be 138,000 lb. The average characteristics of this service have been previously shown in Table II. The weight of the electric locomotive for yard service has been taken for all systems as 160,000 lb., on all the drivers. The estimates are based upon a locomotive with two four-wheeled trucks, having geared motors of 120 hp. each, giving a normal rating of 480 hp. for one hour.

For the road-freight service the electric locomotive selected as a basis for estimates is similar to the yard locomotive except that it has eight motors, two of which are geared to each of the four axles. The total weight has been taken at 230,000 lb. The motors are each of 250-hp. capacity at one hour rating and will develop a tractive effort of 80,000 lb., or sufficient to slip the wheels at 40 per cent adhesion. This locomotive is capable of handling the average trailing load shown in Table II at an average speed of about 22 miles per hour, about 50 per cent more than the average speed of the present steam locomotive. The electric locomotives required for freight-transfer service, the character of which is shown in Table II, need not be different from the type selected for the yard service, and the heavier part of the freight-transfer service may be handled by the road-freight locomotives.

The electric locomotives for passenger service will have to handle a maximum trailing weight of passenger trains of about 900 tons. Most of the lighter trains and those having frequent stops are to be operated with multiple-unit motor cars, leaving the through passenger trains and suburban trains which go to points beyond the limits of electrification to be handled by electric passenger locomotives. The locomotive selected for this service is of the type used by the Pennsylvania Railroad at the New York terminal, having 2000 hp. of motors mounted in the cab above the wheels and driving the locomotive by coupling rods and side rods through a jack-shaft. The total weight will approximate 320,000 lb. and the normal one-hour rating of the motors will give a 24,000-lb. tractive effort at 31.5 miles per hour. This is the only type of locomotive selected for passenger service, the freight locomotives being available for passenger trains making frequent stops.

For the suburban service a motor car has been selected which, when fully equipped with two 250-hp. motors and with average seated load, weighs 117,000 lb. It is approximately 54 ft. long over the body and 64 ft. long over all and has a seating capacity for seventy passengers. The trailer cars have the same dimensions, will seat seventy passengers, and will weigh, with the average load, 88,000 lb. In each train a number ranging from three with an eight-car train to none with a two-car train, will be used, and this will permit speeds averaging about 5 per cent higher than those now common on the steam operation.

The required amount of equipment for each of the different services is made up on the following basis: For locomotive passenger service a study was made of the through passenger schedules, and a sufficient number of locomotives was provided for each railroad to protect all of its passenger trains between the city terminus and the point at which provision is made for the change of motor power, assuming that each train will operate on a schedule indicated by the time-table. For multiple-unit passenger service electric equipment was provided to give 10 per cent more seating capacity than the present service, assuming that each schedule would be maintained, as shown by the present timetables. For road-freight service the number of locomotive-hours and trailing ton-miles for each railroad during each hour of the average day was made the basis. For yard and transfer service the basis was the number of locomotive-hours for each railroad during each hour of the average day.

In connection with the locomotive passenger service it was decided that for the purpose of protecting the schedule thirty minutes spare time would be allowed at the terminal for coupling or uncoupling and for getting the locomotive into position. Where the minimum requirement to protect schedules is four locomotives or less, the number has generally been doubled. On roads having twenty or more scheduled trains daily, one spare locomotive for each twelve appearing on the schedule is regarded as ample. It has been assumed that the electric locomotives will be in operation 80 per cent of the total time, the remaining 20 per cent being required for inspection and repairs. On this basis there will be required to provide for the 704 scheduled trains which make 12,460 miles daily within the limits of the electric zone a total of 228 electric locomotives. Of these, it is calculated that a minimum of 138 will be required to meet the schedules and that the remaining 90 will act as spares. The locomotives will therefore average about 55 miles per day or two and three-quarters hours of work.

For the multiple-unit passenger service, equipment will be required for a service that has been established at 661 suburban trains daily, making 11,328 train-miles with an average of 4.4 cars per train. To the number of cars required actually to protect the schedules, there have been added 15 per cent to provide, first, for inspection and repairs, and second, for exigencies such as extra service, accidents and bunching of trains. It has been assumed that each motor car will be available for service twenty-four hours per day, but that inspection and repairs will consume about 5 per cent of the total time. The number of multiple-unit and trailer cars required for suburban passenger service by the nineteen roads operating it will be as follows:

Average number of scheduled trains daily	661
Average number of train-miles daily	11,328
Total number motor cars	470
Minimum number to meet schedules	406
Spares	64
Total number trailer cars	251
Minimum number to meet schedules	214
Spares	37
Present number of suburban coaches	742

For the road freight service, which is defined as that which involves the movement of freight cars between points within and points outside of the proposed limits of electrification, the basis employed in determining the number of locomotives is the maximum locomotive-hours for each road for the average day. To the daily requirement was added 20 per cent to provide for inspection and repairs, and 5 per cent for exigencies of operation. On this basis, the number of electric locomotives required to handle the road freight service for the nineteen roads operating this service would be 100.

RAILWAY

This number includes 20 spares, and the 80 locomotives for the minimum average service would haul 5,668,326 ton-miles in the 548 locomotive-hours of service required for the average day. The locomotive mileage for the day would be 5369, an average of 53 miles, or 5.65 hours per locomotive-day.

In yard service at the present time, 519 locomotives are ordinarily at work during the maximum hour and to this is added 113 locomotives in transfer service. In determining the total number of electric locomotives required to perform the yard and transfer service in the Chicago terminals it has been assumed that the traffic will have the same flow and that it will be handled in the same average loads and at the same average rate of speed as the present service. Upon this basis, locomotive-hour diagrams have been worked out for each road, and the number of electric locomotives required to handle the yard and transfer service of the road in question has been determined from these. One of the diagrams is presented in an accompanying illustration. To the average daily locomotive requirements thus determined there has been added 9 per cent to protect against the time required for inspection and repairs, and 11 per cent for possible exigencies of service and accidents. On this basis, the total number of electric locomotives required to handle yard and transfer service will be 688, of which 116 are spare engines, leaving a minimum requirement for the average day of 572, it being assumed that the average daily hours of work for each electric locomotive will be 16.5 as opposed to 14.5 hours for the steam machine.

The unit costs for the electric equipment, including cost of delivery in Chicago, are assumed as follows:

Yard locomotives	$33,000
Freight locomotives	50,000
Passenger locomotives	67,500
Motor cars	20,100
Trail cars	10,400

Based upon the requirements of 688 yard locomotives, 100 freight locomotives, 228 passenger locomotives, 470 motor cars and 251 trailers, the total costs of the equipment for Chicago terminals would be $55,150,400. To this is added $34,675 for seventy-three line inspection cars and $85,000 for seventeen repair trains. When the extension factors are added, the total figure becomes $91,703,557, the extension factors being 30 per cent to cover growth in traffic, 10 per cent for contingencies, 5 per cent for engineering and 10.5 per cent for interest during construction.

In the estimates a separate allowance was also made for spare parts for the electrical equipment, and this, including the factors of extension, amounted to a total of $485,343.

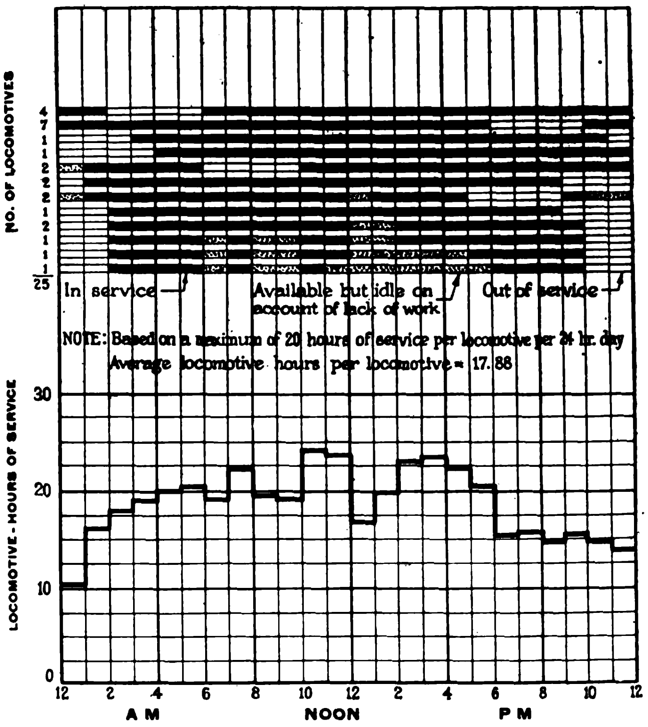
ALTERATIONS TO STRUCTURES

Incidental to the execution of any plan of electrifying the railroad terminals of Chicago through the use of an overhead contact system, certain definite and important changes in existing facilities of permanent structures will be required. Among these is the cost involved in securing the minimum clearance under overhead structures, and this is estimated to cost, with the factors of extension, $834,261. Changes have also been assumed to be necessary in all existing wires and cables which cross above the present tracks, or which parallel tracks in such a manner as to present possible physical interference with the contact system or transmission line. These changes are estimated to cost, with the extension factors, $2,028,007.

Changes in the existing signal systems have also been considered in the estimates owing to the extensive use of direct current signal apparatus. The total estimated cost for all roads affected amounts to $3,491,595. On the basis of the 1475 miles of electrified track, this would amount to $2,365 per track-mile. The factors of extension raise the total cost of the estimated changes in the signals to $6,111,407.

New steam locomotive terminals would have to be established at points beyond the city limits under the general plan of electrification. Provisions will also have to be made for the change of motor power at points outside the city and for the care and handling of electric locomotives and multiple-unit equipment. In a few cases the facilities which are now in use for steam equipment may be rearranged to accommodate electric equipment.

The principal existing facilities which will be rendered worthless to the railroad under electrification and will be abandoned include 42 roundhouses, 53 coaling stations and 96 water tanks. The original cost of these properties was $3,127,259 and the present value is $2,318,604. The salvage value of the property is estimated to be only $249,000. These figures apply, however, only to the year 1912. Subsequent to that time, a rate of increase may be assumed at the rate of 3 per cent per annum, so that in December, 1916, when the electrification is assumed to be definitely decided upon, the value will have increased 12 per cent. However, to offset this there is a salvage value and by deducting this from the assumed value at the time when electrification commences a total amount of $2,317,957 is estimated as the amount which will be rendered useless in the event of electrification and which must stand as an independent item in representing property that is wholly dissipated.



CHICAGO ELECTRIFICATION—TYPICAL DIAGRAM FOR DETERMINING ELECTRIC SWITCH ENGINE REQUIREMENTS

Thirty-six roads will be provided with these transfer facilities, the total cost of which will amount to $19,617,000. Among the items that go to make up this cost are: buildings, $6,323,600; grading, $1,700,700; land, $1,254,500, and, machinery, $1,226,000. Elsewhere the estimates include a charge of $96,383 for the transferring of machinery from the old locations to the new ones. Other items included in the cost of new facilities are: Tracks, $3,490,290; electric equipment

TABLE IX—ESTIMATED FIRST COSTS OF TYPICAL STEAM LOCOMOTIVES

	Average Weight on Drivers, Pounds	Average Total Weight, Pounds	First Cost
Through passenger locomotives	144,000	314,000	$18,500
Road freight locomotives	160,000	324,000	18,500
Transfer locomotives	160,000	324,000	15,500
Yard locomotives	135,000	268,000	13,000
Suburban passenger locomotives	91,000	222,000	12,500

of new track, $597,000; viaducts and subways, $505,000; miscellaneous, $2,553,135.

In accordance with the custom followed in the estimates factors of extension have been applied as follows: To cover growth in the mileage of railroads 30 per cent, contingencies 20 per cent, engineering 10 per cent, interest during construction 10.5 per cent. The imposition of these factors raise the cost of the new terminal facilities to $37,197,383.

ROLLING STOCK RELEASED BY ELECTRIFICATION

The electrification of the railroad terminals in Chicago will result in the elimination of steam locomotives from the tracks of the city and its immediate vicinity. Locomotives thus released may be disposed of. Similarly, it is assumed that under electrification all suburban business which is confined to the electrified trackage will be performed by multiple-unit equipment, with the result that the cars now in this service will be released for other use.

A detailed analysis of schedule requirements shows that the introduction of electric operation will reduce by thirty-seven the number of steam locomotives required to perform the through passenger service. Within the electric zone, as before mentioned, this work is estimated to require 228 electric locomotives. In road freight service, under conditions imposed by existing schedules, the number of steam locomotives released will be 20, the estimated number of electric locomotives to do this work being 100, as before mentioned. In suburban passenger service all of the steam locomotives and coaches, numbering respectively 151 and 742, will be released. For yard and transfer service the number of steam locomotives in service was determined at 612 and 140 respectively, all of which will be released, the total of 752 steam locomotives being replaced by 688 electric locomotives.

The value of the locomotives to be released is based on the first costs of typical locomotives in the various services, these being outlined in Table IX. The value of suburban passenger coaches to be released has been based upon an average first cost of $5,200. The total first cost of rolling equipment to be released is thus $16,926,400. However, the number of locomotives and coaches to be released will increase as the business of the terminal increases, and a factor of extension of 21 per cent has been applied to cover growth at 3 per cent per annum for seven years, from December, 1912, to December, 1919. This brings the total estimated first cost of rolling equipment to be released up to $20,480,944.

TABLE X—SUMMARY OF ITEMS COVERING INSTALLATION COSTS OF ELECTRIFICATION OF CHICAGO RAILROAD TERMINALS

Power station		$10,302,104
Transmission system		1,618,693
Substations		2,024,736
Switching stations		573,073
Overhead contact system		28,141,188
Bridge warnings		1,071,989
Return circuit		4,446,033
Prevention of inductive effects and electrolysis		996,727
Telephone system		272,052
Electric locomotives, multiple-unit equipment, work and inspection equipment		91,703,557
Spare parts		485,343
Changes in overhead structures		834,261
Changes in wire lines		2,028,007
Changes in signal systems		6,111,407
Removal and re-establishment of steam locomotive terminals:		
a. Cost of transferring machinery	$96,383	
b. New steam locomotive terminals and transfer yards	37,197,363	
		37,293,746
Total		$187,902,916

However, the real release value of the equipment will not be equal to its first cost. The locomotives are estimated to have values ranging from 65 per cent to 40 per cent of the first cost. Many of the cars used in the suburban service are old, the average not being far from twenty years, and it has been assumed that $500 per car represents a fair average release value for such equipment. On this account the estimated release value of all rolling stock to be displaced in the event of electrification is $9,496,806, including the factor of extension of 21 per cent previously cited.

Summing up all of the foregoing cost of electrification it will be found that the total estimated cost is $187,902,916. In detail the summary is shown in Table X.

INDETERMINATE COSTS OF ELECTRIFICATION

The committee's estimates of costs above outlined are based upon a definite program of procedure and the estimates may be expected to work out in practice only insofar as the procedure is followed. This procedure has been designedly chosen to give results which may be expected, as those of minimum costs. However, in determining the extent of trackage to be electrified the committee's plan has been based upon the conception that electrification is proposed as a means of smoke abatement. The plan provides for the electrification of all tracks within the city and the termination of such electrifications as soon as practicable beyond the limits of the city. The railroad official who reviews the work will probably feel that if electrification is imposed the extent of trackage affected should be determined from considerations which are the outgrowth of operating conditions, whereas the committee has thought to deal with the minimum trackage consistent with reasonable operating requirements.

In addition, eight railroads have submitted statements of betterments which might be deferred for many years, but would become necessary at once if electrification were decided upon. The list of these precipitated costs covers items for grade separation, for an extension of four-track work where two tracks are now provided, for grade reduction and for changes incident thereto and for relaying rails in certain yards. Extensions of electrified trackage beyond the limits estimated on by the commitee are included. In round numbers, the sums of these respective items are $29,000,000 and $21,000,000, a total of $50,000,000, and the committee's estimate of the cost of electrification for the eight railroads is in round numbers $92,000,000. The excess costs, including those due to extensions of the electrified tracks and to precipitated costs are, therefore, 54 per cent of the amount covered by the committee's estimate, and on this basis the total precipitated costs will amount to $96,313,400. This, added to the figure in the committee's estimate, makes a total from all sources of $274,440,630. The total, it may be said, provides for a deduction of $9,775,686 to cover the salvage from rolling equipment and from facilities to be abandoned or utilized for the purpose. No allowance is made in the first costs for the dissipated values involved by abandoning steam engine terminals, this loss being considered as an operating charge pro rated over a period of ten years.

In connection with Electrical Prosperity Week in Louisville, the Louisville (Ky.) Railway ran a special car in the evenings, routed so as to cover practically the whole system, and gaily lighted so as to call attention to the signs it bore relating to the week of celebration. This car was rigged out by Jovian volunteers.

Papers Presented Before C. E. R. A. Accountants

Central Accounting Body at Sessions in Detroit on Dec. 7 and 8 Considered Topics Dealing with Depreciation and Appreciation, Accrued Accounts, Journal Entry Ticklers, and Shop Orders

The twenty-eighth meeting of the Central Electric Railway Accountants' Association was held on Dec. 7 and 8 at the Hotel Statler, Detroit, Mich. The first session, which opened on Tuesday afternoon, was devoted to an address by the president, H. B. Cavanaugh, auditor Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio; to reports of the various committees, including those on standing passenger and freight accounting and on forms, and to a paper on the subject of "Depreciation and Appreciation," by W. H. Forse, Jr., secretary-treasurer Union Traction Company of Indiana, Anderson, Ind. At the second and concluding session on Wednesday morning three papers were read, as follows: "Accrued Accounts," by A. E. Dedrick, auditor Mahoning & Shenango Railway & Light Company, Youngstown, Ohio; "Shop Orders," by B. H. Jacobs, assistant auditor Cleveland (Ohio) Railway, and "The Journal Entry Tickler," by E. L. Kasemeier, auditor Ohio Electric Railway, Springfield, Ohio. The address by President Cavanaugh and the papers by Messrs. Forse, Dedrick and Kasemeier are published below in abstract form.

ADDRESS OF PRESIDENT

BY H. B. CAVANAUGH, AUDITOR CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO

The successful auditor of to-day must be versed in every line of operation on his property and must be in constant touch with and have the co-operation of all heads of departments and executives. He should originate forms for statistics and information to be furnished the different departments, and he should encourage the friendship of department heads by making frequent visits, by talking operating statistics with them and by showing an interest in their line of work. The association itself should encourage members of the different departments to attend its meetings, and papers should be presented by men who are not accountants, but who are associated with the companies in other capacities.

In regard to the forms now used by the member companies, it may be said that after several attempts had been made to have the different kinds collected and put into shape so that they would be of benefit, the committee in charge of this matter has adopted a system that takes care of all forms and classifies them as to use. This system is flexible, so that new forms can be substituted and old forms taken out at any time. The file of forms is kept in the office of the secretary, who will gladly furnish any information desired.

The question box seems to have been lost for some unknown reason. It cannot be possible that all understand the many intricate problems that are being presented daily, and this feature of association work should be revived. At the meeting in Cleveland on Dec. 13, 1913, the query box committee answered twenty-six questions, but since that time there seems to have been no questions asked. It would be of benefit to all if each member during the coming year would ask the solution of one or more problems, even though he may have solved them himself, as in this manner the members will put before the association questions that will be new to many.

At the last annual meeting it was decided to dispense with a separate secretary and to co-operate with the parent association. Accordingly, the secretary of the Central Electric Railway Association was elected as our secretary, and at a meeting in June we changed our constitution and by-laws to conform to those of the parent association, all of which has promoted the best of harmony. Members of the Accountants' Association should attend meetings of the parent body and keep in touch with its methods and requirements, as in this manner they will be better able to furnish the executive officers of their companies with the information they require. In regard to the representation of Accountants' Association on the parent executive committee, it is recommended that the question of having two members on this committee be taken up with the parent association—one member to be the president of the Accountants' Association and the other to be selected from the membership. One member should hold over in order to have continuity in the work.

The Accountants' Association has had before it for several years the question of a railway property doing a general lighting and power business, but there has been no recommendation as to the proper method of handling these accounts, *i.e.*, in the case of a railway property that has no separate organization or power plant for lighting and power work but handles it in connection with and through the general railway organization. It is therefore recommended that a committee be appointed to cover this business, which with many has grown to considerable proportions.

THE JOURNAL ENTRY TICKLER

BY E. L. KASEMEIER, AUDITOR OHIO ELECTRIC RAILWAY, SPRINGFIELD, OHIO

The Ohio Electric Railway auditor's office has a great many ticklers or reminders in various forms, such as a card tickler for the chief clerk to show the dates for statements, reports, etc., and a double tickler, indexed by dates and alphabetically, for periodical payments of the disbursement department. In line with such systems the general bookkeeper has a tickler for journal entries. This is kept in a book used for the general ledger trial balance. The book is divided into three sections; that is, one-third is allotted for the tickler; another for the trial balance, and the last for a condensed balance to bring the figures down in line with the monthly balance-sheet form. On the left-hand margin of the pages used as a tickler there is written a description of every entry. These are grouped in a systematic way, as follows:

Traffic and agents' accounts.

Power interchanged between light and railway departments and divisions.

Payrolls, vouchers, collection vouchers, drafts, credit advices, freight-claim drafts, ticket-refund drafts, etc.

Store issues, scrap issues, material reclaimed, fuel issues, stationery issues, etc.

Accrual entries for insurance, bond interest, taxes, etc.

Sinking funds.

Trust company's bond coupon deposit accounts.

Mortgage bond issues, changes, etc.

Vertical columns are headed by months, and when the journal entry is made its number is placed in the month's column. If no entry is necessary, a dash is put in that place. For quick reference, journal entry numbers are not duplicated. As there are usually about fifty entries each month, 100 numbers are set aside for a month, as January, 5001; February, 5101; March, 5201, and so on indefinitely.

When the time for closing the books draws near, it is very easy of accomplishment to run the eye down the column for the month in question and see just what entries have not been made. This record is useful many times each month to locate certain journal entries and to refer to such as are made only once or twice each year. The vertical columns headed by months are made very narrow so that a page of the tickler book when opened will exhibit with the usual short leaf insert about six years' entries at a glance.

ACCRUED ACCOUNTS

BY A. E. DEDRICK, AUDITOR MAHONING & SHENANGO RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

Accrued accounts are those which are used to place on the books such items, either actual or estimated, as will reflect as nearly as possible the true financial condition as of a future given date. Such accounts in general may be divided into two broad classes: (1) accounts that may be definitely determined each month, as bond and note interest, rentals, taxes and miscellaneous accruals, and (2) accounts that may be quite accurately estimated, as accident reserve, insurance reserve (where the utility carries its own insurance), depreciation and renewal reserve, taxes, uncollectable debt reserve, and many other accounts that are commonly used by utilities.

In the ordinary conduct of business the prorated accrual of bond interest is considered accurate, for the reason that the utility pays as much interest for February with twenty-eight days as for March with thirty-one days. Note interest, however, can be figured accurately, based on the number of days in each month. Taxes as a whole may be closely estimated. Some classes of taxation, particularly that applying to tax on gross earnings, can be accurately figured, as the base and rate are definite factors. Property and real estate taxes, however, vary so materially in different States and from year to year that actual accruals are not possible. Accruals for bad account reserve, insurance reserve, depreciation reserve and others may be closely apportioned by a careful analysis of conditions.

One form of accruals not ordinarily encountered in the daily routine of work should be considered. Assume, for example, a hypothetical case of a railway and lighting property being sold. In the final balance sheet set up by the company's accountants appears an accrual of $50,000 to cover the lag in continuous meter readings not shown on the books. The accountants for the purchaser, however, set up a counter charge of $25,000 for deferred or accrued operating expenses. This charge represents expense items that the company has secured benefit from but which have not been billed to it or taken on its books. Many items of the latter nature, such as maintenance of municipal bridges, paving repairs, etc., are not billed to a utility until months after the work has been done. Both of these accruals are correct in principle, though subject to adjustment as to the amount.

Closely allied with tax accruals are paving and sewer assessments, which usually accompany the tax bills to Ohio utilities. Yet these are not taxes in any sense of the word and are chargeable to capital or renewals, as the case may be. Some of the smaller companies charge paving assessments to operating expenses, prorating them over the year's business. This practice, however, is ethically wrong from an accounting standpoint, as it does not throw the expenses into the proper period. The accruing of a proper depreciation and renewal reserve would obviate this difficulty. In connection with assessments of this character, it is often advisable, where it can be mutually arranged, to have the municipality raise the funds and carry the account for three to five years before it is extinguished. The municipality can usually raise money at a lower rate than the utility, but the principal advantage lies in the fact that the burden may be distributed over a period of years and in many instances will be paid out of surplus earnings. Thus the utility is relieved of a burden of securities which, once issued, would probably be a liability against the property for a long term of years and impose a fixed charge that might be avoided.

DEPRECIATION AND APPRECIATION

BY W. H. FORSE, JR., SECRETARY-TREASURER UNION TRACTION COMPANY OF INDIANA, ANDERSON, IND.

It is impossible to frame concise general rules for making allowances for depreciation which will not, in their application, be attended with a large margin of possible error. Experience data collected from a number of electric railway accountants show the wide diversity of opinion of men in actual and direct contact with these carriers. The percentages in Table I are the various rates used for the year ended June 30, 1915, for the annual charge for depreciation on rolling stock equipment.

TABLE I—SHOWING VARIOUS ANNUAL RATES USED FOR DEPRECIATION OF ROLLING STOCK EQUIPMENT

Road No.
1—An arbitrary charge of $1,200 per year.
2—4 per cent of original cost less estimated value of salvage.
3—6 cents per car-mile for maintenance and depreciation.
4—3 per cent of the original value.
5—5 per cent of the valuation of equipment.
6—An arbitrary charge of $3,600 per year.
7—3 per cent of record book value.
8—One twenty-fifth of 75 per cent of original cost. (Twenty-five year life; 25 per cent salvage.)
9—Arbitrary deduction from income; $500,000 per year for several years.
10—1 per cent of appraised value.
11—2 per cent of value.
12—3 per cent of cost of equipment.
13—1 per cent of gross value.
14—An arbitrary charge of $2,400 per year.
15—One twenty-fifth of 75 per cent of original cost.
16—5 per cent of value.
17—2 per cent of estimated value.
18—4 per cent of estimated cost less 25 per cent salvage.
19—2½ per cent of present value.
20—Arbitrary charge of $12,000 per year.
21—2 per cent of book value.
22—2½ per cent of inventory value.
23—An arbitrary charge of $1,000 per year.
24—5 per cent of appraised value.
25—6 per cent of gross income.
26—6 per cent of gross earnings for maintenance and depreciation.
27—Arbitrary charge of 4.3 per cent of investment.
28—5 per cent of appraised value less estimated salvage.
29—10 per cent of value.
30—5 per cent of estimated value.
31—2 per cent of book cost including betterments.

It is apparent from a study of the foregoing table that electric railway accountants have grappled with the problem and made a sincere effort to comply with commission requirements. It is likewise apparent that there is an honest difference of opinion regarding the life of rolling stock. The figures as they stand represent an expectation of life ranging from ten years to 100 years.

Table II on the next page has been compiled from electric railway reports and is merely inserted for the purpose of indicating variation of practice. It is inadvisable to jump at conclusions, however, in reading this table. Local conditions must be studied and every fact supporting the figures must be known before an intelligent opinion can be expressed regarding the adequacy or inadequacy of any figures or percentages of this kind.

It is an established fact that a railway system cannot be kept in an absolutely new condition. It may be maintained at 100 per cent efficiency, yet during the early years of its life the maintenance costs will vary considerably until it finally settles down to a practically constant percentage of wear and of depreciation and a practically constant expenditure for repairs and renewals. This leads to a consideration of the subject of renewals and its relation to maintenance and depreciation. Railway rolling stock especially is renewed and rebuilt until of its original component parts there sometimes remains scarcely a trace. One railway system is known to expend in nine years for repairs and renewals of rolling stock a sum equivalent to the total original cost of the equipment. It is quite possible, in this manner, to take care of depreciation through the maintenance and renewal of principal parts and the replacement of units in service. This method has been used very satisfactorily by some steam railways for years. Certainly the question of depreciation cannot properly be discussed without careful consideration of the items of renewals and replacements. In actual practice the use of depreciation accounts may be entirely unnecessary when renewals of principal parts and replacement of units in service have been adequately taken care of through maintenance (operating expense) accounts.

TABLE II—MAINTENANCE AND DEPRECIATION AS SHOWN IN PUBLISHED REPORTS OF ELECTRIC RAILWAYS

	Percentage of Gross Operating Revenue		
	Maintenance	Depreciation (and Renewals)	Total
Boston Elevated Railway:			
Year ended June 30, 1914.....	17.1	None	17.1
Year ended June 30, 1913.....	18.1	None	18.1
Brooklyn Rapid Transit Company:			
Year ended June 30, 1913.....	16.0		16.0
Year ended June 30, 1912.....	16.3		16.3
Chicago Railways:			
Year ended Jan. 31, 1914.....	7.0	8.0 (renewals)	15.0
Year ended Jan. 31, 1913.....	7.8	8.0	15.8
Interborough Rapid Transit Company:			
Year ended June 30, 1914.....	Items not shown separately		12.0
Year ended June 30, 1913.....	Items not shown separately		13.9
Montreal Tramways:			
Year ended June 30, 1914.....	11.6	5.8 (renewals)	17.4
Philadelphia Rapid Transit Company:			
Year ended June 30, 1914.....	11.0	Renewals Res. 4.0	15
Year ended June 30, 1913.....	10.4	Renewals Res. 4.6	15
("Established policy is to set aside 15 per cent for maintenance and renewals.")			
Terre Haute, Indianapolis & Eastern Traction Company:			
Year ended Dec. 31, 1913.....	18.0		18.0
Union Traction Company of Indiana:			
Year ended Dec. 31, 1913.....	18.5	None	18.5
Year ended Dec. 31, 1912.....	19.7		19.7
United Railways & Electric Company:			
Year ended Dec. 31, 1913.....	9.8	5.9	15.7
Year ended Dec. 31, 1912.....	9.8	4.4	14.2
Washington Railway & Electric Company:			
Year ended Dec. 31, 1913.....	Items not shown separately		16.3
Year ended Dec. 31, 1912.....	Items not shown separately		15.9

The plan of accounting for depreciation of railway property, as required by the Interstate Commerce Commission, is neither scientific nor practical in application and operation. A railway which cost $100,000,000 to build and equip may own rolling stock which cost $10,000,000. Is it consistent to select one item of this great transportation machine, and write down its value month by month on a mere guess, while the remaining $90,000,000 of investment, much of it having enormously increased in value, is left undisturbed? Is it a good plan to inject so much of theory and estimate into the accounts of railways?

There was a Conference on Valuation in Philadelphia Nov. 10 to 12, 1915, at which Milo R. Maltbie, member of the advisory board division of valuation, Interstate Commerce Commission, advocated the inclusion of appreciation of land values as an item of income, to be credited as such, on the same theory that depreciation is allowed as a charge to operating expenses (ELECTRIC RAILWAY JOURNAL, Nov. 13, 1915). Yet the inclusion of appreciation of land values as current income, month by month, would be as impracticable and as hard to calculate as the wasting of property (depreciation of rolling stock) month by month. Why should either of them be included in the income account? Would it not be much more sensible to take care of such estimated fluctuations through the surplus account?

If, for example, the book valuation of the various units making up a railway property has not been increased by the estimated appreciation in value of portions of the property, such as right of way, roadbed, terminals, etc., and a book surplus has accumulated, is it not permissible to say that this ability to accumulate a surplus through the operation of the property proves the value of the property as a transportation machine? The existence of a comparatively adequate surplus generally warrants the assumption that replacement of worn-out physical property can be made as and when required by actual depreciation. A surplus may be built up as insurance against financial panic, disastrous floods and fires, and other exigencies as well as for assurance of the replacement of physical property at the termination of useful life. It is not reasonable or fair to assume that a corporation has not provided for depreciation merely because the balance sheet does not contain a separately-tagged depreciation—or replacement—reserve account. Its real surplus may, as a matter of fact, be adequate to take care of many other contingencies besides the wasting of assets or so-called physical depreciation.

A careful examination and analysis of the balance sheet is more important and will be more fruitful of results than mere theorizing regarding the depreciation of a portion of the physical property. Arbitrary regulations of the income account should not in justice be substituted for first-hand knowledge of property and earning values. In order to avoid the monthly arbitrary changes in operating expenses and net earnings, which are unavoidable under the commission plan of accounting, the surplus account should be used to reflect fluctuations in net worth when all the facts are known. If this were done, the use of the depreciation accounts required of railways under the plan now compulsory would be almost wholly unnecessary.

Supplement to the Trade Directory of South America

The bureau of foreign and domestic commerce, Department of Commerce, through the co-operation of American consular officers, has completed a revision of the lists of importers and merchants located in Buenos Aires, Bahia Blanca and La Plata, Argentina. These lists form a supplement to the Trade Directory of South America, which was published in 1914 as a section of the new edition of the World Trade Directory. In publishing the Trade Directory of South America, the bureau of foreign and domestic commerce was obliged to go to press without the list from Caracas, Venezuela. A revised directory for that city has been prepared by the American Consular Service, and is presented in this supplement, together with a later list for La Guaira, Venezuela. The supplement contains thirty-seven pages, and is sold at 5 cents per copy to cover partially the cost of printing. Those desiring one or more copies of this supplement should make application to the Superintendent of Documents, Government Printing Office, Washington, D. C., or to the branch offices of the bureau of foreign and domestic commerce. Money order or check should be made payable to the Superintendent of Documents.

Railway Conditions in California*

Only One of Twenty-five Electric Lines Paid Dividend Last Year—Plight of the Carriers Is Described and Causes Analyzed—How the Public Can Help to Better the Situation

BY PAUL SHOUP, PRESIDENT PACIFIC ELECTRIC RAILWAY, LOS ANGELES, CAL.

What is to be the future of the electric railways in California? Into these enterprises have been poured several hundreds of millions of dollars. The resulting railways have been, and are, great assets to the communities they serve. Yet according to the official statements of the operating revenue for each of the last three fiscal years of twenty-two electric railways of California, the revenues are insufficient. Out of twenty-five roads, just one electric railway paid a dividend to its stockholders last year and that had no bonded debt.

CONDITION OF PROPERTIES

It may be said that while there are material reductions in gross earnings of the roads during the three-year period and marked reductions in the net earnings, yet these are not such as to imperil the properties. This possibly would be true were it not for two facts. In the first place, three years ago the interurban roads as a whole, and a number of the city lines, were not earning their fixed charges. They could afford to lose but little. In the second place, practically all of the roads have, in the three-year period, had to invest large sums of money because of public requirements, such as in paving and track reconstruction incident to paving, newer and much more expensive rolling stock, and many safety devices.

The interurban electric railways of California are not now earning, and have not during any one of the three fiscal years ended June 30, 1915, earned interest and other fixed charges upon the investment—that is, the money actually put into the properties and properly chargeable under the Interstate Commerce Commission classification to capital account. In other words, they have not earned the actual interest upon all the debts they owe, represented by funded and floating debts, or upon the reproduction cost of the properties to-day, the rights-of-way and other real estate being valued, not at reproduction cost but at original cost. The city lines are not much better off. The same statement might be made with reference to them, but their final income accounts for the last year are not at hand, nor am I so familiar with these city properties as a whole. It can be stated with certainty, however, that they are not prosperous. In short, it may be said that more than two-thirds of the electric railway companies of California did not earn their fixed charges last year. This is a serious situation to every community that is served by electric roads, as well as to the employees, the owners and every community that would like to have electric railway service.

CAUSES OF THE PRESENT SITUATION

What are the causes of this condition? Some are uncontrollable. Some are those that other lines of business have to meet. The first is the business depression. The companies face that cheerfully; it is a condition which will pass. The second is the development of the automobile and the extension of the good roads. Privately owned and operated machines form a new and permanent factor. They have made serious inroads upon earnings, but they present a condition that must be faced. Likewise no fight can be made upon the good roads. They are a great asset to California, and in the end the State will reap great benefit.

Other causes, however, are open to criticism. For instance, notice paving expenses. With the advent of the automobile cutting into the revenue came the demand for better streets. People are not satisfied with the light paving as of old. Under the present Los Angeles city specifications, and this is simply to meet the demands of traffic, it costs at least $20,000 per double track-mile on an average just to pave the space occupied by the electric railways, and sometimes, depending on track centers, much more. There has been no such increase in earnings as to justify this increase in investment.

Tremendous investments are put in where there is no possibility of getting any considerable part of the capital back before the expiration of the limited franchises. The Pacific Electric Railway is now paving a section of Santa Monica Boulevard in the city limits, a little more than 2 miles long, at a cost of $225,000, according to the work order estimate, or more than $100,000 a mile. The asphalt paving will cost approximately $70,000. With a franchise expiring in thirty years, and connecting franchises expiring in a much shorter time, and with operating expenses and taxes, on the average, taking more than 70 per cent of the revenue, could it be proved that this investment would be a desirable one, especially as the section involved is in the further limits of the 5-cent fare territory and the rate per passenger is very low, probably not in excess of 1 cent?

The public is demanding this kind of construction, not only in this city, but in every city in California, and because of a very natural demand for good streets. But the question is, with decrease in revenue through automobile competition, both private and publicly operated, can the electric railways find the money to do this work? Is it right for them to risk other people's money in such an investment?

The second cause of present conditions is high taxes. The taxes paid by the electric roads have always been very heavy. If it takes two-thirds of the revenue to meet operating expenses it can readily be seen what a large proportion of the net earnings taxes are. Out of each $1 of revenue the railways now pay 5¼ cents to the State. This represents increases in the last few years as follows, in percentage:

Year	Percentage to State	Increase Over Previous Year
1913	4 per cent	17.8 per cent
1914	4¾ per cent	26.2 per cent
1915	4¾ per cent	3.9 per cent
1916	5¼ per cent	12. (estimated)

The Pacific Electric Railway last year paid on its operating properties $496,477 in taxes. Thus, of the money it had left after paying its operating expenses, more than 17 per cent went to taxes. Incidentally, it may be stated that this company did not earn its interest and fixed charges by $500,000.

The third cause is the greatly increased expenses due to the very proper precautions the electric railways are taking in connection with the safety-first movement. This includes installation and operation of safety devices, such as interlocking plants and signal systems, training schools and flagmen, and a higher standard in the operations all along the line. Wages on practically all of the interurban lines and upon a great many of the city lines have been increased in the last three years. No one has fault to find with these measures, but they involve expenses that must be met by increasing revenues.

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*Abstract of address delivered before Jovian Electric League at Los Angeles on Oct. 21.

The fourth cause is the jitney and motor truck competition. This, of the causes that can be controlled by the public, is most important of all. If these carriers are to take over the electric railway business or any part thereof, they must take over likewise the obligations and responsibilities of such carriers to the public. This is not true now. Jitneys in the cities are being regulated, but they have no such obligations yet as the electric lines have along the line of taxes, paving obligations, and service and fare regulations. The interurban jitneys are practically not regulated except as they come in contact with city regulation. But these various lines, city and interurban, are taking enough of the narrow margin in earnings that the electric railways have to threaten their investments and threaten their efficiency as carriers. It is idle to prove that a jitney is not an economic possibility. It is here just the same.

WHERE THE PUBLIC CAN HELP

The difficulties that electric railways have to face in common with the public they will cheerfully face, but there are other directions where the public can help them and thereby help itself. If the situation is not changed, the electric railways cannot improve and extend their properties. Service must be curtailed and the weakest branches abandoned. This is not a matter of theory. Lines have been abandoned already, for the stronger lines, with unregulated competition and heavier burdens, are no longer able to carry the weak lines.

There will have to be material reduction in other directions in service wherever reductions can be demonstrated as saving more money than is lost through such reductions. This means a cutting down of employees on cars, in shops, on tracks, and in new construction. Not only do the men suffer, but the business of the whole community suffers.

Commutation rates have in many directions been made because it meant the settlement of the country and the creation of individual and round-trip traffic at higher rates. The head of the family would buy a monthly commutation ticket; the others would ride on higher-priced tickets. But if jitneys, without making commutation rates, are to enjoy the higher-priced traffic, then there will have to be a readjustment of the lower rates.

What, then, do electric railways expect? Let one's own conclusions be drawn from the following statements:

1. Electric railways in the State, in behalf of the people whom they serve, the people whom they employ, and those whose money they have invested, have a right to ask that competition of jitneys or motor trucks be asked to take on equal responsibility and obligations to the public.

2. One electric road is not expected to parallel another, or to take another line's passengers from its stations, but this is exactly what automobiles are doing in California. It is therefore very necessary in the interest of service alone to consider under what conditions this question of competition with the electric railways by jitneys should be allowed.

3. The electric railways have reached their limit under present conditions as to taxation. While earnings are being diminished taxes upon the gross income have been increased. Every dollar diverted from an electric road to an automobile, freight or passenger, means a loss of 5¼ cents to the State, and ordinarily, if within the city, some loss to the city likewise.

4. The electric roads will be unable to get money any longer to pave streets where poor earning lines exist. It is going to be a choice of abandonment under present conditions or modification with respect to paving expenses. Some cities are already realizing this, and where traffic is not heavy are permitting the use of less expensive pavement and not demanding that track be reconstructed.

5. Electric railways are in a quandary as to the rate situation. The public, however, is generally realizing that the railways must have revenues if they are to live, and southern California has been showing in this direction an intelligent appreciation of the conditions. It is probable that many rates will have to be increased.

Electric railways can continue to give good service and to expand if the present difficulties can be overcome, and this with fairness to the public. They can be. This is not a pessimistic talk, but a statement of the situation which must be known and considered if the constructive optimism that has made the electric railways is to be upheld by the people who have been most benefited. The questions raised are not party or political questions at all, but they are questions to be answered by the thinking public expressing its conclusions through governmental channels.

1200 Versus 600-Volt Trolley Systems

S. B. Fortenbaugh States Wherein the Merits of the 1200-Volt System Lie and Estimates Its Cost to Be from 10 to 20 Per Cent Less than the 600-Volt System

In a paper delivered at the recent White Springs meeting of the Public Utilities Association of West Virginia, mentioned in the issue of two weeks ago on page 1085, S. B. Fortenbaugh outlined the advantages of the 1200-volt system for interurban railways. He showed that there are no important compensating disadvantages. To illustrate his statements he gave the results of calculations for a 25-mile line with 5 miles additional in terminal cities, using 30-ton cars and making 20 m.p.h. schedule speed with one stop per mile between cities. Hourly service for eighteen hours per day was assumed.

With 1200 volts one substation of 600-kw. capacity would be required in place of three of 300-kw. capacity each at 600 volts. The load factor would be 20.8 per cent and 13.8 per cent in the two cases respectively, and the efficiency 77 per cent and 70 per cent. The daily energy saving due to the use of the higher voltage was 350 kw.-hr., or 10.4 per cent of the total.

With direct generation of d.c. power at 1200 volts as compared with a.c. transmission the saving in power is about 33.5 per cent, made up as follows: Step-up transformer loss, 3 per cent; transmission line loss, 2 per cent of remainder; "all-day" substation losses, 30 per cent of remainder. On the basis of 2700 kw.-hr. per day delivered to the trolley wire, and 1 cent per kilowatt-hour energy cost the money value of the saving is $13.50 per day or $4,930 per year. With a.c. generation and distribution the saving in cost of power is due to improved load factor. On the same basis this saving amounts to $3.50 per day or $1,280 per year.

At $100 per month per substation for labor, maintenance and miscellaneous expense the 1200-volt system saves $2,400 per year in substation expense.

The total saving is, therefore, $4,930 per year for direct d.c. generation and $3,680 for a.c. generation.

Capitalized at 5 per cent these savings are equivalent to additional investments of $73,600 and $98,600 respectively.

Mr. Fortenbaugh claimed that the net saving in the initial cost of "electrification material," i. e., cars, substations, transmission, trolley wire, feeders and bonding will vary between 10 per cent and 20 per cent in favor of 1200 volts. Practically the same result is indicated by the consideration of fixed charges, including depreciation, interest, taxes and insurance. The cost of operation also favors 1200 volts by from 10 to 15 per cent.

Cost of Miscellaneous Shop Equipment

In connection with the inventory recently filed by the Bay State Street Railway of Boston, Mass., with the Massachusetts Public Service Commission, as a basis for rate-making, a large number of data were submitted as to the cost of shop equipment. Representative items from the exhibits are given herewith, the cost installed being stated.

REPRESENTATIVE SHOP EQUIPMENT COSTS

Item	Cost
Campello, Mass.	
No. 0 Springfield car-wheel grinder	$1,455
Foundation for above	78
48-in. Niles-Bement-Pond hydraulic car-wheel press	1,335
Foundation for above	51
45-in. Putnam car-wheel boring machine	1,213
20-in. x 14-in. Bridgewater single-end axle lathe	1,145
Foundation for above	16
No. 14.5 Becker-Brainard vertical milling machine	918
20-in. x 12-in. Reed screw-cutting lathe	836
16-in. x 8-ft. Putnam screw-cutting engine lathe	466
36-in. Fosdick radial drill press	687
24-in. x 24-in. x 8-in. Whitcomb single-head planer	666
1.5-in. "National" single-head bolt cutter	312
Watson-Stillman hydraulic axle straightener	290
16-in. Phoenix single-head traverse shaper	270
New Yankee drill and reamer grinder	146
26-in. Barnes upright drill press	174
24-in. Hoefer upright drill press	137
No. 8 Buffalo hand-operated shears	66
No. 6 Blount tool grinder	58
No. 3 Royal power hacksaw	36
12-in. power hacksaw	22
8-in. x 3-ft. bench speed lathe	28
24-in. x 4-in. power grindstone	22
"CP-22" G. E. air compressor	140
No. 3 Beaudry belt-driven hammer	441
Sturtevant down-draft forge	24
No. 5 Sturtevant suction fan	61
No. 3 Sturtevant Monogram fan	45
8-in. x 8-in. straight line air compressor	298
Foundation for above	31
150-ton hydraulic car-wheel press	835
Columbia banding machine	308
10-kw. G. E. Type H transformer	99
Wire retaping machine	15
20-in. single-surface planer	207
20-in. x 8-ft. American pattern maker's lathe	162
No. 1 American mortiser	160
16-in. Oliver wood jointer	144
40-in. x 45-in. American Universal saw table	138
36-in. White band saw	134
38-in. x 50-in. American saw table	93
No. 3 soft metal furnace	50
2-in. pipe-bending machine	127
44-in. x 34-in. Fairbanks standard portable scales	69
15-in. Hendy pillar shaper	230
14-in. x 4-ft. Garvin speed lathe	45
Singer sewing machine	37
4-in. x 6-in. Deane vertical triplex pump	238
15-hp. vertical fire-tube boiler	192
Torrey Street Carhouse, Brockton	
1.5-in. centrifugal pump	39
Type H-6 National air compressor	451
No. 660 Buffalo portable forge	41
24-in. Columbia portable air pit table	153
North Abington Carhouse	
35-in. x 36-in. Sturtevant blacksmith's forge	25
Fall River Shops	
20-in. x 10-ft. Lodge-Davis screw-cutting engine lathe	697
12-in. x 4-ft. Dexter screw-cutting engine lathe	227
24-in. x 24-in. x 6-ft. Flather single-head planer	566
No. 50 Wiley-Russell bolt cutter	256
22-in. Prentiss upright drill press	160
12-in. x 2-in. small tool grinder	55
5-hp. G. E. d.c. motor	157
Size B Fairbanks belt-driven hammer	322
21-in. hand-operated armature press	103
Banding machine	15
1.5-ton hand-operated traveling crane	163
Wheeler & Wilson sewing machine	16
Whittenton Shop	
41-in. x 49-in. White variety molder	$165
36-in. Collins & Greenwood bandsaw	105
12-in. Baxter wood jointer	134
20-in. Snyder upright drill press	66
No. 2 Buffalo flat iron shears	41
No. 5-A Fox universal wood trimmer	29
Taunton Carhouse	
22-in. Superior upright drill press	118
29-in. x 30-in. Champion blacksmith's forge	21
7.5-in. x 4.5-in. x 10-in. Blake duplex steam pump	194
30-in. x 4-in. power grindstone	33
Washington Avenue Shops, Chelsea	
No. 6 Becker-Brainard vertical milling machine	1,358
No. 3 Hendy universal milling machine	1,125
21-in. Gisholt turret lathe	590
22-in. x 22-in. x 6-ft. Flather single-head planer	512
36-in. Drises standard radial drill	685
23-in. Snyder upright drill press	190
Combination drill and surface grinder	146
12.5-in. x 2-in. tool grinder	60
36-in. Passburg vacuum drying and impregnating equipment	2,801
26-in. x 12-ft. Blaisdell screw-cutting engine lathe	926
20-in. x 10-ft. engine lathe	697
18-in. x 10-ft. engine lathe	630
18-in. x 8-ft. Huntoon screw-cutting engine lathe	319
14-in. x 6-ft. engine lathe	237
75-ton Watson-Stillman vertical hydraulic armature clamping press	623
20-in. Superior upright drill press	109
12-in. sensitive high-speed drill press	39
Ridlon armature banding machine	270
Armature removing cradle	80
Wire-retaping machine	52
26-in. Niagara foot-power shears	17
Field coil winding machine	183
Armature coil winding machine	183
Armature coil taping machine	65
7.5-ton pneumatic press	121
48-in. 300-ton, Niles-Bement-Pond motor-driven car-wheel press	1,540
36-in. Putnam car-wheel boring machine	1,035
Foundation for above	8
10-in. x 1-in. Union tool grinder	60
16-in. Flather crank shaper	230
1.5-in. Wells single bolt cutter	255
46-in. Blaisdell heavy upright drill press	432
4-in. geared power shears	75
11-in. x 24-in. Wood dimension planer	545
Universal wood worker	170
Double spindle wood shaping machine	170
Smith reciprocating vertical mortiser and borer	160
36-in. band saw	155
36-in. x 37.5-in. double revolving universal saw bench	137
8-ft. Type B Oliver swing cut-off saw	106
42-in. x 60-in. double arbor combination saw table	93
42-in. Niles-Bement-Pond motor-driven car-wheel lathe	8,158
Foundation for above	99
500-lb. Beaudry belt-driven hammer	441
Harrington hair comber	36
4.5-in. x 2.75-in. x 4-in. Worthington duplex feed pump	54
No. 1 Champion blower	15
Singer power sewing machine	53
Randall leather creasing machine	15
No. 6 hand-operated wood trimmer	41
4-ton Yale & Towne electric hoist	365

The above costs are those obtaining in particular cases and extend through a considerable period, the latest installation listed being as of Nov. 1, 1914. The costs are not necessarily current prices, but are of value as showing the actual money outlay required for the tools specified.

Petrol-Electric Car for New Zealand State Railways

The New Zealand Government is preparing to handle the suburban passenger traffic on the State Railways in this Dominion in a more economical and satisfactory way than by the usual steam operation, and with this end in view has ordered a 200-hp. petrol-electric car from the Thomas Transmission Company, an English firm. Elasticity in power output is obtained by using the motor to generate electricity which is then employed through an electric motor. At low speeds the electrical machines are used, but when the car has reached a speed in which the motors can be run at economical speed geared directly to the wheels a direct mechanical drive comes automatically into operation, the more complicated electro-mechanical drive being automatically cut out. During trials in Birmingham, England, the engine hauled loads of 120 tons and 200 tons. It is designed for a speed of 40 m.p.h. on the level and will be capable of pulling a trailer.

COMMUNICATION

The Single-Phase Repulsion Motor

GENERAL ELECTRIC COMPANY
SCHENECTADY, N. Y., Dec. 3, 1915.

To the Editors:

I have read with great interest the article in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 13 and the editorial in that for Nov. 20 commenting on the single-phase equipment of the Philadelphia-Paoli electrification. In these articles are pointed out the advantages of using the repulsion starting, single-phase motor which is operated at full speed in a double-fed connection, which has otherwise been called the series repulsion connection.

This development is of no less interest to the writer because the system used is very familiar, and for the readers of the ELECTRIC RAILWAY JOURNAL who may have forgotten I should like to call attention to an article in your issue for Oct. 11, 1913, page 677, where there is a description of a General Electric single-phase motor equipment which at that time had already been for several years in successful operation on the New Haven road. A large single-phase locomotive which is now in operation on the New Haven road is also described. In this article the diagram of connections for these equipments shows the method of operation in starting as repulsion motor and operating as series repulsion or double-fed motor, and the experience with these equipments has fully borne out the predictions of the writer before the American Institute of Electrical Engineers in January, 1908, announcing the first railway equipment of this kind.

E. F. W. ALEXANDERSON.

Bad Advice to Women

Prominent Women's Journal Criticised for Discouraging Direct Settlements and the Giving of Testimony in Accident Cases

In its issue of November the *Ladies' Home Journal* published the following editorial:

> The law is a maze to most women. But every-day law touches nearly all women at some time, and it is wise for them to bear these very simple law points in mind:
>
> First: If you are injured in any accident—automobile, trolley, railroad or what not—never settle a claim for damages with the person who has injured you. Refer the person or company to your lawyer, but don't settle it yourself no matter how much money is offered you.
>
> Second: If you see an accident, and a conductor or a bystander asks you for your name and address as a witness, remember you don't have to give them to him. He has no right to ask them of you: it is your privilege to refuse. If you give your name and address you must be prepared, in case of a suit, to be summoned into court as a witness.
>
> Third: If you discharge a servant and she demands a week's or a month's wages, it is your privilege to give them to her, but there is no right on her side. The law is that where a servant is discharged for cause, he or she is only entitled to the wages due up to the time of discharge.
>
> Fourth: Never buy real estate until the property or the deed has been carefully looked over by a lawyer or a trust company.
>
> Fifth: Never sign a legal document of any sort until a lawyer has looked it over.

The first two recommendations in this editorial have naturally created a great deal of unfavorable comment among claim agents and those actively engaged in the class of work involved in the editorial. Among others to whom the advice seemed most pernicious is C. J. Franklin, formerly general superintendent Portland Railway, Light & Power Company and now a consulting engineer in Portland, Ore. Mr. Franklin has written a letter on the subject to the editor of the *Ladies' Home Journal*. Among other things he says:

"I am sure that it was with no intent to hamper industry or injure any class of people that you gave the advice contained in the first and second recommendations in the editorial. I, therefore, attribute these recommendations to unreliable or insufficient information upon the subject.

"I take it that where you say in your first recommendation: 'Never settle a claim for damages with the person who has injured you,' that you refer not only to the person in charge of operating the vehicle at the time but also to the claim agent, official or other authorized representative of the company. Your recommendation is very clear in referring the injured person to a lawyer before taking any action.

"Experience has shown that this theory does not work out well in practice. Advice of this character might be all right for those who are in the higher circles of society and finance, who wish to avoid the detail connected with a claim for an injury and who have representative attorneys to handle their legal affairs on a guaranteed fee. But for the great majority of people who have never had occasion to consult an attorney, and do not know whom to consult, the services of the high-class attorney, previously mentioned, is not only beyond their means but this class of litigation on a contingent basis is not attractive to them. The consequence is that, as a rule, they fall into the hands of one of two classes of attorneys.

"The first of these is those attorneys who are perfectly reliable but not prosperous or financially able to take a case where the fee is not guaranteed. They therefore follow a contingent plan, charging as high as 60 per cent of the amount recovered, an amount entirely out of proportion to the services rendered, and suit is instituted for an amount which is wholly inconsistent with the damage sustained by the client.

"The second class of attorney is unscrupulous. He makes a business of handling this class of work and also charges on a contingent basis. He will distort and even go so far as to manufacture evidence in order to further his end.

"In either case, should the injured person recover damages the amount that he or she receives, after all expenses have been paid and the contingent fee of the attorney deducted, is almost always less than the company through its agents have offered the injured person, to say nothing of the trouble, publicity, anguish and loss of peace of mind sustained by reason of a law suit. It is a case of 'if you win you lose.'

"Your second recommendation tends to discourage witnesses from giving their names and is unfair and unjust to all concerned. Under the law all are entitled to a fair trial which is based upon the testimony of those who are in a position to know the facts, and surely, this includes eye witnesses to an accident. Would it not be just as unfair to the injured person whose friend was trying to secure the names of eye witnesses to an accident in order to ascertain the facts as it would be to the railroad company whose representative is trying to do the same thing for its protection?

"Little is known by the average citizen of the trials, tribulations, impositions, ambulance chasers and fake accident claims with which public utilities have to contend, and it is for their protection, not to escape from liability, that reasonable instructions are given to employees what to do in case of accidents and how to prevent them.

"The claim agent of a public utility is instructed never to evade liability and to use every effort to settle a case before resorting to the law. The consequence is that the cases which find their way to the courts may be divided into three classes: First, where there is no liability on the part of the utility; second, where there is liability and the claim for damages is out of proportion to the injury, and, third, fake cases. The latter include the cases of those who follow the occupation of getting injured in order to collect damages, manufacture their own testimony and supply their own witnesses at trial.

"I think that I am well within the bounds when I say that if your instructions were followed throughout this country, the public utilities engaged in transportation services would be in the hands of receivers, on account of increased claims for damages, in a very short time."

Successful Tests on the St. Paul

A number of actual speed and tonnage tests were made on the completed section of the electrified mountain divisions of the Chicago, Milwaukee & St. Paul Railway on Dec. 8. The passenger train tests were made by one of the new 260-ton locomotives drawing three special cars and running at various speeds up to 70 m.p.h., and the tonnage tests with the freight locomotives included pulling 2500 tons at a uniform speed over various grades at 16 m.p.h.

The railway officials witnessing the tests included A. J. Earling, president of the St. Paul Railway; H. B. Earling, vice-president; H. R. Williams, vice-president; C. A. Goodnow, assistant to the president; Percy Rockefeller, nephew of John D. Rockefeller; John D. Ryan, the copper magnate; A. J. Pettit, Charles W. Harkness and Donald Gedkes, all members of the directorate. A. H. Armstrong and other General Electric officials were also present. At the conclusion of the tests President Earling and the other officials declared them a complete success. The regenerative braking tests made recently, as described on page 1037 of the issue of this paper for Nov. 20, were repeated and proved under actual tests to be completely satisfactory. In fact, it is reported that the economy of this system was made very apparent to practical railroad men in the party, who saw the use of air brakes made unnecessary except at station stops and in emergencies, an enormous saving resulting in reduced wear and tear on track equipment and the elimination of constant grinding of brakeshoes on the wheels.

It is anticipated that the all-steel continental trains of this company will be operated electrically over the continental divide shortly after the first of the year.

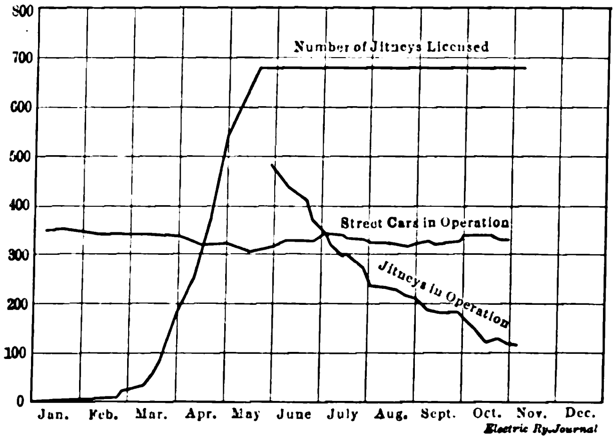
Rochester Jitneys Operate Despite Thompson Law

In Rochester, N. Y., a rather unusual situation has arisen in connection with the Thompson bill, passed by the New York State Legislature for the purpose of regulating jitney buses. This law makes it necessary for all persons and corporations owning and operating stage routes, bus lines, or motor vehicles carrying passengers for a fare of 15 cents or less upon any public thoroughfare in any city of the State except the city of New York, to procure, first, the consent of the local authorities and, next, a certificate of convenience from the Public Service Commission.

The law went into effect during May of the present year. At that time a number of jitney buses had been granted licenses by the city of Rochester, and subsequent to this the jitney operators made no attempt to secure permission from the Public Service Commission for the continuance of their operation. At the present time, therefore, the Rochester jitney buses are operating in direct defiance of the terms of the law, at least in so far as regards the requirement for a certificate of public necessity and convenience from the commission.

This situation may be explained through an opinion which was drafted by the assistant corporation counsel for the city of Rochester, in which it was held that the licenses which had been issued by the city gave the jitneys a legal right to operate there until the expiration of the licenses, or Jan. 1, 1916. This opinion was based on the alleged failure of the Thompson bill to provide any retroactive clause, as it was maintained that nothing appeared in the statutes to indicate that the law had a retroactive effect or was intended to invalidate acts done under laws in existence previous to its enactment. No doubt was expressed that the licenses granted by the city were revocable, but it was held that while these licenses were in force they gave the holder the right to operate in the streets. As a result of this opinion, the city did nothing more to enforce the law than to stop issuing licenses to jitney buses subsequent to the month of May, as indicated in the accompanying graphic record of the jitney movement in Rochester.

These licenses had been issued to the jitney buses on the same basis that the city issued hack licenses, the license fee being $1 and covering the period of one year.



GRAPHIC RECORD OF THE JITNEY MOVEMENT IN ROCHESTER

Certain police regulations were established for the license holders, but owing to the great difficulty of enforcement these have had very little effect, especially in regard to compelling the jitney buses to maintain fixed schedules and routes, and to stop only at authorized points along the streets.

Notwithstanding this practical absence of regulation, the number of jitney buses has decreased with extraordinary rapidity. The records covering the number of jitneys in operation were commenced late in the month of May, the number at that time being close to 500. At the present time only 120 jitneys are in service, the reduction being at a practically constant rate. Prior to the time that the records were instituted the number was estimated to have reached a maximum of 800, and in view of the rapid decrease it is probable that the movement will die out of its own accord even though the Thompson bill has been rendered ineffective.

At present the city's plan is to increase the license fee, after Jan. 1, to $50 per year, for any jitney buses that can secure the right to operate from the Public Service Commission. In connection with the matter of licenses for the ensuing year, the jitney bus operators recently appeared before the City Council for the purpose of getting the fee established at as low a figure as possible. At the same time the data contained in the accompanying illustration were submitted before the Council by the railway company, the record of the number of cars in operation being submitted to show that the street railway company had not been able to decrease its service notwithstanding the jitney's spasmodic inroads into its gross receipts.

American Association News

Tentative Programs for Denver Company Section Meeting Announced—The Connecticut Company Forms Section with 150 Members—Meeting of the Chicago Section—Manufacturers' Association Notes

PROGRAMS OF COMING MEETINGS OF DENVER SECTION

A tentative program has been made for coming meetings of the Denver Tramway Company Section as follows:

December meeting: F. W. Hild, general manager of the company, will speak on scientific management or an allied subject, the title to be announced shortly.

January meeting: H. C. Fligg, in charge of the coasting department, will speak on "Schedules, Skip-stop and Express Service."

February meeting: A member of the Colorado State Public Utilities Commission will address the section on a subject to be announced.

FIRST YANKEE COMPANY SECTION FORMED

At an enthusiastic dinner gathering held in the Garde Hotel, New Haven, Conn., on Tuesday evening, Dec. 7, 1915, a company section of the association was formed by 150 employees of the Connecticut Company. The list of speakers included Martin Schreiber, Newark, N. J., chairman of the committee on company sections and individual membership; C. C. Peirce, Boston, Mass., vice-president of the Manufacturers' Association; E. B. Burritt and H. C. Clark, New York, N. Y., respectively secretary of the association and editor of its magazine, and L. S. Storrs and J. K. Punderford, New Haven, Conn., respectively president and general manager of the company. A. C. Flickinger presided at the dinner.

Mr. Burritt told of the work of the association as it relates to the company section movement. Mr. Schreiber enlarged on the benefits of the company section to all concerned, basing his statements partly upon his experience in the Public Service section. Mr. Peirce gave reminiscences of the early days of the companies which later united to form the Connecticut Company, with which he had been personally familiar. Mr. Clark told of the relation of *Aera* to the sections. Messrs. Storrs and Punderford indorsed the movement in their official capacities and extended their best wishes.

The section is the outgrowth of a bowling club which recognized the advantages of organization. A committee, comprising Harold Bates, assistant engineer, as chairman, and I. A. May, comptroller, made a special study of the matter, visiting the section in Newark to examine at first hand the results of the work. Their report was so favorable that the plan went through with a rush. Details of the organization will be given in a later issue.

CHICAGO ELEVATED SECTION

Reports from the specially-favored members of the Chicago Elevated Railroad section made up the principal part of the program of the meeting held Dec. 1. One hundred and ten members and guests were in attendance, and President Johnson presided. Secretary Smith's report showed that thirty-five new members had been added to the section, making 156 in all. He also read a letter from Charles L. Henry, president of the American Electric Railway Association, in which Mr. Henry expressed assurance of his support and co-operation. C. E. Shaw, division foreman of signals and interlocking, and A. H. Daus, assistant master mechanic, the delegates of the section to the San Francisco convention, reported concerning their trip. Mr. Daus illustrated his talk with a number of photographs which he had taken en route and mounted on lantern slides. J. A. Jarvis, division superintendent and one of three employees who were sent by the company to the military training camp at Fort Sheridan, Ill., told of his experiences there.

NOTES ON THE MANUFACTURERS' ASSOCIATION

The membership in the Manufacturers' Association, although somewhat less than last year, compares very favorably with that during other years when the convention has been held at points other than Atlantic City. At the meeting of the executive committee on Nov. 12, Secretary McConnaughy reported that the total membership at that time was 299, as compared with 359 in 1912 when the convention was held in Chicago, with 274 in 1909 when it was held in Denver, and with 274 in 1906 when it was held in Columbus. At the same meeting Mr. Finigan, who was vice-president in charge of entertainment at the San Francisco convention, stated that the actual expenses for carrying out the entertainment program were $1,725. The treasurer presented a financial report showing a balance in the bank on Nov. 12 of $8,904, and a dinner committee to take charge of the arrangements for the banquet at the time of the mid-year meeting in Chicago was appointed. This committee consists of Charles C. Peirce, L. E. Gould, Miles B. Lambert and E. F. Wickwire.

Annual Meeting of A. S. M. E.

The winter meeting of the American Society of Mechanical Engineers was held in New York from Dec. 7 to 10, with a registered attendance of 1210. An announcement of this meeting with a list of some of the papers of electric railway interest appeared in last week's issue of the ELECTRIC RAILWAY JOURNAL, page 1140. Abstracts of several of the papers will be printed in a later issue.

Among the features of this meeting, aside from the discussion of engineering topics, was a stirring address by the retiring president, Dr. John A. Brashear, a memorial meeting to the late Dr. Frederick W. Taylor, the father of scientific shop management, conferences of delegates from the society's fourteen local sections throughout the country, excursions to various points of engineering interest, and special social functions.

The officers elected for the coming year are as follows: President, Dr. D. S. Jacobus, Hoboken, N. J.; vice-presidents, George W. Dickie, San Francisco, Cal.; Henry Hess, Philadelphia, Pa.; James E. Sague, Poughkeepsie, N. Y.; W. B. Jackson, Chicago, Ill.; J. Sellers Bancroft, Philadelphia, Pa., and Julian Kennedy, Pittsburgh, Pa.; managers, A. M. Greene, Jr., Troy, N. Y.; John Hunter, St. Louis, Mo.; Elliott H. Whitlock, Cleveland, Ohio; Charles T. Main, Boston, Mass.; Spencer Miller, New York, N. Y.; Max Toltz, St. Paul, Minn.; John H. Barr, New York, N. Y.; J. A. Stevens, Lowell, Mass., and H. De B. Parsons, New York, N. Y.; treasurer, William H. Wiley, New York, N. Y.; secretary, Calvin W. Rice, New York, N. Y.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Rail Bond Testing—II—Determining and Interpreting Bond Resistance

BY H. H. FEBREY, ENGINEER AMERICAN STEEL & WIRE COMPANY, FORMERLY ASSISTANT ENGINEER PENNSYLVANIA TUNNEL & TERMINAL RAILWAY

In the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 4, page 1130, the writer outlined the principal means used for testing bond resistance. This second and concluding article is taken up with the practical application of the data derived from tests in the field and in the laboratory.

The true resistance of rail bonds, including contact resistance, has been carefully determined, and sufficient data are available for determining the resistance of almost any bond. Table I is convenient for determining the ohmic resistance of bonds of several sizes. The contact resistances are included.

In Table I the third column shows the resistances of complete joints made with 10-in. bonds, the fourth column giving the approximate resistance of the joints in a mile of rail. The last two columns are added for convenience in determining the resistances of single joints and of joints per mile of rail with other than 10-in. bonds. The fifth column gives the resistance per inch of bond. Obviously the resistance of a joint with a longer or shorter bond is as much greater or less than that of one with a 10-in. bond by the product of the difference in bond length in inches and the resistance per inch. The last column is the corresponding difference per mile of rail. The contact resistances are for 9/16-in. rail webs, but for all practical purposes in testing this is sufficiently close.

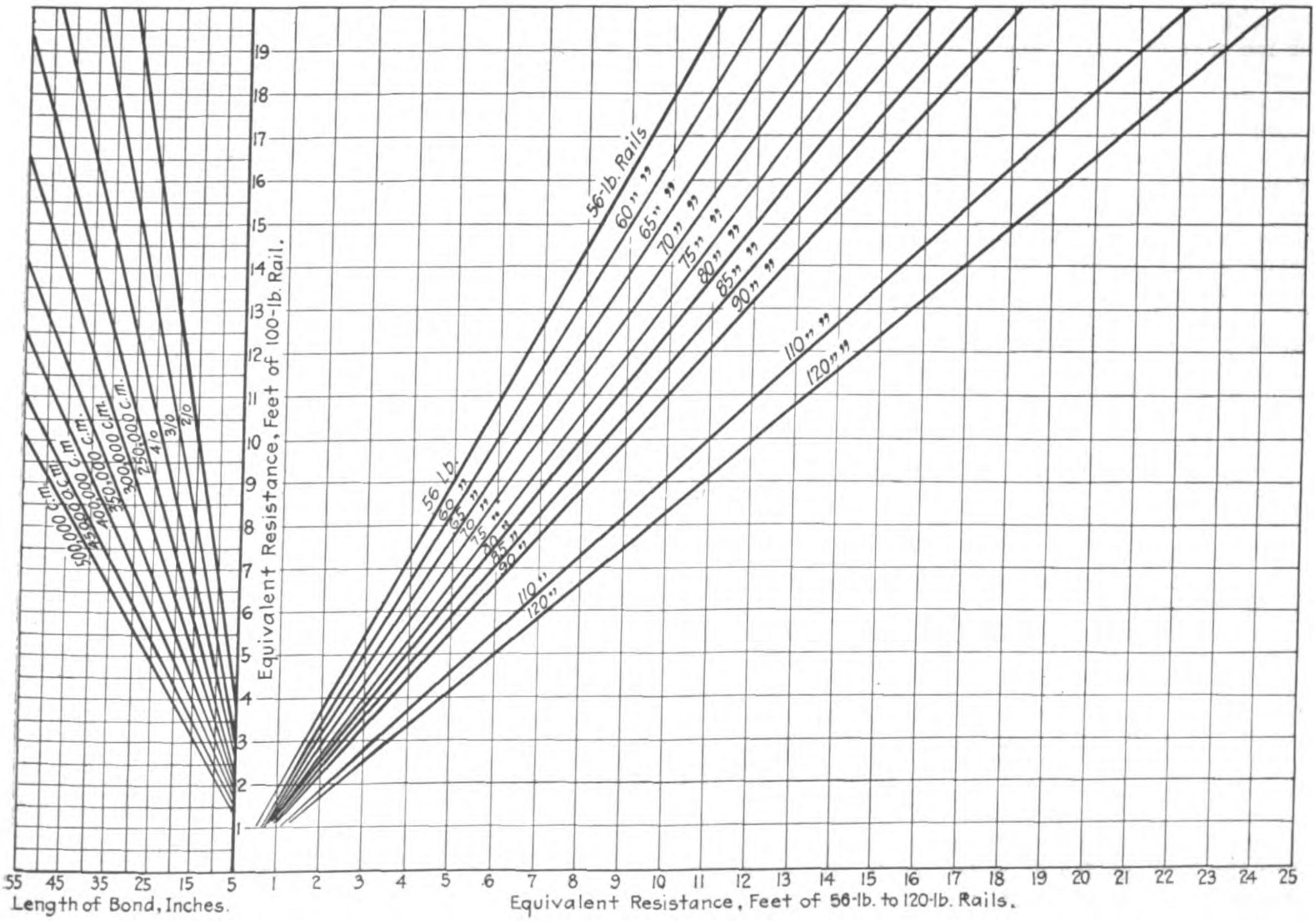
TABLE I—RESISTANCE OF BONDED JOINTS AT 68 DEG. F.*

Size of bond	Diameter of stud terminal, in.	Resistance of joint bonded with 10-in. formed-stud terminal bond, ohm	Total resistance of 170 joints bonded with 10-in. bonds, ohm	Resistance per inch of duplex par. bond conductors	Total resistance of 170 in. of bond conductors
0	½	0.00008271	0.0140607	0.00000792	0.001346
00	⅝	0.00006957	0.0118269	0.000006435	0.001094
000	¾	0.00005343	0.0090831	0.00000518	0.000881
0000	⅞	0.00004553	0.0077401	0.00000410	0.000697
300,000 circ. mil	1	0.00003443	0.0058531	0.00000292	0.000496
500,000 circ. mil	1	0.00002200	0.0037400	0.000001782	0.000309

*This and the following tables are reproduced by permission, from the A. S. & W. Co. Catalog No. 3.

TABLE II—ACTUAL CONTACT RESISTANCE OF STUD TERMINALS UNDER A CONTACT PRESSURE OF 15 TONS PER SQUARE INCH

Diameter of terminal stud, inch	Area of contact, square inches	Contact resistance, ohm
1	1.77	0.00000040
⅞	1.55	0.00000045
¾	1.33	0.00000053
⅝	1.10	0.00000064
½	0.88	0.00000080
Two twin-terminal studs	2.00	0.00000035



BOND RESISTANCE—FIG. 1—CHART FOR DETERMINING LENGTH OF RAIL EQUIVALENT TO A COPPER BOND

TABLE III—AREA OF COPPER, IN CIRCULAR MILS, EQUIVALENT TO RAILWAY STEEL IN CONDUCTANCE

Weight of rail, pound per yard	ACTUAL AREA		Copper Equivalent, Circular mils*
	Square inches	Circular mils	
50	4.90	6,238,800	519,900
60	5.88	7,486,600	623,883
70	6.86	8,734,400	727,866
80	7.84	9,982,100	831,841
90	8.82	11,229,900	935,825
100	9.80	12,477,700	1,039,812
110	10.78	13,725,400	1,143,783
120	11.76	14,973,200	1,247,766

*Based on a conductivity ratio of 12:1.

TABLE IV—RESISTANCE OF CONTINUOUS STEEL RAILS AT 68 DEG. F. (NO JOINTS)

Weight of rail, pound per yard	RESISTANCE, OHM*	
	Per 1000 feet	Per mile
50	0.019925	0.105204
60	0.016606	0.087680
70	0.014233	0.075152
80	0.012454	0.065757
90	0.011070	0.058449
100	0.009963	0.052604
110	0.009057	0.047821
120	0.008303	0.043839

*Based on a conductivity ratio of copper to steel of 12:1.

In Table II are given the contact resistances of terminals of various diameters under a contact pressure of 15 tons per square inch, together with the contact areas in 9/16-in. rail webs. The figures are for single terminals. Table III shows the areas of copper in circular mils equivalent in conductivity to railway steel. Table IV contains the resistance in ohms of continuous steel rails.

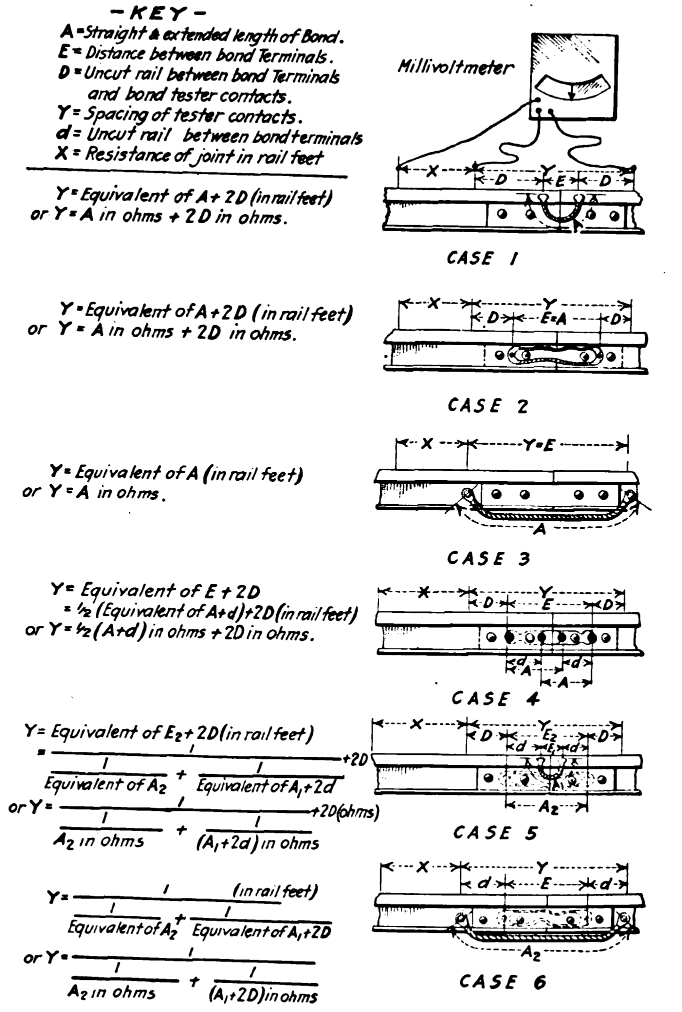
The diagram given in Fig. 1 will be found convenient in determining quickly the length of rail of several sizes equivalent to given lengths of bonds of several sizes. To use the chart, begin at the lower left-hand corner and follow the vertical line corresponding to the length of bond selected until this line intersects the diagonal line corresponding to the selected cross-section of bond. Then follow a horizontal line from this intersection to the right to its intersection with the diagonal line corresponding with the selected size of rail. Directly below this intersection, on the right-hand horizontal scale, is the length of rail having the same resistance as the selected bond. For convenience in reading the lengths of 100-lb. rail corresponding to the several bonds the vertical scale has been shown in this diagram.

Owing to the variation in the lengths of rail bonds it is seldom that the resistances found from tests are exactly as derived from the tables and charts. The bond terminal contacts may be anywhere from 3½ in. to 4 ft. or more apart, whereas the tester contacts are commonly at a fixed distance apart. In the comparative methods it is essential that the center tester contact be outside of the bond terminals. It is obvious that there is a division of the current at the bond terminals, a small part of it flowing through the splice bars and the remainder through the bonds. The uncut rail between the bond terminal and the rail end will contain a smaller current than that outside of the bond terminals and should never be used for comparison, unless correction is made for this. It will eliminate the necessity for corrections if the tester contacts are arranged to coincide with or exceed the spacing of the bond terminals and to consider the results of the test on the basis of so many feet of joint.

The diagrams given in Fig. 2 illustrate how to obtain the proper resistance of the bonded joints as tested. The distance Y is commonly taken as 3 ft. This is convenient for roads where both long and short bonds are used. It is apparent that 3 ft. of joint has different resistances in the figures. The capacity of the bond, number of bonds, and length and distance between bond terminals must be taken into account. As a general rule no consideration is given to the splice bars as paralleling the bond as far as resistance is concerned. The resistance of their contact with the rails is generally very high.

The efficiency of installed rail bonds cannot be clearly defined on account of the joint conditions, which preclude a relative consideration of the perfectly bonded joint. The splice bars undoubtedly reduce the joint resistance to some extent, sometimes by a very appreciable amount but more often by a negligible amount. Furthermore the bond conductors may be broken, thereby reducing the capacity, and the solid rail to which the joint is compared may be worn to reduced section, or the rail may be of different ratio of resistance to copper than the mean value of 12 to 1.

The contact resistance is a very small quantity when the installation is perfect, and a newly applied bond will not develop higher than calculated resistance except at the terminals. Experiments have shown that a contact pressure of 25,000 lb. per square inch is necessary in order to obtain an air-tight connection. There is therefore little room for increase in the total resistance of newly installed bonds, and the practice of testing bonds immediately after installation should be extended. The argument often advanced to the effect that it is necessary for a bond to be exposed to the elements for a time in order to determine faulty installation, is to some degree a fallacy. The effect of the splice bars may offset the resistance of the terminal contacts, thereby causing an improperly installed bond to appear good, but this is unavoidable. It will more often be found that the splice bars are of too high resistance to influence the test. The purpose of the test is to locate the poorly-applied bonds, and if the test develops a resistance greater than the calculated value it seems reasonable to assume that the resistance must lie in the terminal contacts of a new bond. If the de-


-KEY-
A = Straight & extended length of Bond.
E = Distance between bond Terminals.
D = Uncut rail between bond Terminals and bond tester contacts.
Y = Spacing of tester contacts.
d = Uncut rail between bond terminals
X = Resistance of joint in rail feet
Millivoltmeter
X
Y
D
E
D
Y = Equivalent of A + 2D (in rail feet)
or Y = A in ohms + 2D in ohms.
CASE 1
X
Y
D
E=A
D
Y = Equivalent of A + 2D (in rail feet)
or Y = A in ohms + 2D in ohms.
CASE 2
X
Y=E
A
Y = Equivalent of A (in rail feet)
or Y = A in ohms.
CASE 3
X
Y
D
E
D
d
A
d
A
Y = Equivalent of E + 2D
= ½ (Equivalent of A+d)+2D (in rail feet)
or Y = ½ (A+d) in ohms + 2D in ohms.
CASE 4
X
Y
D
E2
D
d
E1
d
A2
Y = Equivalent of E2 + 2D (in rail feet)
= 1 / (1/Equivalent of A2 + 1/Equivalent of A1+2d) + 2D
or Y = 1 / (1/A2 in ohms + 1/(A1+2d) in ohms) + 2D (ohms)
CASE 5
X
Y
d
E
d
A2
Y = 1 / (1/Equivalent of A2 + 1/Equivalent of A1+2D) (in rail feet)
or Y = 1 / (1/A2 in ohms + 1/(A1+2D) in ohms)
CASE 6

BOND RESISTANCE—FIG. 2—FORMULAS FOR CALCULATING RAIL JOINT RESISTANCE fects in the bonds are corrected immediately the bonds may maintain contact indefinitely.

Bonds which have been installed for a period may be given different consideration. If they are concealed it is possible that the bond conductors may be broken or the terminals may have been loosened by interference with the splice bars. The bonds are therefore subject to deterioration from causes which affect the entire bond and under the circumstances they are entitled to a direct comparison between the perfect bond resistance and the resistance of the entire bond when tested. If the joint, as tested, should measure as equivalent to 6 ft. of rail and the perfect joint was equivalent to 4 ft., the relative efficiency would be 66.6 per cent. To say at what efficiency old bonds should be replaced is impracticable for the reasons already given. Local conditions will govern this. Newly installed bonds, however, should test not to exceed 6 in. more than the calculated resistance.

Another point for consideration is the case where rebonding is done with the old bonds in place. When the new bond is applied to a bonded joint a parallel resistance condition is interposed. The resistance of the old bond should be noted and figured as in parallel with that of the perfect new bond in order to determine what the resistance of the rebonded joint should be.

Frequently joints which are bonded with concealed bonds in paved streets are rebonded by placing bonds around the splice bars. In other instances concealed bonds are bonded over with short bonds attached to the head of the rail.

To take a concrete case, assume a 70-lb. T-rail to be bonded with one 10-in. No. 0000 bond and that a test of 3 ft. across the joint shows it to be equivalent to 14 ft. of rail. This is illustrated by Case 2, Fig. 2. The equivalent of A is (14 ft. 0 in.) — (2 ft. 2 in.), or 11 ft. 10 in. If we add a No. 0000, 8-in. twin-terminal bond to the same joint we have the same condition as in Case 5, where $E_1 = 4$ in. and $2d = 6$ in. Using the equation for equivalent of Y in rail-feet we find that the resistance will be reduced to that of 4 ft. 7 in. by the addition of the twin-terminal bond.

If we had considered the resistance of the twin-terminal bond alone, as in Case 1, the equivalent of 3 ft. of joint would have been 2 ft. 7 in. + 2 ft. 8 in. = 5 ft. 3 in., instead of 4 ft. 7 in., or an error of 8 in.

The difference will be found to be much greater when a long bond is placed around a high-resistance, concealed bond as in Case 6. Assuming that the rail and concealed bond are the same as in the previous case, we find that the resistance of the joint, when rebonded with a 37½-in. No. 0000 bond, is equivalent to 6 ft. 11 in., as against 13 ft. 7 in. for a single long bond.

It will be seen, therefore, that the higher-resistance bonds, say 20 ft. and more in length, will have practically negligible effect on the resistance of joints with short new bonds, but where long bonds are being placed around a joint the resistance of the joints before rebonding is of appreciable importance.

While it is undoubtedly more accurate to determine first the resistance of any joint before bonding in order to obtain the actual resistance of the new bond, it is not often practical to do this, nor is such a procedure warranted where the paralleling effect of the splice bars only is of concern. If many joints test better than perfect, so much the better for the return circuit. The higher-resistance bonds are the ones to be located and replaced.

The various laboratory tests which have been made to determine the actual resistances of carefully installed bonds differ somewhat. That there is a slight, and in some instances inconsistent, variation in the figures given in different sources of information is probably due to differences in the locating of testing instrument contacts. The personal element and the inequality of testing facilities also contribute in part. In the case of the terminal-contact resistance alone the variations are more marked. Values given for the same diameter terminal in the same thickness of rail web vary anywhere from three to fifteen times the values given herein. Although the maximum difference is less than 0.01 microhm, a variation of 1500 per cent does not seem reasonable.

The contact resistance cannot be measured directly because it is the resistance of an infinitesimal space. The values given herein were obtained by careful tests on plane surfaces in which the minimum resistance per square inch of surface was determined. With this as a unit the actual contact resistances were calculated.

In conclusion, attention is called to the somewhat general complaint that bonds gradually increase in resistance. This may be due to the elimination of the paralleling of the splice bars on account of wear and rust.

Brush Tests on Non-Interpole Motors with Slotted Commutators

BY KEITH MACLEOD, MONTREAL TRAMWAYS

For the purpose of comparison with the results of tests described in an article printed in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 22, 1914, page 355, the following results recently completed on brushes used on non-interpole motors with slotted commutators are given. These results show the effects of the practice of commutator slotting under the conditions obtaining on the Montreal Tramways.

The recent tests were conducted in substantially the same manner as those previously described, and both sets of tests were made for the purpose of selecting the most economical brush.

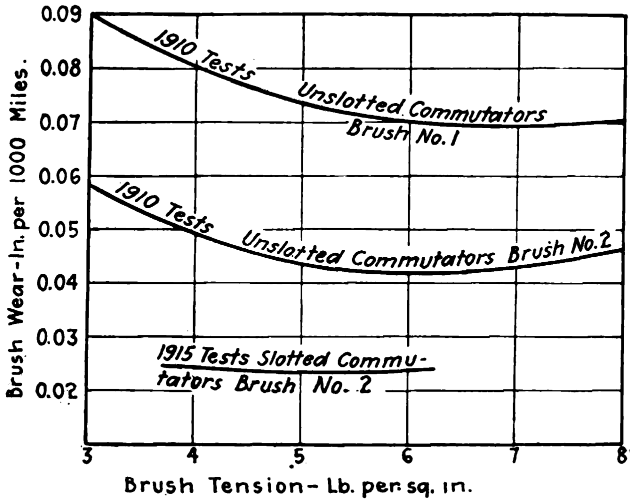
When the practice of slotting commutators was started it was noted that the percentage of broken brushes was increasing, and it was primarily to find out if a brush could be selected to stand up under the new conditions that the latest tests were started. It was noted that the old standard brush had no injurious effect on the slotted commutator, which was rather remarkable as this was a brush designed especially for commutators with flush mica. Accordingly this brush was included in the tests, making a total of four types of brush tested.

Each of these, with the exception of No. 2, was the brush recommended by one of three brush manufacturers for non-interpole motors, with slotted commutators, in city service. Data as to brush resistance were not available for, as the manufacturers' representatives pointed out, resistance measurements of carbon have to be made under identical conditions to give results of value. However, considerable mechanical data were obtained. Leaving out No. 2, an abrasive brush not particularly recommended for the tests, these were as given below.

The relative hardnesses, or resistances to scratching with a knife, were as follows: No. 4, softest; No. 5, hardest.

The breaking strengths, as determined by supporting the brushes on round bars placed 1½ in. apart, applying a breaking load at the middle by means of a round iron bar, and calculating the stress by the usual beam formula, were as follows: No. 4, 1020 lb. per square inch; No. 3, 1920 lb. per square in, and No. 5, 2380 lb. per square inch.

A motor that experience had shown to be typical of



VARIATION IN BRUSH WEAR WITH BRUSH TENSION IN NON-INTERPOLE MOTORS

the non-interpole motors on the road was chosen for the test, and seventeen regular cars equipped with this type of motor were fitted with the test brushes.

Brushes of each type were distributed in various ways among the motors on each car, and each brush was marked with the car number and its position in the car. Thus "1300-2-R-0" would indicate that the brush was on car No. 1300, on No. 2 motor of this car, and in the rear brush-holder. It was also the outside brush. Each brush remained in the same position throughout the test.

Beyond instructions to workmen to report to the foreman any cases of marked brushes needing replacement, and an occasional inspection by the foreman, no particular attention was paid to the brushes under test. The tests were continued for about a year, variation in conditions due to change in weather being thus taken care of.

The results of the tests are shown in Tables I and II.

The results of the test show conclusively that the brushes formerly used as standard on unslotted commutators are not well suited for operation on slotted commutators. There is no great difference in the average rate of wear of the different types, and the rate of wear is practically uniform.

The greatest differences among brushes were in their ability to resist chipping and breaking. While it would seem at first sight that the toughest brush would produce the most wear on the commutator, this proved not to be the case, the wear of the commutators with all types of brush being entirely negligible.

The effect of variation in brush tension on wear was not very marked, the tension being varied between 3¼ lb. and 6 lb. per square inch to determine this point.

TABLE I—RESULTS OF BRUSH TESTS ON NON-INTERPOLE MOTORS WITH SLOTTED COMMUTATORS

Type of brush, number	2*	3	4	5
Number tested	91	75	74	77
Per cent chipped and broken	29.7	18.7	20.3	6.5
Wear per 1000 miles, inch	0.025	0.023	0.033	0.024
Normal life, miles	35,000	38,000	26,500	36,500
Cost per motor per 1000 miles, cents	1.26	1.05	3.82	1.00
Cost per motor per 1000 miles allowing one-half normal life for broken and chipped brushes, cents	1.64	1.25	4.60	1.07

*This brush was formerly standard on unslotted commutators.

TABLE II—RATES OF WEAR FOR DIFFERENT PERIODS OF TEST

	FIRST PERIOD		SECOND PERIOD		ENTIRE TEST	
Type of Brush, Number	Total Miles	Wear per 1000 Miles, Inch	Total Miles	Wear per 1000 Miles, Inch	Total Miles	Wear per 1000 Miles, Inch
2	917,840	0.025	1,062,650	0.026	1,980,490	0.025
3	879,920	0.025	1,033,510	0.021	1,913,430	0.023
4	879,920	0.034	607,100	0.033	1,487,020	0.03′
5	917,840	0.028	860,350	0.020	1,778,190	0.024

Comparing the results of the later tests with those of the former ones the following appeared to be the most noticeable differences due to the practice of slotting the commutators:

The rate of wear of brushes of the same type is largely reduced, but chipping and breaking of brushes may increase. This might not be so noticeable in double-ended cars, as the tendency to sharpen the edges of the brushes would not be so great as on cars running continuously in one direction. The chipping can be minimized by selecting the proper type of brush.

The wear of commutators is reduced to an almost negligible quantity.

The effect of brush tension on brush wear is not nearly so marked as with unslotted commutators. This may be due to the fact that where the mica is not undercut it does not long remain exactly flush with the copper, and thus creates a condition favorable to arcing and rapid wear. The fact that there is less effect on wear due to variation in brush tension with slotted commutators should, however, not be made an excuse for slackness in maintaining the tension at its correct value.

It has been noted that unless the undercutting has been very carefully done and each slot gone over by hand to thoroughly remove all mica, the advantages of slotting are considerably diminished. On the other hand the resulting economy fully justifies the best possible workmanship in this operation.

In connection with this matter of selecting the most economical brush it is necessary to keep in mind the quantities which are involved in brush cost. These are: The cost due to the actual wear of the brush; the cost due to the replacing of brushes before they are worn out for any reason, and the cost due to the wear of the commutator.

The wear of brushes may be considered as made up of two components, electrical wear and mechanical wear. The electrical wear is the disintegration that results from the slight arcing under the brushes, which is noticeable in non-interpole motors, especially those with unslotted commutators. This wear is much aggravated by unevenness of the commutator surface or by excessive vibration of the motor as a whole, caused by excessive stiffness in suspension, poor fitting of gears and pinions, roughness of track, etc. The mechanical wear is due to friction between brush and commutator; which depends to a large extent on the condition of the surface of the latter. It is in the reduction of mechanical wear that the advantage of a brush which produces a burnished commutator appears.

Brush tension in general has contrary effects on the electrical and mechanical wear of brushes. Obviously, the less the tension the less the brush wear if no current is passing. On the other hand, low tension encourages bad sparking with deterioration of brush and commutator surface. In non-interpole motors with unslotted commutators the two effects are quite marked, and there appears to be a tension at which the combination of the two rates of wear is a minimum.

On the accompanying curves are shown the effects of brush tension on the wear of the two types of brush. The most economical tension is about the same for both, notwithstanding the wide difference in the actual rate of wear.

Commutator wear is influenced to a large extent by the type of brush used. On unslotted commutators the necessary abrasive for cutting the mica may not be correctly proportioned, with the result that high mica and consequent burning of the copper produce rapid wear. The effect on the commutator wear of varying the brush tension is not so marked as it is in the case of brush wear, but the general tendency is the same.

The item of cost resulting from the brushes not reaching their full life depends not only upon the tendency of brushes to chip and break, but also on the efficiency of the carhouse force in keeping the brush-holders and springs in good condition and in seeing that worn brushes reach their minimum length before they are replaced. Aside from the carhouse conditions, which are independent of the type of brush, there is always a percentage of the brushes that break up or are so badly chipped as to be unfit for service before they wear out.

It is difficult to fix an average service which these brushes should give before they have to be replaced, but in comparing types of brush it will usually be within the limits of error to assume the average for all chipped and broken brushes to be equal to about half the normal life. This was done in calculating the cost shown in Table I.

That the three items of cost discussed are worth considering is shown clearly by the data given in Table III, which are taken from the results of the test referred to.

TABLE III—RESULTS OF TESTS OF BRUSHES ON NON-INTERPOLE MOTORS WITH UNSLOTTED COMMUTATORS

Type of brush, number	2	1
Number tested	32	32
Per cent chipped and broken	21	40
Cost per motor per 1000 miles due to brush wear only, cents	2.03	1.15
Cost per 1000 miles due to brush wear, allowing broken and chipped brushes one-half normal life, cents	2.46	1.61
Cost per 1000 miles due to wear of commutator, cents	2.60	5.48
Total cost per motor per 1000 miles, cents	5.06	7.09

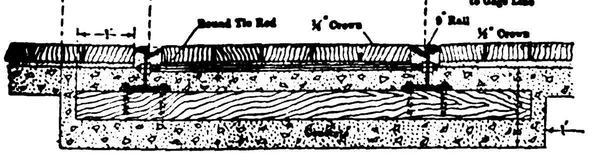
NOTE.—No. 1 was a cheaper brush and "brush wear only" cost less in spite of greater wear.

These tests were made more than five years ago to find a brush which would reduce brush costs, these being excessive at the time. As a result of the tests No. 2 was selected and remained standard until the practice of slotting was adopted. As shown in the table, the costs due to brush wear and chipping were favorable to the previous standard, No. 1, and it was only when commutator cost was included that the great advantage of the more expensive brush, No. 2, appeared. That this selection was justified was proved by large reductions in costs, the lower figures obtaining until slotting was started, when they began to rise on account of abnormal chipping.

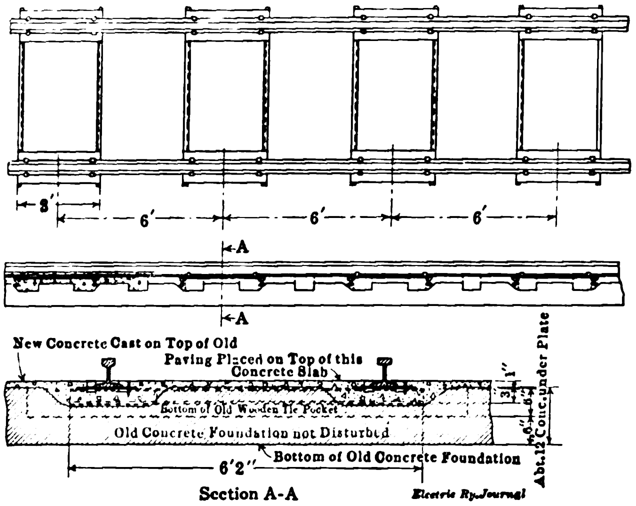
Steel Twin Ties for Concrete Track Rehabilitation

One of the interesting and valuable possibilities of twin steel ties of the International Steel Company, Cleveland, Ohio, lies in its application to rehabilitated concrete track. A certain railway which has been using a 9-in. girder rail wished to replace it with a 6-in. T-rail. To do this in the ordinary way, the company would have found it necessary to break up and remove the wooden ties and a 7-in. concrete base. This, of course, would have been very costly and slow.

The engineer of the property conceived the idea that by using twin steel ties which are only 3-in. deep he could build up the new track of 6-in. T without disturbing the concrete base of the original wooden ties.



CROSS-SECTION OF ORIGINAL FOUNDATION WITH WOODEN TIES AND 9-IN. GIRDER RAIL

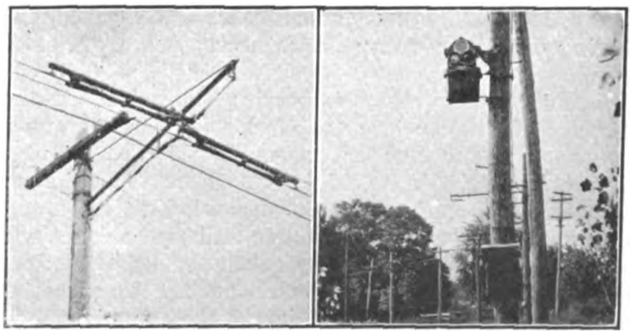

3'
6'
6'
6'
A
A
New Concrete Cast on Top of Old
Paving Placed on Top of this Concrete Slab
Bottom of Old Wooden Tie Pocket
Old Concrete Foundation not Disturbed
Bottom of Old Concrete Foundation
1"
3"
6"
6"
Abt. 12" Conc. under Plate
6'2"
Section A-A
Electric Ry. Journal

FOUNDATION AS ALTERED TO TAKE NEW T-RAIL ON TWIN STEEL TIES

These ties, by the way, had been creosoted and were in excellent condition, except for mechanical damage due to the character of their fastenings. Thus the application of the shallow but strong-bearing International twin tie will solve the most important rehabilitation problem that has arisen from the use of concrete foundations. The cost of the ties is actually less than would be the cost of removing the old concrete alone. The cost of new concrete is also eliminated and disturbance to traffic is avoided to a very large degree.

Contactor Signals Operate at Low Voltage

Automatic signals operated from a trolley potential varying from 200 to 600 volts represents a most severe test, but signals installed on a certain section of the Louisville (Ky.) & Interurban Railway have met this condition and have given no trouble whatever from this source. The Louisville & Interurban Railway operates an interurban line to Jeffersontown, 12.5 miles from the Louisville terminal station. This line is double track through the city and 5.2 miles out, and then continues as single track with passing sidings to Jeffersontown. The line is fed from a power house 1.5 miles from the terminal station, consequently there is a large line drop near the Jeffersontown terminal, at times momentarily as much as 400 volts. When traffic is heavy the drop is too great and a substation 2.6 miles from Jeffersontown is put into service. As a rule, however, the traffic is rather light, except on Sundays and holidays and at county fair times, and ordinarily does not warrant the operation of this substation. Cars are operated on a one-hour headway, but on Sundays and holidays, as mentioned, a half-hourly headway is maintained and alternate trains have two cars.



CONTACTORS AND SIGNAL ON LOUISVILLE & INTERURBAN RAILWAY

About three-quarters of a mile from Jeffersontown the line passes under the Southern Railway, threading through a cut where the view is obstructed. To protect this block Nachod automatic signals, Type CD, have been installed at the two sidings, a half mile apart. These permit following movements through the block but prohibit opposing ones. At these points the wide variation in voltage obtains at certain periods without affecting the operation of the signals. It is, of course, possible to compensate partly for varying line voltages by proper use of the car controller, but the signal remains with a fixed resistance for all line voltages. Although the signal relays are operated by direct-acting, long-stroke plunger magnets, provision for this wide range of operating voltage is made by oil-cooling the relay coils and by using resistances which are shunted out of circuit before the magnets operate.

The trolley contactors at one of the sidings are shown in one of the accompanying illustrations. They are placed outside of the turnout on the single track, two being necessary in the double-trolley construction. These contactors are suspended from one end only, on a double curve pull-off, thus being free from line stresses. They are placed with respect to the bracket, so that the contactor will have been traversed by the wheel and contact made before the wheel strikes the suspension. In this way the contacting has been done before the wheel receives the slight shock due to the cusp in the wire at the suspension. In another one of the accompanying illustrations the signal at the other end of the block is shown. This is supported on an iron bracket through-bolted to the pole, from which it may easily be lifted and lowered to the ground with connections intact. To make this possible the vertical pole wiring is in a cable made by taping the separate rubber covered wires and tying the cable to cleats as a single wire. This bracket offsets the signal from the pole so that it is plainly visible to approaching cars. A locked fuse box is also provided at man height on the pole in order to isolate the circuits and arrange for easy disconnection, tests and fusing.

Both signals are normally dark, but a west-bound car accepting the "neutral" signal at one siding and passing under the trolley contactor sets the opposing signal at the other siding at stop—a red light and red disk. The signal, in advance of the west-bound car changes to permissive—a white light and white disk, which indicates full protection through the block. A following car may accept this permissive signal and will be counted in on the signal relay, a situation which is indicated by the blinking of the white light. Not until both cars have left the block would the signals again be restored to normal.

The trolley contactors, shown in the illustration, are of the wiping type and receive the wheel very smoothly, operating on some lines at the very high speed of 71 m.p.h. Since these contactors have no moving parts they are directional. A car passing under a contactor toward the signal will set both signals as described, but backing out again under the same contactor will clear them.

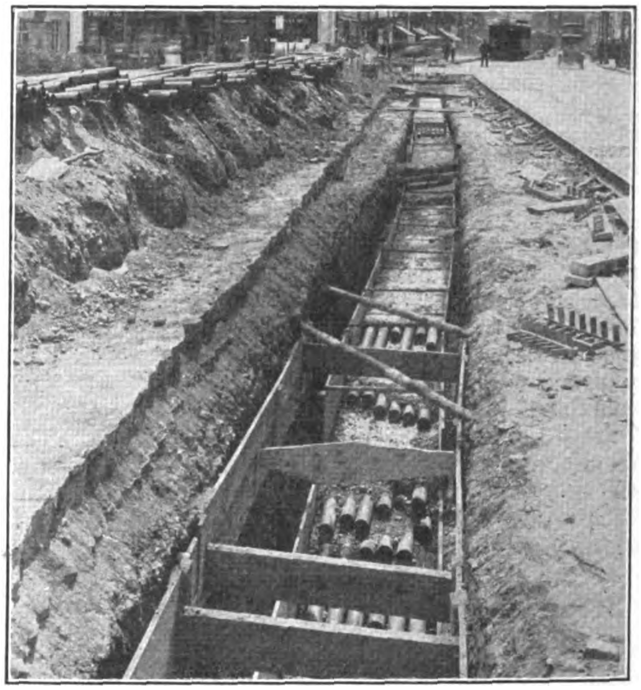
Should the signal be indicating "permissive," the entrance of the car into the block will merely cause a movement of the counter one notch forward and one reverse, leaving it in its original position. Should a car over-run the contactor with the signal indicating "stop," the signal aspects will not change although a count will be recorded. If the car backs out again the indications of the signal will not have been changed. The operation of the signal is normal even though the car might have the trolley wheel on the wrong wire for that direction. The control is thus extremely flexible, the signals showing at all times whether the block is clear or occupied, and if occupied, which way the cars are moving in the block.

Motormen are instructed to throw off power while passing contactors to reduce line drop at that time. These signals are both operated and lighted by the trolley voltage, no changes whatever in the track being necessary. The signal lights are 60-watt tungsten lamps and the disks enameled aluminum, moving parallel to a glass roundel. This combination of lights and disks gives unmistakable indications under the worst conditions of bright sunlight and low voltage.

Fiber Duct Conduit at Worcester

In the issue of the Electric Railway Journal for Aug. 21, 1915, reference was made to the installation of fiber ducts for feeders by the Worcester Consolidated Street Railway coincident with double-tracking. In this connection the accompanying illustration and other particulars will be of interest.

The new Worcester feeder conduit consists of thirty or thirty-six 3½-in. Orangeburg fiber ducts of the Fibre Conduit Company, Orangeburg, N. Y., laid in a trench 5 ft. deep and 30 in. wide at the bottom. They contain both positive and negative feeders, and provide rental space also. The special manholes used are of an offset type with entrances 30 in. in diameter located at one side of the track. The working chamber, brick-lined at the sides, with an 8-in. concrete base and concrete, brick and steel roof, is 8 ft. long and 5 ft. wide, the height being 7 ft. 6 in. At one side is a step 3 ft. high and 2 ft. 9 in. wide below the entrance, which was required by the city to facilitate the location of future underground structures. The negative feeders are carried from duct to duct along the roof, the other cables being racked on the wall in the usual way. Thirteen bull rings, attached to walls and floor, provide means for the handling of cable from the street into the ducts by snatch blocks and pulleys.



FIBER CONDUIT FOR RAILWAY FEEDERS AND OTHER CIRCUITS AT WORCESTER, MASS.

News of Electric Railways

TORONTO RAPID TRANSIT REPORT PRESENTED

Engineering Commission Proposes System of Rapid Transit and Radial Railway Entrances to Cost $18,817,000

The report on a system of rapid transit and radial railway entrances proposed by Mayor Church of Toronto, Ont., in his inaugural address to the City Council was presented to the city on Dec. 7 by R. C. Harris, Commissioner of Works; F. A. Gaby, chief engineer of the Hydro-Electric Power Commission of Ontario, and E. L. Cousins, chief engineer of the Toronto Harbor Commission, who was in actual charge of the preparation of the report. The system of radial entrances, terminals and yards as proposed by the engineering commission will cost $18,817,000 divided as follows: west line, from terminal to west focal point, 5.2 miles, $4,076,000; east line, from terminal to east focal point, Coxwell and Danforth Avenue, 4.7 miles, $3,120,000; north line, Queen Street to north focal point, Duplex Avenue and Belt line, 3.2 miles, $7,696,000; east and west yards and freight facilities, $1,365,000; terminal station at the foot of Yonge Street and carhouse, $2,560,000. The conclusions of the engineering commission are in effect as follows: the existing surface railway system within the old city limits, provided with more cars, improved equipment, and operated at a higher efficiency, will adequately serve the city within the limits of 1891. The present radials entering the city cannot be considered rapid transit lines. The most feasible entrances for such a system lie along the water front. The entrance from the north may be easily effected by subway construction.

The report states that aside from operating considerations, the additional cost of $8,000,000, embracing a four-track subway from the water front to College Street, and the erection of a terminal at the latter point, make an uptown terminal unfeasible. The terminal should be at the axis on the water front. Provision should be made for the co-ordination of rail and water traffic. The radial railway trunk lines should, as the future demands, and the city extends, provide for the operation of semi-rapid transit lines.

The commission recommends in effect as follows:

The acquisition by the city of the Toronto Railway system in 1921. The establishment of a transportation commission, with representatives from the ctiy, the Harbor Commission, and the Provincial Hydro-Electric Power Commission, so constituted as to give the city a majority. The construction of three trunk radial entrance lines, with necessary yards and terminals. Until 1921 the radial railways should be restricted to the use of the water-front terminal. The future will demonstrate the advisability of a down-town loop operated initially as a surface line, pending the time traffic warrants other construction.

The engineers say that the construction of a rapid transit system in the strict meaning of the term is not justified in the city. They recommend that the radial railway trunk line entrances be used for a semi-rapid transit system. The policy should be declared at once, and immediate steps taken for acquiring the Toronto Railway in 1921. The reduction of the present gage of the rails to the standard gage is recommended. Present traffic conditions, the engineers point out, could be improved by rerouteing. It is estimated that the city will have a population in 1927 of 750,000, in 1936 of 1,000,000, and in 1950 of 1,500,000. A rapid transit system, the report explains, has never been provided in cities with less than 1,000,000 inhabitants, mainly because the initial cost is so large. In this connection the engineers say:

"Toronto is not in a position to construct a rapid transit system in the strict sense of the term, but may, when conditions demand, institute a semi-rapid transit service by using the radial railway entrance lines. We have developed the radial entrance plan so as to permit of such joint use. By so doing, adequate and rapid service may be furnished that portion of the population living outside of what we have termed the thirty-five-minute zone. We assume that persons who travel from the central area to their abode, or vice versa, in the space of thirty-five minutes do not require more rapid transit."

McCALL REMOVED — OSCAR S. STRAUS APPOINTED

Chairman of New York Commission, First District, Dismissed by Governor on Charges Preferred by Legislative Investigating Committee

Edward E. McCall has been removed as chairman and member of the Public Service Commission of the First District of New York by Governor Whitman. The Governor filed his order of dismissal on Dec. 6, after having had under consideration the plea made in his own behalf by Mr. McCall on Dec. 3. The charge of which the Governor found Mr. McCall guilty is that he violated Section 9 of the public service commissions law, which forbids a commissioner to hold stock in a corporation subject to the supervision of the commission. Chairman McCall held 387 shares of stock of the Kings County Electric Light & Power Company, and his defense was that he transferred this stock to his wife just before he was appointed to the commission. In his opinion Governor Whitman said there was no evidence before him of the transfer except the commissioner's unsupported statement, and that while he had no desire to question the truth of Mr. McCall's statement he "did not believe that a transfer within the meaning of the law ever was made." The Governor dismissed entirely the other charges made against Chairman McCall by the Thompson legislative committee. They comprised six charges and twenty specifications, and have been published previously in the ELECTRIC RAILWAY JOURNAL.

On Dec. 9 the Governor announced the appointment of Oscar S. Straus to succeed Mr. McCall as chairman. A personal reviewing the career of Mr. Straus is published elsewhere in this issue.

Mr. McCall answered the charges before the Governor late on the afternoon of Dec. 3. In his brief of more than 100 printed pages he dealt at length with his ownership of 387 shares of the Kings County Electric Light & Power Company stock. Mr. McCall said he would stand on the records of the commission. He also denied the charge that he had accepted a retainer from and rendered legal services to a corporation seeking to avoid the payment of State taxes. He pointed out that the Governor dismissed this charge against him once before, and that as to the committee's motive for bringing it up again he would not stoop so low even to refer to it.

Mr. McCall was appointed to the commission on Feb. 3, 1913, by Governor Sulzer. He has been in public life since 1902 when he was elected to the Supreme Court. He was an unsuccessful candidate for Mayor of New York City in 1913.

The Thompson committee was appointed by the Legislature last January and empowered to investigate the workings of both Public Service Commissions. The committee in the spring filed charges of neglect of duty and misconduct in office against four of the commissioners for the First District, Mr. McCall, J. Sergeant Cram, G. V. S. Williams and Robert C. Wood, but after a hearing before him, the Governor dismissed the allegations as not sustained. Last summer the committee resumed its investigation of the commission for the First District and the subsequent hearings disclosed Mr. McCall's alleged ownership of stock of the Kings County Electric Light & Power Company. The formal charges against him were filed with the Governor on Nov. 15. The investigation of the commission for the First District has not been finished, and a few days ago Senator George F. Thompson, the chairman of the legislative investigating committee, announced that it would be rushed to completion and the inquiry into the workings of the Public Service Commission for the Second District would be resumed.

LIVE AND LET LIVE PLEA IN LITTLE ROCK

Four proposals, the adoption of which, in the belief of the Little Rock Railway & Electric Company, Little Rock, Ark., would aid materially the growth of Little Rock and increase the usefulness and the value of the street railway property, have been submitted to Mayor Taylor and the members of the finance and the public utilities committees of the city.

According to D. H. Cantrell, president of the company, the first thing that is necessary in order to insure a complete protection of the company's investment is a proper regulation of the jitneys so as to put them as nearly as possible on the same basis with the street railway company, as common carriers. Second, President Cantrell, in view of all of the facts and the circumstances surrounding the granting of the Merchants Lighting Company's franchise and its injustice to the railway company, and also, in view of the very doubtful liability of the railway for the annual tax of $500, asks that the city abandon any further claim for this tax. Third, President Cantrell asks that an investigation be conducted into the actual cost to the city of Little Rock of its municipal lighting plant, in order to determine the feasibility and desirability of a contract being entered into between the city and the railway, whereby the utility company would supply electricity for the municipality's needs; provided, that the railway could supply current more cheaply than the municipal plant could manufacture it. President Cantrell's fourth proposal is one looking toward the elimination of the provision in the company's present franchise which requires it to sell six tickets for a quarter when the population of Little Rock reaches 100,000.

President Cantrell's communication, directed to Mayor Charles E. Taylor and the members of the finance and of the public utilities committees, is concluded as follows:

"It would not be good policy for the city to seriously hamper and embarrass an institution which is yielding and will yield so much revenue to the city, and will pay so much for improvement of the streets. In other words, it would not be good policy 'to kill the goose that lays the golden egg.' Rather should the city aid and assist the company in all reasonable ways to carry out its obligations to the city."

PRESIDENT ON THE RAILROADS

In his address to Congress President Wilson referred to the railroad problem as follows:

"In the meantime may I make this suggestion? The transportation problem is an exceedingly serious and pressing one in this country. There has from time to time of late been reason to fear that our railroads would not much longer be able to cope with it successfully, as at present equipped and co-ordinated. I suggest that it would be wise to provide for a commission of inquiry to ascertain by a thorough canvass of the whole question whether our laws as at present framed and administered are as serviceable as they might be in the solution of the problem. It is obviously a problem that lies at the very foundation of our efficiency as a people. Such an inquiry ought to draw out every circumstance and opinion worth considering, and we need to know all sides of the matter if we mean to do anything in the field of federal legislation.

"No one, I am sure, would wish to take any backward step. The regulation of the railways of the country by federal commission has had admirable results and has fully justified the hopes and expectations of those by whom the policy of regulation was originally proposed. The question is not what should we undo? It is, whether there is anything else we can do that would supply us with effective means, in the very process of regulation, for bettering the conditions under which the railroads are operated and for making them more useful servants of the country as a whole. It seems to me that it might be the part of wisdom, therefore, before further legislation in this field is attempted, to look at the whole problem of co-ordination and efficiency in the full light of a fresh assessment of circumstance and opinion, as a guide to dealing with the several parts of it."

In this connection Senator Newlands of Nevada is quoted as saying that legislation aiming to give the railroads of the country federal instead of State incorporation would be sought in the present term of Congress. Plans are also said to be under way to obtain federal supervision of railroad securities, to increase the membership of the Interstate Commerce Commission, and to divide the railroads into Eastern, Middle Western, and Far Western groups, each section to be under regulatory supervision of a separate branch of the commission.

NETWORK OF HYDRO-RADIALS PROPOSED IN ONTARIO

Details of the hydro-radial project, advocated by Sir Adam Beck and the Hydro-Electric Power Commission of Ontario in conjunction with certain municipalities in Western Ontario, were laid before the Toronto Board of Control on Dec. 3. Accompanying the details were the draft by-law, which the city is asked to indorse, and a copy of the agreement which the city will have to enter into with the Hydro-Electric Commission. The latter relates to the construction and operation of the lines. The entire project, as outlined, calls for an expenditure of $13,734,155, of which the city of Toronto will have to contribute $4,240,196, or slightly less than one-third of the total cost. This is the amount the people will be asked to authorize, provided the Council indorses the proposition and decides to submit it to the people on Jan. 1.

This will be a separate and distinct undertaking from the scheme for improving the transportation facilities within the city proper. The proposed undertaking is aimed to provide increased transportation facilities over a large area radiating from Toronto to Guelph, London and Sarnia. In addition to the heavy capital expenditure for construction of the lines, the municipalities affected will have to assume responsibility for the large operating and maintenance charges, should the revenue not suffice to meet the same. Further, the scheme now presented only makes provision for radials to the west of the city. Another scheme dealing with the eastern section of the province will be submitted at a later date. The eastern scheme, however, will not be such a serious undertaking for the city, as while no mention is made of it in the report presented on Dec. 3, it may be assumed that sufficient accommodation will be provided at the proposed central terminal station, which is to be erected at the foot of Yonge Street, to care for all traffic, both east and west.

In addition to the $4,240,196, the city is to provide a free right-of-way for the railway and power lines of the commission over and through any property owned by the city, and to convey the same or to execute an agreement for its free use, as the commission shall deem advisable.

The initial cost will be divided between thirty-two municipalities, Toronto being the largest contributor with $4,240,196, London coming second with $1,109,303. It is also pointed out that the city of Toronto will be required not to grant any more franchises to railway or other transportation companies without the consent of the Hydro-Electric Power Commission. The commission will undertake to finance the scheme and to do the actual construction work. Debentures covering the amounts allotted to the several municipalities are to be issued and handed over to the commission, which will retain or hypothecate them as it considers desirable.

Mayor Church announced on Dec. 1 after a conference between Sir Adam Beck and the Board of Control that the question of submission of a by-law to guarantee $3,000,000 bonds for these hydroelectric radials would be laid before Council at a special meeting on Dec. 8.

At a joint conference of the Port Credit Village Council and the engineers of the Hydro Commission held on Nov. 30 a resolution was passed by the Council indorsing the route selected by the commission for the Toronto to London line through the municipality. The deputation asked that facts as to cost, etc., be presented to Council in time for discussion at the next regular meeting, when a by-law will be put through to enable the people to vote on the question at the municipal election. Chief Engineer Gaby explained to the deputation that the line is to be the main power line that will link up scores of municipalities of western Ontario with a rapid transit system over a private right-of-way, coupling the speed of the steam roads with the frequency of a local street car service.

The outlook is not at all propitious for Federal assistance by way of subsidy to this scheme. Two years ago the largest delegation that ever went to Ottawa urged subsidizing these roads as a great movement for the benefit of the people. Nothing was done then, and the policy was laid down last session that because of the war there should be no railway subsidies of any kind.

EXPOSITION GATES CLOSE AFTER SUCCESSFUL AND PROFITABLE SEASON

The Panama-Pacific International Exposition officially closed its gates at midnight on Dec. 4 with ceremonies attended by record-breaking crowds. The closing day exercises began at high noon in the Court of the Universe, when President Moore of the exposition read a toast from President Wilson and a reply thereto. The several palaces were closed by President Moore's party making a tour of the grounds, meeting the chief of each department at the entrance to each palace, where there were a few words of official congratulations, after which a herald in the historic costume of the Town Crier announced the building closed. Prosperity week electrical parade, aeroplane flights, and a continuous illumination and fireworks display during the evening were features of the program. At midnight President Moore closed a switch in the Court of the Universe, turning off the lights and leaving the grounds in semi-darkness. This was a signal for a corps of buglers on the darkened Tower of Jewels to sound taps in requiem toward the four points of the compass.

After the gates closed on Dec. 4 the total number of admissions recorded was 19,876,000, of which approximately 13,000,000 were paid admissions. Reviewing the financial history of the exposition in a general way it may be said that the income during the operating period exceeded all operating expenses by $2,572,000. The net earnings are estimated at $1,360,000. The Municipal Auditorium, which cost $1,086,000, was presented to the city by the exposition as a memorial. The disposal of the net profit from the operating period has not yet been decided upon, but efforts are being made to induce stockholders to assign it to the preservation of parts of the exposition, particularly a boulevard that would follow the present Marina and connect with the Ocean Highway.

GENERAL MANAGER WRIGHT ON WILKES-BARRE STRIKE SITUATION

Renewed riots marked developments in the strike of the carmen of the Wilkes-Barre (Pa.) Railway during the week ended Dec. 5. Additional men of the State Constabulary and many extra policemen have served to keep the semblance of order among the lawless element. The company is running cars over almost all of the lines.

In a statement issued by T. A. Wright, general manager of the company, the recent developments in the strike situation were summarized as follows:

"The Chamber of Commerce, for the purpose of settling the strike, appointed a committee which succeeded in bringing about a conference between the company's officials and the men. At the first meeting, on Nov. 27, the chairman of the committee proposed that the question of the validity and finality of the decision of July 10, 1915, be left with Charles E. Rice, judge of the Superior Court of Pennsylvania. National Organizer P. J. Shea, of the carmen, announced that the trainmen repudiated the award, and also the working agreement signed on Jan. 9, 1915. He declared that the men now demanded a new working contract containing a clause giving recognition to the national officers of the association and a protective clause. The protective clause, he said, must provide that whenever a man was discharged he should have the right, if the committee of Local No. 164 demanded it, to have his case decided by a board of three arbitrators, citizens of Luzerne County, to whose decision, if adverse to the general manager, the company must bow.

"The leaders of the men also demanded that the company take back all the men. This the company agreed to do, but refused the demand of the committee that an agreement be entered into in which the company would have no power to discharge an employee, as such action would be tantamount to turning over the control of the property to the employees. The company refused to abrogate the agreement of Jan. 9, on the grounds that such action, together with the refusal of the strikers to abide by the award of July 10, would mean that all agreements, no matter how solemnly entered into, would be subject to the sole interpretation of the men, enforced by their ability to strike at will.

"Evidence of the conciliatory attitude of the company is shown in its willingness to take back all of its striking employees, although the behavior of some of these men both during the strike and previous to it entitles them to absolutely no consideration.

"If the company had agreed to permit the Amalgamated Association to arbitrate every time an incompetent, inefficient or dishonest employee was to be discharged, it would virtually mean the passing of the control of the company from a responsible board of directors to a body of employees who have shown how little they regard a contract that was solemnly signed and sealed. To accept this provision would mean to make the general manager of the company, its president and board of directors mere puppets in the hands of the trainmen.

"It was evident that the question uppermost in the minds of the men was how far they could go to take the control of the company out of the hands of its directors. To have accepted their impossible demands would have been to permit the Amalgamated to decide what men should work for the company, what they would be paid, how long they should work, and where they would work, leaving the owners of the property only the prerogative as to what men it might employ."

CHICAGO COUNCIL IGNORES SMOKE REPORT

By a unanimous vote the report of the committee of the Chicago Association of Commerce on smoke abatement and electrification of railway terminals was ignored by the Chicago City Council at its regular meeting on Dec. 6. Mayor Thompson submitted the report at this meeting, and soon after its presentation an order was introduced and passed unanimously that the committee on railway terminals, an independent body of which John F. Wallace is the chairman, consider immediately the subject of electrification of steam railroads within the city of Chicago. The order states that the committee is to report to the Council at an early date such ordinances as may be necessary to bring about the adoption of electricity as a transportation power where steam power is now employed. It was suggested that the committee begin its work with the passenger facilities, considering first the electrification of the Illinois Central Railroad and the Northwestern Railroad. The permanent railway terminal committee is composed of Walter Fisher, Bion J. Arnold, Edward H. Bennett, L. E. McGann, J. W. Beckwith, Ellis Geiger and John F. Wallace, who is chairman.

OHIO COMPENSATION LAW INTERPRETED

Judge Oppenheimer of the Superior Court at Cincinnati, in a decision handed down on Dec. 1, ruled that the payment of an award by the State Industrial Commission to the dependent of a man killed by accident cannot be construed as preventing the dependent from bringing suit against and recovering damages from a third party to whom the accidental death is due. He holds that the compensation required by the State is a kind of social life insurance and has nothing to do with damages that may be recovered from a third party who causes a death.

The decision was handed down in the case of Mathilda H. Kenning against the Interurban Railway & Terminal Company, Cincinnati. Her husband was an employee of the Fairmount Brewing Company and while driving his wagon was killed by one of the railway's cars. The brewery company was a contributor to the State workmen's compensation fund and the State Industrial Commission granted Mrs. Kenning an award of $3,744. She then brought suit against the railway for damages for her husband's death.

The attorneys for the Interurban Railway & Terminal Company argued that she was estopped from bringing suit against the company to recover damages because she has been granted an award from the State fund and because the railway was a contributor to the fund. Judge Oppenheimer said the compensation law disavows any claim that sums paid by virtue of its provisions shall be full compensation and that Mrs. Kenning was entitled to sue for recovery. He also said that this company is contributing to the State fund for insurance on its own employees only and that the brewery made the contributions which furnished the insurance for Kenning and all its other employees.

AMERICANS TO OPERATE BRAZILIAN STATE RAILWAYS

Negotiations are admitted to be under way whereby the operation of the Brazilian State Railways will be assumed by American interests, displacing the management by English and French interests. The negotiations have been carried on through the Latin American Public Works Corporation, a concern started eight months ago by interests associated with the J. G. White Management Corporation. The head of the corporation is J. W. McCroskey. He is in Brazil in charge of the negotiations with the Brazilian Government and the English and French interests which now operate the Brazilian State Railways. The Brazilian Government has leased its railways to English and French capitalists for a period of years, and it is understood that the Latin-American Public Works Corporation merely plans to take over the lease for the unexpired term. The project, however, will carry with it the necessity of financing for new equipment and possibly for new construction. All the lines are operated by steam but it is stated that electrification of certain lines is being agitated. At the office of the J. G. White Management Association in New York inquirers were referred to Mr. McCloskey.

PROGRESS WITH CINCINNATI TRANSIT MATTERS

The members of the Rapid Transit Commission of Cincinnati, Ohio, made a tour over the proposed route of the rapid transit loop on Nov. 30. A meeting will be held at an early date at which the commission will decide definitely whether "modified route No. 4" will be adopted as it is or further modifications made. The estimate of the cost of construction of the line on this route is $6,000,000. Should no further changes be made the proposition would be ready for submission to a referendum vote at the Presidential primaries in April.

The proposed franchise of the West End Rapid Transit Company, Cincinnati, was approved by all the business organizations in the city at a delegate meeting held on Nov. 30. This road would bring into the city the interurban lines from Anderson's Ferry. The terminus would be at Third and Walnut Streets. The city may purchase the property any time after ten years at a bonus of 25 per cent on the sum invested. Provision is made for the division of the earnings with the city after the guaranteed return has been made to the company.

All trains are to be operated by electricity or other approved motive power. Provision has been made in the franchise which will prevent its interfering in any way with the municipal rapid transit proposition or any other improvement that may be undertaken.

NEW YORK INVESTIGATION CONTINUED

The first witness on Dec. 7 before the legislative committee which is inquiring into the work of the Public Service Commission for the First District of New York was Ashley T. Cole, of counsel for the Kings County Lighting Company. He said that William F. Sheehan, as a partner in the firm of Hatch & Sheehan, attorneys for the company, is custodian of certain books and papers of the concern. Mr. Sheehan was thereupon subpoenaed to bring before the committee all the books and records of the lighting company.

Commissioner Williams was then called. He was asked what part of his opinion regarding the Kings County Lighting Company's rate case was written from the report of Mr. Semple. He said Mr. Semple prepared his report dealing with these four matters after he had conferred with himself and Commissioner Hayward. There was very little difference of opinion between himself and Commissioner Hayward on the points involved. Commissioner Hayward told of his connection with the Kings County Lighting Company's rate case. He took charge of the case after Commissioner Maltbie's term of office expired, but owing to pressure of work he had the case assigned to Commissioner Williams. He admitted he had not written his own opinion in the case until after he had seen Commissioner Williams's. He was asked about his talk with Mr. Semple regarding the oil contract of the company which, it is alleged, was made at a price above that which other companies were paying, and at a time when oil prices were on a decline.

Gas-Electric Car Tested on Muscatine-Iowa City Line.—The initial trip of the first gasoline-electric motor passenger car over the Muscatine & Iowa City Railway, Muscatine, Iowa, was made on Dec. 1, 1915. A. D. Bowen, president of the company, and about forty members of the Muscatine commercial club made the trip to test the equipment. Additional passenger motor cars and freight locomotives have been purchased and full operation will be inaugurated as soon as this equipment is received.

Strike Suspends Service.—No efforts have been made by William B. Cutter, president of the Buffalo & Depew Electric Railway, to operate cars on the line between the Buffalo and the Depew city lines since the strike was called more than three weeks ago. A committee of citizens of Depew has been trying to effect a settlement of the differences between the men and the company, but the officers of the company say the line has never paid and that it cannot increase the wages of the men. This is the only request made by the men.

Effort to Secure Common User Rights in Seattle.—The City Council of Seattle, Wash., has passed a resolution directing Corporation Counsel James Bradford to make application for common user privileges over the Fourth Avenue tracks of the Seattle, Renton & Southern Railway in order that Division "A" of the Seattle Municipal Railway can derive benefits accruing from business at the transcontinental depots on King Street. This is a move on the part of the city to bolster up the earnings of the Municipal Railway, which is being operated at a loss.

Report on Grade Elimination in Dallas.—The Board of Commissioners of Dallas, Tex., has received final recommendations of John Findlay Wallace, the engineering expert retained to investigate and report on the elimination of grade crossings within the city. Mr. Wallace recommends the construction of a belt line around the city and the complete removal of all railroad tracks within the city limits or the use of such intra-city switch tracks only during restricted hours at night. The carrying out of the belt line plan would involve an expenditure of $900,000.

Street Railway Department for Pekin.—The City Council of Pekin, Ill., has introduced an ordinance to establish a street railway department, of which the commissioner of public property and the commissioner of public affairs shall be the heads. Pekin has a 2-mile municipally owned street railway, and the ordinance provides that not less than three nor more than five motormen shall be employed; that their wages shall be fixed by the department; that one of the motormen or conductors shall be appointed foreman; that a watchman and a general repair man be employed; and that the motormen and conductors shall give bond in the sum of $1,000 each with at least two sureties.

Extension Under Subway Car Replacement Order.—The Public Service Commission for the First District of New York has extended the time limit under which the Interborough Rapid Transit Company is required to replace with steel cars all the wooden or composite cars now in use in the subway. Early in November the company asked the commission for an extension of time. The commission referred the subject to its electrical engineer, C. W. Wilder, and on his recommendation it granted an extension to April 1, 1916. From Mr. Wilder's figures it appears that about 195 of the 478 cars had been converted up to the time of his report. The car bodies which are replaced are to be used on the elevated lines.

Chicago Traction Commission Ordinance Delayed.—The ordinance authorizing the creation of a commission to report on the operating, engineering and financial questions involved in the proposed consolidation of the Chicago surface and elevated lines, and the construction of a subway was brought up for passage at the meeting of the Chicago City Council on Dec. 6. A number of important amendments were offered at that meeting and the ordinance was referred back to the local transportation committee for further consideration. It was contemplated that the committee would act on the amendments at a meeting on Dec. 8, so that the ordinance can again be reported to the Council at its next meeting.

Opponents of Milroy Plan Heard.—At a meeting of the sub-committee of what is known as the Milroy street railway committee, held in the Council Chamber at Toledo, Ohio, on Nov. 30, men who voted against the franchise proposition at the polls were again asked for suggestions as to the kind of settlement they wish made. All agreed on municipal ownership and most of them were in favor of a valuation of the street railway property as a going concern. As to the method of paying for the property a variety of suggestions were made. Some of the speakers thought the city could easily float a bond issue that would cover the cost, while others contended that only part payment should be made and the company should take a mortgage on the property for the balance due and remaining under the contract after the initial payment.

Mission of Fort Wayne Conciliatory Board Fails.—The committee of eight business men of Fort Wayne named by Governor Ralston early in November as a "conciliatory board" to try to adjust the differences between the Fort Wayne & Northern Indiana Traction Company and its former employees, announced on Dec. 6 that it had failed in its efforts to effect a settlement of the difficulties which would be acceptable to both parties, and that the committee had, therefore, automatically expired. Travel on the cars in Fort Wayne is increasing despite the efforts of union labor organizations and sympathizers to divert travel to the jitneys. With the advent of cold weather several jitneys have dropped out of service. Some of the men who went out on strike in September have returned to work, starting in as new men and working through the extra list. Efforts are still being made to raise money by popular subscription to stock at $10 per share for the organization of a motor bus company to compete with the street railway.

Commission Upheld in Case Involving New Construction.—The Public Service Commission for the First District of New York has received notification from Albany that the Court of Appeals, without opinion, had decided in its favor a case involving the double tracking of the Castle Avenue surface railway of the Richmond Light & Railroad Company, in the borough of Richmond. After investigation the commission in 1913 ordered the company to construct and operate such extra tracks as may be necessary to provide a complete double-track railroad on this line between St. George, New Brighton and Broadway, West New Brighton; the work to be begun by June 1, 1913, and to be completed by Nov. 1, 1913. The company took the matter into the courts, and by appeal from each lower division to the Court of Appeals. The decision of the commission was upheld by all the courts. The company contended that the evidence before the commission did not warrant the issuance of the order; that its franchise permitted either a single or double-track line, and that the enforcement of the statutory penalty of $5,000 a day for violation of the order would deprive it of its property without due process of law, and therefore be a violation of the State and national constitutions.

Wage Arbitration Decided Upon in Charleston.—The differences between the Charleston Consolidated Railway & Lighting Company, Charleston, S. C., and the motormen and conductors employed by it will be referred to arbitration. The following statement has been issued by the company: "The committee of the motormen and conductors called on the president and advised him that at a meeting of the men, held after his talk to them, the proposition of the company had been rejected and that the motormen and conductors, in accordance with the terms of the contract with the company, propose that the differences in the matter of wages be settled by arbitration. Section 23 of the contract with the local union provides that all matters in regard to wages * * * shall be submitted to arbitration, said board of arbitration to consist of one man to be named by the company and one man to be named by the association, and the two arbitrators chosen shall name a third arbitrator, provided the first two fail to agree. Either side failing to name its arbitrator within five days forfeits the case. Mr. Gadsden told the committee that the company was, of course, prepared to abide by the arbitration provision as contained in the agreement with the men, and that he will appoint the arbitrator on the part of the company within the time prescribed by the agreement. It is the disposition of both parties to name their respective arbitrators as soon as practicable."

Financial and Corporate

ANNUAL REPORT

Bay State Street Railway

The statement of income, profit and loss of the Bay State Street Railway, Boston, Mass., for the year ended June 30, 1915, as presented in the annual report of the controlling company, the Massachusetts Electric Companies, follows:

Operating revenue	$9,538,406
Operating expenses	6,897,752
Net operating revenue	$2,640,654
Taxes	653,380
Operating income	$1,987,274
Non-operating income	66,459
Gross income	$2,053,733
Deductions from gross income:	
Rent leased roads	$182,228
Interest funded debt	1,039,076
Interest unfunded debt	104,279
Miscellaneous	25,599
Total deductions	$1,351,183
Net income	$702,550
Dividends:	
First preferred stock at 6 per cent	$164,916
Common stock at 2½ per cent	512,930
Total dividends	$677,846
Net income less dividends	$24,704
Surplus, June 30, 1914	213,532
	$238,236
Profit and loss debits	$253,481
Miscellaneous profit and loss credits	20,996
Net debit	$232,485
Surplus, June 30, 1915	$5,751

The operating company felt the depression in business conditions during the year. The passenger earnings, instead of the usual increase, showed a loss for the year of $133,535, a result undoubtedly brought about in part by jitney competition. Other branches of the business, however, were not so seriously affected, so that the year resulted in a decrease of $75,746 or 0.78 per cent in total operating revenues. The expenses, owing to increases in wages and commission rulings, showed a heavy increase of $469,888 or 7.3 per cent. As a result the net operating revenue decreased $545,635 or 17.1 per cent. Taxes increased $10,057, and non-operating income decreased $14,637, so that the gross income of the company fell off $570,329 or 21.3 per cent. Deductions from income increased $42,392 during the year and helped the net income to drop from $1,315,270 to $702,549, a decrease of $612,721.

To offset this falling off in business dividends were reduced $564,223, which left a balance for the year of $24,703, a decrease of $48,498 from the previous year. This with the company's surplus on June 30, 1914, gave a surplus of $238,235. Of this amount the company was forced to spend for sinking fund appropriation, $5,090; for loss on property retired, $23,067; for miscellaneous debits, $9,339, and reconstruction, $215,984, the last figure alone being an increase of $109,984 over the previous year. Total debits amounted to $253,481, an increase of $135,138, which with a credit of $20,996 left a surplus on June 30, 1915, of only $5,751, a decrease of $207,780.

The arbitration of the wage dispute between the Bay State Street Railway and its employees was decided June 21, 1915. The award was for the period between Sept. 30, 1914, and Oct. 1, 1916. By that award increases in wages, from Oct. 1, 1914, to July 1, 1915, amounting to $46,000, were granted. From June 30, 1915, to July 1, 1916, the estimated increase in wages under the award will amount to $247,000. From July 1, 1916, to Sept. 30, 1916, both inclusive, the estimated increase will amount to $80,000 more than for the corresponding period of the previous year.

During the last year the Interstate Commerce Commission ruled that the non-betterment part of reconstruction work must be charged to operating expenses in the year in which the work is done, and the accrued amount must be charged off in three years. The company had formerly charged the balance after betterment to a suspense account until such time as net income would permit it to be wiped out. As a result of the new rule the estimated non-betterment part of the reconstruction completed during the year, amounting to $182,851, was charged to operating expenses, and one-third of the non-betterment part of reconstruction completed prior to the beginning of the year, amounting to $215,984, was charged off to profit and loss account, leaving $431,969 to be charged off during the next two years. During the last year the commission also ordered companies to estimate the amount of depreciation of equipment. As a result, $120,000 was charged to expenses last year.

Jitney competition first appeared at Fall River, and gradually extended to such an extent that on Nov. 1 there were 655 jitneys and jitney buses licensed in twelve cities and one town in the company's territory, and seventy-one were being operated in cities where no licenses are required. In November this competition caused an estimated loss to the company of about $700 per day. In view of this and other conditions the directors decided that the rates of transportation must be increased in order to secure a reasonable return on its investment and attract new capital, and hearings to this end are now being held before the Massachusetts Public Service Commission.

During the year an amount of $1,052,308 was spent for new property and reconstruction. A total of 3.77 miles of new track was constructed, 18.94 miles were reconstructed and 2.26 miles of reconstruction were in progress at the close of the year. About $40,000, out of a total requirement of $110,000, was spent in lowering car steps in compliance with the orders of the commission. No new capital was issued during the year by the Massachusetts Electric Companies. The Bay State Street Railway received authority to issue 12,819 shares of first preferred stock, but none has yet been issued.

EMPIRE UNITED READJUSTMENT PLAN

Clifford D. Beebe, president Empire United Railways, Inc., Syracuse, N. Y., recently announced that the directors had considered a readjustment of the company's finances and particularly the situation of the Rochester, Syracuse & Eastern Railroad first mortgage 5 per cent bonds. As a result they decided to recommend to the bondholders the following plan:

(1) That they accept a reduction in interest from 5 per cent to 3 per cent for a period of five years from Nov. 1, 1915, in connection with settlement of the Nov. 1, 1915, coupons either in securities, or, if possible for the company, in cash.

(2) That the holders of the securities of the Empire United Railways, Inc., and its indebtedness should accept in place of what they now have, securities without a fixed charge or on an income basis.

(3) That there should also be provided, without calling upon the underlying bondholders for assistance, between $300,000 and $400,000, to be used in taking care of capital expenditures for the next two years, particularly the forced capital expenditures in the way of paving and other requirements in the villages along the line which would affect the bondholders; also to take care of the car trust obligations outstanding as they mature.

(4) That there should be provided sufficient other funds for the company to be left free of all other indebtedness and with no fixed charge outside of the underlying bonds, so that all the net income which the company might earn on the different divisions would be first applicable to the underlying bonds, which would insure prompt payment of the semi-annual interest thereon.

Previous items regarding the recent receivership of this company under H. S. Holden and C. Loomis Allen were published in the ELECTRIC RAILWAY JOURNAL of Nov. 13 and Dec. 4.

Atlantic City & Shore Railroad, Atlantic City, N. J.—The Atlantic City & Shore Railroad being unable, owing to jitney competition, to pay the interest due Dec. 1 on its $950,000 of first mortgage 5 per cent bonds, the following bondholders' committee has been organized: G. Burmham, Jr., Harry C. Francis, Frank H. Bachman of Philadelphia, T. Johnson of Wilmington and David Fitzsimmons of Atlantic City. A call for deposit of the bonds will probably be made in a short time. The appointment of Clarence C. Cole as receiver of the company was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 4.

Birmingham-Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala.—The Birmingham-Tuscaloosa Railway & Utilities Company has filed papers in the Probate Court showing that at a recent meeting of the stockholders and directors the name of the company was changed to that of Tuscaloosa Railway & Utilities Company, and the capital stock of the company reduced from $3,500,000 to $3,000,000. The president is authorized to refund and retire outstanding collateral trust notes, and retire the trust agreement with the Girard Trust Company and mortgages with the Fidelity Trust Company. He is also authorized to issue $1,000,000 of first mortgage 6 per cent twenty-five-year gold bonds and complete arrangements with the Republic Trust Company, Philadelphia, as trustee. The company owns and operates the 14-mile street railway through Tuscaloosa to Holt, and does a lighting business in Tuscaloosa.

Brooklyn (N. Y.) Rapid Transit Company.—Holders of the $59,699,000 of 5 per cent six-year gold notes of 1912, due on July 1, 1918, of the Brooklyn Rapid Transit Company have been reminded that their option will expire with the close of business on Dec. 31 to exchange their notes, with all unmatured coupons attached, for an equal face amount of first mortgage 5 per cent sinking fund gold bonds of the New York Municipal Railway Corporation. These bonds are in coupon form with all unmatured coupons attached, and bear the endorsement of the Brooklyn Rapid Transit Company and of the New York Consolidated Railroad Company agreeing to pay principal and interest thereon. To exercise the option the notes must be presented, in bearer form with all unmatured coupons attached, at the Central Trust Company of New York. The New York Municipal Railway Corporation pays the normal income tax on these bonds and the corporation has also paid the tax on the mortgage securing the same, so that the bonds are exempt from local taxation as provided by the laws of the State.

Buffalo & Susquehanna Railroad, Buffalo, N. Y.—The abandoned property of the Buffalo & Susquehanna Railroad between Buffalo and Wellsville has been bought by a syndicate consisting of C. A. Finnegan and Theodore Hofeller, Buffalo, and Abraham Weber, of S. Weber & Son, Louisville, Ky. The purchase price was $800,000, the obligations outstanding being assumed. Martin Bogue, of Bertron, Griscom & Company, New York, acted for the committee of bondholders in making the sale. The new owners will operate the road, and it is understood experts will make a study of the traffic and transportation problems with a view of recommending the installation of electrical equipment. Included in the purchase is a 25-acre plot, fronting on the inner harbor of Buffalo and possessing 2000 ft. of dockage space suitable for grain elevators. Previous notes referring to an option held on this section by interests connected with the Western New York & Pennsylvania Traction Company were published in the ELECTRIC RAILWAY JOURNAL of July 17 and Oct. 2.

City Railway, Los Angeles, Cal.—The City Railway of Los Angeles has filed with the California Railroad Commission an application for authority to issue 349 bonds, face value of $349,000, to the Los Angeles Railway Corporation in payment of money advanced and used for betterments and improvements.

Grand Valley Railroad, Brantford, Ont.—At a special meeting of the Brantford City Council it was decided to give ratepayers of the city a chance to vote on the ratification of the sale of the section of the Grand Valley Railway between Paris and Galt to the Lake Erie & Northern Railway, which railway is controlled by the Canadian Pacific Railway. The price set, as noted in the ELECTRIC RAILWAY JOURNAL of Aug. 21, was $30,000, with a promise of the electrification of the Lake Erie & Northern Railway from Galt to Port Dover. C. H. Hartman, chairman of the Brantford Municipal Railway Commission, is the only one opposed to the transaction. The general manager of the Galt, Preston & Hespeler Railway, who is acting for the Canadian Pacific Railway in the matter, had given the Council until Dec. 4 to act, but later it was decided to wait until the people had had a chance to approve the sale. It was asserted that the line would be in operation within a month under electric power.

Interborough Consolidated Corporation, New York, N. Y.—Out of the surplus of the Interborough Consolidated Corporation the directors have purchased for investment $500,000 of Interborough-Metropolitan Company 4½ per cent collateral bonds on a 6 per cent basis. The Interborough Consolidated Corporation has also anticipated the sinking fund requirements on the $3,000,000 of 6 per cent ten-year Interborough-Metropolitan notes by purchasing $500,000 of the notes, or $200,000 in excess of sinking fund requirements for the year. At this rate the notes will all be retired considerably before their maturity.

Interborough Rapid Transit Company, New York, N. Y.—The Interborough Rapid Transit Company has sold to J. P. Morgan & Company $20,000,000 of first and refunding 5 per cent bonds, making a total of $30,000,000 of the bonds sold under the agreement with the bankers to provide money this year for new subway construction. The bonds are a part of the $300,000,000 mortgage authorized in 1913, and $128,658,000 of the bonds are now outstanding. Under the agreement the bankers can take more bonds of this issue to the amount of $27,342,000. It is understood that the same group of investment houses that placed previous bonds of this issue will distribute the amount now purchased.

Mansfield Public Utility & Service Company, Mansfield, Ohio.—The Ohio Public Utilities Commission on Nov. 30 authorized the Mansfield Public Utility & Service Company to issue $3,500 of common stock at not less than par. The proceeds are to be applied to the payment of the purchase price for the property and assets of the old Mansfield Railway, Light & Power Company, acquired at public sale last September, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 16.

Memphis, (Tenn.) Street Railway.—The $30,000,000 mortgage of the Memphis Street Railway recently filed with the Guaranty Trust Company, New York, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 20, secures an issue of general mortgage bonds bearing interest at not more than 6 per cent, dated Nov. 1, 1915, and due on Nov. 1, 1935. The immediate issue of $492,000 (6 per cent) is pledged as part collateral for the $1,500,000 of two-year 6 per cent collateral notes sold last October for refunding purposes and working capital. The total authorized issue of general mortgage bonds is $30,000,000, but $10,000,000 of this amount is reserved to retire a like sum of consolidated (now first) mortgage 5 per cent bonds, including the $1,416,000 of the latter pledged under the aforesaid note issue. In addition to the two-year note issue there were sold last October $600,000 of one-year 6 per cent guaranteed gold notes, and it was agreed that so long as these guaranteed gold notes are outstanding the company shall not issue its general mortgage bonds in an amount to exceed a total of $650,000, except with the consent of the holders of two-thirds of the collateral notes and of the holders of three-quarters of the guaranteed notes, and then for only 80 per cent of the cost of new construction. The general mortgage bonds are redeemable on any interest date at 102½.

New York (N. Y.) Railways.—John C. Cobb, Charles P. Howland, George B. Leighton, William H. Remick and Richard H. Swartwout have been elected directors of the New York Railways to represent the company's adjustment income bondholders. These men, elected as a result of a successful proxy campaign, are said to be pledged to fight for the payment of full 5 per cent interest on the income bonds. The directors displaced by the above-named five men were mostly representatives of large insurance companies that some time ago withdrew from suits for payment of back interest. They included Darwin P. Kingsley, president New York Life Insurance Company; Henry Ollesheimer, president Metropolitan Bank and director Metropolitan Life Insurance Company; Frank S. Witherbee, president Witherbee, Sherman & Company and director Equitable Life Assurance Society, and Francis L. Leland, president New York County National Bank and director United States Life Insurance Company. The election of the five new directors, however, cannot result in their controlling the board and changing the company's policy in regard to the payment of interest on the income bonds, for the stockholders are allowed to elect six members of the board. Their ticket, elected without opposition, included August Belmont, Edward J. Berwind, Thomas De Witt Cuyler, Theodore P. Shonts, Cornelius Vanderbilt and W. Leon Pepperman, the last named taking the place of the late Andrew Freedman.

San Francisco (Cal.) Municipal Railways.—The total receipts of the San Francisco Municipal Railway system for November are reported to be $233,520, the estimated net being $115,000. The receipts are the second largest in the operation of the system, being exceeded by August, 1915, when a total of $234,159 was reached with one day more of operation. During October, 1915, the total receipts were $214,029.62.

San Joaquin Light & Power Corporation, Bakersfield, Cal.—The San Joaquin Light & Power Corporation has received permission from the California Railroad Commission to renew three promissory notes for a term not exceeding two years from July 15, 1915. Of these notes $100,000 is payable to the Bank of California and $200,000 to the Savings Union Bank & Trust Company. The new notes at 6 per cent are to be to the Hibernia Savings Bank of Los Angeles for $100,000; to the Security Trust & Savings Bank, $150,000, and to the Security National Bank, $50,000. The money from the original issue was expended in construction, extensions and improvements.

Seattle (Wash.) Municipal Street Railway.—The report of A. L. Valentine, superintendent of public utilities, on the operation of the Seattle Municipal Street Railway for October shows that the revenue of Division A amounted to $1,622. The expenses were $2,125, giving a loss of $503 from operation. The revenues of the Lake Burien Line, Division C, amounted to $1,514, with expenses of $2,286, or a loss of $772. The total loss for both lines for the month was $2,868, this figure including $1,593 for interest on bonds.

Syracuse & South Bay Electric Railroad, Syracuse, N. Y.—Justice Andrews on Dec. 4 ordered the foreclosure sale of the Syracuse & South Bay Electric Railroad and the Syracuse, Watertown & St. Lawrence River Railroad. These two companies, which are financially distinct but are operated under one management, were some time ago placed in the hands of Ernest Gonzenbach as receiver, as noted in the ELECTRIC RAILWAY JOURNAL of May 29. The purpose was reported to be a friendly readjustment having in view the consolidation of the two properties. It has not been announced when the sales now ordered will take place or whether they will be made together, but notice of sale must be published for six weeks. The reports of the referees appointed by the court to compute the amounts due trustees of the mortgages were presented to Justice Andrews by E. I. Edgcomb. Referee Carl E. Dorr, who acted in the case of the Bankers' Trust Company, New York, against the Watertown road, reported that the amount due on the mortgage of this company was $236,353. Referee Thomas W. Dixon, who acted in the case of the South Bay line, reported that $591,250 was due on the mortgage held by the Equitable Trust Company, New York.

United Gas & Electric Corporation, New York, N. Y.—A dividend of 3 per cent has been declared on the $9,284,800 of first preferred stock of the United Gas & Electric Corporation, payable on Dec. 30 to holders of record on Dec. 20. This is the first payment since April, 1914. President George Bullock is quoted as saying: "I have every reason to believe that with a continuation of the present prosperity of the company the payment of current dividends from now on will be resumed on our first preferred stock, as the operating results of all the subsidiaries for the past six months have been very gratifying, and substantial increases in both gross and net are being shown by practically all the companies."

United Light & Railways Company, Grand Rapids, Mich.—It is announced that the United Light & Railways Company will on Jan. 1 redeem $500,000 of outstanding notes.

DIVIDENDS DECLARED

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1¾ per cent, preferred.

Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont., quarterly, 1½ per cent, preferred.

Continental Passenger Railway, Philadelphia, Pa., $3.

Interstate Railways, Camden, N. J., 30 cents, preferred.

United Gas & Electric Corporation, New York, N. Y., 3 per cent, first preferred.

United Light & Railways Company, Grand Rapids, Mich., quarterly, 1½ per cent, first preferred.

United Traction & Electric Company, Providence, R. I., quarterly, 1¼ per cent.

West End Street Railway, Boston, Mass., $2, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
ATLANTIC SHORE RAILWAY, KENNEBUNK, ME.					
1m., Oct., '15	$24,486	$23,839	$647	$612	$35
1 " " '14	27,184	26,024	1,160	623	537
AMERICAN RAILWAYS, PHILADELPHIA, PA.					
1m., Oct., '15	$465,261	......	......	......	......
1 " " '14	464,220	......	......	......	......
10 " " '15	4,468,635	......	......	......	......
10 " " '14	4,638,925	......	......	......	......
BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.					
1m., Sept., '15	$12,040	*$8,536	$3,504	$1,103	$2,401
1 " " '14	13,080	*9,240	3,840	1,105	2,735
12 " " '15	115,736	*98,381	17,355	13,600	3,755
12 " " '14	120,480	*100,965	19,515	12,845	6,670
BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.					
1m., Oct., '15	$81,179	*$67,879	$13,300	$16,846	†‡$3,383
1 " " '14	90,000	*97,653	†7,653	17,372	†‡24,883
4 " " '15	352,785	*259,633	93,152	67,741	‡26,016
4 " " '14	375,320	*334,996	40,324	68,607	†‡27,552
CONNECTICUT COMPANY, NEW HAVEN, CONN.					
1m., Oct., '15	$711,185	*$508,783	$202,402	$98,014	‡$127,637
1 " " '14	654,584	*500,921	*153,663	98,754	‡76,686
4 " " '15	3,067,969	*2,008,869	*1,059,100	392,430	‡759,458
4 " " '14	2,959,943	*2,175,961	*783,982	393,860	‡476,627
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO					
1m., Oct., '15	$109,962	*$77,199	$32,763	$27,526	‡$5,319
1 " " '14	107,610	*70,836	36,774	27,478	‡9,296
10 " " '15	1,030,094	*696,754	333,340	274,987	‡59,319
10 " " '14	1,058,200	*683,804	374,396	273,456	‡100,940
LAKE SHORE ELECTRIC RAILWAY CLEVELAND, OHIO					
1m., Oct., '15	$118,315	*$75,476	$42,839	$36,283	$6,556
1 " " '14	113,777	*72,977	40,800	35,801	4,999
10 " " '15	1,150,649	*746,619	404,030	361,116	42,914
10 " " '14	1,212,704	*746,859	465,845	335,038	130,807
NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.					
1m., Oct., '15	$28,216	*$24,278	$3,938	$8,005	†‡$4,011
1 " " '14	27,142	*25,085	2,057	7,876	†‡5,776
4 " " '15	161,568	*111,030	50,538	32,005	‡18,796
4 " " '14	166,375	*115,642	50,733	31,503	‡19,446
NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.					
1m., Oct., '15	$45,190	*$40,898	$4,292	§$4,495	†‡$1,129
1 " " '14	39,074	*42,943	†3,869	§5,873	†‡8,209
4 " " '15	170,076	*166,354	3,722	§25,038	†‡14,412
4 " " '14	149,223	*171,132	†21,909	§23,695	†‡39,147
RHODE ISLAND COMPANY, PROVIDENCE, R. I.					
1m., Oct., '15	$439,590	*$342,111	$97,479	$120,284	‡$4,630
1 " " '14	440,696	*337,179	103,517	118,551	‡13,004
4 " " '15	1,898,150	*1,363,843	534,307	481,674	‡84,313
4 " " '14	1,979,491	*1,381,168	598,323	474,500	‡158,498
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.					
1m., Oct., '15	$806,542	$488,732	$317,810	$142,969	‡$175,882
1 " " '14	798,732	473,343	325,389	132,777	‡193,977
10 " " '15	7,802,968	5,020,123	2,782,844	1,354,075	‡1,448,242
10 " " '14	7,735,571	4,789,642	2,945,928	1,309,280	‡1,647,804
WESTCHESTER STREET RAILWAY, WHITE PLAINS, N. Y.					
1m., Oct., '15	$22,249	*$21,719	$530	$1,607	†‡$1,049
1 " " '14	22,995	*23,947	†952	1,298	†‡2,237
4 " " '15	96,381	*87,792	8,589	6,393	‡2,315
4 " " '14	103,633	*94,954	8,679	4,911	‡3,818

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*Includes taxes. †Deficit. ‡Includes non-operating income. §Excludes interest on bonds, charged income and paid by the N. Y., N. H. & H. R. R., under guarantee; also interest on notes held by the N. Y., N. H. & H. R. R. not credited to income of that company.

Traffic and Transportation

ACCIDENTS IN NEW YORK DECREASE

Near-Side Stops in Use Since 1914 Said to Be Responsible for Good Showing

Surface cars in Greater New York have been making the near-side stop since Sept. 1, 1914. There has never been a month during this period in which there has not been a decrease in the number of street accidents. Frequent reports have been issued by the Safety First Society during the past year containing statistics bearing out the contention of the organization's official that it would prove to be one of the greatest factors in reducing the number of accidents and fatalities in Greater New York. A tabulation of street accidents for the five months from June 1 to Oct. 31 of this year as compared with the same months last year follows:

	1914	1915
Car collisions	582	366
Persons struck	1,489	1,251
Vehicles struck	5,973	5,744
Boarding	3,236	2,685
Alighting	4,831	4,038
	16,111	14,084

This statement contains both fatal and non-fatal accidents, but for ascertaining the success of the ordinance as regards fatalities, the following compilation has been made for the same periods:

	1914	1915
Car collisions	0	0
Persons struck	31	25
Vehicles struck	12	2
Boarding	4	1
Alighting	8	7
	55	35

In Manhattan, where there are more congested sections, the success of the ordinance remains indisputable. The Safety First Society particularly requested the Public Service Commission to compile a tabulation of the accidents involving the operation of street cars during June, July, August, September and October when the schools are closed and the children are using the streets more than at any other time in the year. In Manhattan the figures show a decrease of 1219 accidents, with fatalities reduced from twenty-nine a year ago to seventeen this year. The Brooklyn and Queens statistics have been combined, as there are several companies operating in both boroughs. The decrease in this section shows a total of 482, there having been 7096 accidents during the period indicated last year as compared to 6614 this year. The fatalities have almost been cut in two, there having been twenty deaths recorded last year as compared to eleven this year.

There have been no increases, either in fatal or non-fatal accidents, in the Borough of Manhattan during the present year, while in the Brooklyn-Queens section there has been an increase of 111 accidents involving persons boarding cars, and an increase in the number of accidents wherein people were killed while alighting from street cars. This tabulation, showing a general average decrease in street car accidents, offers conclusive proof of the successful operation of the near-side stop ordinance, and the Safety First Society officials also contend that the installation of the "car stop-safety zones," have been of much assistance in providing better safeguards for the patrons of the surface lines.

PENALTIES CLAIMED IN MILWAUKEE

Violations Charged of the Railroad Commission's Service Order Issued in 1913

The State of Wisconsin, in an action begun on Dec. 6 in the Circuit Court for Dane County, charging violations of the order of the Railroad Commission issued on Dec. 25, 1913, fixing standards for street railway service in Milwaukee, has sued The Milwaukee Electric Railway & Light Company for penalties aggregating $186,000. The State's complaint comprises a document of over 225 pages, and is based on data furnished by City Attorney Hoan, who was elected on the Socialist ticket. The company has twenty days in which to answer, which will bring the case on for trial at the January term of the Dane County Circuit Court.

The complaint charges specifically 186 separate violations of the commission's order. It is charged, in each instance, designating the time and place and the number of passengers carried, the number of seats furnished and the number of seats required under the order, that the street railway "failed, refused and neglected" to furnish the number of seats required, "all in violation of said order and contrary to law." It is alleged in each instance that "the defendant thereby became indebted to the State of Wisconsin in the sum of $1,000, whereby a right of action accrued to the State of Wisconsin for the recovery thereof, by virtue of and pursuant to the provisions of Secs. 1797-27 and 1797-31, Wis. Stat." The statutes referred to prescribe a penalty of $100 to $10,000 in the discretion of the court for any neglect, failure or refusal by a railway company to obey any lawful requirement of a service order of the commission.

After the service order on which the suit is based was issued by the commission the company complained that it was vague and impracticable of application in its existing form and applied to the commission for an interpretation and modification of the order. At its request a hearing was granted on these points, and testimony was presented to justify its claims by the company about a year ago, but no decision has been handed down by the commission. The violations which are alleged to have been committed occurred after the company had applied for this interpretation of the order.

Lexington Employees' Publication.—Employees of the Kentucky Traction & Terminal Company, Lexington, Ky., have begun publication of *The Employees' Bulletin.*

Hoboken Fare Hearing on Jan. 12.—The application of the city of Hoboken to require the Public Service Railway to operate for a 3-cent fare in Hoboken will be heard by the Board of Public Utility Commissioners of New Jersey in the court house in Jersey City on Jan. 12.

St. Louis Skip Stop Report to Be Filed Dec. 15.—The time of filing the report on the stop elimination test by the United Railways, St. Louis, Mo., has been extended until Dec. 15, on an order made by the State Public Service Commission. John M. Atkinson, chairman of the commission, said that a hearing would be held in St. Louis before the report is filed by the company.

Jitney Measure Before Newark Council.—The Newark, N. J., jitney ordinance, referred to in the ELECTRIC RAILWAY JOURNAL of Nov. 20, was approved by the license committee of the Common Council on Dec. 2. On Dec. 3 the measure was passed on first and second reading and ordered to a third reading and then recommitted to the license committee.

Prize Contest by Elevated in Chicago.—The Chicago (Ill.) Elevated Railroads has announced through *Elevated News,* its official publication, a contest to close on Dec. 31, in which the person sending in the best letter on "An Experience with "Elevated Service" (telling how the elevated has helped him in some way) will be awarded a cash prize of $25; the person sending in the next best letter, a cash prize of $15; and the third, a cash prize of $10.

New Orleans Jitney Ordinance Held "Ultra Vires."—The Supreme Court of Louisiana has annulled the New Orleans ordinance on the ground that while the municipality had the power to regulate jitneys, along with other vehicles, a measure that is in fact prohibitory is *ultra vires* and void. The court held that the city had no power to interdict the use of the streets to vehicles such as are commonly operated in cities any more than it had the power to interdict their use by pedestrians.

Fresh-Air Car for Texas Line.—The Bryan & College Interurban Railway, Bryan, Tex., has ordered what it describes as "a large windowless electric car." In order to induce travel for health and pleasure the company will operate the car every Sunday from 4 p. m., to 7 p. m., between Villa Maria and College Station at 10 cents for the round trip, a rate less than 1 cent a mile. This arrangement will not affect the regular schedule or the regular rate of 25 cents between Bryan and College and 10 cents between Bryan and Villa Maria.

Change in Route of Washington Jitneys Allowed.—The Public Utilities Commission of the District of Columbia has granted the application of the District Jitney Bus Company for permission to discontinue operation over the route authorized by the commission's order No. 166, dated Oct. 27, 1915, and hereafter to operate from Eighth Street and Pennsylvania Avenue, N. W., west on Pennsylvania Avenue to Fifteenth Street, north on Fifteenth Street to Massachusetts Avenue, west on Massachusetts Avenue to Sixteenth Street, north on Sixteenth Street to U Street, and return.

Reduction in Fare Ordered.—The Public Service Commission of Washington has ordered the Gray's Harbor Railway & Light Company, Aberdeen, Wash., to reduce to 5 cents the single-trip fare between Cosmopolis and Aberdeen. The fare heretofore has been 10 cents. The commission finds that since the Cosmopolis line is only 0.625 miles long, and most Cosmopolis patrons ride only to the mill section of Aberdeen, the average trip from Cosmopolis to Aberdeen actually is shorter and less expensive to the company than the average trip within the city limits of Aberdeen, for which only 5 cents is charged.

Route Changes Ordered in Los Angeles.—In order to relieve traffic congestion in the business district, the Board of Public Utilities of Los Angeles, Cal., has issued an order, effective on Dec. 1, which calls for a complete revision of the car routing plan in the down-town system of the Los Angeles Railway Corporation. Ten existing car lines are to be discontinued and twelve new lines established, while the practice of turning cars back is to be discontinued. The plan does away with curves as far as possible, and in the main only straight line crossings are to be permitted. However, the present service on Broadway and Hill Streets, two of the busiest thoroughfares, will not be disturbed.

Jitney News from Fort Worth and Austin.—The jitney ordinance of Fort Worth, Tex., has again been held constitutional and the right of the city to regulate the jitneys upheld in a decree handed down by the Court of Civil Appeals for the Second Supreme Judicial District, which affirms the judgment of the Sixty-Seventh District Court in the case of the Auto Transit Company of Fort Worth versus the city of Fort Worth. The case was filed in the form of an application for an injunction to prevent the enforcement of the ordinance. Jitneys in Austin, Tex., ceased operating on Nov. 30, with the enforcement of the regulatory ordinance which has been upheld both in the Corporation Court and the Court of Criminal Appeals. The operators claim that the Austin law is too stringent to render the business profitable.

Voluntary Reduction in Interurban Fares.—L. H. Bean, manager of the Seattle-Tacoma interurban line of the Puget Sound Electric Railway, Tacoma, Wash., has announced a voluntary reduction in passenger fares between Seattle and Georgetown, including points south in the Duwamish Valley. The new rates to become effective on Nov. 25. A. W. Leonard, president of the Puget Sound Traction, Light & Power Company, in speaking of the reduction, said: "The company in making the reduction in fares on the Seattle-Tacoma interurban system, including the Renton line, does so in the belief that its service, which will be as good as can be found on similar lines in this country, will receive the patronage and support it deserves. The move is in the nature of an experiment. It is expected that the people of the valley will prefer our dependable service to disjointed, irresponsible and unreliable jitney service. The service will be of high order, and it will be made permanent if the patronage warrants it. There will be transfer privileges on all fares." The round-trip fare between Georgetown and Renton has been reduced from 54 cents to 28 cents.

Only Twelve Fatal Accidents in New York City in October.—The engineers of the Public Service Commission for the First District of New York have made a report upon the accidents occurring on railroads and street railroads in that district for the month of October, 1915. The report shows that only twelve persons were killed during the month. This is the smallest total in the history of the commission. The largest number of fatalities ever reported was in the month of September, 1907, when sixty-three persons lost their lives. When the commission was created the number of persons killed ranged from 500 to 600 a year. This has been practically cut in two, notwithstanding the greatly increased traffic. The report for October shows a decrease in the number of accidents as well as in the fatalities. The total number of accidents was 5395 against 5519 for October of last year. Of the total 3920 accidents occurred on surface lines, 950 on subway and elevated lines, 509 on railroad trunk lines, twelve on railroad terminal lines and three on motor bus lines. Of the killed six met death on the surface lines, four on the subway and elevated lines, one on railroad trunk lines and one on a railroad terminal line.

Chicago Company Seeks Relief from Wagon Traffic.—Underneath a line cut showing a heavily-loaded dray broken down on the car tracks the Chicago (Ill.) Surface Lines in a recent daily newspaper advertisement said: "Were you late for work this morning? How many times have you been late this year owing to delays in street car traffic caused by wagons and trucks whose drivers refuse to get out of the car tracks, or by breakdowns of vehicles in the car tracks? We want to improve our service. Our problem is one of track capacity. With the limited number of outlets from the loop we can move only so many cars in a given time. We can move the maximum number of cars only if we can have the maximum use of our tracks. We can do nothing to correct present conditions until the City Council passes an ordinance giving us the use of our tracks —at least during rush hours. The present ordinance permits the obstruction of traffic by vehicles. If you want better service, write a letter to your aldermen, or to the local transportation committee, telling them that you want such an ordinance, and why. The City Council will respond to your wishes if you will take the trouble to express them. Write your letter to-day."

Schenectady Service Questions Before Commission.—James F. Hamilton, general manager Schenectady (N. Y.) Railway, agreed before the Public Service Commission of the Second District on Dec. 1 to have the Schenectady cars east-bound make the regular stops between the city line and Watervliet Avenue for the accommodation of local passengers. The hearing was on the complaint of residents of Albany against the Schenectady Railway and the United Traction Company as to the transfer situation between the two lines on local traffic. The officials of the road assured the commission that if east-bound cars refused to stop it was probably due to a misunderstanding on the part of the crews and that the matter would be remedied. The company still refuses, however, to carry local west-bound passengers. Recently the commission ordered transfers to be issued and accepted by the two lines for all local passengers, whereupon the Schenectady Railway posted a notice that it would carry no local passengers west. Reuben S. Calkins for the complainants raised anew the question of universal transfers between the two companies. The companies were allowed ten days in which to file any briefs they may wish supplemental to those filed some time ago when the case was up before.

Seeking to Correct Transfer Abuses in Columbus.—A change in the method of issuing and receiving transfers on the cars of the Columbus Railway, Power & Light Company, Columbus, Ohio, has been announced, to be effective at an early date. S. G. McMeen, president of the company, said recently: "The transfer system that has been in use in Columbus for several years has brought about certain practices that have curtailed the legitimate and expected revenues of the company. Whatever the loss to the company may be through the abuse of transfer privileges, it is an earning that not only the company is entitled to, but one that should be counted since it is of benefit to the car riders of the city, to the end that fare reductions may not be precluded or fare increases may not be exaggerated. The company realizes that so great a change from present habits to something radically different, no matter what the necessity, ought not to be made in a moment nor without proper discussion. The mere fact that the company has the power to make these new rules is not sufficient for undue haste. Therefore, we have determined to discuss this whole matter with the people of Columbus before we even set the date for the change. We invite the frankest discussion, criticism and comment."

Personal Mention

Mr. Frank A. Spies has been elected president of the Menominee & Marinette Light & Traction Company, Menominee, Mich., to succeed Mr. Augustus Spies.

Mr. W. E. Nemits, chief clerk to the general claim agent of the Chicago (Ill.) Surface Lines, has been appointed assistant general claim agent.

Mr. Frank J. Gatrell, formerly chief adjuster of the Chicago (Ill.) Surface Lines, has been appointed acting general claim agent to succeed Ralph S. Rowley, deceased.

Mr. Charles Smeeth has been appointed superintendent of the Ironwood & Bessemer Railway & Light Company, Ironwood, Mich., to succeed Mr. F. L. Blackhurst, resigned.

Mr. Frederick B. Van Vorst of New York has been elected to the office of vice-president of the United Railways Investment Company and not to that of secretary, as mentioned in a recent issue.

Mr. W. Leon Pepperman, assistant to the president of the Interborough Rapid Transit Company and the New York (N. Y.) Railways, has been elected a director of the latter company to succeed the late Andrew Freedman.

Mr. George Caywood has been appointed engineer of the power station of the Twin City Rapid Transit Company, Minneapolis, Minn., to succeed Mr. Donald Goodrich, who is superintendent of the Minneapolis division of the company.

Mr. C. K. Minary, president and treasurer of the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., has also been appointed manager of the company to succeed Mr. H. C. Mason, whose resignation, effective Dec. 1, was noted in the ELECTRIC RAILWAY JOURNAL of Oct. 30.

Mr. A. J. Klatte has been appointed acting electrical engineer of distribution of the Chicago (Ill.) Surface Lines to succeed Herbert M. Wheeler, deceased. Since the consolidation of the Chicago City Railway and the Chicago Railways as the Chicago Surface Lines Mr. Klatte has served as assistant engineer of electrical distribution.

Mr. Harry H. Hanson, the newly appointed superintendent of Division 7 of the Boston (Mass.) Elevated Railway, entered railroad work in 1889 as conductor on the old Brattle Street line. After three years he was made starter and later became inspector. In 1901, on the opening of the elevated, he was appointed to the position of district supervisor and stationed at Dudley Street. In February, 1913, he was promoted to be superintendent of Division 2, with headquarters at Lenox Street. The approaching completion of the extension of the East Boston tunnel to Bowdoin Square, connecting with Cambridge lines at that point, brought about the consolidation of Division 4 (East Boston) and Division 7 (Cambridge), all under one head, Division 7, and Mr. Hanson was placed in charge.

Mr. W. B. Saunders, formerly consulting engineer of Minneapolis, and previous to that a member of the field staff of H. M. Byllesby & Company, Chicago, has been appointed engineer for the Railroad and Public Service Commission of Montana. Mr. Saunders received his professional education at the University of Wisconsin and first engaged in engineering work on the forces of the Union Pacific Railway in 1901. He served with the Rocky Mountain Bell Telephone Company from 1903 to 1904, and with the Salt Lake Route for a short period in 1905. From the latter year until 1906 he was engineer and construction supervisor for the Michigan State Telephone Company, leaving that work to become assistant engineer in the United States Reclamation Service. He joined the forces of H. M. Byllesby & Company in 1910 and continued with them until 1913. In 1914 he opened offices in Mankato, Minn., to engage in consulting practice.

Mr. George Lorne Guy has been appointed engineer of the Manitoba Public Utilities Commission, Winnipeg. Mr. Guy was born at Portage du Fort, Que., on April 14, 1883, and was educated at Camden East, Newburgh, and Queen's University, Kingston, Ont. From 1899 to 1902 he was armature, transformer, meter and test operator with the Canadian General Electric Company at Peterborough, Ont. From 1902 to 1907 he was chief electrician with Graves, Bigwood & Company, at Byng Inlet, Ont., and during the winter months of these years attended Queen's University. From 1907 to 1908 he was engaged in contract construction work at Camden East, Yarker and Newburgh, Ont. From 1903 to 1910 Mr. Guy was engineer of rolling stock with the Winnipeg (Man.) Electric Railway. From 1910 to 1912 he was engineer with the electrical department of the city of Winnipeg, and from 1912 to 1914 was sales manager of the electrical department of the Canadian H. W. Johns-Manville Company at Winnipeg. Since March 1, 1914, he has been engaged in private practice as a consulting electrical engineer.

Mr. G. Sabin Brush, chief clerk of Division 8 of the Boston (Mass.) Elevated Railway, has been appointed superintendent of the railway department of the Cumberland County Power & Light Company, Portland, Me. Mr. Brush was born at Stillwater, Minn., in 1884. In 1903 he entered the Massachusetts Institute of Technology, taking the course in mechanical engineering, and during vacations he was employed by the Middlesex & Boston Street Railway at Newtonville, Mass. Here Mr. Brush did much original work in the direction of publicity for traffic stimulation, and in 1908 entered the employ of the Boston Elevated Railway in the transportation bureau. He was later transferred to the president's office, then to the claim department, and in the fall of 1910 was appointed chief clerk of Division 6, with headquarters at Sullivan Square Terminal, Charlestown. Shortly afterward Mr. Brush became chief clerk of Division 8, which comprises the entire business section of Boston and includes all surface car subways and tunnels. Mr. Brush is a brother of Mr. Matthew C. Brush, second vice-president of the Boston Elevated Railway. He is a member of the New England Street Railway Club. On the afternoon of Dec. 4 he was presented with a chest of silver at the main offices of the company in Boston on behalf of starters, inspectors, office and other employees. A farewell dinner was held in his honor on the same evening at the Engineers' Club, Boston, at which many officers of the company were present. In his new position, which he assumed this week, Mr. Brush will have charge of the operation of 107 miles of track in Portland and vicinity.

G. SABIN BRUSH

Mr. Oscar S. Straus, New York, ex-Ambassador from this country to Turkey and Progressive candidate for Governor in 1912, was named by Governor Whitman on Dec. 9 as member and chairman of the Public Service Commission for the First District, to succeed Mr. Edward E. McCall, who was removed from office on Dec. 6. The Governor said that Mr. Straus had accepted the position, and expected to qualify soon. Mr. Straus was born in Bavaria on Dec. 23, 1850. He lived in Talbotton, Ga., and afterward went to Columbus Ga., where he resided until 1865, when he moved to New York. He was graduated from Columbia University with the degree of A.B. in 1871. In 1873 he received the degree of LL.B. and in 1874 was granted an A.M. degree. He practised law in New York from 1873 to 1881. He was a member of the firm of L. Straus & Sons, importers of pottery and glassware, in New York from 1881 to 1906. He was Envoy Extraordinary and Minister Plenipotentiary to Turkey from 1887 to 1889 and again from 1898 to 1901. He was appointed a member of the Permanent Court of Arbitration at the Hague in 1902 to fill the vacancy caused by the death of former President Harrison. Ex-President Roosevelt appointed Mr. Straus Secretary of the Department of Commerce and Labor, and he served in that capacity from Dec. 17, 1906, to March 4, 1909. For the third time he was appointed Envoy Extraordinary and Minister Plenipotentiary to Turkey and served from May, 1909, to December, 1910. He was formerly president of the New York Board of Trade and Transportation; also of the National Primary League and of the American Social Science Association. He was vice-president of the National Civic Federation and the International Law Association. In 1914 he was appointed chairman of the arbitration commission selected to decide the wage dispute between the Eastern railways and their engineers. In 1912 he was the Progressive candidate against Mr. Sulzer for Governor of New York. The appointment of Mr. Straus as chairman of the commission was announced after the first editorial page of this issue had gone to press. This paper considers the appointment of Mr. Straus a good one and extends its congratulations to Governor Whitman on his selection.

OBITUARY

William H. Bache, retired manager of the Graphite Lubricating Company, Bound Brook, N. J., died on Nov. 12.

James Carrigan, who completed fifty years of continuous service with the Union Railway, New York, N. Y., died on Dec. 1. At the time of his death Mr. Carrigan was actively associated with the Union Railway as general superintendent. Mr. Carrigan, who was seventy-six years of age, began his railroad career with the old Huckleberry line in The Bronx in 1864, driving a street car between Harlem Bridge and Morrisania.

John H. Studley, for thirty-seven years identified with street railway service in eastern Massachusetts, died at Malden, Mass., on Dec. 5. Mr. Studley was born in Charlestown, Mass., sixty-three years ago. He was formerly treasurer of the old Middlesex Street Railway and of the Boston & Chelsea Street Railway. For many years he was employed by the Boston Elevated Railway in connection with transfer work. He is survived by his widow and a married daughter.

George W. Bruce, for twenty-three years claim agent of the street railway lines in Indianapolis, Ind., died at his home in that city on Nov. 28. He was seventy years old. Mr. Bruce was born in Dearborn County, Ind., on Sept. 8, 1845. He was educated at Moores Hill College, and, after he was graduated, taught school for about two years. He then went to Cincinnati and became connected with the Adams Express Company. Later he was appointed agent for this company at Indianapolis. After nearly fifteen years' service with the Adams Express Company, Mr. Bruce was chosen bailiff in the Superior Court at Indianapolis and held that office for about twelve years. In 1892 he was appointed claim agent for the Citizens' Street Railroad, which then operated the street railway lines in Indianapolis, and he continued as claim agent for the Indianapolis Traction & Terminal Company when that company leased the street railway properties. Mr. Bruce is survived by his widow, two sons, a sister and two brothers, one of whom, Joseph G. Bruce, is connected with the claim department of the Indianapolis Traction & Terminal Company.

Andrew Freedman, financier, director of many corporations and a silent power in Democratic politics in New York, died on Dec. 4. Mr. Freedman was born in New York City on Sept. 1, 1860. He attended the public schools and later the College of the City of New York, from which institution he was graduated. His first business connection was with a wholesale dry goods house. In 1885 he entered the real estate business and became a specialist in this field. In 1898 Mr. Freedman became interested in the Fidelty & Guarantee Company, Baltimore. He left that company in 1903 to organize the Casualty Company of America. The formation of the Interborough Rapid Transit Subway Construction Company was largely due to his efforts. It is said that it was to him that Mr. John B. McDonald came with the idea of the New York subway, and together they interested Mr. August Belmont in the project. As the owner of the New York Baseball Club Mr. Freedman came into national prominence in the world of sports. In 1902 he sold his interest in the Giants to the late John T. Brush. Mr. Freedman was a director of many companies, among them the Interborough Rapid Transit Subway Construction Company, the New York Transportation Company, the Fifth Avenue Coach Company, the New York Consolidated Company, the New York & Queens County Railway and the New York Railways. Mr. Freedman was also a trustee of the New York & Long Island Railroad. He was unmarried.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Consolidated Utilities Company, Wilmington, Del.**—Incorporated in Delaware to lease, own and operate electric railways. Capital stock, $3,300,000. Incorporators: Herbert E. Latter, Norman P. Coffin and Clement M. Egner, all of Wilmington.

***Youngstown & Niles Railway, Youngstown, Ohio.**—Incorporated in Ohio with a capital stock of $10,000. R. P. Stevens, president of the Mahoning & Shenango Railway & Light Company, has stated that the new line will extend from the Mahoning Avenue line to Niles, along the south side of the Mahoning River. Incorporators: James P. Wilson, U. C. DeFord, Fred J. Heim, Richard Wilson and J. W. Blackburn.

***Green Bay & Eastern Railway, Green Bay, Wis.**—Incorporated in Wisconsin to construct a line from Green Bay to Sheboygan via Manitowoc, 70 miles. Capital stock, $50,000. Among the incorporators are Charles Frazier and Rude Stockinger, Manitowoc, and R. P. Mattern, Milwaukee.

FRANCHISES

***Los Angeles, Cal.**—Henry. M. Dennison has received from the Council a one-year extension of time on a franchise to construct a line on Main Street between Slauson and Manchester Avenues.

Sacramento, Cal.—The Oakland, Antioch & Eastern Railway has received a franchise from the Council to construct a double-track line on M Street, extending westerly to the Sacramento River, thence easterly along M Street to Third Street, along Third Street to I Street, the portion of the line to be constructed on the M Street bridge to be single track.

St. Louis, Mo.—The East St. Louis & Suburban Railway has asked the Board of Public Service for a franchise to operate cars over the free bridge and around a loop which they propose to build in St. Louis.

Niles, Ohio.—The Cleveland, Alliance & Mahoning Valley Railroad has asked the Council for a franchise to extend its tracks through Niles.

Youngstown, Ohio.—The Youngstown & Southern Railway has asked the Council for a ten-year extension of time on its franchise, making the concession good for twenty-five years from the date of its passage.

Barrie, Ont.—The Toronto, Barrie & Orillia Railway has asked the Council for a one-year extension of time on its franchise to construct a line in Barrie.

TRACK AND ROADWAY

Little Rock Railway & Electric Company, Little Rock, Ark.—As a counter proposal to the city, this company offers the extension of several lines at a cost of $310,683 if the city will abandon the use of its electric light plant, purchase power from the company, regulate jitneys and make other concessions.

Central of Florida Railway, Daytona, Fla.—This company plans to build about 2 miles of single track during 1916.

***Ocala, Fla.**—Citizens of Ocala are interested in a proposition to construct an electric line between Ocala and Silver Springs. A committee comprising Jake Brown, J. H. Taylor and J. M. Thomas was elected to confer with the Council with a view to calling a bond election to raise funds sufficient to construct the line.

Lula-Homer Railroad, Lula, Ga.—A report from this company states that it expects to build 110 miles of new line during 1916, as follows: From Winder to Jefferson, 15 miles; from Jefferson to Commerce, 14 miles; from Commerce to Cinesville, 18 miles; from Cinesville to Bowerswell, 14 miles; from Hartwell to Anderson, 23 miles; from Belton to Homer, 14 miles; from Homer to Cinesville, 21 miles. The contract for the construction of one section from Belton to Homer has been awarded to W. J. Redmond, Atlanta. D. G. Zeigler, engineer. [Sept. 25, '15.]

***Pocatello Transportation & Interurban Company, Pocatello, Idaho.**—Prominent business men and capitalists of Pocatello are interested in a proposed line to be built by this company. It is expected that articles of incorporation will be filed at once. The company has opened offices in the Kane Building and preliminary arrangements are being made for the organization of the company.

Alton, Granite & St. Louis Traction Company, Alton, Ill.—The city of Alton has asked this company to extend its line 1 mile east of Alton to the State Hospital site.

Gary, Hobart & Eastern Traction Company, Hobart, Ind.—This company reports that during 1916 it plans to build about 12 miles of track between Hobart and Valparaiso.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.—This company reports that during 1916 it expects to build about 6 miles of new line from Swanwood Junction to Des Moines, over which section the company is now using leased tracks.

Charles City Western Railway, Charles City, Iowa.—This company has completed the construction of an extension of its line from Charles City to Colwell, 8 miles.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—Operation on this company's line has been extended to Linwood, half-way between Bonner Springs and Lawrence. It is expected that operation to Lawrence will be begun within a few weeks.

Cumberland & Manchester Railroad, Barbourville, Ky.—The contract for the construction and track-laying of this company's line from Barbourville to Manchester has been awarded to the Read Construction Company, Philadelphia and Hazleton. [Nov. 27, '15.]

Springfield (Mass.) Street Railway.—Announcement has been made by this company that operation on the new East Street line into Chicopee Falls will be begun within the next few days.

Detroit (Mich.) United Railway.—This company will extend its South Dearborn line from River Rouge to Ecorse and operation will be begun about Dec. 25. The extension will carry the company's city lines 3 miles southwest of the Detroit limits.

***Kansas City, Lawrence & Topeka Electric Railroad, Kansas City, Mo.**—A report received from this company states that it expects to build 52 miles of single track between Zarah and Topeka during 1916.

Moncton Tramways, Electricity & Gas Company, Ltd., Moncton, N. B.—This company reports that during 1916 it expects to construct about 1½ miles of track in the city and suburbs of Moncton and to Sunny Brae.

Public Service Railway, Newark, N. J.—Operation has been begun by this company on its extension from Roosevelt Junction, on the Trenton fast line, to Carteret and Chrome, 1½ miles.

International Railway, Buffalo, N. Y.—This company has submitted plans to the Ontario Railway Board of alternative changes in the line from Queenstown Heights to the level of Lake Ontario, on which a serious accident occurred last summer. Recently the Ontario Railway Board submitted plans proposing a new down-grade, single-track line which would take one long, continuous curve, leaving the present line for up-grade traffic. The alternative proposed by the company's engineering experts is a reconstruction of the present double-track line to lengthen the curves and ease the grade. It is expected this plan will be acceptable to the board.

Jamestown & Buffalo Street Railway, Buffalo, N. Y.—Clarence G. Mead, who is securing the right-of-way for the proposed electric railway from Jamestown to Buffalo, is now working in the vicinity of Eden. The rights-of-way from Jamestown are mostly secured. As proposed, the line from Gowanda will extend east of the Erie until near Lawtons, when it will change to the west and from Hamburg will extend to Athol Springs, connecting there with the tracks of the Buffalo & Lake Erie Traction Company. [Jan. 10, '14.]

Interborough Rapid Transit Company, New York, N. Y.—The contract for the installation of tracks on the White Plains extension of the Lenox Avenue branch of the existing subway has been awarded by the Public Service Commission for the First District of New York to the Coast & Lake Contracting Corporation, the lowest bidder, at $53,930.50. Bids were opened Dec. 7 for construction of the tunnel under the East River from Fourteenth Street, Manhattan, to North Seventh Street, Brooklyn. The two lowest bidders were Booth & Flinn, Ltd., $6,631,000, and Holbrook, Cabot & Rollins Corporation, $6,907,000.

Long Island Railroad, New York, N. Y.—All tracks of the Long Island Railroad are now in use over the new $1,000,000 Woodside-Winfield cut-off, which eliminated a dangerous curve and ten grade-crossings, including the one at Queens Boulevard, where thousands of automobolists have been compelled to use a steep wooden bridge. This will be removed in a few weeks, permitting the double-tracking of Manhattan & Queens Traction Corporation, and the old tracks of the Long Island Railroad will be removed and the land sold for building sites.

Manhattan & Queens Traction Corporation, New York, N. Y.—Efforts of the property owners in the southern section of Jamaica, Queens, to compel the Manhattan & Queens Traction Corporation to extend its lines from the Jamaica station to the city line, at Rosedale, have been defeated by the Board of Estimate. A resolution has been adopted directing that the line be constructed as soon as possible to the junctions of Sutphen Road and Lambertville Avenue and that the construction to St. Albans be completed only upon an order from the borough president of Queens with the sanction of the Board of Estimate.

Rochester (N. Y.) Connecting Railway.—The Public Service Commission at Albany on Dec. 1 heard further testimony in behalf of the application of the Rochester Connecting Railway for a certificate of public convenience and necessity. The new road, which is designed to afford a connection at Rochester with the Erie and the Pennsylvania Railroads for the Buffalo, Lockport & Rochester Railway, together with the other projects designed to connect the Buffalo, Lockport & Rochester Railway with the Canadian Northern and other roads at its western terminus, is being opposed by the New York Central. Testimony was not concluded when the hearing was adjourned to a future date.

***Champlain & Sanford Railroad, Sanford, N. Y.**—It is reported that this company has secured right-of-way for the construction of a line from Sanford Lake to Fort Ticonderoga, about 60 miles.

Dover, Millersburg & Western Railway, Canal Dover, Ohio.—Bids are being received by this company for the construction of its proposed line between Canal Dover and Millersburg via Sugar Creek. The line will cross the Wheeling & Lake Erie Railroad at grade and the Baltimore & Ohio and Pennsylvania Railroads on an overhead line. Benjamin George, Canal Dover, is interested. [Nov. 13, '15.]

Cleveland, Alliance & Mahoning Valley Railroad, Cleveland, Ohio.—It is reported that this company is considering plans to build a double-track extension from Warren to Youngstown, via Niles. Local real estate dealers are said to be much interested in the new project and are assisting in securing the needed right-of-way.

East Liverpool Traction & Light Company, East Liverpool, Ohio.—According to a statement made by C. A. Smith, general manager of the East Liverpool Traction & Light Company, at a recent meeting of the Council, about $250,000 will be expended within the next few months in improving the lines and property of the company. Of this amount between $75,000 and $100,000 will be required in the construction of the new "safe route" to Grandview, while approximately $20,000 will be necessary for the improvements in the West End. The improvements of the property of the company on Harvey Avenue would also involve an expenditure of several thousand dollars.

Hershey (Pa.) Transit Coompany.—Operation has been begun by this company on its extension from Hershey to Elizabethtown.

Montreal & Southern Counties Railway, Montreal, Que.—This company's extension from St. Cesaire to Abbotsford and Granby has been completed and W. B. Powell, general manager, has announced that the line will be placed in operation from Montreal to Granby during the early part of this month.

Chattanooga (Tenn.) Traction Company.—Grading has been begun by this company on its extension to Hixon. Rights-of-way have been acquired for practically the entire distance. It is stated that the grading will be completed within ninety days when the work of laying track will be begun. An order was placed some time ago for the rails and it is expected that they will be delivered by the first of the year.

Richmond, Rappahannock & Northern Railway, Richmond, Va.—The contract for the construction of this company's line from West Point to Urbanna, 17 miles, has been awarded the Central Construction Company, Harrisburg, Pa. C. L. Ruffin, 514 American National Bank Building, Richmond, chief engineer. [Nov. 20, '15.]

Princeton & Bluefield Electric Railway, Princeton, W. Va.—It is reported that construction on this company's line between Princeton and Bluefield is nearing completion and it is expected that operation will be begun by Jan. 1. The Princeton Power Company, of which S. J. Evans is president, is building the road.

Sheboygan Railway & Electric Company, Sheboygan, Wis.—During 1916 this company expects to build 1 mile of track in Sheboygan.

SHOPS AND BUILDINGS

Holyoke (Mass.) Street Railway.—This company has provided material for two waiting stations, which the people of South Amherst will set up at the junction of West Street, Bay Road and Potwin Lane.

Northern Texas Traction Company, Ft. Worth, Tex.—The Board of City Commissioners of Dallas has been notified by Edward T. Moore, representing the Northern Texas Traction Company, of the acceptance of the ordinance granting a franchise for the erection of a union interurban passenger station which is to cost approximately $2,000,000. Work will be started on the structure by Dec. 20.

Petersburg & Appomattox Railway, Petersburg, Va.—Plans are being made by this company to build a carhouse and power house at Plant Street and Tenth Avenue, Hopewell.

POWER HOUSES AND SUBSTATIONS

Richmond Light & Railroad Company, New York, N. Y.—This company has petitioned the Public Service Commission for permission to make improvements and additions to its electric plant.

Dover, Millersburg & Western Railway, Canal Dover, Ohio.—This company, which plans to build a line between Canal Dover and Millersburg, via Sugar Creek, will build a power house at or near Sugar Creek.

Lake Shore Electric Railway, Cleveland, Ohio.—This company will build an extension to its power house at Fremont. Contract has been awarded.

Toronto (Ont.) Suburban Railway.—The new substation of the Toronto Suburban Railway in Lambton Park is now nearly completed. A large water tower has been erected at the east side of the building.

Quebec Railway, Light & Power Company, Quebec, Que.—This company is building an extension to its power house at Montmorency Falls and it is expected that construction will be completed about Dec. 15. It will add 15,000 hp. to the power at present at the company's disposal.

Texas Traction Company, Dallas, Tex.—The substation of this company, 1½ miles south of Sherman, was destroyed by fire on Nov. 29, entailing a loss of $35,000. Three transformers and three modern rotary converters were lost. The fire was caused by the high-tension wire carrying 33,000 volts breaking and falling across the dispatcher's telephone wire. A portable substation was rushed out from Denison, and the traffic was resumed within five hours.

Manufactures and Supplies

ROLLING STOCK

Ogden, Logan & Idaho Railway, Ogden, Utah, expects to purchase during 1916 three motor cars.

Southern Oregon Traction Company, Medford, Ore., expects to purchase during 1916 one four-motor car.

Reading Transit & Light Company, Reading Pa., has completed the remodeling of one of its double-truck cars in its shops.

Lehigh Valley Transit Company, Allentown, Pa., expects to issue specifications in about a week for eighteen new center-entrance interurban cars.

Northern Ohio Traction & Light Company, Akron, Ohio, expects to purchase during 1916 ten 53-ft. interurban cars and fifteen 50-ft. city cars, both types semi-steel.

Covington & Oxford Street Railway, Covington, Ga., expects to purchase next year two light single-truck trailers 18 to 20 ft., and second-hand for temporary service.

United Railways & Electric Company, Baltimore, Md., it is reported, will equip with vestibules and improved steps 560 of its cars. New wheelguards and improved fenders will also be provided. The work is to start next spring.

Pittsburgh (Pa.) Railways, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 27, 1915, as having ordered 175 city cars, has an option of increasing the St. Louis Car Company order from 100 to 150 cars and the Cincinnati Car Company order from seventy-five to 100 cars.

Interborough Rapid Transit Company, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Nov. 27 as having ordered 311 subway car bodies from the Pullman Company, has ordered the trucks also from this company. The order for electric equipment will be equally divided between the General Electric Company and the Westinghouse Electric & Manufacturing Company.

Wilmington & Philadelphia Traction Company, Wilmington, Del., noted in the ELECTRIC RAILWAY JOURNAL of Nov. 6 as having ordered thirty-one prepayment semi-convertible cars from The J. G. Brill Company, has specified the following details for this equipment:

Seating capacity	44
Weight of car-body	15,000 lb.
Bolster centers, length	17 ft. 4 in.
Length of body	29 ft.
Length over vestibule	40 ft.
Width over sills	8 ft. 2 in.
Height, rail to sills	26½ in.
Height, sill to trolley base	9 ft. 1¾ in.
Body construction	T-iron posts, sheet steel sheathing, wood roof
Interior trim	cherry, stained mahogany
Head-lining	Agasote
Roof	plain arch
Underframe	metal
Air brakes	G.E.
Bumpers	Hedley anti-climber
Cables	G.E.
Car trimmings	Brill
Conduits and junction boxes	Brill
Control	G.E.
Drawbar	portable
Curtain fixtures	Cur. Sup. Co., No. 89
Curtain material	Fabrikoid
Destination signs	Elec. Ser. Sup. Co.
Fenders	Parmenter
Gears and pinions	G.E.
Gongs	Brill
Hand brakes	National Brake Co.
Heaters	Peter Smith Electric
Headlights	Esterline
Motors	G.E., 258-A, 4 per car, inside hung
Paint	Chicago Varnish Co.
Registers	International R-7
Sanders	Brill "Dumpit"
Sash fixtures	Brill
Seats	Brill "Winner," pressed steel
Seating material	cane
Trolley catchers	Elec. Ser. Sup. Co.
Trolley base	G.E.
Trucks	Baldwin 62-18c
Varnish	Chicago Varnish Co.
Ventilators	Ry. Utility

TRADE NOTES

Elyria Iron & Steel Company, Cleveland, Ohio, announces the removal of its general offices from Elyria, Ohio, to 232 East 131st Street, Cleveland, Ohio, where the company just completed an additional plant.

Woodmansee & Davidson, Chicago, Ill., engineers, announce their removal, effective Dec. 15, from the First National Bank Building to Suite 782-788, Continental & Commercial National Bank Building.

H. L. Lewenberg has been appointed engineer of estimates of the St. Louis Car Company, after having been in its service for several years. Mr. Lewenberg was formerly with the Standard Steel Car Company and the Pressed Steel Car Company, and is a graduate of the Massachusetts Institute of Technology.

Krehbiel Company, Chicago, Ill., engineers and constructors, announce the appointment of Edward N. Lake, formerly in charge of the Chicago office of the Stone & Webster Engineering Corporation, as a partner in this company with offices in the Marquette Building, Chicago. The business will be continued under the present firm name. Mr. Lake will be treasurer and manager and Fred A. Krehbiel will continue as president. Both were connected with the Arnold Company and Bion J. Arnold for a number of years. Mr. Lake has also been connected in turn with the Western Electric Company, Chicago-Edison Company and Board of Supervising Engineers.

The J. G. Brill Company, Philadelphia, Pa., on Dec. 1 instituted direct representation on the Pacific coast with offices at 907 Monadnock Building, San Francisco, this arrangement taking the place of the relationship formerly existing between The J. G. Brill Company and Pierson, Roeding & Company. The establishment of its own Pacific coast offices and representatives has been deferred for years by reason of the very satisfactory association with Pierson, Roeding & Company. However, the new course, because of its certain desirable features, was an inevitable eventuality. The present time seemed best for all parties concerned in the consummation of the change and therefore the sales organization of The Brill Company has been extended to the Coast.

Kelly, Cooke & Company, Philadelphia, Pa., have recently opened offices in the Drexel Building, to conduct a general engineering practice in the public utility and industrial fields. Their work includes design and supervision of construction for railways, light and power properties and industrial plants; engineering reports, appraisals, and rate developments for public utilities. William F. Kelly, senior member, received the degree of Mechanical Engineer from the University of Pennsylvania in 1893. For several years thereafter he was on the engineering staff of the Union Traction Company of Philadelphia and from 1901 to 1915 was a member of the staff of Ford, Bacon & Davis, acting as engineer-in-charge of several of their larger operations including the construction and reconstruction of the properties of the Knoxville Railway & Light Company and the Birmingham Railway, Light & Power Company. Charles B. Cooke, Jr., was also graduated from the University of Pennsylvania and entered the shops of the Westinghouse Machine Company at East Pittsburgh, working up finally to the position of assistant commercial engineer of the company, which position he occupied for two years prior to joining the staff of Ford, Bacon & Davis. During his connection with the latter firm Mr. Cooke specialized on financial engineering reports and also had personal charge of a number of important rate developments and reports for public utility companies.

ADVERTISING LITERATURE

St. Louis (Mo.) Car Company has issued a folder describing the new light-weight car built for the Albuquerque (N. M.) Traction Company, seven of which are now in service.

Railways Accessories Company, Seattle, Wash., has issued a bulletin describing the supported and suspended types of the Wightman rail joint and base plate. These joints are claimed to be in no way dependent on bolt pressure, thus eliminating track-way expense pertaining to bolt renewals and tightening. It is also stated that these joints minimize the breaking strain on angle bars, minimize vibration at rail ends, eliminate tie pounding and prevent the settling of ties, known as "low joints." It is also said that they eliminate all relative motion of rail ends, either vertical or lateral, prevent rail breakage resulting from the accumulation of longitudinal strains and maintain positive and permanent contact between angle bars and rails, thus rendering electrical bondings unnecessary in block signal circuits.

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NEW YORK COMMISSION ON TRIAL

Events in connection with the investigation being conducted on the New York Public Service Commission, First District, have followed fast during the past week. As our issue of Dec. 11 went to press, the appointment of Oscar S. Straus as chairman of the commission was announced, and this week charges of a serious nature have been brought against another member of the commission. Until the accused has had a chance to answer them, it would be unfair to pass judgment, but if the charges are sustained the setback to commission regulation will be severe. The event certainly illustrates the necessity of great care in the appointment of men to positions of such responsibility as that of public service commissions. The commission form of regulation is on trial in the community, and its future is dependent upon the character of men selected. The public utility companies have a vital interest in this matter because they have come to learn that it is better to place the responsibility for proper regulation upon a regularly appointed commission which gives its time to a study of the questions which arise, than to have these questions left to a large political body like the Legislature. That the proper kind of men can be secured is shown by the records of a large number of conspicuously capable commissioners whose rulings have gained the confidence of both the public and the utilities. The intrusion of politics has complicated matters in some instances to the detriment of the service.

PURCHASED POWER FOR THE NEW HAVEN

Except for the high guaranteed load factor the contract under which the New Haven Railroad is purchasing power from the New York Edison Company and the United Electric Light & Power Company does not differ materially from others in its class. The load factor clause, however, is quite an important element in this contract. The West Farms substation operates in parallel with the railroad company's Cos Cob power plant. It draws a load of minimum load factor of 70 per cent. The substation, therefore, gets the "cream" of the load, leaving the skim milk for Cos Cob. Consequently, the energy generated in the power plant will cost much more per kilowatt-hour than it would if the power plant supplied the entire demand. In return, however, the railroad is able to buy energy at a low rate, it avoids the necessity for making a very large capital investment at a time when the management is struggling to put the property upon its feet, and, best of all, it secures insurance against interruption of power supply. The single-phase railway does not by any means call for an ideal kind of a load from the standpoints of either generation or transmission. The ideal condition would be a three-phase, balanced load. The three-phase generating unit has now become so well established as standard that it is used even for single-phase supply, but it is naturally not working under the best conditions as to capacity and regulation when it is forced to furnish single-phase power. These fundamental facts are mentioned as explaining the reason for the requirement of a high load factor by the electric company, especially when a power factor as low as 70 per cent is permitted.

EVOLUTION OF THE NEW HAVEN ELECTRIFICATION

The execution of the contract referred to in the above paragraph is significant as an event in the development of this famous electrification. While the extension of electrical operation on the New Haven system has not been as rapid as was expected some years back, there has been "something doing" most of the time since the inception of the electrification ten years ago. First came the 11,000-volt Woodlawn-Stamford section with double catenary support for a copper contact wire, which soon had to be supplemented with a steel wire. Next the Harlem River branch was electrified with a compound-catenary overhead construction, giving increased flexibility. Coincidentally, the design of column was improved, and, during this period, also the New York, Westchester & Boston Railway was constructed with similar overhead work. Then the Stamford-New Haven section was completed, somewhat along the same lines but with a novel distribution scheme for eliminating inductive interference with telephone and telegraph lines. This involved the use of auto-transformers, which raised the transmission voltage to 22,000, with one terminal connected to the feeders, the other to the contact wires, and the mid-point to the rails. Simultaneously the distribution of the section originally electrified was remodelled in accordance with the same scheme. While the system was expanding the Cos Cob power plant was doubled in size. Meanwhile many interesting although minor developments have been tried out in the New Haven electric zone. Crane-type column overhead construction was installed on a small scale and found unsatisfactory. The mercury-vapor converter locomotive has had a long and severe test, and series motors of the repulsion type have had service trials previous to their adoption by the Pennsylvania Railroad for the Philadelphia electrification. The latest step in the evolution of the New Haven electrification is the contract, already referred to, for the supply of a large amount of power. The railroad thereby avoids the necessity for increasing its own power generating capacity by utilizing the capital and operating staff of the electric service company to this extent.

DISCUSSION ON WORKINGMEN'S COMPENSATION The Pennsylvania Street Railway Association did well to devote an entire session to the discussion of workingmen's compensation laws as applied to electric railway companies. Statutes embodying the principle of workingmen's compensation by employers in case of accident as a substitute for the old common law master and servant doctrine are of very recent origin in this country, but the idea of their desirability has spread so rapidly that laws of this character are now on the statute books of a great many States. An examination of recent decisions on the subject shows that there is not only a great variation in the laws in force in the different States but also that the judicial interpretation of even precisely similar words or clauses is different in different States. In one State (Kentucky), it has even been held that full payment under the law to an injured workman was not a bar to his further recovery under the common law because the limitation in amount imposed by the law was in violation of the State constitution. The court, however, made specific suggestions as to points to be modified in order to make such a law constitutional. Other questions upon which judicial interpretation is needed, as it has varied according to the State in which it was rendered, are in the definitions of the word "accident," of the expression "growing out of and incidental to the employment," what constitutes "regular employment," "dependency," "incapacity," "partial disability," etc. Practically all of President Tingley's address was devoted to this subject, and the papers contributed to the discussion, devoted as they were principally to the electric railway aspects of the case, made them of especial interest to electric railway companies.

"THREE-WIRE" SYSTEM IN SPRINGFIELD The announcement in the news columns of this issue to the effect that the "three-wire" system will be used in Springfield, Mass., for the purpose of mitigating the evils of electrolysis compels more than passing attention. This scheme must not be confused with the double trolley wire plan which has been used to some extent. The latter plan involves two collecting devices on the car and a complicated distribution system. It is used mainly on conduit roads and in heavy traction abroad. It has not proved popular for overhead construction. The "three-wire" plan is similar to the familiar Edison system for electric lighting plants, the third "wire" being the rail return. Alternate sections are positive and negative, and if the load is balanced, that is, if the cars under the negative trolley wire are drawing the same total current as those under the positive wire, no current returns to the power station through the rails. The only current in the rails in such an installation is that necessary to supply the locally unbalanced loads, and that incident to connecting the positive and negative sections in series. In this case, the plan has the approval of the Bureau of Standards and the engineers of Stone & Wester. The willingness of the Springfield Railway to try this experiment will be appreciated by railway men generally. The plan has been tried several times before in this country and abroad. In this country it has been abandoned on account of overhead complications, while abroad the use has been on a small scale only. One such installation, in Brisbane, Australia, was described in a communication printed in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 22, 1914, page 348. In this, J. S. Badger, manager Brisbane Tramways, said that the scheme had proved practicable there while undesirable under most conditions. The fact that the principle has been understood for a long time and has not been generally adopted where electrolysis difficulties existed indicates that the complications have been found serious. For these reasons the results of the service test in Springfield will have great reference value.

THE DEMAND FOR SPEED

What has become of our old friend the 100 m.p.h. railway? It is now some time since we have welcomed a definite project to our columns, and we are beginning to have some serious doubts as to whether extreme speed, upon rails at least, would fill any long-felt want. The 100 m.p.h. automobile has already appeared, as witness the results of the last great race, and aeroplanes have pushed the pace even considerably higher than this for fairly long flights. If mankind really wants to devour space at 100 m.p.h. or thereabouts it is pertinent to inquire why none of the various projects for fast electric railways has proceeded beyond the conversational stage. It has been fairly well understood for more than a decade that suitable equipment for such a performance is not in the least a difficult matter. Indeed, more than one electric manufacturing company would take an order guaranteeing the result without raising an eyebrow, and undoubtedly track construction could be provided sufficiently strong to accommodate this speed.

Yet if there were really strong demand for 100 m.p.h. it seems altogether likely that at least one project of the kind between important centers would have come nearer to the stage of realization than anything at present indicates. It looks very much as if mankind were fairly well satisfied with a mile a minute or less and might not be willing to pay the price for anything considerably in excess of such speeds. Indeed, if one looks back both at the list of railway records for pace it is notable that some of those made nearly forty years ago still stand, and that on the whole the more powerful engines of the present day have been devised and operated more with the idea of handling heavy trains than for the purpose of quickening the schedule.

It would be entirely practicable to-day, using merely steam locomotives, to decrease the time between New York and Chicago by five or six hours at considerable increase of expense and some added risk. Electrification of a suitable through line would very likely do even better than this, but are there any definite indications that there is a sufficient demand now for such service or that one is likely soon to arise? On the face of the evidence up to date we doubt the existence of enough public desire for that kind of accommodation to encourage the promoter. The possibility has stood out boldly in the public eye for a good many years, and the public seems to have smiled genially upon it and turned the back of distrust. As a rule, sooner or later, the public gets what it is willing to pay for, and this is one of the things for which it is apparently not willing to reach deep into its pocket.

To look at the matter quite seriously, all ordinary needs of traffic seem to be met by running speeds of somewhat less than a mile a minute, even for the fastest express trains, and this sort of schedule can be maintained month in and month out in all sorts of weather with very few noticeable delays. Considering the fact that over haste is one of the banes of our national life it is somewhat doubtful whether the gain of added speed is worth while. It certainly is not conspicuous enough to give encouragement in undertaking radical and complete change from the existing order of things. If conditions so alter as to cause an acute demand for quickened service it will probably come, along both on steam and electric lines, somewhat gradually, feeling its way to more sensational achievements. It is now more than twenty years since the first well-organized plan for a 100 m.p.h. electric road was formulated, time enough certainly to have brought it to fulfillment had it really been a thing of large commercial importance. We are sorry to say a fond good-bye to our old friend, the 100 m.p.h. road. It may return some day to find a fresh welcome, but for the present it seems to have departed to that indeterminate limbo which has already engulfed many another sensational project for readjusting human affairs.

A LARGER OUTLOOK FOR THE MANUFACTURERS' ASSOCIATION

One of the recommendations made by President Allen at the San Francisco Convention was that the relations between the Manufacturers' Association and the American Association should be changed so that the former should be "co-equal and recognized in all ways, the same as the Engineering, Accountants, Transportation & Traffic and Claims Association." There is no doubt, as we said editorially in the same issue in commenting on this suggestion, that the interests of the manufacturers of electric railway apparatus and of the companies engaged in electric railway operation are essentially the same. The former prosper with the prosperity of the latter, and depression in the railway business is felt acutely in the loss of orders by the manufacturers. Up to this time there has been, officially, no bond in the way of organization between these two essential parts of what is really the same business except a single clause in the constitution of the American Electric Railway Association. This clause simply authorizes the executive committee of the Railway Association to assign to its "allied" association, the American Electric Railway Manufacturers' Association, the management of the exhibit features at its annual conventions, and to arrange with it the details of such entertainments as may be given in connection with these annual conventions. At the time this constitution was drafted, these duties seemed to be the principal way, if not the only way, in which the manufacturers could help the railway companies. At that time, the idea of general publicity on the part of the American Association had not been considered. Each company was dealing with its public in the way which seemed best to itself alone, and the problem of public relations, as that problem is now understood, was practically unknown.

It is needless to say that conditions have vastly changed in this respect since 1905, and it is the part of wisdom that as times change people should change with them. The Manufacturers' Association has faithfully performed the work which was assigned to it by the constitution. It has managed the exhibit features of the annual conventions admirably, and it has acceptably arranged the details of the entertainments given in connection with those conventions. It has also from time to time, through convention arrangements and in other ways, been of help to the association financially. But if anyone should say now that he believed the opportunities for usefulness to the electric railway industry of the country by the manufacturers should be limited to those duties only which were assigned to it at the time of the 1905 convention, he would greatly minimize the possibilities. The manufacturers of steam railway apparatus do much more than this to assist the steam railroads in their problems, as the excellent record of the Railway Business Association proves, and there is no reason why the manufacturers of electric railway apparatus should not have the opportunity of being equally helpful. There is still another phase of the situation which has to be considered. Although the manufacturers are as much interested in the progress of the industry and also in the science of railroading, they have been able to attend the conventions only as associate members, and as such, have at least officially not been on the same basis as the delegates from member companies.

To meet this situation the executive committee voted in New York this week to recommend to the membership at large a revision of the constitution which will place companies engaged in the manufacture of electric railway apparatus on the same basis as railway companies, in other words, the manufacturing companies would be "company members." The details of this plan, so far as the schedule of dues, direction of exhibits, etc., remain to be determined, but if the principle is settled, these matters can be worked out easily and in justice to all concerned, including the small manufacturer. This was the principle for which the manufacturers contended in 1905 and ever since many of the manufacturers have said that they did not see why they were not recognized as having as much interest in the objects for which the American Association stood as the railway companies. This contention is now admitted. The plan adopted b ythe executive committee, in our opinion, should be generally endorsed.

Purchased Power for the New Haven

The New York End of the Main Line and the Harlem River Branch and the New York, Westchester & Boston Railway Are Now Drawing Power From a New Substation Erected by the United Electric Light & Power Company at West Farms Station

Under a contract which became operative on Sept. 1, 1915, the New York, New Haven & Hartford Railroad is purchasing a minimum of 40,000,000 kw.-hr. annually from The United Electric Light & Power Company. This energy is generated in the 201st Street power station of the lighting company in New York and transmitted in underground conduit to a substation at West Farms, at the junction of the New York, Westchester & Boston Railway and the Harlem River branch of the New Haven Railroad.

The functions of this substation are to adapt the three-phase current from The United power station for the several requirements of the railways, which are as follows:

11,000-22,000 volt, 25-cycle, single-phase power for train operation.

2300-volt, 60-cycle, single-phase power for signaling purposes.

The substation is operated by the lighting company.

The contract under which power is supplied to the railroad provides for primary and secondary charges. The minimum maximum demand is 6500 kw. with a minimum load factor at this demand of 70 per cent, and a minimum power factor for the single-phase service except momentarily of 70 per cent. For loads above the minimum demand the limit of load factor is 50 per cent.

The maximum demand is the sum of the average kilowatts taken by the two classes of service separately during their respective highest sixty-minute intervals in each service year. These intervals are specified not to be those of abnormal demand due to service interruptions.

The substation and the equipment are the property of The United Company. The site belongs to the railroad company and is leased by The United Company. Provision is made for the terms under which the railroad may take over the building and contents on termination of the contract.

GENERAL LAYOUT OF THE SUBSTATION

The substation is of the semi-outdoor type, the transformers being located outside of the building and the switching apparatus and auxiliaries inside. The building is 98 1/3 ft. x 49 ft. outside, and a concrete transformer platform about 19 ft. wide extends the length of the building on one side.

Inside the building the most important equipment, much of which is shown in the accompanying illustrations, is as follows:

A switchboard for controlling the incoming power and the distribution of three-phase power, etc. This contains the recording measuring apparatus.

A switchboard for controlling the anchor-bridge switches.

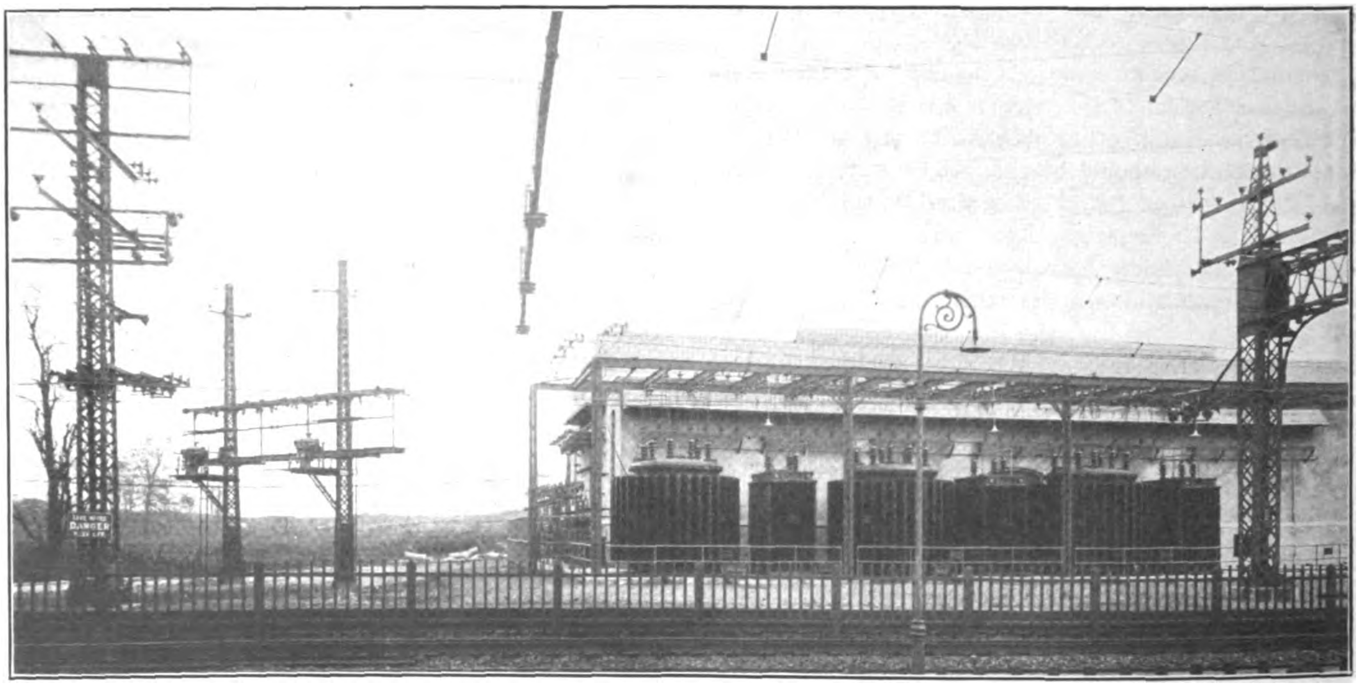
Rows of busbar and switch compartments for 11,000-volt and 22,000-volt service.

A two-gallery, screen-inclosed, grid-resistor compartment, 66 ft. x 11 ft. in size. The grid resistors are used, here as in the Cos Cob power plant of the railroad company, to limit the current flow under short-circuit.

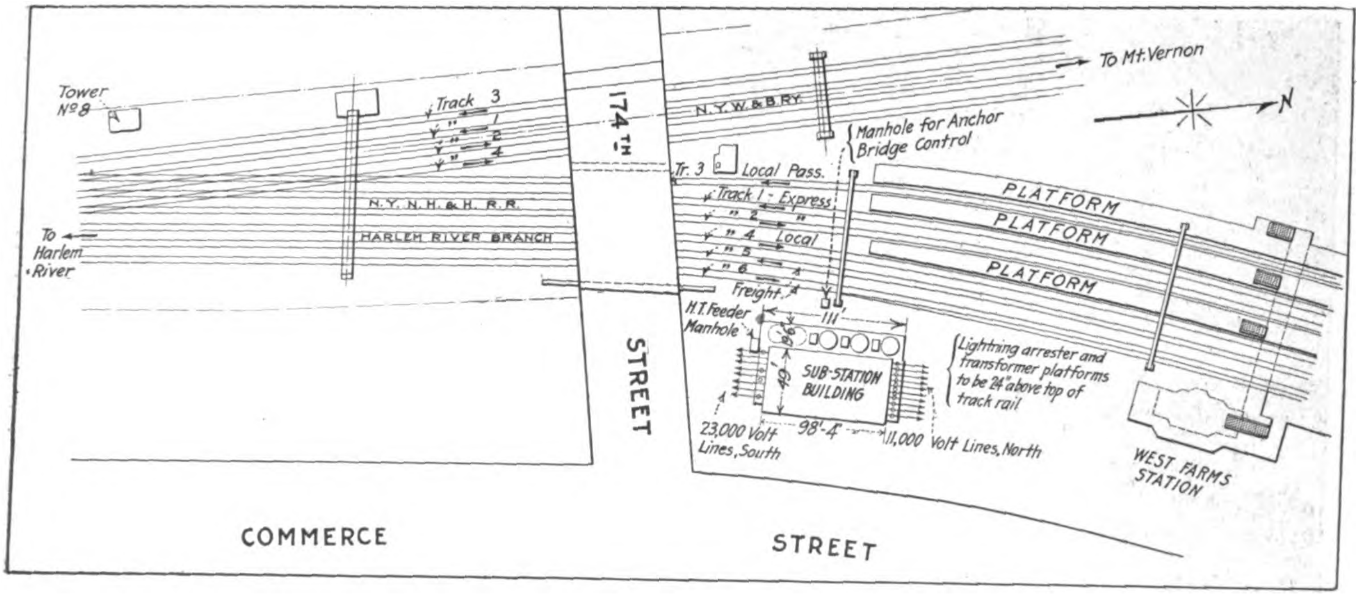
A motor-generator set and storage batteries for supplying switch control current.

THE OUTDOOR TRANSFORMER

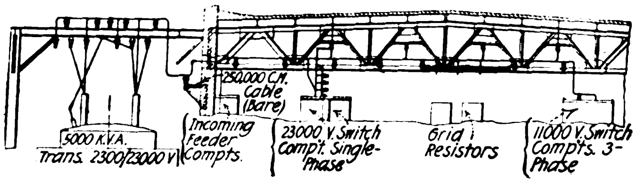
Outside the station are the transformers and the electrolytic lightning arresters. There are three transformer units in operation at present with provision for additions. Each unit consists of a main, 5000-kw. West-



WEST FARMS SUBSTATION—VIEW FROM PASSENGER STATION PLATFORM SHOWING 5000-KW. AIR-COOLED TRANSFORMERS, LIGHTNING ARRESTERS AND FEEDER SUPPORTING STRUCTURES


Tower
No 8
Track 3
" 1
" 2
" 4
N.Y. N.H. & H. R.R.
HARLEM RIVER BRANCH
To Harlem River
174TH STREET
N.Y.W.&B.RY.
To Mt. Vernon
N
Manhole for Anchor Bridge Control
Tr. 3
Local Pass.
Track 1 - Express
" 2 "
" 4 Local
" 5
" 6
Freight
H.T. Feeder Manhole
111'
49'
9'6"
SUB-STATION BUILDING
98'-4"
23,000 Volt Lines, South
11,000 Volt Lines, North
Lightning arrester and transformer platforms to be 24" above top of track rail
PLATFORM
PLATFORM
PLATFORM
WEST FARMS STATION
COMMERCE
STREET

WEST FARMS SUBSTATION—PLAN OF SUBSTATION, PASSENGER STATION AND NEIGHBORING TRACKS


250,000 C.M. Cable (Bare)
5000 K.V.A. Trans. 2300/23000 V
Incoming Feeder Compts.
23000 V. Switch Compt. Single-Phase
Grid Resistors
11000 V. Switch Compts. 3-Phase

WEST FARMS SUBSTATION—DIAGRAMMATIC CROSS-SECTION OF UPPER PART OF SUBSTATION

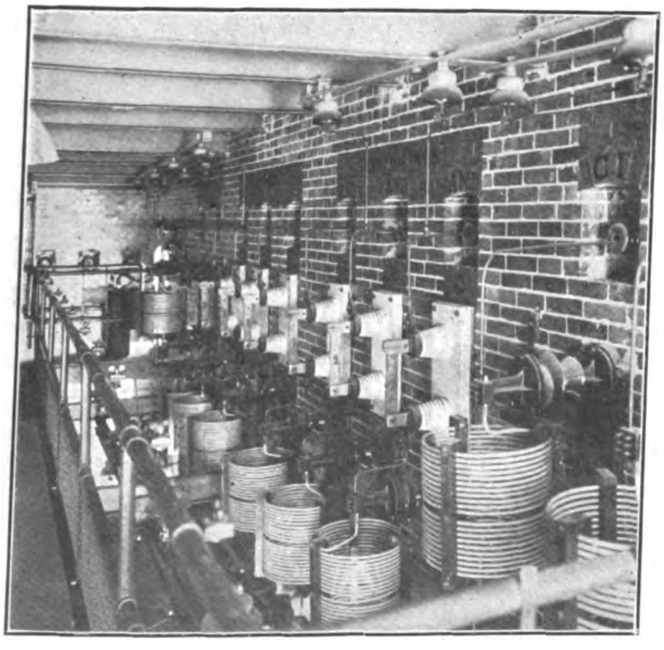
inghouse oil-insulated, self-cooled transformer, and a 1000-kw. teaser transformer, the pair taken together being connected to receive unbalanced three-phase supply and to deliver balanced three-phase voltage and single-phase voltage. The connections for the purpose are explained later in this article.

The radiator construction of the self-cooled transformer units at the West Farms substation is an evolution of the tubular oil-cooled construction used by the New York, New Haven & Hartford Railroad for auto transformers of 2000-kva. rating along the tracks of their system, a description of which is given in the issue of the ELECTRIC RAILWAY JOURNAL for May 2, 1914, page 961. The cooling of the oil results from natural circulation due to the thermal head, or difference of temperature of the oil at the top and the bottom of the radiators.

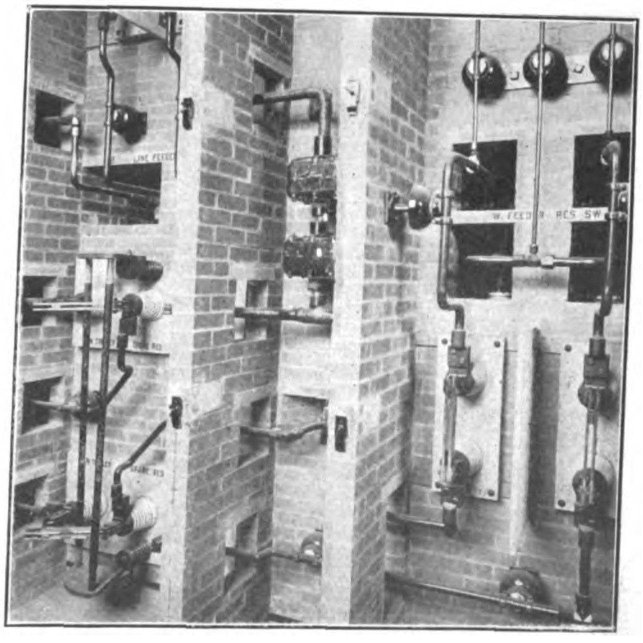
Taps are provided in the windings of the transformers to permit loading to full capacity, at high-tension voltages to 10 per cent above or below normal in 2 per cent steps.

SOME DETAILS OF THE CONDUCTOR SYSTEM OF WHICH THIS SUBSTATION IS A PART

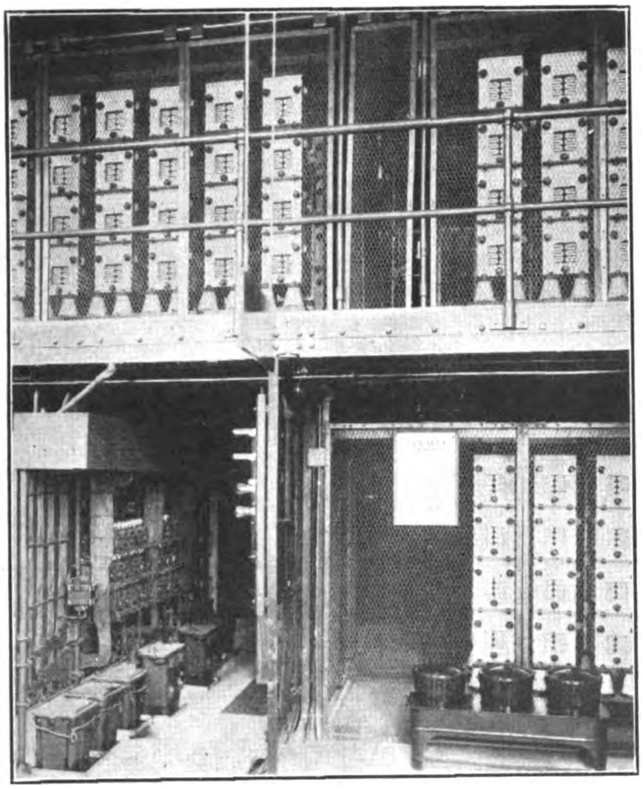
For the supply of propulsion current to the railroad the West Farms substation produces single-phase current. The transmission system is known as a semi-balanced one. The plan was adopted in January, 1914, to minimize inductive interference in telephone and telegraph wires and at the same time to improve transmission economy. The contact wires are at the same potential, 11,000 volts above the rail. There are two



WEST FARMS SUBSTATION—LIGHTNING ARRESTER CHOKE COILS, LINE "DISCONNECTS" AND GROUNDING CLAMPS ON HANDRAIL



WEST FARMS SUBSTATION—BUSBAR COMPARTMENTS, SHOWING "DISCONNECTS" AND INSTRUMENT TRANSFORMERS



WEST FARMS SUBSTATION—REAR OF 11,000-VOLT SWITCHBOARD AND SOME GRID RESISTORS

feeders on each side of the railway tracks with auto transformers distributed along the line. The contact wires are connected together and to one terminal of each auto-transformer, while the feeders in parallel are connected to the other with the middle points of the transformers connected to the track. This transmission scheme is similar to the Edison three-wire system except that the direct load is on one side of the circuit, the other receiving its share through the auto transformer which performs the same function as balancer sets in a direct-current distribution system. Complete details of this arrangement were published in the issue already referred to.

Power is received at the substation from the 201st Street power plant of The United Company over 350,000-circ. mil triplex cable laid in the underground ducts. It is transmitted by the three-wire, two-phase system, with 24,600 volts between outer wires and 17,394 volts between each outer wire and the third wire. The three-wire, three-phase plan is used on account of the desirability of efficiently transmitting power for single-phase and three-phase distribution over the same line.

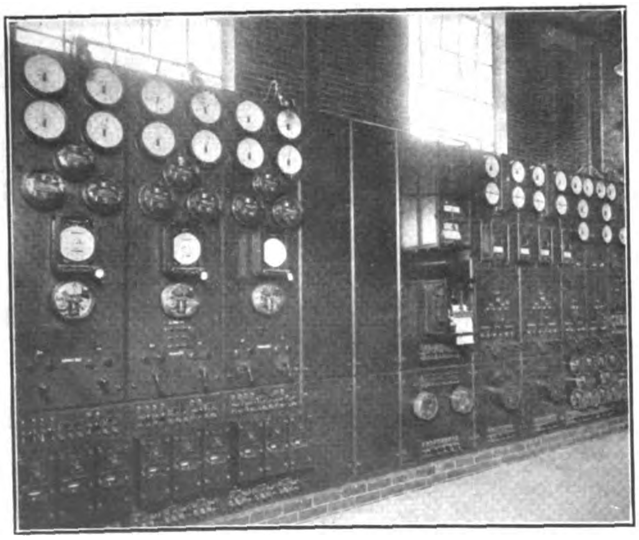
As shown in the large substation wiring diagram the triplex cable, emerging from the pothead, is fanned out for connection, through instrument transformers, to the main and teaser transformers. The two cable terminals between which is the higher voltage are connected across the main transformer primary. The other is connected to one terminal of the teaser transformer primary. The other teaser primary terminal is joined to the mid-point of the main transformer primary.

Single-phase power at 22,000 volts is taken off from the secondary of the main transformer which has a 1:1 ratio of transformation, except as adjusted by use of the regulating taps.

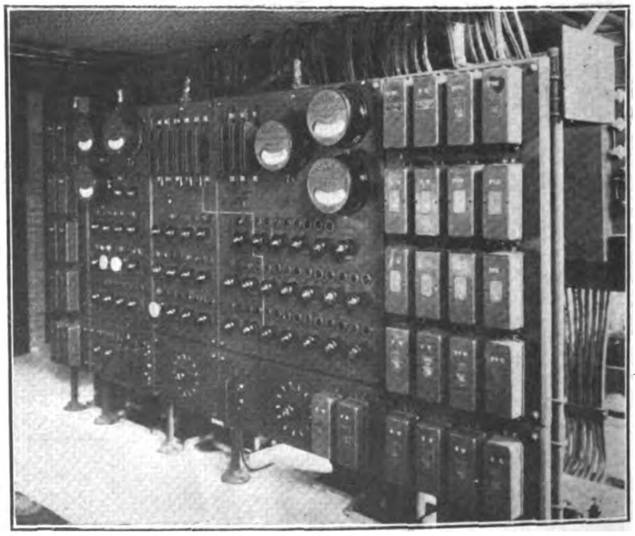
Three-phase power at 11,000 volts is taken off from one terminal of the teaser secondary and two points midway between the center and the terminals of the main transformer secondary. The other teaser terminal is tapped in at the center referred to.

Provision for Clearing Railway System of Grounds

On account of the importance of the part played by the grid resistors and their control switches in the reliable operation of the railway system, the details of the sequence of operation of the several relays and switches have been determined with great care. An accompanying diagram is reproduced to make these clear. In this the sequence is indicated by consecutive numerals in small circles. With a short on the contact wire (indicated by the cross) the following operations occur consecutively: (1) The double-ratio current transformer energizes its corresponding coil of the selective relay and also the overload and restoring relay. (2) Current passing through the lower coil of the selective relay separates the lower contacts, thus selecting the feeder switch to be tripped. (3) At the same time the overload and restoring relay closes the upper contactor circuit of the selector relay, actuating the trip coil of the feeder resistor switch and energizing the

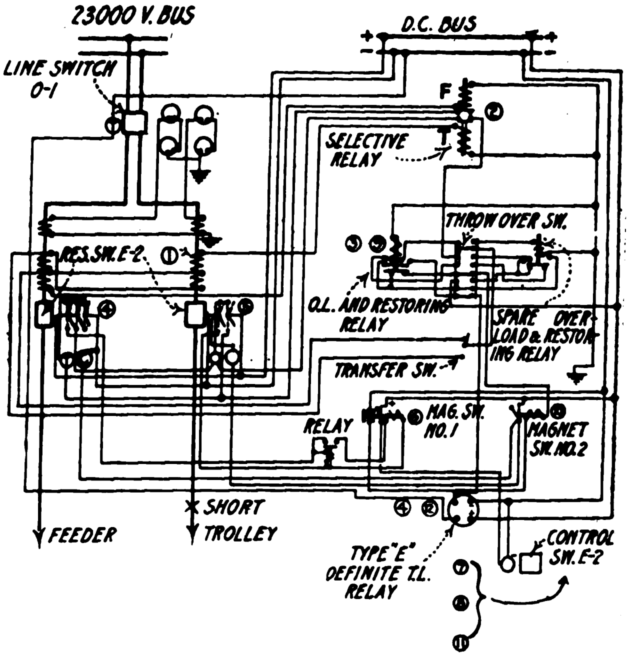


WEST FARMS SUBSTATION—LIGHTING COMPANY'S SWITCHBOARD FOR INCOMING LINES, OUTGOING THREE-PHASE LINES, AND LOCAL LIGHTING AND POWER, WITH RECORDING INSTRUMENTS



WEST FARMS SUBSTATION—RAILROAD COMPANY'S SWITCHBOARD, SHOWING ANCHOR BRIDGE SWITCH CONTROL, RELAYS AND INDICATING INSTRUMENTS

Type E definite time limit relay. (4) When the resistor switch opens, the pallet switch is thrown into the dotted position, energizing the trip coil of the trolley resistor switch. (5) The latter on opening throws the pallet switch into the dotted position, energizing magnet switch No. 1. (6) On operating, this switch closes its contactors, as shown by dotted lines, thereby preparing the coil of magnet switch No. 2 for energizing current and allowing energy to flow through the closing coil of bridge control oil circuit breaker. (7) On closing, the control switch energizes the bridge control circuit. (8) The bridge switch, if still overloaded with the resistors in series, then opens and removes the "short." (9) When the ground is cleared the contact bar on the overload and restoring relay drops onto the contacts, energizing magnet switch No. 2. (10) This in turn moves its contactor into the dotted position, thereby closing both of the resistor switches. (11) Simultaneously with the closing of the resistor switches the bridge control switch opens and normal conditions are restored. (12) In case the "short" remains and the bridge switch fails to open, however, the definite time limit relay energizes the tripping coil of the Type 0-1 line circuit breaker, opening same, in which case it has to be closed by hand. Signal lamps on the switchboard indicate the position of all switches.



WEST FARMS SUBSTATION—DIAGRAM SHOWING SEQUENCE OF OPERATIONS IN CLEARING GROUNDS

PROVISION IN THE POWER PLANT FOR GENERATING RAILWAY POWER

The problems involved in carrying the railway load from the standpoint of the electric service company included provisions for handling single-phase loads in the steam generating station and the operation of this station through the West Farms substation in parallel with the Cos Cob plant of the railroad company.

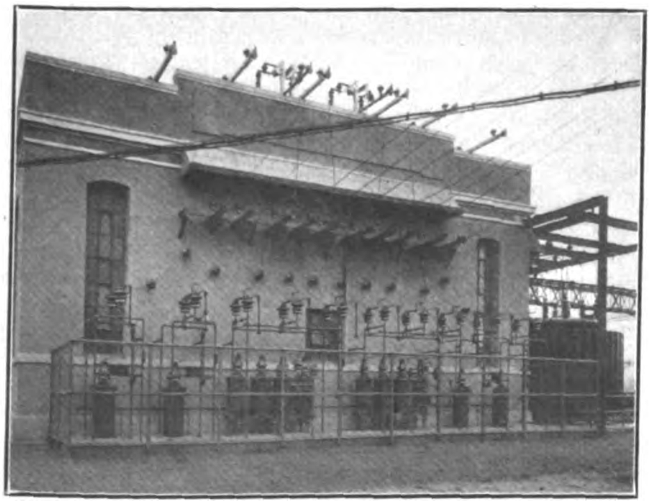
In The United Company station there are two three-phase, 20,000-kw., 6600-volt 25-cycle turbo-generators. These have the highest rating to date of generators operating single-phase. They supply power to T-connected air-blast step-up transformers, the main units of which are rated at 5500-kva., also the largest of their kind yet made. The winding connections of the transformers in the generating station and substation are shown in the wiring diagram on the following page. The new turbine equipment was added without increase in the boiler plant which had been installed to provide for future demand.

When the turbo-generators are operating three-phase at 100 per cent power factor, with 185 lb. pressure and 100 deg. superheat, the steam consumption will not exceed 14.3 lb. per kilowatt-hour with a load of 5000 kw., 12.07 with 11,000 kw., and 12.63 with 20,000 kw. When using a manually-operated supplementary valve, the steam consumption is guaranteed not to exceed 12.1 lb. per kilowatt-hour with a load of 13,000 kw. and 12.13 with 15,000 kw. The consumption when operating single-phase at 70 per cent power factor will not exceed 14.37 lb. with a load of 5000 kw. and 12.14 lb. with 11,000 kw.

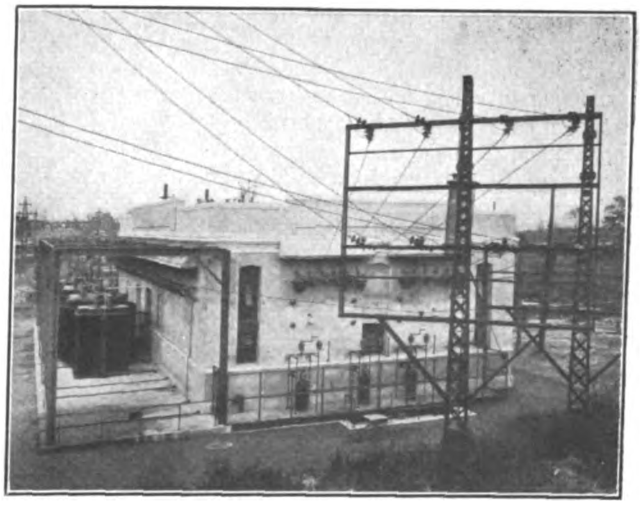
Air for cooling the generators is chilled, humidified and washed by Metropolitan air washers and is then forced into the end bells of the units by motor-operated blowers. Each blower is capable of supplying 60,000 cu. ft. of air per minute, and is driven by two three-phase 440-volt motors, each capable of running the blower alone. The generators can be excited from any exciter in the station in conjunction with an automatic voltage regulator.

A 3750-kva. single-phase frequency changer set has been installed to permit the 60-cycle equipment to reinforce the 25-cycle supply if necessary.

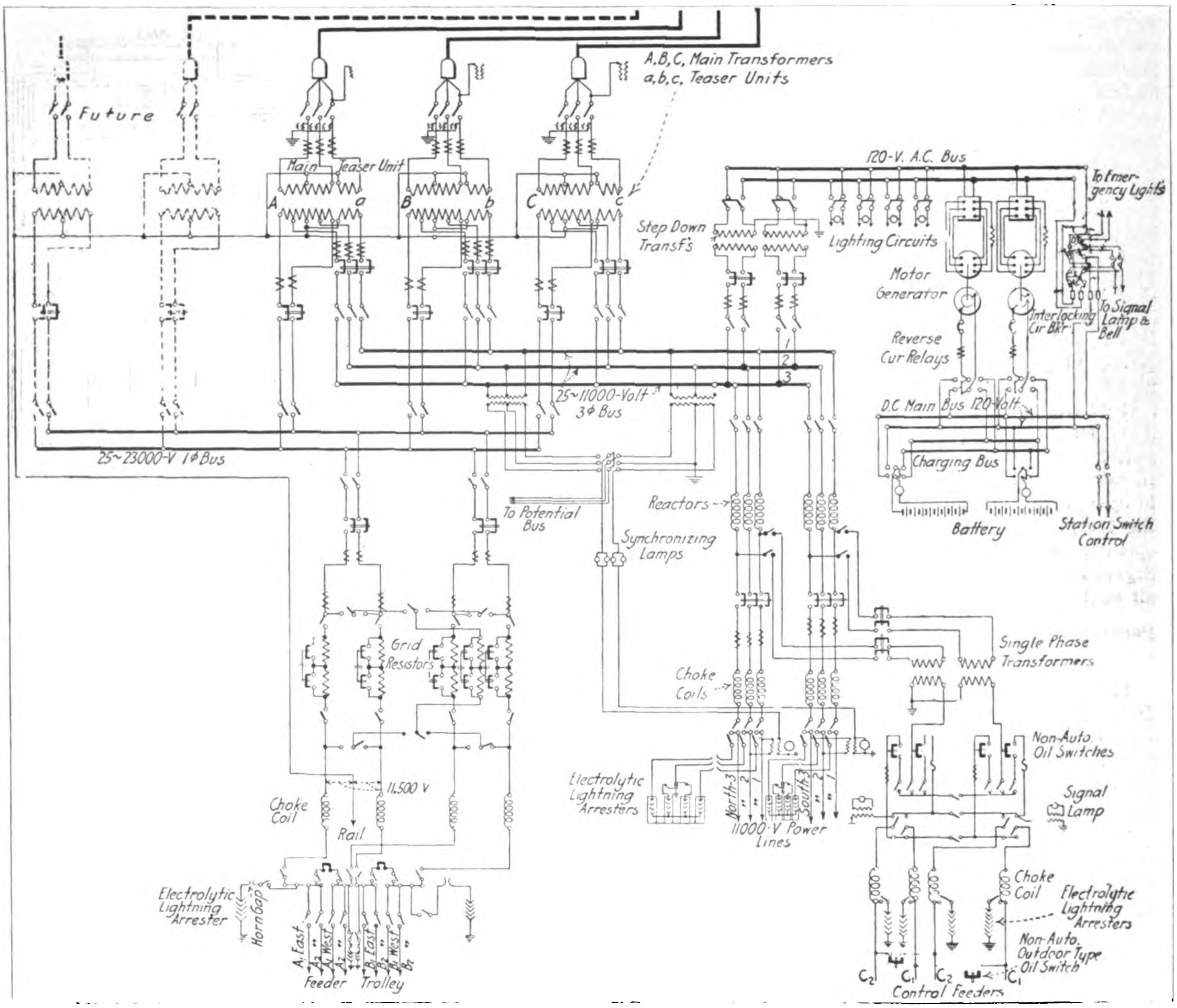
Each of the main 5500-kva. air-blast transformers at The United Company generating station is operated with



WEST FARMS SUBSTATION—NORTH SIDE, SHOWING 11,000-VOLT LIGHTNING ARRESTERS AND RADIATORS OF 5000-KW., SELF-COOLING TRANSFORMERS



WEST FARMS SUBSTATION—SOUTH SIDE, SHOWING TEASER TRANSFORMERS, 23,000-VOLT LIGHTNING ARRESTERS AND FEEDER SUPPORTING STRUCTURE


Future
A,B,C, Main Transformers
a,b,c, Teaser Units
Main
Teaser Unit
A
a
B
b
C
c
120-V. A.C. Bus
To Emergency Lights
Step Down Transf's
Lighting Circuits
Motor Generator
To Signal Lamp & Bell
Interlocking Cir Bkr
Reverse Cur Relays
2
3
25~11000-Volt 3φ Bus
D.C Main Bus 120-Volt
25~23000-V 1φ Bus
Charging Bus
Battery
Station Switch Control
To Potential Bus
Reactors
Synchronizing Lamps
Grid Resistors
Single Phase Transformers
Choke Coils
Non-Auto Oil Switches
Signal Lamp
Electrolytic Lightning Arresters
North-3
2
1
South-3
2
1
11000-V Power Lines
11,500 V
Choke Coil
Rail
Electrolytic Lightning Arrester
Horn Gap
A East
A2 West
A1
A2
B East
B West
B2
Feeder
Trolley
Choke Coil
Electrolytic Lightning Arresters
Non-Auto. Outdoor Type Oil Switch
C2
C1
C2
C1
Control Feeders

WEST FARMS SUBSTATION—GENERAL ELECTRIC CIRCUIT DIAGRAM OF SUBSTATION WIRING AND EQUIPMENT

a 1000-kva. teaser transformer through T-connections, the reverse of the arrangement described for the substation. The bank steps up the generator voltage from 6600 three-phase to the values already stated. Two low-tension leads and a low-tension neutral are brought out through the top of the main transformer case, as well as two high-tension leads and neutral leads. The high-tension neutral is grounded to the case but the low-tension neutral is not. The high-tension neutral is capable of carrying the full current of the winding. The regulation of these units is specified at 11 per cent when carrying 13,750-kva. load at 60 per cent power factor. A separate winding, which has a rating of 20 kva. at 210 volts, is connected permanently to the air-blast motor, so the latter will start as soon as the transformer is energized. The inherent reactances of both the main and teaser transformers are 5 per cent.

Report-Writing Course

An important addition to the curriculum of the Massachusetts Institute of Technology has recently been made in the shape of a course in report writing. Instruction in this desirable direction is given to students in engineering administration, with the object of strengthening what is at present a weakness in the qualifications of technically trained men for the broadest field of usefulness. The technique of the course consists largely in the solution of problems, followed by reports thereon from two points of view: First, that of the magazine article or popular presentation, and, second, a more concise story, in which details are included in appendices so that the report itself may be the more direct.

Some of the problems have been highly practical, the first assigned being a written application for a position, with statement of individual qualifications. Next the students received a letter from a chauffeur who had saved money and desired to start an auto-truck sightseeing business. The students, as engineers, weigh the different aspects of the matter, competition, demand, condition of business in general and present their conclusions. Another problem was the benefits of the fare-collecting equipment used on the Boston Elevated Railway, with the expediency of extending its use, and following a lecture on the dye situation in America, a report was presented on the practicability of establishing a plant for the manufacture of dyes. Finally, the students have investigated the desirability of an electrically operated blue-printing outfit for the new buildings of the institute at Cambridge, reporting to President Maclaurin. The reports are examined and criticised by the professors. About eighty juniors are now engaged in this work, which is under the immediate direction of William Green of the English department.

Pennsylvania Association Meets

Electrification, Shop Methods, and Proposed Safety Rules and Code Form Topics of Discussion at Scranton Meeting on Dec. 14—At Meeting on Dec. 15 Delegates Consider Problems Arising Under New Pennsylvania Workmen's Compensation Law

The winter meeting of the Pennsylvania Street Railway Association was held on Dec. 14 and 15 at the Hotel Jermyn, Scranton, Pa. The first session, on Tuesday afternoon, was devoted generally to the subjects of railway electrification and shop methods and to the committee report on the proposed safety rules and code of the Bureau of Standards, while the concluding session was given over to addresses on workmen's compensation for accidents. This subject was of particular interest on account of the new Pennsylvania law going into effect on Jan. 1, 1916.

The first meeting was opened by President C. L. S. Tingley, second vice-president American Railways, whose address is abstracted elsewhere in this issue. In connection with his remarks President Tingley brought to the attention of the delegates the fact that a campaign has already been started for the passing of laws affecting electric railways by the next Legislature. He said that at the second annual conference on welfare and efficiency, recommendations were made in favor of automatic instead of linked couplings; for the use of air brakes as the standard instead of hand brakes; for the requiring of vehicles operating between sun-down and sun-rise to display lights on the front, the rear and the sides; and for the use of vestibules on summer cars and the abolition of running boards. President Tingley also cited the model health insurance bill of the American Association for Labor Legislation, this bill providing for a commission similar to the new compensation commission and requiring the industry to bear the burden of sickness of, as well as accidents to, employees.

ELECTRIFICATION AND SHOP METHODS

After the reading of the treasurer's report by Henry M. Stine, the questions referred to the Question Box were presented by W. A. Heindle, superintendent Southern Pennsylvania Traction Company, Chester, Pa., for later discussion. N. W. Storer of the Westinghouse Electric & Manufacturing Company then gave a general talk on railway electrification, and J. F. Layng of the General Electric Company read a paper on "Shop Methods." Mr. Storer's remarks are published elsewhere this week in abstract form, while Mr. Layng's paper will appear in a later issue.

In the discussion on Mr. Layng's paper W. B. Rockwell, manager Eastern Pennsylvania Railways, Pottsville, Pa., said that city and interurban operation differ widely on the question of maintenance, and that the operating costs on interurban lines would run way up if city practices were followed. Mr. Heindle thought that Mr. Layng's remarks referred to inspection and not to general overhauling and wanted to know what would be the figures for maintenance when cars were taken out of service at stated intervals and generally overhauled.

Mr. Layng explained that on account of the size of the subject his remarks had been confined only to city service. The system from which his figures had been taken had moderately new equipment, and there would undoubtedly be systems where twice as many men would be required for the shop work on the cars. Local condition, the lay-out of the country and the type of motor used would make a great difference.

Mr. Rockwell said that a manager should make sure that every car was in first-class condition before letting it go out of the carhouse, and Mr. Layng felt that companies which put money into inspection saved much on material.

PROPOSED SAFETY RULES AND CODE

The report of the committee on the proposed safety rules and code of the Bureau of Standards was then read by Chairman Gordon Campbell, president York (Pa.) Railways. On behalf of the committee on this subject, Mr. Campbell made a progress report. He traced the development of Circulars 49 and 54 issued by the Bureau, with the title, "Safety Rules to be Observed in the Operation and Instruction of Electrical Equipment and Lines" and "Proposed National Electrical Safety Code" respectively. These have been discussed from time to time in this paper.

The "Suggested Standard Safety Rules for Electrical Apparatus" which were offered at the second annual industrial welfare and efficiency conference conducted by the Department of Labor and Industry of the State of Pennsylvania were also mentioned. It was stated that Dr. E. B. Rosa of the Bureau of Standards had presented a paper at that conference urging the adoption of a single set of safety rules by the several states. This suggestion was approved at the 1914 annual meeting of the Pennsylvania Street Railway Association.

Mr. Campbell then explained what had been done recently by way of co-operation with the A. E. R. A., the C. E. R. A. and the N. Y. E. R. A. in formulating suggestions for improvements in the proposed rules of the Bureau of Standards. In conclusion the members were urged to forward suggestions to reach the A. E. R. A. office not later than Dec. 20, 1915.

After the report Mr. Campbell read a letter from Dr. Rosa to the effect that the Bureau of Standards is continuing the study of the variations in the strength of construction as required by the weather conditions in various sections and also the study of the separation of transmission lines of high voltage. In the ensuing discussion the point was raised that the proposed code will prove burdensome on account of the necessary expenditures involved. Mr. Storer thought that a factor of safety of two was not excessive and the companies should not oppose it. As for the added labor required by the code, that was a different question. President Tingley stated that while he did not desire to criticise the Bureau of Standards, he felt that it was not sufficiently acquainted with the working conditions of small properties, on which the proposed rules bear with great weight, and that the association should protect such companies.

It was next announced that on account of the storm in eastern Pennsylvania E. C. Spring, assistant to president Lehigh Valley Transit Company, Allentown, Pa., was unable to be present to read his paper on "Efficiency Through Conservation in Time in Interurban Traffic." His paper, however, is released to the members through the ELECTRIC RAILWAY JOURNAL, as shown elsewhere.

Committees on nomination of officers, auditing and resolutions were then appointed, and the session adjourned. Trips in special cars had been arranged for after the session to the shops of the Scranton Railway and the power plant of the Scranton Electric Company. At 8 p. m. an informal dinner was served to members of the association and guests at the Hotel Jermyn.

WEDNESDAY'S SESSION

In opening the session on Wednesday morning President Tingley referred to the importance of safety work in connection with workmen's compensation laws, and mentioned the slogan "Be careful first" as being less selfish than "Safety first." He said that railways should not object to compensation laws on the ground of the safety devices that would be necessitated, for such devices should have been put on machines in the beginning, and he pointed out to the manufacturing companies the desirability of designing machines with safety appliances as integral parts thereof.

H. P. Megargee, assistant to vice-president American Railways, Philadelphia, Pa., then gave a talk on safety methods and devices, with illustrations from the shops of the Chicago & Joliet Electric Railway, Joliet, Ill. This talk will be abstracted in a later issue. In the ensuing discussion the fact was emphasized that the hazard of new employees is a vital point in safety work to be overcome through a proper training and cautioning of new men, and C. B. Fairchild, Jr., executive assistant Philadelphia (Pa.) Rapid Transit Company, told of the experience of his company in combining safety inspection work with fire prevention inspection without any increase in the force used for the latter or in the cost thereof.

The remaining addresses were devoted to different phases of workmen's compensation legislation, as follows: "Some Practical Questions Arising Under Workmen's Compensation Law," by Lefferts S. Hoffman, general attorney Public Service Corporation of New Jersey, Newark, N. J.; "Workmen's Compensation Liability in Pennsylvania," by H. A. Mackey, chairman Workmen's Compensation Board, Harrisburg, Pa.; "Mutual Insurance Against Workmen's Compensation Liability," by Walter S. Bucklin, president Massachusetts Employers' Insurance Association, and "Stock Company Insurance," by R. H. Keffer, general agent Ætna Life Insurance Company, Scranton, Pa. The addresses by Mr. Hoffman and Mr. Mackey are abstracted elsewhere in this issue.

MUTUAL INSURANCE

Mr. Bucklin brought to the delegates a message from large employers in Massachusetts who had had four years' experience in compensation work. The Massachusetts law at first proposed provided that all insurance should be carried by one large mutual co-operative company managed and controlled by the employers themselves, on the basis of modern efficiency and economy, but in the final draft passed the State was thrown open to the competition of private commercial companies. The State helped to introduce a mutual company controlled by the policy-holders, however, and under the guidance of the best actuary obtainable rates were prepared and published three weeks prior to the effective date of the act. The stock companies withheld their rates until three days before this date, so that the mutual company was compelled to get 100 employers to join it without knowing whether or not the new stock company rates would be as high. Later the stock companies cut their rates 25 per cent and finally as much as 30 or 40 per cent.

Mr. Bucklin said that the organization of this mutual company, the Massachusetts Employers' Insurance Association, provides for different groups, as one for manufacturing companies and one for street railways, each working out its own experience. A few very large companies are carried, each in a group by itself. The company has charged lower rates, paid compensation in full and returned an average annual cash dividend of 30 per cent to the member employers, besides accumulating a surplus of $400,000. There is no stock, the only income being the premiums that would otherwise be paid to the commercial companies. Mr. Bucklin said that State fund insurance is really a mutual plan conducted by the commonwealth, but that the most desirable plan is one mutual company to be controlled by the employers themselves, managed by competent insurance men and fully equipped with safety and claim departments conducted on a humanitarian rather than a profit-making basis.

Of all preventable injuries, said Mr. Bucklin, 50 per cent can be prevented only by the education of the employee. The Massachusetts mutual company has recognized the importance of the growing science of safety engineering. It has a specialist for analyzing the problems of street railways and making recommendations along safety lines, and it conducts a wide safety campaign through such media as lectures, views, bulletins, payroll slips and the like. The company has in Boston an out-patient hospital for the employees of the Boston Elevated Railway and the Bay State Street Railway. Where these companies formerly paid $5 for first aid and frequently the same charge for subsequent treatments, the mutual company is now giving these services in each case for an average of $1.80.

To Mr. Bucklin's mind one of the most valuable features of his company has been the condition whereby the street railways have been freed from the responsibility of adjusting claims with employees. It is his experience that when injured employees are told by the railway that arrangements have been made whereby their compensation will be adequately handled by the mutual company, both the employees and the labor unions are fully satisfied. In closing, Mr. Bucklin stated that the Mutual Compensation Insurance Company of Pennsylvania was being formed to apply the Massachusetts plan to Pennsylvania, and it was possible that a separate group would be made in this company for street railways. The experience already gained in Massachusetts would enable the company to work out the problems so as to save more money to the street railways and foster better relations with the employees than possible in any other way. In Pennsylvania the rates had to be the same as those of the stock companies, but the saving would be in the cash dividends returned.

STOCK COMPANY INSURANCE

Mr. Keffer said that the companies desiring protection had only to consider the solvency of stock companies. All large stock companies had more experience data than mutual companies, and they maintained costly inspection services for the benefit of the policyholders. All in all stock companies could give cheaper insurance than mutuals on account of the service rendered and the value of the business done. State funds in operation were said to be showing losses, and in view of the fact that the Pennsylvania law requires the State fund rates to be "adequate," the danger of an assessment disguised under increased rates was hinted at. As to compensation liens on real estate, which, it was said, would not receive the necessary certification by the commission for filing against State fund subscribers, Mr. Keffer maintained that these liens were permitted by the act to be relieved by the stock companies and that his company was pledged in its policies to take care of such liens so as not to have them stand against the property. Hence the asserted superiority of the State fund plan on this basis was a negligible point.

DISCUSSION ON WORKMEN'S COMPENSATION

H. W. Foster, chief engineer Independence Inspection Bureau, Philadelphia, Pa., believed that self-insurance for street railways was feasible under certain conditions. In adopting this method the employer would face the responsibility for medical attention, claim service, accident prevention service and compensation payments, in all of which respects the street railways by virtue of their established practices for handling injuries to the public should in general be competent also to take care of employees' injuries. A point of danger, however, arose in connection with extraordinary claims for catastrophes, and for this reason there was an opportunity in Pennsylvania for insurance against special risks. Mr. Foster then mentioned the Excess Interinsurance Exchange organized in Philadelphia and said that insurance against catastrophes under some such organization when the rate is fairly proportioned to the whole insurance rate and accident inspection service is rendered, might prove a wise plan for the railways leaning toward self-insurance.

E. W. Heilig, secretary of the welfare committee Public Service Corporation of New Jersey, then described some of the features of this company's welfare plan, the spirit of which the New Jersey compensation act follows. In the last four and one-half years 27 per cent of the 10,000 accidents had come under the act. The cost to date for compensation had been $2.62 per man, with outstanding claims not included, while the welfare plan had cost $5.96 per man. It was found, upon investigation of the probable compensation for all cases under the compensation act the first year, that the payments required would be about the same as under the old common law plan. President Tingley said that for the accidents of the last five years on the Scranton Railway the amount expended under the old plan and the amount required under the compensation act differed less than $100, the claim and legal department costs being excluded because of the maintenance of these at no less efficiency for public accident service.

Mr. Rockwell said that he had favored self-insurance because his company had practically been doing this for several years. He was impressed, however, with the mutual plan but feared that the extension of such companies into other than the original states where incorporated indicated a money-making desire. Mr. Bucklin explained, however, that the co-operation of different mutual companies or the extension of work with common inspection and claim service made for increased efficiency and lowered costs, just as in the case of the mutual fire insurance companies. Mr. Mackey explained how stock companies spend 43 per cent of the premium for overhead and how the State fund rates had been put about 10 per cent below the stock rates because of the lessened overhead. Mr. Rockwell asked why it would not be better to adopt self-insurance and avoid paying rates covering any overhead, and Mr. Mackey, while disclaiming any desire of the compensation board to favor any insurance plan, said that probably every big going concern that could show satisfactory financial responsibility could do better by insuring itself. As to what would constitute proof of such financial responsibility, Mr. Mackey remarked that the board had no fixed rule and wanted to cut all the red tape possible. While a form had been prepared, the board desired any showing in a company's own way that would prove its responsibility. The steam railroads had already been allowed to strike out the questions on the form and submit the latest annual report. Mr. Mackey then mentioned the point that the board preferred parent companies to report for their subsidiaries and to assume the compensation therefor. As for examinations of employees, he said that the board was not concerned with the real duty of companies in starting out right under the act, but for obvious reasons discrimination among employees would prove unwise. Mr. Bucklin then added that the annual overhead expense of the Massachusetts mutual company was only 15 per cent of the premium. The matter of catastrophes was handled by mutual companies through providing re-insurance policies whereby the first loss up to a certain figure was handled by the mutual companies and any higher loss fell on interinsurance companies.

A motion by A. E. Wildt, engineer of power and equipment Scranton Railway, providing for an improvement in the safety-first slogan, "certainty first" being mentioned, was referred to the executive committee. The Question Box was passed over on account of the lateness, and the questions will be answered by mail by the chairman. Mr. Fairchild moved that the meetings of the association be held on the third Tuesday and Wednesday in May and the third Tuesday and Wednesday in November, so as to secure better weather conditions, and the question was referred to the executive committee.

The meeting then closed with the election of the following officers and executive commitee: President, T. A. Wright, vice-president and general manager, Wilkes-Barre (Pa.) Railway; vice-president, Gordon Campbell, president York (Pa.) Railways; secretary and treasurer, H. M. Stine, Harrisburg, Pa.; executive committee: T. A. Wright; Gordon Campbell; T. B. Donnelly, claim agent West Penn Traction Company, Pittsburgh; C. L. S. Tingley, second vice-president American Railways, Philadelphia, Pa.; C. B. Fairchild, Jr., executive assistant Philadelphia (Pa.) Rapid Transit Company, and Thomas Cooper, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

PRESIDENT'S ADDRESS

BY C. L. S. TINGLEY, SECOND VICE-PRESIDENT AMERICAN RAILWAYS, PHILADELPHIA, PA.

The general business depression beginning to be felt at the time of the meeting a year ago was aggravated for electric railways by the advent of the jitney, which, in the cities where it became prevalent, made—for the time being at least—great inroads into the receipts of the electric railways. This is a subject upon which all member companies should place before the public the fullest information, confident that the public, in possession of the facts, will realize the necessity in its own interest of regulating a condition which not only threatens the prosperity and so the usefulness of an instrumentality of transportation essential to all communities but which brings in its wake effects most harmful to the public itself.

The association, through its executive committee, authorized the president to take such steps as he might deem necessary to bring this question before the Pennsylvania Public Service Commission. In pursuance of this authority, he appeared with counsel before the commission on June 18 and prayed them to take jurisdiction over the whole jitney situation on the ground that the jitneys were common carriers and therefore were operating in violation of the public service commission law when they failed to get certificates of public convenience before beginning operation and when they failed to file their tariffs. After some time the commission requested the association to withdraw its petition, which it did.

After a careful search of the State for a case against some man of property who would let a case go through to decision, the Scranton (Pa.) Railway made three complaints against M. J. Walsh, W. H. Owens and S. Wilson, and F. Williams, these three cases being heard in Scranton on Oct. 14. It was either proved or admitted that these men were performing the service of carrying passengers for hire by trips over fixed routes on more or less definite schedules, and it was therefore asserted by the complainant that they were common carriers. The attention of the commission was called to the fact that the regulatory law includes all common carriers and that common carriers include persons engaged in the transportation of passengers for profit. In support of this contention the following citations were made: An act of the State of Georgia, approved on Aug. 22, 1907; Georgia Railway & Power Company *vs.* Jitney Bus Company, *et al.*, Public Utility Reports 1915-C, page 928; an order of the Public Utilities Commission of the District of Columbia made on Aug. 28, 1915; an order of the Illinois Public Utilities Commission in the case of Jacksonville Railway and W. B. Miser *vs.* L. F. O'Donnell,* and Charleston Interurban Railroad *vs.* Clyde Smith *et al.*, Public Utility Reports 1915-E, page 177. For a suitable definition of the word "common carrier" the following cases were cited: Lloyd *vs.* Haugh, 223 Pennsylvania 148; Donnelly *vs.* Philadelphia & Reading Railroad, 53 Superior Court 78; Primrose *vs.* The Casualty Company of America, 37 County Court Reports 441; Dwight *vs.* Brewster, 18 Massachusetts 50; Gordon *vs.* Hutchinson, 1 W. & S. 285, and Fuller *vs.* Bradley, 25 Pennsylvania 120. The decision of the commission has not yet been handed down.

The legislature had before it during its last session many bills of interest to the industry, which were reported from time to time in the bulletins issued from the secretary's office. Unquestionably the most important of the enactments was the workmen's compensation act, which goes into effect on Jan. 1, 1916. This is revolutionary, for it is an entire change in the economic aspect of injuries to employees. This is well pointed out in a decision of the Supreme Court of Washington in which it uses this language:

"To say with appellant that the intent of the act is limited to the abolishment of negligence as a ground of action against an employer only is to overlook and read out of the act and its declaration of principle the economic thought sought to be crystallized into law, that the industry itself was the primal cause of the injury and, as such, should be made to bear its burdens. The employer and employee as distinctive producing causes are lost sight of in the greater vision that the industry itself is the great producing cause and that the cost of an injury suffered in any industry is just as much a part of the cost of production as the tools, machinery, or material that enter into that production."

In view of this radical change in the relationship which companies bear to their employees, it has seemed wise to place this subject upon the program for a full discussion. One or two phases of the question, however, which have not found a place upon the program should be mentioned. For example, instead of State, mutual or stock company insurance, the employer may carry the risk himself. This possibly can be safely done by large concerns, but in arranging to do so the catastrophe hazard must not be overlooked.

Furthermore, it is to be regretted that the definitions contained in the act are not perfectly clear, so that there will be many questions arising which will have to be determined by the courts. For instance, the term "employee" as used in the act is declared to be synonymous with "servant," but in seeking a definition of the word "servant" it is found to have been construed in almost every way that one can possibly wish. It has been suggested by counsel, however, that the working of the act with respect to the compensation being based on "daily or weekly" wages confines its operation to subordinate employees. Who is omitted from the operation of the act, however, under the term "casual employees"? Cases do not give much help here. It is also to be regretted that the act does not specifically provide for the exemption from its operation of carriers who are engaged in interstate commerce and who therefore come under the federal liability law. The decisions of the courts in this class of cases have been quite contradictory, but seem to be settling down to a holding which would warrant the assumption that practically any employee of an interstate carrier is engaged in interstate commerce.

It is unfortunate that the words "arising out of and" have been omitted from the act. As it is, companies are called upon to make compensation for all accidents in the course of employment whether or not they arise out of the employment. There are a long line of decisions, both in this country and in England, in which the distinction is clearly drawn, and it can be readily seen that in many cases the absence of these words will work a hardship and injustice upon the employer. Out of eighty-five enactments of this character that have been examined—thirty-two of the United States and fifty-three foreign—only seventeen omit the words "arising out of," and only six of these are in the United States—namely, the state acts of Pennsylvania, Ohio, Texas and Washington, the federal employees' act of May 30, 1908, and the canal zone act, the latter two being more in the nature of pension acts than compensation acts. Ohio and Pennsylvania are the only industrial States which omit these words. West Virginia's original enactment omitted them, but they were inserted in the amended act approved on Feb. 26, 1915. Of the foreign countries excluding this language the only important ones are Austria, Germany and Hungary, the others all being comparatively small countries with the possible exception of Japan. It is unfortunate also that the words "willful disobedience of orders or rules, and intoxication" are omitted from the bars to recovery.

There is another serious matter to be carefully guarded against, and that is the question of hernia. This has been found so serious in West Virginia that the Legislature amended the act, and the radical language used shows that there must have been a very serious abuse of the compensation law on this point. It would seem that the only safeguard for an employer in this State is to require a medical examination before employment. If the prospective employee refuses to submit to such examination, the company should either refuse employment or compel him to reduce such refusal to writing. Then this refusal can be presented to the compensation board in case claim is made for disability arising from hernia or other organic defects.

There also arises under these laws a class of cases which affect electric railways as carriers as distinguished from employers, viz., an accident to an employee of a third party in the course of his employment, his employer being subrogated to his right of action against the carrier. A good example of this class of cases is Newark Paving Company *vs.* Klotz (91 At. Rep. 91), although at that time in New Jersey the employer was not subrogated to the right of the employee. In this case the administratrix of a workman of the defendant company sued to recover for his death (the decedent was struck by a street car and killed while fixing his wheelbarrow). Compensation was awarded, notwithstanding a prior release to the street car company upon payment by it of $800. Now, since this act does not take negligence into consideration and since a man hurt in the course of his employment must be compensated by his employer, will not companies in a majority of cases of this class have the employer or his insurer assisting the man, if not actually suing on his behalf? And will not this interest of the third party make it more difficut to prove negligence?

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*In this case the commission held:

"From the evidence in this case, the commission finds that the respondent owns, controls, operates and manages, within this State, for public use, a number of automobiles which he is using for the transportation of persons for hire between points within this State and that in the conduct of such business the respondent is a common carrier of persons and is a public utility within the meaning of the act. * * *"

EFFICIENCY THROUGH CONSERVATION OF TIME IN INTERURBAN TRAFFIC

BY E. C. SPRING, ASSISTANT TO PRESIDENT LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.

The interurban lines of the country are to-day confronted with the problem of giving greater speed of service. The question is not, as it was a few years ago, a matter of frequency of service. In meeting this new condition, many things must be taken into consideration.

What appeals most to the masses traveling is through service to distant points without transfer, and intertraffic arrangements are being made by many companies so that passengers can go from one point to another without change. In cases of this character, a heavy increase in traffic has been the result. Where companies adjoin each other, physical connections and through service should be maintained. The use of this class of service has been most advantageously demonstrated in the Middle Western States and has done more to place the interurban lines in a position to compete with the steam railroad lines than any other factor.

The general minimizing of time demands serious thought. The elimination of curves, the replacing of tracks upon private rights-of-way wherever it is possible and the relocating of tracks outside of towns are all matters of serious import. In the past it was thought that lines must traverse every municipality and cover every street in order to get the business in the community, but it is being found that just as much traffic can be secured by going on the outside and around the towns. The Lehigh Valley Transit Company, at a cost of about $250,000, has just taken 8 miles of its track off the public highway and eliminated more than sixty bad curves, thus reducing its track mileage only 1.6 miles but its operating time seventeen minutes. Between two certain stations the running time was reduced from twelve to five minutes. When it came to a question of going outside the towns, the cry was heard on every hand that the traffic would be killed, and mass meetings in protest were held in various municipalities. In every instance, however, where the tracks were taken away from the center of the town, the business has almost doubled. In these cases of abandonment of track in towns, the company established at a central point standard stations, with night and day agents and combined passenger, freight and express offices.

A system of stop numbers for local stops is more than essential in interurban operation, as it defines definitely every stop and facilitates the loading and unloading of passengers. The condensing or elimination of stops between towns forms a great factor in cutting down time. Although the public will at first think it cannot get along without such stops, it will enter into the spirit for faster service and the complaints will die a natural death. The Lehigh Valley Transit Company went over 45 miles of track and abolished twenty-two stops. The letters and petitions received at that time would make the archives of the library at Washington blush with shame, but the company made it a point all along the line, through publicity of various kinds, to bring the public into a close appreciation of and co-operation with the work being done to give faster and more up-to-date service. The increased traffic and the building-up of the entire length of the lines has more than compensated this act.

The operating features also constitute a very potent factor in the time unit. The operation of two or more car trains minimizes the units in operation, getting away from the old system of operating two or three sections to each train, which in itself consumes a great deal of unnecessary time and has serious features from the accident standpoint. The operating of every other train as a limited and every other train as a local is working out well in many sections of the country. A service of less frequency works to as good advantage with less cost of operation, and the limited service, stopping only in municipalities, gives a double service where it is most needed. The Lehigh Valley Transit Company, in the inauguration of its through limited service from Philadelphia to Allentown, has carried out these ideas in a most satisfactory manner. The through limited trains cover a distance of 56 miles in one hour and fifty-seven minutes, and only nine regular stops and two flag stops are made. The local trains make all stops. Both classes of service operate hourly, thus giving to the municipalities a half-hour service.

The laying out of the operating schedule so that all local trains may have sufficient time, under various traffic conditions, to clear the limiteds at the passing points, is a problem to be worked out by the dispatching department. If the limited service is kept on schedule at all times, the local service as a natural consequence will also be so kept, and the greatest advertising feature of any service, namely, "Always on the dot," can be very easily maintained. It might be mentioned that in connection with the limited service, the Lehigh Valley Valley Transit Company charges an excess fare of 10 cents for any traffic that originates or ends between the terminals. For traffic that originates or ends at either of the terminals, no excess is charged. This is done to relieve the limited service from local traffic, and the public at large is keen to appreciate this high-grade service and is willing to pay for its benefits.

Not only does the passenger service enter into the conservation of the time, but the freight and express service forms an equally important factor. The interurban roads are in the best of positions to solve the problem of quick delivery of perishable market garden products to municipalities. The Lehigh Valley Transit Company last year handled as one commodity alone about 42 tons of mushrooms, which class of shipment demands the best of service. This business was taken from one of the old-line express companies on account of the electric railway facilities for landing it in Philadelphia to make connections with Northern and Southern points in the quickest manner. For this traffic the company used the baggage compartment of the limited cars, operating every hour, so that the time factor would be reduced to a minimum. Another class of perishable shipments are the products of the Florex Greenhouses, located on the company's line. These greenhouses supply the Eastern markets with "American Beauty" roses and with carnations, and the company gets the major part of this business because it can place these goods in Philadelphia more quickly than the steam roads.

The matter of farm products is also entering very largely into the time factor of interurban lines. At present there are no municipal markets in Philadelphia, but the present administration has lately taken up the question of the introduction of markets and has called the interurban people into their conferences, and the lines are affiliating themselves with the city government. The farmers are interested in the organization of a farmers' association or common pool, this pool to hire a representative in the municipal markets to whom goods may be shipped for disposal. The interurban lines are the ones that are going to accomplish this work, and the factor of speed plays an important part in the success of their endeavors.

In figuring out the various problems for the conservation of time, an interurban line should not for one moment neglect or in any way disregard its local riding. In all its arrangements it should protect the local traffic with the view that this, rather than being interfered with in any reorganization scheme, shall be materially benefited by a better and more efficient service.

It must be remembered that in all plans for the reduction of time, the interests of safety must be protected. The placing of tracks upon private rights-of-way, the elimination of curves, the establishment of definite stops, adequate protection of crossings by crossing bells and signs, the installation of automatic block signals, either track or overhead, and the physical examination of employees are all essential factors which enter into safety in operation. Along with its other safety work, the Lehigh Valley Transit Company has placed bells as well as warning signs at all dangerous crossings along its line, and at the present time is erecting warning signs 300 ft. from the crossings.

SOME PRACTICAL WORKMEN'S COMPENSATION QUESTIONS

BY LEFFERTS S. HOFFMAN, GENERAL ATTORNEY PUBLIC SERVICE CORPORATION OF NEW JERSEY, NEWARK, N. J.

The first question arising in connection with the Pennsylvania workmen's compensation act, effective on Jan. 1, 1916, is as to the advisability of accepting its compensation provisions. If the elective system of compensation is not accepted by the employer, and an action is brought against him by an injured employee, the three principal defenses of employee's negligence, assumption of risk and fellow-servant responsibility, which have heretofore been of great assistance in defending such damage suits, are taken away. With these defenses gone, the matter of establishing the employer's liability to respond in damages for injury by accident, on account of which a suit could be maintained at common law, would be a comparatively easy matter, particularly when it is considered how many accidents to employees are caused by the carelessness of fellow employees, the liability for whose acts is now placed upon the employer. This same question as to whether or not the act should be accepted arose with the Public Service Corporation of New Jersey under the law of that State, and after a thorough consideration of the matter, the elective compensation system was adopted.

EMPLOYEES' MEMORANDA OF ACCEPTANCE OF COMPENSATION

Having decided to adopt this system, the company drew up a memorandum for the employees to sign, showing whether they rejected or accepted the elective compensation provisions of the act. The Pennsylvania act provides, in Section 302, that every contract of hiring made after Dec. 31, 1915, and every contract of hiring renewed or extended by mutual consent, expressed or implied, after that date, and every such contract in operation on Dec. 31, 1915, shall be conclusively presumed to continue subject to the provisions of the elective compensation system, unless either party shall have notified the other in writing to the contrary. As a copy of the notice has to be filed with the bureau of workmen's compensation of the Department of Labor and Industry, it would seem as though it were not necessary to have proof other than the files of the bureau of the status of the employees toward their employers in respect to the act.

In the section noted, however, there is a proviso to the effect that the provisions "shall not be construed as to impair the obligation of any contract now in force." If this raises any serious question as to whether or not it applies to the ordinary contract of hiring, then it would be advisable to obtain such signed memoranda from the employees as above described for the purpose of eliminating any question as to the application of the proviso to any particular case. On the other hand, the obtaining of such signed memoranda is quite an undertaking, gives rise to many discussions between the employees and the company as to the advisability of employees accepting or rejecting the provisions of the act, necessitates among employees a campaign of education relating to the act, and may, in view of the provisions of the act, prove to be more trouble than it is worth. Very likely the proviso in the section refers to hiring for definite lengths of time extending beyond Dec. 31, 1915, but it can easily be seen how the question might arise with many ordinary employees as to whether or not their contracts now existing did not extend beyond that date.

EFFECT OF BENEFIT ASSOCIATIONS

Section 204 provides that the receipt of benefits from any association or fund shall have no effect upon the operation of the law, and a release executed in consideration of such benefits shall be void. If any company has an association from which benefits are derived by the employees, this matter will require consideration.

The Public Service Corporation of New Jersey has a welfare plan, under which certain allowances are made to employees during a limited period of incapacity caused by accident or sickness, and a certain sum is paid to their families in case of their deaths. This plan was in operation prior to the passage of the workmen's compensation act of New Jersey. When this act was passed, however, the company modified its welfare plan so that the employees would not be paid under both systems. A rule was passed by the welfare committee to the effect that in the event of employees being incapacitated by an accident whereby the company was obligated to pay them under the workmen's compensation act, no payment would be made under the welfare plan unless the amount which they became entitled to under the workmen's compensation act was less than they would be entitled to under the welfare plan. In this event the company would make up to them the difference.

If any Pennsylvania company is in a similar position and intends taking a similar course, it would be well to bear in mind that in making the payments the first care is to see that the payments are made in accordance with the workmen's compensation act and in discharge of the liabilities thereunder, and that any balance that might be due under any other plan is paid to the employees as something entirely separate from the act. The New Jersey courts have held that any payment in excess of the amount called for by the act is a mere gratuity or gift, which cannot be recovered and to which no credit can be given the employer. This is a matter of no great importance, but it sometimes has happened that under a mistaken view of the act the employee has each week been paid a larger sum than he was entitled to, and when disputes have arisen as to the length of time the employee was entitled to compensation, he has taken the matter to court. Perhaps he sustained the contention that he was entitled to payments for a longer period than his employer thought, but the court also found that he was entitled to payment at less than the rate at which the employer had been paying him. In such a case, the court has held that any excess payments that may have been made are mere gifts, and that the employer shall continue to pay at the rate fixed by the court during the period determined by it, with no credits for excess payments theretofore made.

LENGTH OF MEDICAL ATTENTION

In Section 306 of the Pennsylvania act there is a provision to the effect that during the first fourteen days no compensation is payable but that surgical, medical and hospital service, medicines, etc., shall be supplied. While, of course, it is quite necessary that the law should put a limit upon the time during which such service must be supplied by the employer, in the practical operation of the law it will many times be wiser to supply medical attendance beyond the mere statutory period of two weeks, for the reason that it is to the interest of both the employer and the employee for the injured man to recover and be able to return to work as speedily as possible. If the employer ceases promptly at the end of two weeks to furnish medical attention, it will happen in many instances that the employee will fall into the hands of unscrupulous or incompetent physicians and his incapacity will be unnecessarily prolonged. The Public Service Corporation of New Jersey does not hesitate to furnish free medical attendance for a long time after the expiration of the two weeks, not only because it feels that by so doing it actually saves money which it would otherwise be obliged to pay out on account of the prolongation of the period of recovery, but also because under the welfare plan the company has enough interest in its employees to see to it that those injured while in its employ should receive competent medical and surgical attention.

Sometimes employees are suspicious of treatment by doctors furnished by the company, but cases where employees refuse the medical and surgical service supplied are getting more and more rare. If Pennsylvania companies adopt this plan, there may at first be doubts and suspicions in the mind of the employees in using service which the law does not compel the companies to furnish, but when it becomes apparent that they are not trying to put the employees in a false position or to make testimony for use in the event of a trial, little difficulty will be had in the matter.

INJURIES CAUSED BY THIRD PARTY

Section 319 of the act provides that where an employee in the course of his employment is injured by a third person, the employer shall be subrogated to the rights of the employee against such third person. In order to preserve all the rights under this section, a company should, on the occurrence of an accident caused by the third person, immediately give notice of the occurrence to such third person, making a claim against him by way of subrogation. Otherwise the third party may settle with the employee on the assumption that the injured person was not an employee of anyone, or, at the time of the accident, was not in the discharge of his duties as an employee.

The person causing an injury to the employee of another could, in the absence of notice of the employer's rights, settle with such employee so as to relieve himself of any further obligation, irrespective of the provision of the statute. In fact, if the general principles of subrogation are to be applied, no reason is apparent why a settlement cannot safely be made with an injured person who is acting in the employ of another when injured, provided the settlement is made before the employer makes his settlement with the employee, as it is a general principle relating to subrogation that there can be no subrogation until the one who claims that right has discharged his obligation in full.

Of course, if a fair settlement is made by the third person with the employee, no harm is done the employer, because the amount paid the employee can no doubt be credited against the amount which the employer is obligated to pay him under the statute. Thus the chief object in giving notice would be to prevent settlements between the employee and the third person which are entirely inadequate and insufficient to offset the amount which the employer would have to pay under the statute, and also to prevent, so far as possible, settlements between the injured employee and the third person being kept secret.

The question of strict subrogation, as applied to the New Jersey act, has not arisen because this act provides that in the event of an employer wishing to claim reimbursement from a third person causing an injury to one of his servants, he shall file with the third person a statement of his claim. Until the statement is filed, the injured employee and the third person causing the injury are left free to act as they see fit regarding the employee's claim.

AGREEMENT UPON COMPENSATION

Section 410 of the Pennsylvania act provides that the employer and employee, or his dependents, may agree upon the compensation payable under the act. This agreement would be valid and binding, however, only when finally approved by the board. In the practical administration of the act, however, it will be found that such an agreement is seldom, if ever, necessary. The New Jersey act has a provision that a company may agree with its employee as to the amount of compensation due, but I do not know of a case where the Public Service Corporation of New Jersey entered into such an agreement. It has been found that the easiest way to administer the law is to begin payments in accordance with the law's provisions and continue them for such a period as the law provides. Where the period is indefinite, the company continues them until in the opinion of its physicians the employee is well and able to go to work. Very seldom, if ever, does a dispute arise as to when that period arrives, but if it does the company endeavors to get together with the employee and satisfy him. If he cannot be satisfied, he is left to his remedy by petition to the court.

In the New Jersey act, however, the agreement may be opened after the expiration of one year, so that it might not be of so much value as would be an agreement under the Pennsylvania act, which appears to make the agreement final, provided it is approved by the board. It is so rare that any disagreement as to the amount and the period during which compensation is payable arises between the employer and the employee, that it very likely would not be worth the time and effort spent, and the discussion which would necessarily follow, to procure an agreement with employees as to the amount of compensation to which they were entitled under the law. A possible exception would be special cases, as, for instance, death cases, where no doubt it would be well to fix by inclusion in a binding agreement the names and ages of dependents, their relationship to the decedent, etc.

METHOD OF INSURANCE

The Pennsylvania act provides that companies must insure in the State workmen's insurance fund, or in some insurance company authorized to insure such liability, unless the employer is exempted by the bureau on an application showing his financial ability to pay compensation. This choice of method constitutes the most important questions to be decided. In New Jersey there is no State fund, but the New York law provides for such a fund. Where it is necessary to be insured, the question of insuring in the State fund or insuring in an insurance company is one depending merely on the cost and on the exercise of care in selecting an insurance company.

In insuring in the State fund the employer is relieved from all liability to pay compensation to its employees. In insuring in an insurance company, however, there is the possibility of the insurance company not being able to pay, in which event the employer would nevertheless have to make the payments required by the act. It therefore is important to look into the financial standing of the insurance company, if this method is adopted, for the liability to make payments in particular cases may be continued for a period of sixteen years. The law provides that the payments in death cases shall cover a period of 300 weeks, but if there are children of the decedent under sixteen years of age the payments shall continue until such children arrive at the age of sixteen years at the rate of 15 per cent for one child and 10 per cent for each additional child, but not in excess of 50 per cent. It appears by this that in the case of a child born at about the time of the father's death, or in the case of a posthumous child, the law continues to operate for the benefit of that child for a period of sixteen years. A company must, therefore, consider the future of any company with which it may insure.

What appears to be the most important question to be considered in connection with insurance, is whether the company cares to adopt either the State-fund or the insurance-company method, or be exempted from such methods and thus get the benefits of administering the law itself. The greatest benefit of compensation laws is the taking away of causes of friction, annoyances and misunderstandings between the employer and the employee. The Public Service Corporation of New Jersey has found in its experience of about four and one-half years that the greatest amount of benefit of this nature can be obtained through the administration of the law by the employer himself, for when the money is paid out by the employer his agent comes in personal contact with the injured employee, either at the paying office of the employer or at the home of the employee, and thereby can keep in close touch with him and his family and show a personal interest in their welfare. The benefit that a company derives from such close personal communication between the injured employees with their families and its executive officers is invaluable in preventing an unrest or antagonism between employer and employee which otherwise might well exist.

The point is that in insuring in the State fund a company is depriving itself of all benefit to be derived from the personal administration of the law, as the payments, when made by the State, must of necessity be more or less of an impersonal nature. If a railway insures in an insurance company, it should be provided that the railway itself, as employer, should have the right to administer the fund which is supplied by the insurance company under its contract.

STEAM RAILROAD ELECTRIFICATION

BY N. W. STORER, GENERAL ENGINEER WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, EAST PITTSBURGH, PA.

In general it may be stated as an accepted fact that very few railroads will ever introduce electric operation unless they can see a profit resulting from it. Of course, some companies may be forced to electrify by city councils, a method that is greatly to be deplored; others may have certain portions of their line electrified to avoid the dangers and losses incident to smoke in tunnels or to increase the capacity of a terminal or congested division; and still others may desire to utilize cheap water power instead of paying exorbitant amounts for coal. When all these lines are electrified, however, there will still remain a large part of the railroad mileage in this country to be handled by the steam locomotive, which, by the way, is not the weak and inefficient machine that it was twenty years ago. Indeed, the high-speed passenger locomotive of to-day is capable of developing 3000 hp. at 70 m.p.h. for several hours at a time, and no electric locomotive has yet been built to equal this performance. Nevertheless, there is no doubt in the mind of anyone that this, or even greater power, can be easily supplied by an electric locomotive if such a machine is ordered.

The electric locomotive must make a large part of its showing in its incidental advantages, and one of the most important of these is that it may remain in service continuously for a week at a time, while the steam locomotive has to spend a large part of its time in the roundhouse. Potentially, the electric locomotive is able to start out with a train and take it clear through to its destination, whether this is 100 miles or 1000 miles away. In the future, annual mileages will be obtained with electric locomotives that are to-day undreamed of with steam machines. Electrification is going to result, therefore, in a more efficient handling of transportation. An electric locomotive designed for a normal speed of 14 m.p.h. and making a daily mileage of only 75 or 100 is not working up to its capacity in any respect, and a railroad president properly can, and no doubt will, inquire why the traffic cannot be arranged so as keep engines at work making 200 or 300 miles per day.

An incidental advantage resulting from the electrification of large terminals will come from the greater value of real estate owned by the railway companies. The cost of a right-of-way in a large city is enormous, but if the tracks are electrified, the entire area can be covered with buildings of all kinds. Covering the tracks with warehouses will be of particular advantage, because in such a case it will be possible to raise carloads of freight on elevators to higher floors in the warehouse, where the cars can be unloaded promptly or reloaded whenever the goods have been sold. The cost of handling freight will thus be enormously reduced, and demurrage charges will be eliminated.

Many other incidental advantages will be found when railroads are finally induced to electrify. They cannot appear all at once, and the best results from electrification cannot be obtained unless all of the details are worked out with the greatest care. I am, therefore, very much opposed to forcing the electrification of terminals before the railroads are ready for it. The cost of electrification is enormous, and the railroads must either save enough money in the cost of operation to pay for the interest on the investment or else the freight and passenger rates must be increased. I am a thorough believer in electrification, but until the best system for electrification is more definitely decided progress will be slow. Enough has been done, however, to show that there is no class of service in the United States that cannot be handled at least as well by electricity as it is by steam.

WORKMEN'S COMPENSATION IN PENNSYLVANIA

BY HARRY A. MACKEY, CHAIRMAN WORKMEN'S COMPENSATION BOARD, HARRISBURG, PA.

The compensation plan in Pennsylvania is an optional one. The first question that an employer must decide between now and Jan. 1 next is whether he will accept or reject compensation. In order to reject the law it will become necessary to notify the employees to that effect in the manner prescribed by the act, file a proof of the same with the board at Harrisburg and then wait for the consequences. When Article III of the act is rejected, if an employee is injured under such circumstances that he can allege negligence with sufficient evidence that it will become a question for the jury, the company will not be able to set up contributory negligence, risk of employment or negligence of a fellow-employee. The only defense will then be a reckless indifference to safety appliances provided by the employer, or intoxication, both being questions for the jury. It seems, therefore, that not only the spirit of the times but a desire to protect their own interests would impel street railways to adopt compensation. In doing this they really have nothing to do, for silence will be considered acceptance.

After having decided to accept the act, then companies are brought face to face with the question of insurance. The compensation board does not advocate any particular form. The State is a wide field for competition. Many insurance companies are in the field, all having complied with the laws of the State, and all are entitled to fair play. At the time this act was passed the Legislature created two new means for the employer to effect insurance. Where twenty or more employers employ 5000 or more employees and have accepted the provisions of the act, they may form an incorporated employers' mutual liability insurance association for the purpose of insuring themselves. There is also the State insurance fund. Probably all these forms of insurance have their individual advantages.

There has been a very lively interest excited throughout the State because of the State insurance fund feature. The sponsors for the act never intended that it should monoplize the business or that it should be a serious obstacle in the way of good and lucrative business for the other insurance companies. It is intended as a regulator of rates—in fact, a State-managed mutual company. It has its limitations and its advantages. It cannot, under its act of creation, issue a policy to employers for complete coverage, indemnifying employers from liability to the general public, but it can give complete immunity to its subscribers because of employees injured during the course of their employment, and under such circumstances that there is a liability created under the workmen's compensation act. One of the advantages of State insurance under the act and the rules of the board is that subscribers are absolutely immune from the filing of a lien against their real estate for claims arising under the operation of the compensation law.

The act also provides that companies can make application upon forms furnished by the board, for the right of self-insurance. If they satisfy the board of their financial responsibility, it can place them upon the exempted class of those who are allowed to carry their own insurance, or it can make such orders as it thinks will inconvenience the companies the least and furnish their employees with absolute and positive security against losses from injuries by accidents.

It is very essential that, having decided to accept compensation, the companies should determine the question of insurance and act upon it. If they do not do so and are notified that it is their duty to insure, and then fail after thirty days' notice thus given, the injured employees have the option of either suing at common law, with the three old defenses stricken out, or of claiming compensation under the act, just as they think their best interests will be served.

C. E. R. A. Accountants Meet in Detroit

Proceedings of Sessions Held on Dec. 7 and 8—Abstract of Paper on "Shop Orders"

The twenty-eighth annual meeting of the Central Electric Railway Accountants' Association was called to order at 1.30 p. m. on Dec. 7 at the Hotel Statler in Detroit, Mich., by President H. B. Cavanaugh, auditor Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio. About twenty-five members from Indiana, Ohio and Michigan were present, and members in other States in Central Association territory were represented by telegrams.

After the reading of the minutes of the previous meeting held at Indianapolis last June, President Cavanaugh called attention to the activities of the last year and the impression on general railroad accounting being made by the association. An abstract of his presidential address was published in the ELECTRIC RAILWAY JOURNAL of Dec. 11. The executive committee in its report presented the names of four new applicants for membership, who were unanimously elected.

W. H. Forse, Jr., secretary-treasurer Union Traction Company of Indiana, Anderson, Ind., then read a paper on "Depreciation and Appreciation," an abstract of which was published in the issue of Dec. 11. After a two-hour discussion of this paper it seemed to be demonstrated to all present that there was little hope of arriving at any definite rate to be used in accruing the charges for depreciation at the present time or in the near future. The many angles of the subject and the varying physical conditions of the companies were held to prohibit the association from taking any definite action on this subject. It was the consensus of opinion, however, that the Interstate Commerce Commission should furnish more definite instructions. One phase of the discussion related to the blanks furnished by the commission and used by the companies in making a report for the fiscal year ended June 30, 1915, and it was stated that these blanks seemed to fit in very well with the classification of accounts for electric railways issued in 1914.

The standing committee on passenger and freight accounting reported that it had nothing new to present. Only one question had arisen since the last meeting, and the answer to this would be made at a later date. The committee on forms presented a report stating that the filing system authorized at the June meeting had been installed, and an index of all forms on file had been sent out by the secretary of the association to all its members. It was requested that members forward any new forms. A nominating committee of three members was then appointed by President Cavanaugh, after which the announcement was made that Irwin Fullerton, auditor Detroit (Mich.) United Railway, had invited the delegates to a dinner at the Fellowcraft Club. The invitation was accepted with a rising vote of thanks.

The second session was called to order at 9 a. m. on Dec. 8, and it was announced that a trip to the Ford

Automobile Company's plant would be made at the end of the session under the auspices of the Detroit United Railway, as well as a trip to the freight stations and other property of the latter company if the members desired to go.

The first paper of the morning was on the subject of "Accrued Accounts," by A. E. Dedrick, auditor Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, which was abstracted in the issue of Dec. 11. In the discussion on this paper the most important item covered was the taxes accrued account. The Ohio tax law was quoted and its requirements discussed. This law and its application seem to be not very well understood by either the companies taxed or the tax commission. Other papers of the morning were that by B. H. Jacobs, assistant auditor Cleveland (Ohio) Railway, on the subject of "Shop Orders," which is published, in abstract, on this page, and that by E. L. Kasemeier, auditor Ohio Electric Railway, Springfield, Ohio, on the subject of "The Journal Entry Tickler," which was published in abstract form in the issue of Dec. 11.

The report of the nominating committee was unanimously accepted by the delegates, and officers were elected for the coming year as follows: President, F. T. Loftus, auditor Indianapolis & Cincinnati Traction Company, Rushville, Ind.; first vice-president, J. B. Hooper, auditor freight accounts Detroit, Monroe & Toledo Short Line Railway, Detroit, Mich.; and second vice-president, T. P. Kilfoyle, auditor Cleveland (Ohio) Railway. The executive committee for next year consists of the following: Oren A. Small, auditor Benton Harbor & St. Joseph Railway & Light Company, Benton Harbor, Mich.; A. C. Van Driesen, chief accountant Toledo Railways & Light Company, Toledo, Ohio; A. E. Dedrick, auditor Mahoning & Shenango Railway & Light Company, Youngstown, Ohio; P. C. Reinking, auditor Fort Wayne & Springfield Railway, Decatur Ind., and B. H. Jacobs, assistant auditor Cleveland (Ohio) Railway.

After the meeting of the delegates had been adjourned, the new executive committee held a meeting at which A. L. Neereamer, secretary Central Electric Railway Association, was unanimously re-elected for the year as secretary of the Accountants' Association. Mr. Neereamer is also treasurer of this body, by virtue of being treasurer of the parent association, in accordance with the revised constitution and by-laws. It was decided that the June meeting would be held in Toledo at a time to be determined later.

SHOP ORDERS

BY B. H. JACOBS, ASSISTANT AUDITOR CLEVELAND (OHIO) RAILWAY

The shops of the Cleveland Railway have had to assume an exceptionally important part in the rehabilitation of a property that was run down to a very low state of upkeep by several years of continuous municipal warfare waged against it. The part played by the shops in the reconstruction and remodeling of obsolete and inefficient cars, the installation of fare boxes and changes in platform and doorways incident thereto, alterations in motor cars made necessary by the use of trailers, and the construction and contributing construction of additional rolling stock, pertinently suggested the need and the value of more shop-cost details. More recently it has also been found advisable to keep an account of the cost of repairing cars damaged in collisions separate from the account for repairs made necessary by the ordinary wear and tear resulting from car operation and use.

The accounting department has attempted to meet and control these conditions by the use of shop orders. On receipt of advice from the general manager that alterations are to be made in a certain lot of cars, or that an order has been placed for a stated number of new car bodies, the installation of the electric equipment, air brakes and other accessories thereon to be done in the shop, the master mechanic issues a shop order with the proper consecutive number. This outlines the nature of the alteration or character and extent of the construction work required, together with such other instructions as may be deemed necessary. Copies of the order are sent to the foreman of each department likely to have a hand in the work prescribed, and to the auditing department.

From then on the job is known as "S. O. No. —," and all invoices, time reports and requisitions for material used in connection therewith show distribution to the particular order. When such orders included work to be done on both the car bodies and the electrical equipment as well, the order is made to read, for example, "S. O. 112 car bodies, 112a electric equipment," to enable the auditing department to make the proper distribution of charges, when the various shop orders are charged out at the end of each month to the maintenance or capital accounts that are affected by the work accomplished.

The use of letters in this manner provides a flexible system that will admit of almost unending details. It has not been found practicable, however, to go into detail necessitating the use of more than three or four letters except in one or two instances. Four letters provide the necessary segregation of expenses, such as those in connection with the bodies, the motors, the air brakes and some special accessories in the cost of installation of which the management may be especially interested.

An itemized account of every charge to each shop order is kept in a shop-order ledger, from which a summary is carried monthly to the appropriate capital and maintenance accounts. Only the total amount of the shop order is transferred to the corresponding account in the betterment ledger, in posting from the shop-order ledger, but such totals are supported by a summary sheet immediately following each account, giving the quantities as well as the amounts of the various parts for which the charges were made. Thus when a shop order is complete, the summary sheet affords a very ready means of discovering any discrepancies in either quantities or amounts charged, and provides, with other things, a complete inventory of all the parts involved in the carrying out of the order.

Chicago Surface Lines Club

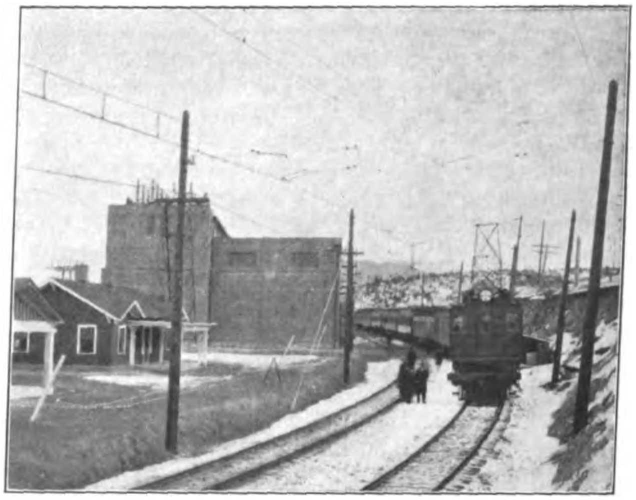
The first dinner meeting of the Chicago Surface Lines Club was held at the Morrison Hotel on Dec. 14, 1915. Two hundred and sixty members of the club attended and addresses were made by H. M. Webber, superintendent of relief and safety Chicago Telephone Company; W. A. Sauer, assistant superintendent of accounting department Peoples' Gas, Light & Coke Company; George B. Foster, assistant to vice-president Commonwealth Edison Company, and E. J. Blair, electrical engineer Chicago Elevated Railways. L. A. Busby, president Chicago Surface Lines, also addressed the club, and incidentally announced the fact that the membership had now exceeded 600. A. R. Peterson, trial attorney Chicago Surface Lines, acted as toastmaster. The dinner was purely a social affair, and the speakers from the other Chicago utilities companies outlined the work their employees' clubs were doing.

St. Paul Locomotive Tests

Two of These Locomotives Have Handled Larger Trains than Three Steam Locomotives at Speeds More than 50 Per Cent Higher

Details of the tests upon the electric locomotives for the Chicago, Milwaukee & St. Paul Railway, which have been conducted on the first electrified division of that railroad between Three Forks and Deer Lodge, Mont., show that the electrical equipment has met every expectation of its sponsors. The tests began on Dec. 2, shortly after power was cut in on the line and on Dec. 6 two of the electric locomotives took a freight train weighing 2800 tons from Butte to Piedmont across the continental divide, some 16 miles east of the former city, making the total distance of 39 miles in two hours and fifteen minutes. This run includes an up grade of approxmately 10 miles in the vicinity of the Janney substation with maximum gradients of 1.66 per cent, and a downgrade of 21 miles on the eastern slope of the continental divide with maximum gradients of 2 per cent. This train made an average speed up grade of 14 m.p.h., and it descended the 2 per cent grade into Piedmont at a practically uniform speed between 17 m.p.h. and 18 m.p.h., the average speed for the entire run being 17 m.p.h.

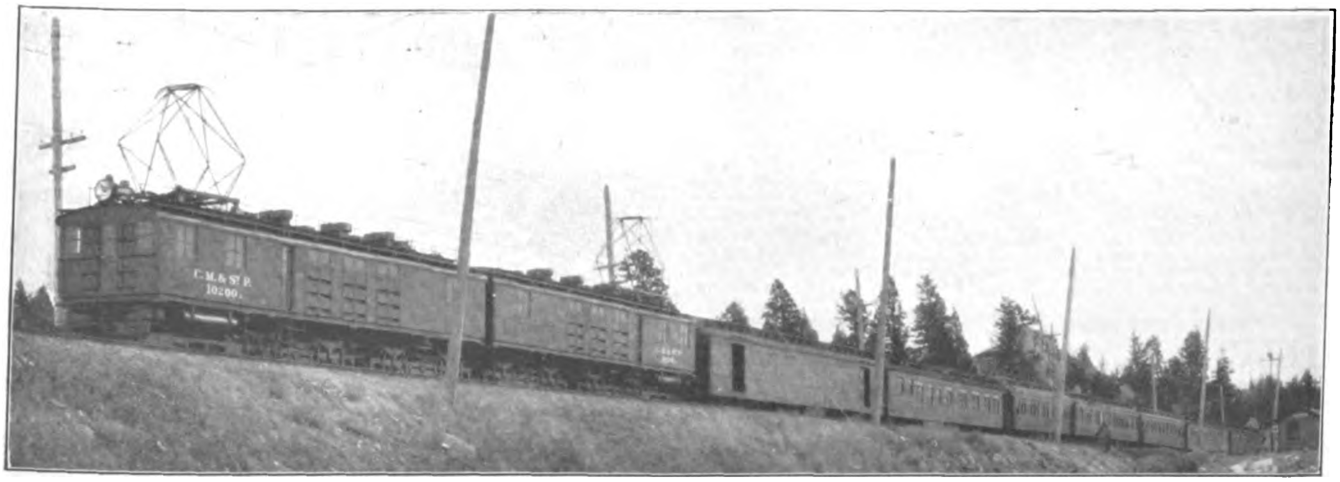
On Dec. 8 a competitive test between the electric locomotives and steam engines took place under the observation of a large party of officials of the Chicago, Milwaukee & St. Paul Railway, including A. J. Earling, president; C. A. Goodnow, vice-president; R. Beeuwkes, electrical engineer, and J. J. Murphy, superintendent, together with A. H. Armstrong and W. B. Potter of the General Electric Company. In this test a train of forty-eight cars, aggregating 3000 tons in weight, was made up in Butte and run over the mountain to Piedmont with two electric locomotives. The inspection party observed the test from Janney substation, and at that point the train hauled by the electric locomotives was operated at a speed of 16 m.p.h., apparently without taxing the power of the electric machines, the rating of the two engines on the 1.66 per cent grade being 3700 tons based on a rolling friction of 6 lb. per ton. Following the electrically-operated train was another in which there were thirty-seven cars approximating 2200 tons in weight, and this was hauled by three steam locomotives, two of which were of the Mikado type, with the third, a Mallet locomotive, acting as a pusher. This train was able to ascend the hill at a speed of only about 10 m.p.h., in marked contrast to the electrically-operated train that had preceded it.



ST. PAUL LOCOMOTIVE TESTS—SPECIAL TRAIN AT JANNEY SUBSTATION

The special train for the party of inspection was made up of six Pullman cars and this also was drawn by an electric locomotive. It was operated over the divide to Piedmont substation and then ran back to Janney, going up the 2 per cent grade west of Piedmont with greatest ease at a speed of about 22 m.p.h. During the return to Butte the train was operated over the relatively level track approaching that city at a rate of about 31 m.p.h. No attempt at great speed was made, however, because the engine was geared for freight service, none of the passenger engines having yet been delivered. The latter engines are expected to make 60 m.p.h. with an 800-ton trailing load, and judging from the smooth-riding qualities of the freight engine in the test outside of Butte, it is said to be certain that no difficulties will be experienced at the higher speeds.

No troubles of any kind have appeared in connection with the operation of the locomotives, either in regard to their ability to haul trains up grade or in regard to the operating features of the regenerative system on the down grades. In consequence, the four locomotives that are on the 113-mile electrified division, which is at present completed between Three Forks and Deer Lodge, have been placed in actual service and are doing pusher work on the grades to help out the steam locomotives. During the month of December three and possibly four more locomotives will be delivered, and if the railroad company has received a total of eight freight locomotives by Jan. 1, electric freight transportation between Deer Lodge and Three Forks will be established during the first week of the new year. The initiation



ST. PAUL LOCOMOTIVE TESTS—PASSENGER TRAIN ON 2 PER CENT GRADE WEST OF PIEDMONT of electric operation of passenger trains will depend upon the delivery of the passenger locomotives, which are similar in every respect to the freight engines except for the gearing. However, it is expected that shipments of these units will be made some time after the first of the year.

In connection with this it is of interest to note that some time ago the purchases of steam locomotives for the divisions under electrification were limited by the railway company. In consequence, there is a scarcity of steam motive power at the present time which is being supplied by the electric machines, and this fact would indicate that the steam locomotives which are to be retired are going to be credited to the electrification at their full value. Another item of interest in connection with the electrification was recently made public in a speech delivered at the inauguration of electric operation by John D. Ryan, who is one of the directors of the Chicago, Milwaukee & St. Paul Railway. In this Mr. Ryan said "it was the foresight of the management of the St. Paul road that made its route run close to those water powers and made possible the development of them. The fact is that the development of these great water powers of Montana was possibly largely through the practical assurance that the St. Paul road would take a part of that power. It was through this that we have made possible for all, little and big, to secure the best and cheapest power. It makes no difference whether they use 1 hp. or 10,000. They are able to get it because of the railroad taking this power.

Cost of Motor Buses

Figures Based on Actual Operation of Motor Bus Line in Richmond, Va.

Statements have been made from time to time in this paper about the fleet of motor buses operated last summer in Richmond by the Virginia Railway & Power Company. This company owns the electric railway system in Richmond and found last spring, in common with many other companies, that its receipts were being adversely affected by a large number of jitneys. The company decided if the jitney was a real improvement in methods of city transportation it was in a better position than anyone else to conduct this service. Consequently, it purchased some forty cars in April and operated them on regular schedules in that section of the city where jitney service was being rendered. The test with these cars showed that the business could not be conducted without a loss, and it was discontinued in September. Through the courtesy of C. B. Buchanan, general manager Virginia Railway & Power Company, the following statement of jitney operation is published:

STATEMENT OF RICHMOND JITNEY OPERATION, APRIL 17, 1915, TO SEPT. 14, 1915.

Gross earnings		$30,501.28
Taxes	$671.00	
Operation	24,043.79	
Maintenance	9,758.70	
General expense	1,856.77	
		*$36,330.26
Deficit		$5,828.98
Bus-hours operated		62,080
Earnings per bus-hour		$0.491
Expenses per bus-hour		$0.585
Loss per bus-hour		$0.094

*Expenses do not include any charges for depreciation, or for rent of garage.

As will be noticed, the earnings per bus-hour were less than the operating expenses, not including depreciation or rent for the garage. The company first undertook to keep a record of its expenses on the bus-mile basis but had to abandon this plan on account of numerous errors in the mileage recorders, so that the statement was prepared on the bus-hour basis. The average miles per hour made by the buses were approximately 12 miles. The company owned the garage where the buses were stored, and in the statement given above no allowance is made for the rent of the garage. No attempt was made to estimate the depreciation on the buses, but Mr. Buchanan says, "It was very great for the short time they were operated." The buses used were five-passenger touring cars of the usual kind. Part of them were Fords and the others Briscoes.

COMMUNICATION

Chicago Smoke Abatement Report

WATERTOWN, N. Y., Dec. 14, 1915.

To the Editors:

The synopses of the Chicago smoke abatement and terminal electrification report, published in the issues of the ELECTRIC RAILWAY JOURNAL for Dec. 4 and 11, while omitting details, are nevertheless complete enough to demonstrate the cosmic dimensions of the whole field of inquiry, and the conscientious and scientific manner in which the task was performed by the engineers, who did the real work. Local atmospheric and combustion conditions have been examined, every railroad electrification in the world analyzed, and the various proposed substitutes for the steam locomotive subjected to engineering scrutiny. It would therefore seem that engineers, at least, can accept conclusions which have been reached with such painstaking care, being based upon a wide survey of the state of the art. There is an impression that the people of Chicago have been encouraged to believe that if the steam locomotive could be banished from their railroad tracks, the city would be relieved from the stigma of atmospheric pollution for which it has so long been proverbial. The writer recently saw a clipping from a Chicago newspaper's editorial column, arguing seriously that because railroad electrification had succeeded elsewhere it would be bound to succeed in Chicago, and cynically impugning the good faith of the committee and the railroads for undertaking the investigation of the matter with a negative answer as a foregone conclusion.

The engineering fraternity, however, is quite prepared for a presentation that shows the problem to be a many-sided one, and can appreciate the difficulty of trying to convince the molders of public opinion of the real nature of the disease and the proper course of treatment for its eventual cure.

The impression one gains from the synopsis is that of inclusive breadth of treatment, applied to a problem that could be stated about as follows: What is the railroads' share of Chicago's atmospheric pollution, and what will it cost to substitute smokeless for smoky railroad operation? And the answer has propounded a still harder problem, how to remove the causes, other than steam locomotives, that produce 95 per cent of the atmospheric pollution? That which interests us primarily is the engineering aspect of electrification as a substitute for the steam locomotive.

Here, two things stand out prominently; first, the economic futility of electric motive power when applied on a tremendous scale to the Chicago terminal system as a whole, under conditions where it is not a physical necessity for train haulage; second, the mechanical inadequacy of the proposed self-propelled substitutes.

Electrical engineers will be impressed not only by the heavy cost of electric rolling stock as given in the estimates, but also by the heavy cost of delivering the electric power to the rolling stock; and are also reminded that the full benefits of electrification involve such radical changes in layout that the non-electrical features cost nearly the same as the electrical.

Using round figures, from the published summaries, the entire cost is about $274,000,000, of which only $82,000,000, net, is for new smokeless rolling stock. About $59,000,000 must be spent on the power supply system and related accessories. This is an addition of about 72 per cent to the net cost of new rolling stock. On top of this comes $37,000,000 for transplanting the locomotive terminal facilities to the outer edge of the electric zone—this item is not peculiar to the electric system but would have to be provided for any other smokeless substitute. Finally, there is the $96,000,000 "precipitated" charge, required to get the full benefit of all the rest of the money. The last two items, which are entirely non-electrical, amount to 48½ per cent of the whole.

The switchyard problem undoubtedly has inherent peculiarities which make its electrification more expensive or less remunerative than straightaway trunk line or suburban electrification, though of course such considerations are not self-evident to newspaper writers, and, in fact, can only be properly grasped by technical experts after careful analysis. For instance, it has been an accepted principle of railroad electrification that it can only succeed economically, when the traffic is sufficiently dense. On the face of it, this means train-miles per mile of track as a unit of comparison. The synopsis does not elucidate how the annual saving by electric operation over 3500 miles of track comes out at so low a figure as $2,333,000; but it may well be that the actual car-miles or train-miles per any one mile of railroad yard track, even at Chicago, do not approach the density that is shown by economically successful main line electrifications now operating. The complete report doubtless contains figures that betray not only this but other underlying conditions equally important. It would indeed be presumptuous, if not impossible, for an outsider to criticise the financial conclusion, without having had the opportunity to study the conditions very carefully and with trained insight. Electrical engineers may confess to a sense of disappointment, but they are no doubt open to conviction by the broad and careful reasoning of the engineers who have made the estimates. They will at least be saved the trouble of controversy over the system question, for it seems hardly worth while to waste words over the manner of creating an annual deficit of nearly $15,000,000, particularly when the net costs of the three systems proposed differ by such small percentages. It may be fortunate in the long run, that the state of the art (which has progressed somewhat since 1912) was not such as to give electric power the decision.

There is a hint in the synopsis published Dec. 4 that some consideration has been given to the possibility of a few railroads electrifying separately. Presumably, such roads would be those having the heaviest suburban traffic, and if electrifications were carried out upon these roads with an eye to financial economy, it might well happen that only such tracks would be equipped as would permit a favorable economic result. The fact that electrification of Chicago's tracks as a whole means a financial deficit does not necessarily mean anything of the kind for such individual roads as have favorable conditions. It may turn out, when once the public is convinced that the railroad smoke is responsible only for a very small fraction of the total pollution, that the possible willingness of some one or more roads to electrify their suburban lines will be treated by the public as a matter of economics, and not as a pretext for attempting to force all the others into it, regardless of financial consequenes.

It seems surprising in the abstract, that, after all the mechanical, electrical and chemical developments of the past few years, no self-propelled substitute for the steam locomotive has become available that can be applied to heavy traction duty on a large scale. The internal-combustion engine has done wonders in recent years. It has in many instances won such an economic victory over electric traction in the lighter passenger service, that its invasion of the heavy traction field has evidently been anticipated as a possibility. Its mechanical limitations, however, have proved a bar to its progress in this direction, while electric power, though mechanically feasible, is financially impracticable in the present instance. It may be questioned whether carrying of liquid fuel on locomotives, in large quantities is a greater risk than that due to the presence of thousands of gasoline-carrying automobiles in congested city streets.

Within recent months it has become known that powdered coal fuel has been successfully used on steam locomotives, not only with great reduction of visible smoke, but also resulting in actual financial savings in operating cost. One of the roads entering Chicago is now experimenting with it, and reports encouraging results. This is another instance of what intensive engineering has done for the steam locomotive, in raising its operating economy, and in narrowing and sometimes obliterating or even reversing the margin by which electrification might render it obsolete. The enormous costs of wholesale electrification have prompted some of the larger railroad companies to pay for economical improvements in the steam locomotive which they would have scoffed at a dozen years ago. George Stephenson's iron horse has been bred up to a much higher degree of efficiency, with possibilities not yet exhausted.

Engineers familiar with the subject know very well that it takes a particularly special traffic situation to make electric power attractive financially. There are doubtless such situations in Chicago and elsewhere, but it is not likely that extensive switchyards conduce to electrical economy.

The committee lays down the proposition that, on the face of the facts, atmospheric pollution can be cured only with the aid of the entire fuel-burning community, and not by the railroads alone. It will probably require several more years of study to work out practical means for bettering domestic and manufacturing fuel combustion, and some more years thereafter to get them adopted.

Huge quantities of fuel have to be burned in Chicago. The question is one of handling the products of combustion with the least detriment to the general public. It is to be hoped that Chicago's citizens may be guided in the conclusions, not by public spokesmen of the type whose perspective is limited by self-interest, but by the constructive and judicious opinions of impartial engineers, whose value as trustworthy guardians of the public interest is now beginning to be recognized.

W. N. SMITH, M.E.

The Royal Commission of Norway has recently prepared a remarkably complete report dealing with the question of State waterfalls and their exploitation and with the whole question of Norway's supply of energy from hydroelectric power stations. The commission recommends that the large waterfalls which the State owns in northern Norway may be early dealt with, as they are well suited both for large industrial undertakings and for the electrification of a northern railway.

American Association News

Reports of Meetings of the Executive, Public Relations, A. E. R. A. Advisory Committees, Also Committee on President's Recommendations—Activity Among the Company Sections—Detailed Appendix of Committee Subject Assignments for 1916

EXECUTIVE COMMITTEE OF THE AMERICAN ASSOCIATION

A meeting of the executive committee of the American Electric Railway Association was held at New York on Dec. 16. Those in attendance were: Charles L. Henry, president; L. S. Storrs, first vice-president; T. S. Williams, second vice-president; John J. Stanley, third vice-president; T. P. Kilfoyle, president Accountants' Association; John Lindall, president Engineering Association; H. A. Nicholl, president Transportation & Traffic Association; George Carson, president Claims Association, and past presidents C. S. Sergeant, H. H. Vreeland, James F. Shaw, Arthur W. Brady and C. Loomis Allen.

The report of the meeting of the committee on recommendations on the president's address was received and adopted. The committee also received a report from B. I. Budd, chairman committee in charge of arrangements of the mid-year meeting, recommending Friday, Feb. 4, as the date of meeting of the mid-year convention. This was adopted. All of the meetings will be held at the Congress Hotel, and the dinner in the evening will be held at the same hotel. It was decided to devote the technical meetings during the day to considering the subjects of "rate of return" and "valuations." There will be a paper on each of these subjects, and each paper will be followed by short addresses from four speakers to be selected in advance. For the dinner in the evening it was decided to have only four addresses. One will be made by the president of each association, and the other two addresses will be made by speakers of national reputation. Their names will be announced as soon as the speakers are selected. The price per plate will be $10. The committee on arrangements consists of B. I. Budd, chairman; Leonard A. Busby and Henry A. Blair, representing the American Association, and Charles C. Peirce, L. E. Gould, E. F. Wickwire and M. B. Lambert, representing the Manufacturers' Association.

The executive committee also considered but did not approve the changes in organization of the affiliated associations suggested by the standards committee of the Transportation & Traffic Association at the San Francisco convention. The suggestion was that the American association should appoint a committee from its own members or a joint committee from the four affiliated associations to consider various changes in the constitution and by-laws of the several associations by which the following changes, among others, would be brought about. (a) that the president should have charge of the finances, (b) that there should be but one vice-president for each of the affiliated associations, (c) that there should be an executive committee of nine consisting of the three officers and six elected members, with past presidents as honorary members. Under this plan the vice-president would be instructed to keep especially in touch with committee work and would submit to the president on June 1 a recommended list of appointments for the new committee on subjects, to be appointed not later than Aug. 1, and would submit to the executive committee at its last meeting at the convention a tentative list of recommended committee appointments for the ensuing year.

COMMITTEE ON PUBLIC RELATIONS

A meeting of the American Association committee on public relations was held at the Metropolitan Club in New York on Wednesday, Dec. 15, 1915. Those in attendance were C. Loomis Allen, chairman, H. C. Bradlee, A. W. Brady, E. B. Burritt, J. K. Choate, H. C. Clark, S. M. Curwen, H. C. Donecker, C. L. Henry, J. R. Lovejoy, J. H. McGraw, J. D. Mortimer, C. C. Peirce, L. S. Storrs, Guy M. Tripp, H. H. Vreeland, T. S. Wheelwright and T. S. Williams.

The sub-committee arrangement made last January was changed by combining the sub-committees on the dissemination of literature and lectures on Chautauqua circuits and elsewhere, under the chairmanship of Mr. Tripp. Messrs. Lovejoy, Vreeland and McGraw were appointed a sub-committee on co-operation with similar committees of other public service associations, with the last-named as chairman. Messrs. Brady, Wheelwright and Williams were appointed as the sub-committee on the preparation of popular articles for publication in magazines and periodicals, with Colonel Williams as chairman. The sub-committee on newspaper advertising was discontinued. Reports on the work which was done by last year's committees were received.

"AERA" ADVISORY COMMITTEE

A meeting of the American Association "Aera" advisory committee was held in New York, Dec. 15, for general discussion regarding contributions to the association magazine. Those present were H. C. Donecker, Newark, N. J., chairman; George Carson, Seattle, Wash.; H. C. Clark, New York, N. Y.; T. P. Kilfoyle, Cleveland, Ohio; John Lindall, Boston, Mass.; H. A. Nicholl, Anderson, Ind., and C. C. Peirce, Boston, Mass.

COMMITTEE ON PRESIDENT'S RECOMMENDATIONS

A meeting of the committee of the American Association to consider the recommendations made by Mr. Allen at the San Francisco convention was held at the office of the association on Wednesday, Dec. 15. Those present were Arthur W. Brady, Anderson, Ind., chairman; General George H. Harries, Louisville, Ky.; Thomas N. McCarter, Newark, N. J.; J. R. Lovejoy, representing E. W. Rice, president of the General Electric Company, and Guy W. Tripp, chairman board of directors Westinghouse Electric & Manufacturing Company. In addition, the following representatives of the executive committee of the American Electric Railway Manufacturers' Association were in attendance: E. H. Baker, W. L. Conwell, C. R. Ellicott, C. S. Hawley, B. A. Hegeman, Jr., W. H. Heulings and C. C. Peirce.

The principal subject considered by the committee was the recommendation made in San Francisco by President Allen in regard to a change in the relations between the Manufacturers' Association and the American Association. The sentiment was expressed that a closer relationship should exist, and it was finally agreed to recommend that manufacturing companies should be admitted as company members of the American Electric Railway Association, with all of the privileges now possessed by railway companies as company members, including the right to vote and of their delegates to hold office. This recommendation was later approved by the executive committee of the American Electric Railway Association.

PUBLIC SERVICE SECTION

The annual smoker of the section was held in Newark, N. J., on Dec. 16, 1915, with a large attendance. Good entertainment, plenty of smoking materials and a substantial supper served in the company dining room were the features.

CONNECTICUT COMPANY SECTION

As was announced in last week's issue company section No. 7 was formed amid great enthusiasm on Dec. 7, 1915. It is expected that the enrollment will reach 175 by the date of the January meeting. The membership includes general officers, office employees, local managers, superintendents, store keepers, master mechanics, general foremen, line foremen, chief engineers of power stations and others.

The election resulted as follows: President, W. J. Flickinger; vice-president, I. A. May; secretary, W. E. Jones; treasurer, G. H. Crosson; director for one year, P. W. Ripple; director for two years, C. H. Jones; director for three years, C. R. Harte, and company representative, W. P. Bristol.

MANILA COMPANY SECTION

At the October meeting, held on the fifth, a safety-first program was carried out. C. H. Van Hoven read the introductory lecture on accident prevention furnished by the N.E.L.A. lecture bureau, and this was repeated in Tagalog. Safety-first slides were shown and described by W. A. Smith. An open discussion followed.

The meeting was held in the "Meralco" palm garden and it was attended by a large number of guests and employees, many of the Filipino employees being accompanied by their families.

COMMITTEE SUBJECT ASSIGNMENTS FOR 1915-1916

The subject committees of the various affiliated associations have now completed the work of assignments to the different committees appointed for 1915-1916. These subjects have been approved by the executive committees of the various associations interested, and a list of them is published below:

Committee Subject Assignments for 1915-1916

ENGINEERING ASSOCIATION

BUILDINGS AND STRUCTURES

1.—Review of association's existing standards and recommendations.

2.—Design of shelters (considering 1912 report), bridges, culverts, fences, etc., looking to their adoption.

3.—General specification and form of contract for railway structures.

4.—Proper provision for expansion and contraction in restrained concrete structures, consideration to be given to both plain and reinforced concrete, with provision made to properly waterproof and protect such arrangement.

5.—Oil houses and their equipment.

6.—Consideration of tentative safety code of the United States Bureau of Standards in so far as it applies to the work of this committee.

ELECTROLYSIS

Co-operate with the association's representatives on the national joint committee on electrolysis, continuing a study of the general subject.

EQUIPMENT

1.—Review of association's existing standards and recommendations, with special reference to the following:

(a) Revision of steel wheel design covering both 2½-in., 3-in. and 3½-in. tread, and wheel from 21 in. to 37 in. in diameter.

(b) Revision of contour of tread and flange of wheel.

(c) Revision of standard design of brakeshoes, brakeshoe head and keys.

(d) Revision of standard design of axles, with a view toward including smaller sizes to take care of recent development in motor design for low-floor cars.

2.—Standardization rules of the A. I. E. E. (July 1, 1915, edition) in so far as they apply to the work of this committee.

3.—Car ventilation.

4.—Lighting of electric street cars.

5.—Standard sizes of carbon brushes for street railway motors.

6.—M. C. B. brass for heavy electric traction.

7.—Design of limit of wear gage for association's standard flange contours.

8.—Design of trolley catcher socket which will permit of using any make of catcher without necessitating change of socket.

9.—Painting cars, including consideration of the various so-called "quick drying" methods that have been suggested within the past few years, also the enameling of cars, with the idea of providing specifications for the application of same.

10.—Consideration of tentative code of safety rules of the United States Bureau of Standards in so far as they apply to the work of this committee.

11.—Investigation of rail corrugation in its relation to the use of rolled or forged steel wheels versus the use of chilled cast-iron wheels.

HEAVY ELECTRIC TRACTION

1.—Review of association's existing standards and recommendations, with special reference to:

(a) Change in designing line for equipment in standard clearance diagram for third-rail working conductors. (Co-operating with American Railway Engineering Association and American Railway Association.)

2.—Consideration of standardization rules of A. I. E. E. (July 1, 1915 edition) in so far as they apply to the work of this committee.

3. Study of modern electric locomotives, including safety devices. (To cover electric locomotives that are used in interurban service.)

4.—Co-operation with committee on block signals and power distribution in preparing clearance diagram for block signals.

5.—Consideration of tentative safety code of United States Bureau of Standards in so far as it applies to the work of this committee.

POWER DISTRIBUTION

1.—Review of existing standards and recommendations.

(a) Revisions of specifications for overhead crossings of electric light and power lines, if completed by the national joint committee on overhead and underground line construction.

(b) Revision of standard stranding table.

(c) Revision of standard specification for rubber insulated wire and cable for power distribution purposes as suggested by W. A. Delmar of Association of Railway Electrical Engineers.

2.—Consideration of standardization rules of A. I. E. E. (July 1, 1915 edition) in so far as they apply to the work of this committee.

3.—Clearance diagram for semaphore signals. (To be considered jointly with committee on heavy electric traction and committee on block signals.)

4.—Further consideration of the subject of concrete poles, including deflection formulas and tables for tapered sections.

5.—Further specifications for overhead line material, including especially a standard thread for pins and insulators (this subject to be taken up in connection with other associations), and specification for structural steel cross-arms and fittings.

6.—Consideration of various types of third rail construction with description, and with a view to preparation of specifications.

7.—Collection of data preparatory to possible standard specifications for high-voltage d.c. and catenary trolley construction.

8.—Consideration of tentative safety code of United States Bureau of Standards as it affects line construction.

POWER GENERATION

1.—Review of association's existing standards and recommendations.

2.—Consideration of standardization rules of the A. I. E. E. (July 1, 1915 edition) in so far as they apply to the work of this committee.

3.—Advantages and disadvantages of 60-cycle apparatus, with particular reference to rotary converters for railway service.

4.—Collect and, if practicable, publish data and information that may be available in regard to operating performances of railway power systems.

5.—Report on good practice in regard to smoke abatement from the standpoint of smoke observations and appliances and devices used for determining smoke density.

6.—Consideration of the boiler code of the A. S. M. E. looking to its adoption by this association.

7.—Specifications for the purchase of fuel.

8.—Consideration of tentative safety code of the United States Bureau of Standards in so far as it affects the work of this committee.

STANDARDS

1.—To approve new sections for insertion in Engineering Manual.

2.—To consider further the standard form for drafting specifications.

WAY MATTERS

1.—Review of association's existing standards and recommendations.

(a) Specifications for special work. (These specifications to be revised and corrected grammatically and be re-drafted to conform to the proposed standard of the committee on standards.)

(b) Revision of recommended design of 7-in. and 9-in. joint plates with special reference to sizes of bolt holes and fits. (Recommended that title of this subject be changed to read "Designs for Drilling of Rails and Joint Plates and Their Application.")

(c) Recommended symbols for recording surveys. (Committee of 1915 on way matters recommends title be changed to "Conventional Signs for Recording Surveys." To confer with such other committees as in the opinion of the committee would be affected by the symbols suggested.)

(d) Recommended designs for layouts for switches, mates and frogs.

2.—Ballast for suburban and interurban lines.

3.—The use of rolled manganese and other alloyed steel rails.

4.—Investigation of the use of high elastic steel machine bolts 1⅛ in. diameter, ream or driving fit in connection with mechanical joints of standard design in curves.

5.—Pavement for use in connection with girder grooved and plain girder rails to cover:

(a) The formulation of a specification covering the manufacture and installation of the various types of paving which might be used in connection with the car tracks.

(b) The matter of proper foundation should also be incorporated in such specification as well as the type of filler and cushions.

6.—Consider for approval specification for preservatives and treatment of woods for inclusion in the engineering manual.

7.—Preparation of specifications with definitions for sundry track materials such as ties, track spikes, bolts, tie rods, tie plates, etc., such investigation to be through co-operation with the A. S. T. M. in accordance with the procedure prescribed in the instructions to the committee.

8.—Report upon the most efficient types of hand track tools.

TRANSPORTATION & TRAFFIC ASSOCIATION

CONSTRUCTION OF SCHEDULES AND TIMETABLES

1.—Co-ordinate work of past committees.

2.—The skip-stop development and what it means, particularly from the community standpoint. Study influence of frequency of stops on schedule speed and the influence of schedule speed on operating costs.

3.—Revise the standard interurban timetable as adopted in 1911.

4.—Study of traffic regulations.

5.—Exhaustive study of running time as affecting scheduled methods of determining same, together with variable effect of traffic on same, as well as effect on other elements, such as power, etc.

EXPRESS AND FREIGHT TRAFFIC

1.—Co-ordinate past work of previous committees.

2.—To make further effort to ascertain which style of contract is the most favorable from a revenue standpoint with old line express companies, "a tonnage basis," "a mileage basis," or "a prorate of the rates."

3.—To make an effort to secure a form of contract which the committee may recommend for the use of traction lines in contracting with old line express companies.

4.—Further information tending to show the growth of interchange business with steam railroads.

5.—Study motor truck operating costs, etc.

FARES AND TRANSFERS

1.—Co-ordinate work of previous committees.

2.—Recommendation for a method of interchange of passengers by means of paper transfers, or otherwise, with the idea of preventing abuse:

First, on the part of passengers.
Second, exchange of transfers by conductors.

Recommendation for an efficient method of checking transfers with a view to discovering irregularities in either of the above ways.

3.—Collection of fares in congested areas and terminals, including fare collectors, etc.

PASSENGER TRAFFIC

1.—Co-ordinate work of previous committees.

2.—Interline passenger traffic arrangements between interurban and steam roads, with particular reference to collecting data from member companies who have such traffic agreements with steam lines.

3.—Ascertain basis of participation of interurban lines in through rate, where the interurban line is the original carrier, and where tickets read to points beyond the next connecting line.

4.—Financial aspects of the operation of open cars.

5.—Special car methods and results.

RULES

1.—Co-operate on block signal rules.

2.—Rules for two or more car unit operation.

TRAINING OF TRANSPORTATION EMPLOYEES

1.—Co-ordinate work of previous committees.

2.—Eyesight and hearing standards. Watch inspection methods. (These to be given additional study with recommendation as to definite standards.)

JOINT COMMITTEES

BLOCK SIGNALS

Engineering Association Subjects

1.—Review of association's existing standards and recommendations.

2.—Consideration of standardization rules of A. I. E. E. (July 1, 1915 edition) in so far as they apply to the work of this committee.

3.—Digest of block signal laws and rulings. (This to cover the period from June 1, 1914, to June 1, 1916.)

4.—Bibliography of block signal installation from June 1, 1915, to June 1, 1916, following the same plan as started by the 1915 committee.

5.—Designs of additional block signal apparatus looking to its adoption.

6.—Clearance diagram for semaphore signals. (As the committee did not consider this subject jointly with the committees on heavy electric traction and power distribution, the 1915 committee on standards referred it back for further consideration so there would be no conflict with existing recommendations.)

7.—Block signal rules. Continuation of the subject as considered by the 1915 committee.

8.—Study of block signal operation, covering maintenance cost, efficiency of operation and effect on traffic. This subject includes definition of signal failure.

9.—Highway crossing protection, including aspect for highway crossing signals that can be adopted by the association.

10.—Light signals for interurban railways. (Should be given further consideration with a view to the adoption of definite sizes of lenses.)

11.—Consider tests for contactor type of recording signals.

12.—Consideration of tentative code of safety rules as prepared by the United States Bureau of Standards in so far as it applies to the work of this committee.

Transportation & Traffic Association Subjects

13.—Co-ordinate past work of the committees on block signals.

14.—Bring up to date recommendations for the committee on standards.

15.—Study methods of highway crossing protection.

16.—Study methods of drawbridge protection.

17.—Develop form of contract for signal installation.

18.—Study of operating without dispatchers.

CLAIMS TRANSPORTATION

Transportation & Traffic Association Subjects

1.—Co-ordinate past work of the committees on claims transportation.

2.—Investigate the applicability of moving pictures to safety first work in its three phases, namely, training of employees, education of school children, and education of the general public.

3.—Co-ordinate safety first movement.

4.—Safety advertising on cars.

Claims Association Subjects

Not yet assigned.

ENGINEERING ACCOUNTING

Engineering Association Subjects

1.—Inter-departmental charges.

2.—Consideration of the sub-division of accounts covering steam power station costs as submitted by the 1915 committee on power generation.

3.—Development of a property ledger looking toward the maintenance of a continuous inventory. (This to be considered as applying to the entire physical property.)

Accountants' Association Subjects

Not yet assigned.

LIFE OF RAILWAY PHYSICAL PROPERTY

Engineering Association Subjects

Should co-operate with committee on valuation and continue the work of compiling an up-to-date bibliography on valuation.

Accountants' Association Subjects

Not yet assigned.

TRANSPORTATION ACCOUNTING

Transportation & Traffic Association Subjects

1.—(a) Investigation of cost of handling baggage free to determine whether it brings business to the line, and if so, whether the cost of handling this baggage wipes out the profit resulting from the fare received.

(b) Investigation and subdivision of power cost between construction, maintenance and operation.

2.—Graphic presentation of transportation data and statistics.

Accountants' Association Subjects

Not yet assigned.

TRANSPORTATION ENGINEERING

Engineering Association Subjects

1.—Train operation in city service. (It is understood there have been recent developments which would warrant further consideration at this time.)

2.—Economics of one-man car operation. (To carry on work started by committee on passenger traffic of T. & T. Association.)

3.—Two or more car operation, interurban service:

(a) Passenger service.
(b) Freight service.

(Investigation to cover cost of operation and comparative figures for single car operation.)

4.—Effect of car and equipment design on duration of stops for both passenger and freight service. (Car design to be studied from a traffic standpoint in all its phases, first standardizing the method of determining results, i.e., having identical formulae and practice for obtaining observation and data from which conclusions are drawn. Investigation to include specimen data sheet showing information which should be obtained in order that member companies who desire to follow the recommendations may have full information before them.)

5.—Investigation of braking distance on interurban cars with special reference to location of block signals.

6.—Study of electric current saving devices, including summary showing results obtained, together with costs including maintenance, etc.

Transportation & Traffic Association Subjects

7.—Train operation in city service—trailer versus motor cars.

8.—One man car operation—comprehensive study—regulations in different localities—increase in, etc.

9.—Consider rules and regulations for interchange of equipment between interurban lines and between interurban and steam lines. Submit report for further consideration from accounting, operating and mechanical standpoints.

Equipment and Its Maintenance

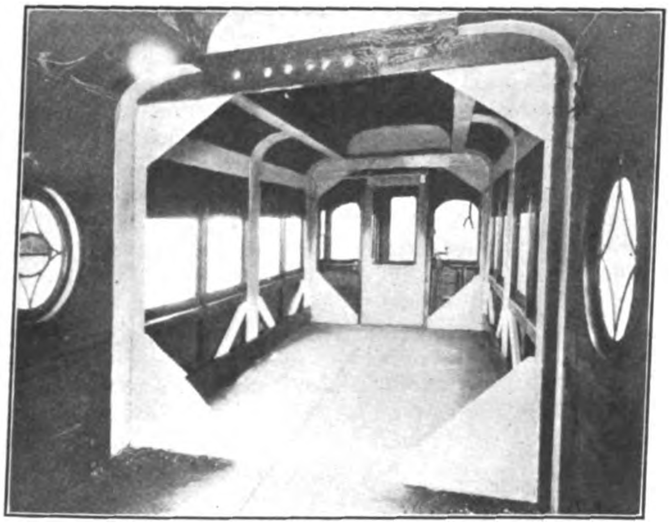
Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

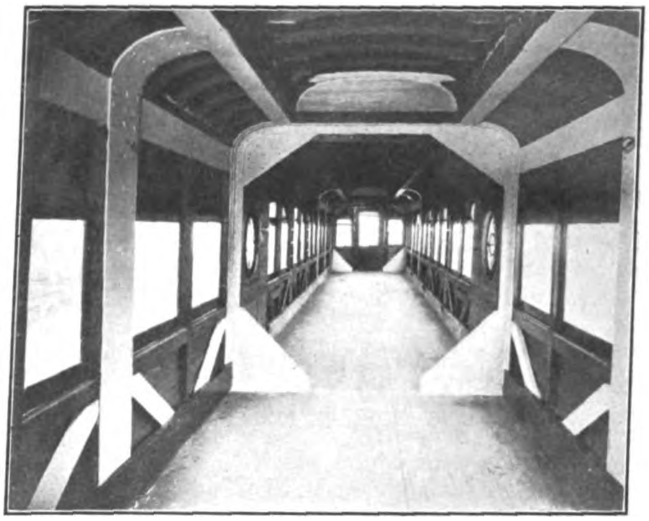
Reinforcing High-Speed Interurban Cars

BY W. J. BOWMAN, MASTER MECHANIC AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Excessive racking throughout the bodies of some of the cars on the high-speed Aurora, Elgin & Chicago Railroad, Aurora, Ill., has been overcome with 712 lb. of steel reinforcement at a cost of approximately $390 per car. An unfortunate combination of 60-ft. rails with staggered joints and approximately 30-ft. truck centers made car-body torsional strains especially severe on this road. These conditions, together with the high rates of acceleration and maximum speeds of more than 66 miles per hour required an unusually strong body structure to withstand the strains without movement ultimately developing in the framing. An exceptionally interesting series of experiments in car reinforcement was necessary before the final form was adopted. These tests passed from the simple substitution of wooden knee braces to steel reinforcement weighing 2600 lb. and costing approximately $765 to install. By a process of elimination and simplification, however, both the weight and the cost were brought down to the amounts before mentioned.



REINFORCED INTERURBAN CARS—FIRST TYPE OF REINFORCING IN FRONT END OF CAR



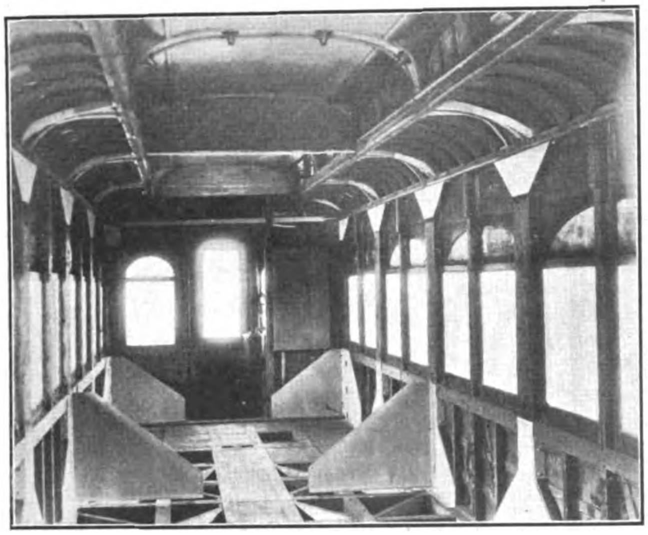
REINFORCED INTERURBAN CARS—FIRST TYPE OF REINFORCING IN REAR END OF CAR

In the beginning one of the cars needing reinforcement was stripped of the seats and operated over various sections of the road to determine the points in the car structure where movement occurred. Some movement was observed in the underframe, which was of composite wood and steel construction, but the excessive racking and wearing was found to be in the body superstructure. Both at starting and stopping there was a tendency for the body above the side sills to move forward or backward, with the bottoms of the window posts as the pivotal points. After this test a decision was reached that the only way to correct the trouble was by cut-and-try methods, too many factors entering to make it a strictly engineering problem. Diagonal bracing in all three planes was found to be necessary to counteract completely all movement in the car body. To do this properly all inside finish had to be removed and at first wooden diagonals were placed at all possible points in the body. Tie rods also were provided at the intermediate partition and the end bulkheads, and the underframe was braced by laying diagonal flooring. A test of the car reinforced in this manner showed that while racking had been materially relieved the wooden bracing was insecure and, therefore, not permanent.

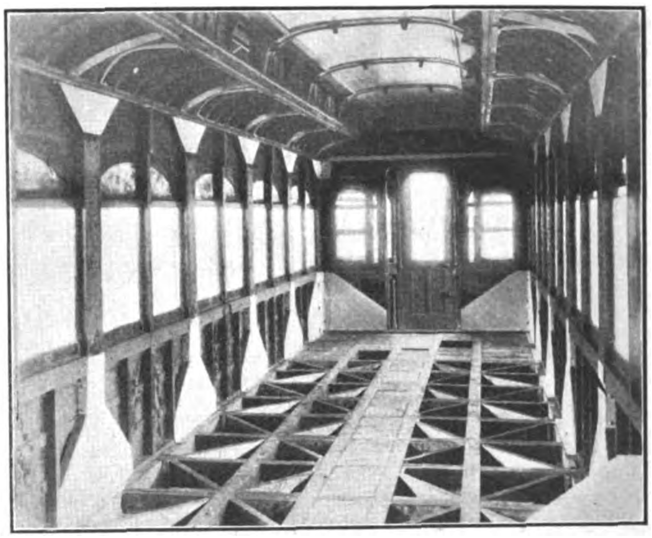
A continuous steel inside sheathing, bolted to the side sills and the window posts and extending up to the window stools, was then tried. This with tie rods at the two end posts and at the intermediate partition, was found insufficient. While it greatly reduced movement in the body it was not reinforcement enough to make the roof and the side plates as rigid as they should be. To stiffen this point $\frac{3}{8}$-in. x 10-in. plates were provided on the window posts, which extended to the side plates, thence along the roof of the deck sill. Similar plates were through bolted to the side plates and extended from the end bulkheads to points inside the body bolsters. A third longitudinal plate of the same section was bolted to the underside of the deck sill and also extended from the end bulkheads to points inside the body bolsters. All of these longitudinal plates were riveted to the vertical plates at the corner and window posts.

Transverse diaphragms consisting of angles, continuous from side sill to side sill and conforming to the car-body section, were introduced at the two end bulkheads and at the intermediate partition. Heavy gusset plates were riveted to these angles, and they were further reinforced to resist torsional strains by being riveted to the $\frac{3}{8}$-in. x 10-in. window post plates. A view of this type of reinforcement is shown in an accompanying illustration. It will also be noted that the wooden diagonal brace extending from the double window posts at the window stools to the single window posts at the side sills were retained as side stiffeners.

All of this reinforcing steel weighed approximately 2600 lb., and the cost of material and labor to reinforce a car was approximately $765. While this type of re-



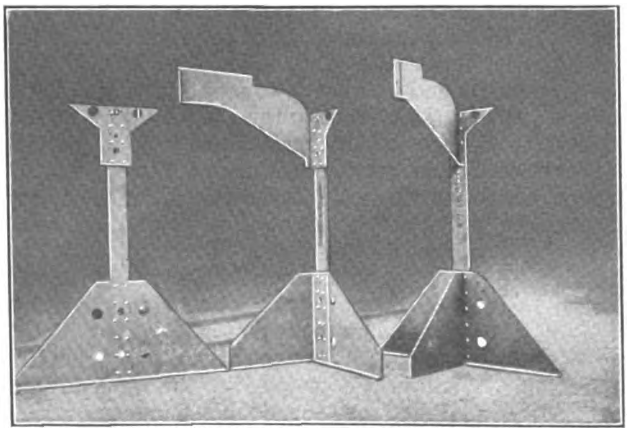
REINFORCED INTERURBAN CARS—FRONT END OF CAR WITH GUSSET REINFORCING IN PLACE



REINFORCED INTERURBAN CARS—REAR END OF CAR WITH GUSSET REINFORCING IN PLACE

inforcement solved the problem, it was considered unsatisfactory because of its high cost and excessive weight. Tests were then made to determine how the weight and the cost of installation could be reduced without diminishing the effectiveness of the reinforcement. The first step was to reduce the 3/8-in. metal to 1/8 in. and to substitute unit structures for the heavy plates at the alternate double window posts, at the intermediate partition and at the end bulkheads. The three types of these unit reinforcements are shown in one of the accompanying illustrations. With these the weight was reduced to 1420 lb. and the cost of installation was approximately $500.

Essentially these unit reinforcements were made up of 6-in. 11¼-lb. channels with flanged gussets at the side sills and at the side plates. At the double window posts the gussets extended 2 ft. 8½ in. each side of the post, and the channels filled the space between the two posts. At the corner posts the gussets were set at right angles to each other and extended 3 ft. 1½ in. along the car sides and 2 ft. 7 in. into the bulkheads at the floor line and completely across the car at the roof line. At the intermediate partition longitudinal and transverse gussets were required. The transverse gusset at the floor line extended 2 ft. 7½ in. toward the center of the car body, and that at the roof, 2 ft. 10½ in. All of these reinforcements were through bolted to the side sills and plates and to the window posts and cross-bearers. Two types of cars are being reinforced, and for the one 53 ft. long, 8 ft. 8½ in. wide with 34 ft. 3 in. truck centers the unit reinforcement was considered to be the simplest form because of the window-post construction.



REINFORCED INTERURBAN CARS—UNIT TYPE OF REINFORCEMENT

The third stage in simplifying the reinforcement and reducing the weight included the elimination of the 6-in. channel members along the double window posts, and changing somewhat the dimensions of the gusset plates. As a substitute for this the double window posts which were made up of two members were provided with oak filler blocks continuous from the side sills to the side plates. These were through bolted to make them serve as a single member. The gusset plates were through bolted to the side sills and plates and to the cross-bearers. All gussets were also securely fastened to the faces of the window posts with wood screws. Movement in the roof between the side plates and the deck sills was eliminated by adding ½-in. x 1½-in. metal carlines to the wooden carlines over the double window posts. Bolted to each side of these were two angle braces of the same section, which were also through bolted at the side plates and the deck sills. Tie rods 5/8 in. in section also extend between the side plates at the intermediate partition, and just over the door openings in the bulkhead two ¼-in. x 2-in. tie rods were installed. The gusset plates at the end bulkheads were through bolted to the corner posts, side and end sills.

Reinforcing in the underframe in both types of cars consisted of diagonal braces between the cross-bearers in the floor system. The underframes of the original cars consisted of 9-in. I-beam side sills and two 6-in. I-beam center sills, and the transverse floor system was made up of all wooden members. A view of this type of reinforcement at the front and rear ends of a car 47 ft. 4 in. long, 8 ft. 8 in. wide and with 28-ft. 11-in. truck centers is shown in two of the accompanying illustrations. It will also be observed that the space between the two center sills was completely closed with 2-in. material to produce the same result as the diagonal bracing in the remainder of the floor system. The blocking between the center sills was secured by tie rods and spiked, and the diagonal floor braces were wedged down by separate blocks and spiked, to make them secure. This construction made the floor system very rigid and eliminated the weaving. In all twenty-five cars will be reinforced either with the gussets or with the unit system, depending upon the character of framing.

Change from Half to Full Flanged Brakeshoes

BY R. E. HEWITT, MASTER MECHANIC SOUTHERN PACIFIC COMPANY ELECTRIC LINES, WEST ALAMEDA, CAL.

The standard brakeshoe for motor cars used on the Oakland, Alameda and Berkeley electric lines of the Southern Pacific Company was a partially flanged shoe known as Y-1 manufactured by the American Brake Shoe & Foundry Company.

The trouble with this shoe was that if one of the flanges at the top or the bottom of the shoe broke off the shoe was apt to override the sides of the tire, which naturally shortened the shoe life and slightly reduced the braking power. This condition also had a detrimental effect on the tires, as the shoe at the point where the flange broke off had a tendency to wear into the throat of the wheel flange and caused the flange to wear sharp quite rapidly.

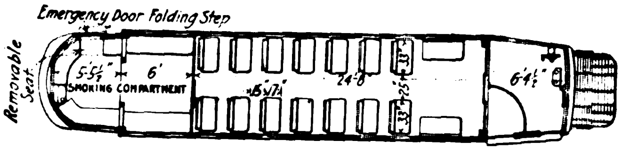
Last May a test was made of the K-280 diamond, steel-back, full-flanged brakeshoes manufactured by the same company, and the results obtained with this type of shoe were so satisfactory that it was deemed advisable to adopt them as standard for our motor cars.

At that time eight shoes of Y-1 type made a total of 16,592 miles, with an average mileage per shoe of 2074. Eight shoes of the K-280 type gave a total mileage of 34,195, with an average mileage per shoe of 4274.

The advantage of the full-flanged shoe is that it adheres to the contour of the tires at all times, causing the tires to wear more evenly and lessening the percentage of sharp flanges.

One-Man, Two-Man Cars for Spokane

Confronted by the problem of competing with the privately-owned automobile and the public jitney, the Washington Water Power Company, Spokane, Wash., has remodeled its large four-motor Brill cars which are in service in the "Falls City" for operation as near-side, pay-as-you-enter, one or two-man cars. Operating tests covering thirty days have shown the cars to be a great success from the public and the company's standpoints. The cost of the remodeling has been about $300 a car, and a considerable decrease in operating cost has accompanied their use.

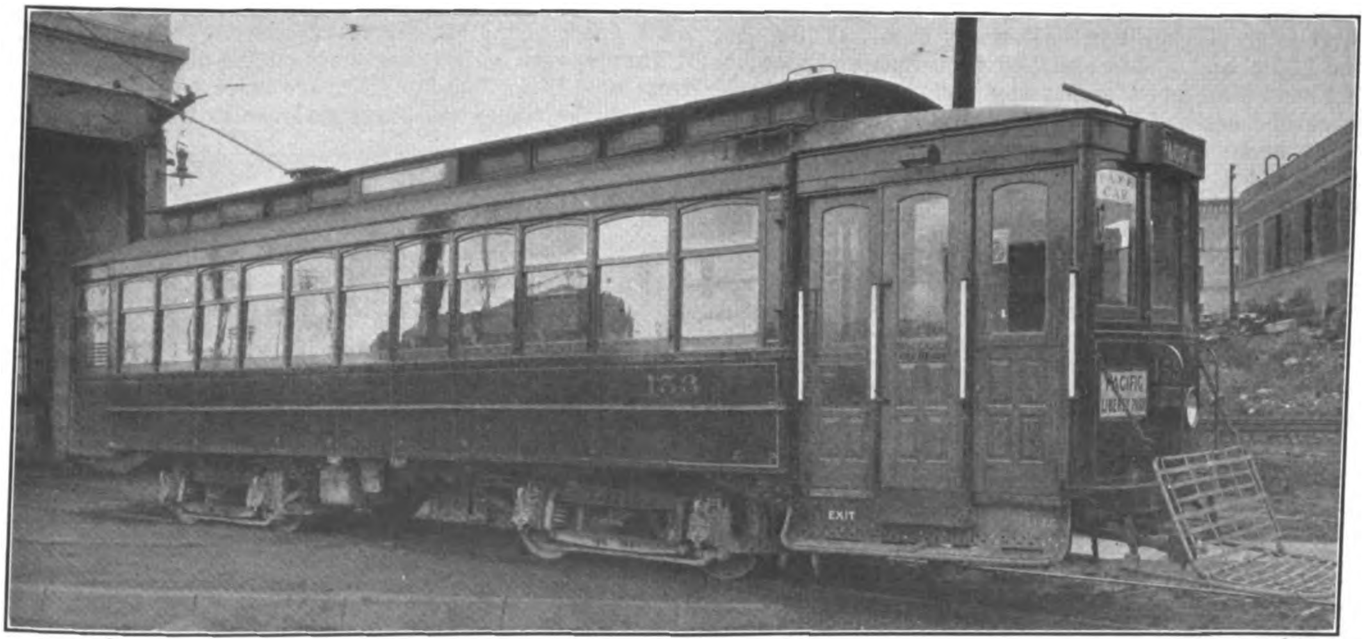


SPOKANE CAR—GENERAL PLAN OF CAR

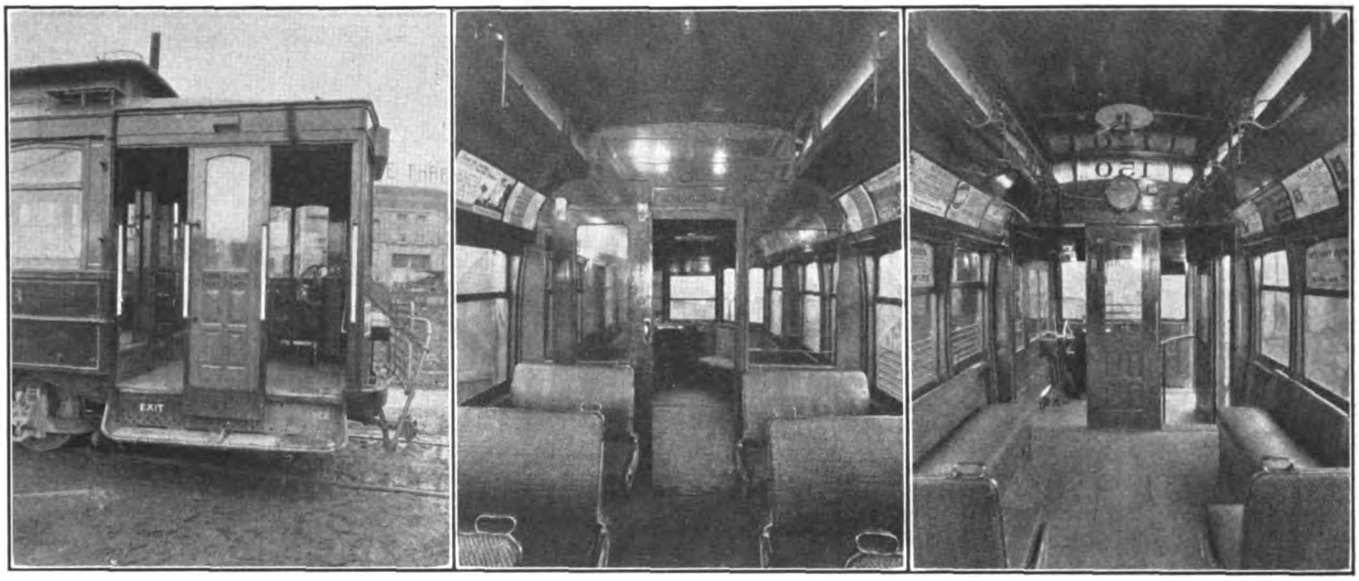
One of the problems in making over pay-as-you-enter cars into near-side cars is taking care of the long overhang at the rear end. This was overcome in the present case by reversing the car and changing the entrance and exit doors from one side to the other, leaving the longer overhang on the front. The motorman can thus watch for pedestrians and vehicles who might be in danger on account of the sweep of the car. The change leaves very little overhang on the rear.

In remodeling, the steps were lowered in all about 3½ in., making the distance from the ground to the first step, 14 in.; the next step 13 in., and the step from the platform to the car 11½ in. Two sliding doors are provided, the one where passengers enter being next the motorman. The other door serves as an exit. There is a small reflector light between the two front doors on the outside, which illuminates the steps. The sliding doors operate separately or in combination so that people getting off do not interfere with those getting on, each door sliding into a pocket between the entrance and the exit.

The rear portion of the car is divided off by means of a partition with a sliding door placed immediately in front of the rear longitudinal seat. This portion of the car is reserved for smokers. Many patrons who work in offices and stores where smoking is not allowed are taking advantage of this smoking compartment. The controller was allowed to remain at the rear end of the car for switching purposes. At the rear end of the car an emergency door with folding step was provided. This door is for use in case of accident only, and is held in place by a spring pin. A safety device was arranged so that if the pin is removed and the door opened a



SPOKANE CAR—CAR REMODELED FROM REAR-ENTRANCE PAY-AS-YOU-ENTER TYPE FOR NEAR-SIDE, ONE OR TWO-MAN OPERATION



SPOKANE CAR—REMODELED VESTIBULE, INTERIOR LOOKING TOWARD THE REAR, INTERIOR LOOKING FORWARD

quarter of an inch, an alarm gong rings near the motorman warning him to stop the car immediately.

There are two hangers for the trolley catcher at the back of the car; one located above the rear windows and the other in the regular position. The top one is used in case mischievous boys attempt to pull down the trolley. The cars are equipped with Esterline Golden Glow headlights, and Mazda lamps are used throughout. The lighting in the front vestibule is automatic. When the door opens to admit a passenger, one lamp in the car is switched off and another lights near the motorman to give him illumination for making change. The entrance and exit is equipped with white enamel grabhandles, which are conspicuous by night as well as by day.

In the distribution of labor with these cars shifts are arranged so as to provide two men on each car when traffic is heavy. In the preliminary tests of the system it was found that two and one-third men can do the work of four on lines with average travel, without loss of efficiency. Motormen and conductors break in for both ends of the car. The shifts are arranged so that there is an overlap between 7 and 9 a. m.; 11.30 a. m. and 1.30 p. m. and 4.30 and 7.40 p. m., making two runs of about nine hours each and a swing shift of about seven and one-half hours.

A scheme has been adopted by the company to curb the activities of "hold-up" men who might consider the late one-man cars, at the lonely ends of the line, as easy prey. A steel safe was placed in the basement of the company's bank, which fortunately is located at the traffic center of the system, to which a steel tube was run from the starter's booth. After 6 o'clock in the evening, when the conductors have accumulated an excess of money they deposit this in individual sacks bearing their names, when they come in from the ends of their lines. These sacks are returned to them at the receiver's office when they turn in at the end of their runs. The hold up men who "stick up" conductors in the outskirts hereafter will be able to secure only a few loose nickels and a bundle of cancelled tickets and transfers.

The remodeling of the cars as described above and the adopting of operating conditions to utilize them effectively have been carried out under the direction of R. A. Willson, general superintendent of railways Washington Water Power Company, who has furnished the above interesting particulars.

Telephone Dispatching Eliminated by Signals at Portland, Me.

By the installation of eight blocks of Chapman automatic signals on the Westbrook division of the Cumberland County Power & Light Company's Portland (Me.) lines, telephone dispatching has been eliminated and a saving of five to eight minutes has been made in the running time when a car has been delayed between Portland, Westbrook, South Windham and Gorham. The signals are of the standard illuminated semaphore type made by the Electric Railway Signal Company, Charles N. Wood Company, agents, Boston, Mass.

The Westbrook division consists in the main of a system of interurban tracks over which cars are operated on different routes at headways ranging from sixty minutes to fifteen minutes. About 2¾ miles out of Portland, at a junction designated as Rosemont, two main lines from the city are joined, the remainder of the route to Westbrook and beyond being by single track with the exception of an unsignaled double-track section in Westbrook 1.5 miles in length and 500 ft. of double track opposite the Westbrook carhouse.

The distance between turnouts on the division varies from 1000 ft. to 4000 ft. There are three railroad crossings on the single-track lines and two crossings of the

TYPICAL SIGNAL NEAR PORTLAND, ME.

local electric railway belt line. Certain cars are routed in or out of Portland via Woodford's and others via Brighton. In general a headway of fifteen minutes is maintained on the main line and the Brighton and Woodford branches into the city and the same interval is maintained out of town as far as the Westbrook carhouse. Under normal conditions one car an hour is run to South Windham and one to Gorham, from Portland, with a similar service inward. The distance from Westbrook carhouse to Portland is about 6.5 miles via either Woodford's or Brighton. A telephone is installed at every turnout, but is seldom needed. In general, the setting and restoring contacts are located in the trolley wire about 90 ft. inside the switch point, on both the siding and the main line. The signals include the usual counting-in feature, and while the installation is standard in general arrangement, it illustrates the convenience of automatic equipment of this kind in facilitating the movement of traffic over single-track routes with and without branches.

Operating Cost of Forced Draft Heaters Less than 2 Mills Per Car-Mile

Through the courtesy of the Empire United Railways the following data on the cost of operating Peter Smith hot-air heaters have been made available for the winter ending Feb. 23, 1915:

Fuel:		
Coal—68,642 lb	$214.22	
Unloading coal, 68,642 lb. at 10 cents per ton	3.43	
		$217.67
Maintenance:		
Two armatures, at $24	$48.00	
Twelve motor brushes at $0.25	3.00	
Eight grates at $1.50	12.00	
Six brush-holder springs at $0.05	.30	
One commutator-end ball bearing	3.50	
Total material	$66.80	
Labor on repairs, estimated	10.00	
		76.80
Total cost		$294.47
Mileage made by cars from date of installation of heaters		170,937
Cost per car-mile		$0.00172
Cost per car a day, averaging 300 miles		$0.517

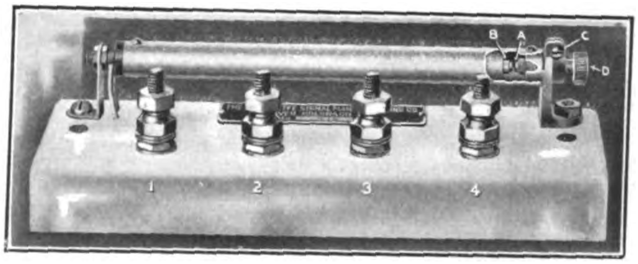
The heaters used are of the Peter Smith type, and are equipped with ½-hp. blower motors.

They are employed in cars formerly equipped with as much as 15½ kw. capacity in electric heaters.

A Thermostatic Time Element

A device designed to operate in connection with a relay and intended for use with any electrical circuit where it is desired to operate a time element for any specified time interval of from thirty seconds to five minutes has recently been placed on the market by the Protective Signal Manufacturing Company, Denver, Col. This operates upon the principle that a rod of metal when heated by an electric current of a certain amperage will increase its length by a given amount in a given time, and will thus make possible the closing of a pair of contacts at any desired time after current is first applied to the heating coil.

In the device there is an operating rod that is wound with high-resistance insulated wire through which a current of electricity is passed, thereby generating heat and causing the rod to expand. After a known time interval the end of the rod makes contact with an adjusting screw. As soon as the contact is made the relay is energized and the outside controlling circuit is closed. The thermostatic circuit is thereby opened, allowing the thermostat to cool and the operating rod to return to its normal position.

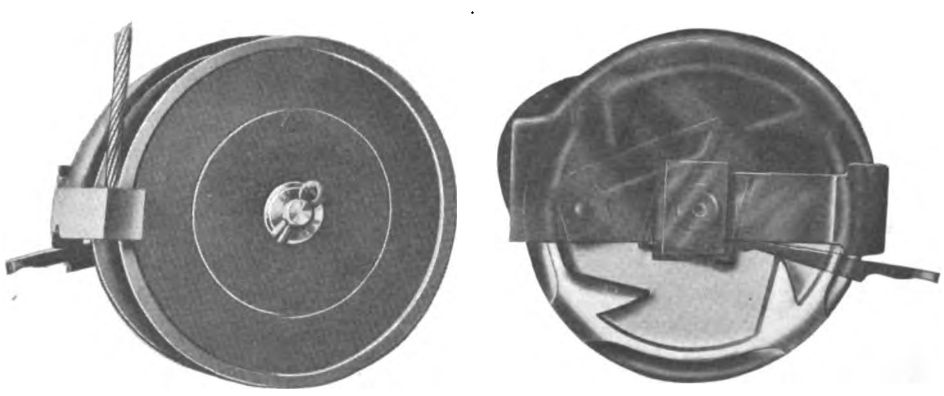


ELECTRIC TIME ELEMENT

The heating or operating unit is inclosed within a dustproof and moisture-proof casing and is protected from the outer casing by an insulated heat-resisting tube. It is not affected by the surrounding temperature of the atmosphere, owing to the fact that the two basic metals that are used in the construction are of the same density and of similar characteristics so that expansion and contraction due to atmospheric changes is the same for both metals. The device can be wound for any voltage from 6 to 110. Adjustment of the time interval is determined by the distance between the contact points at the end of the operating rod and at the end of the adjusting tube, depending primarily, of course, upon the amount of current applied which is constant in any particular installation. The adjusting screw is equipped with a micrometer thread and the screw can be withdrawn, increasing the space between the two contacts until the desired time is consumed between the application of current and the closing of the contact. The over-all dimensions of the unit are 8 in. x 2½ in. x 2½ in., and it weighs 2 lb. complete.

A Simplified Trolley Catcher

The "Q-P" trolley, manufactured by the Q P Signal Company of Needham Heights, Mass., now being sold exclusively by the Lord Manufacturing Company, New York City, is a simplified device that has been perfected to reduce the maintenance costs that have frequently been involved with such devices. There are actually only four principal parts that are essential to the operation of the apparatus, these being a rope reel that is cast integral with the square centrifugal hub and the ratchet, the housing, the pawl, and the involute tension spring. The ratchet teeth are deep and substantially


GENERAL VIEW OF SIMPLIFIED TROLLEY CATCHER AND PHANTOM VIEW SHOWING MECHANISM

designed, and the open rope reel affords easy access to the trolley rope, eliminating the chance of interference by snow and ice. Among the distinctive features are the quick action of this device (catches after a rise of only 4½ in. above the trolley wire), the weight of only 10½ lb., the simplicity that accompanies the use of only four principal parts, and an automatic lock which operates when the catcher is removed from its socket, thus preventing any possibility of injury to passengers or employees or damage to the trolley catcher or to other parts of the car equipment.

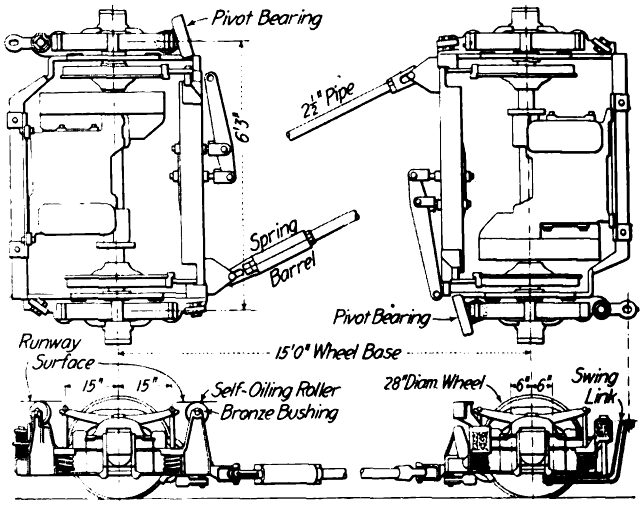
Single-Truck, Center-Entrance, Low-Step Car at Glens Falls, N. Y.

Through the courtesy of A. E. Reynolds, general manager Hudson Valley Railway, Glens Falls, N. Y., the Laconia Car Company, Boston, Mass., is demonstrating the operating advantages of its stepless center-entrance car. This car was placed in service on Nov. 30, and it is planned to have it remain in Glens Falls for about one month during which period it will be operated over one of the lines, at all times of the day and night, to demonstrate its ability to meet all kinds of physical and service conditions.

The low-step doorway, the center-entrance feature and the thoroughly modern equipment of this car has attracted very favorable notice among the Glens Falls public. The car is especially popular with the old and infirm, many of whom have told the conductors that they would be willing to travel downtown regularly if the car were to continue in operation in their district.

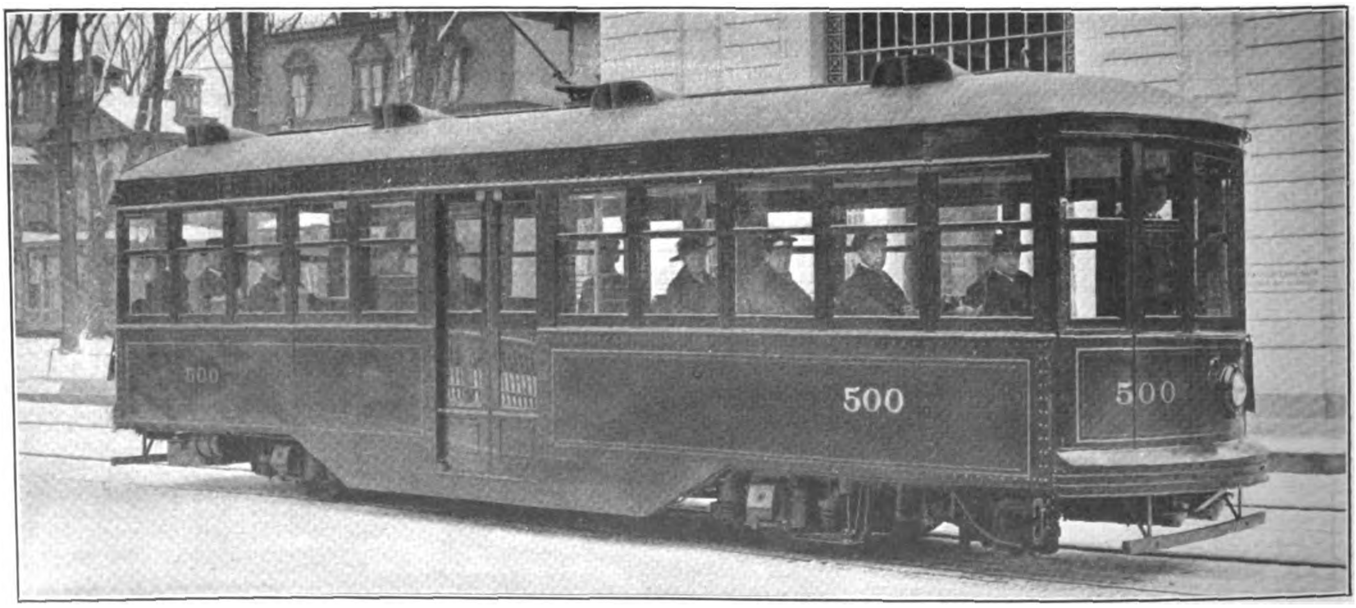
The principal dimensional figures on this car may be summarized as follows: Length over all, 33 ft.; width, 8 ft. 2 in.; height, only 10 ft.; wheelbase, 15 ft.; wheel diameter, 28 in.; clear width of doorways at center of car, 3 ft. 3 in.; step from pavement to car well, 14 in.; inside step to longitudinal aisle, 11¼ in.; number of seats, 44; width of cross-seat, 35½ in. The present weight of the car at Glens Falls is 26,000 lb., but even with the present motor and air brake equipment the weight can be brought to 24,200 lb., or less than 550 lb. per seated passenger. Reductions are possible in the weight of the trucks by omitting the emergency doors at the ends of the car, which are not required, and also by omitting the pockets for the center-entrance doors. In ordering cars of this type it will be optional with the purchaser to use double outside folding doors or outside sliding doors.

The radial-axle truck, which is built under license from the Philadelphia Holding Company, has a 15-ft. wheelbase and is of forged steel throughout. One of its most important features is the care taken to make use of standard double-truck car parts such as journal boxes, wedges, bearings, brakeshoes, wheels and axles. The brake applications also are made just as on a double-truck car with no tendency to throw the axles out of alignment. As shown in Fig. 1, this truck is really a pair of single-axle trucks because the diagonal bar which connects them is simply a safety appliance with a reciprocating joint therein to allow for uneven action in going over special work, in and out of curves, over rough track and the like. Each truck is capable of throwing the axle 18 in. out of its normal center line.



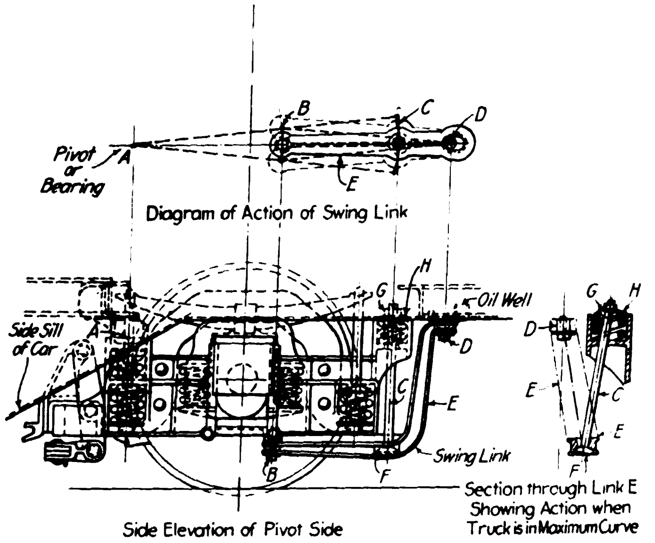
NEW LOW-STEP CAR—FIG. 1—GENERAL LAYOUT OF TRUCK

Attached to each truck on the pivot side is a swing link fitted on the bottom with a half-ball joint on the end of a suspension hanger. The upper end of this swing link is pivoted to the car body and the lower end is pivoted directly under the journal box on the pedestal tie. On the opposite end is the pivot which is connected to the car body. Under this pivot is a spring acting in conjunction with a frictionless bearing to allow free radiation of the truck without bringing any torsion on the springs. Fig. 2 shows the pivot side of this truck



SINGLE-TRUCK, CENTER-ENTRANCE, LOW-STEP CAR AT GLENS FALLS, N. Y.

in side elevation and an end view or section through the link. The heavy line in the diagram shows this link in its normal running position on tangents, while the dotted line shows its position when the truck is in the middle of a 35-ft. radius curve. In the section the link is represented by the letter *E*, the suspension hanger by *C*, the half-ball joint by *F*, the nut at the top by *G* and the spring follower on the top of the spring, working in conjunction with *G*, by *H*. This section shows the relative position of link and hanger on a maximum curve.

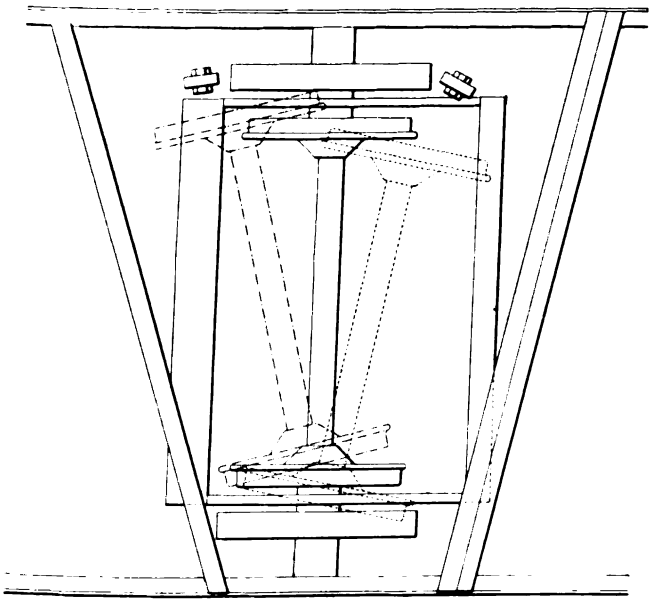

Pivot or Bearing
A
B
C
D
E
Diagram of Action of Swing Link
G
H
Oil Well
Side Sill of Car
A
D
C
E
Swing Link
B
F
Side Elevation of Pivot Side
G
H
D
C
E
F
Section through Link E Showing Action when Truck is in Maximum Curve

NEW LOW-STEP CAR—FIG. 2—DETAILS OF SUSPENSION AND LINK

The frictionless ball joint is represented by *B* and the sliding fulcrum point on the car body by *D*. Casting *D* is lubricated by means of an oil well similar to that used on the later type of motors. The swivel or pivot is shown at *A*. The bearing casting is secured to the cross-member of the car as in the case of an ordinary center plate.

The movement set up between the body spring hanger and the frictionless pivot when the car enters and leaves a curve is shown in an accompanying drawing, Fig. 3.

The spring system is another most original feature. On each side of a journal box is a pair of helical springs which carry a saddle upon which a semi-elliptic spring is mounted. From the ends of this saddle extend a second pair of helical springs parallel to and outside of the first pair of helical springs. The inner helical springs take the jar or impact of wheel movement, which is absorbed finally by the semi-elliptic springs; the outer helical springs are designed to care for the ordinary vibration of the car body.



NEW LOW-STEP CAR—FIG. 3—DIAGRAM SHOWING DISPLACEMENT OF AXLE ON CURVES

The motors are hung as on standard trucks so that they have no other duty than to propel the car. They are not required to take the thrust of operating around curves or the stresses due to braking.

On the whole, the motion of the car is found to be non-galloping and non-nosing. The wheels have an easy, natural movement, which does not cause abnormal binding on the rail or special work.

The following equipment is included on this car:

Air brake (Featherweight)	Westinghouse
Anti-climbers	Hedley
Buzzers	Consolidated
Curtains	Curtain Supply
Hand straps	Rico Sanitary
Headlights	Neal
Heaters	Consolidated
Heat deflectors	Consolidated
Motors, 40 hp. with P. K. control	Westinghouse
Sand boxes	Kilburn
Seats	Heywood-Wakefield
Stanchions	Ellcon
Starting signal	Consolidated
Thermostat	Consolidated
Ventilators	Automatic
Wheels	Griffin

Cost of Roadway Machinery and Tools

In the cost sheets filed by the Bay State Street Railway of Boston, Mass., with the Massachuetts Public Service Commission in connection with the pending fare case are given the company's investments in roadway machinery and tools, as of Nov. 1, 1914. Extracts from these costs are tabulated below, the figures representing the cost of the equipment in the field, exclusive of overhead charges during installation.

Item	Unit Cost
Wharton portable crossover, 110-lb. rail	$825
Wharton portable crossover, 60-lb. rail	385
No. 4 Duntley electric track drill	254
No. 3 Duntley electric track drill	142
Gore drilling machine	112
Screw girder rail bender	61
Motor-driven reciprocating track grinder	1,805
Indianapolis portable electric welder	505
Sherburne No. 2 rail bender	89
Victor portable rail saw	50
Acme motor-driven stone crusher and equipment	1,788
Type 21 American Steel & Wire Company track drill	111
Seymour portable rail grinder	555
Type 22 American Steel & Wire Company track drill	151
No. 6 Bryant rail saw	126
Electric hammer	165
Emerson bending machine	130
14-in. portable rail saw	50
Stow portable rail grinder	327
Hydraulic girder rail bender	365
Sherburne girder rail bender	153
No. 12 Smith motor-driven concrete mixer	1,397
4-in. Worthington centrifugal pump	467
Carey motor-driven saw bench	398
Buffalo portable forge and blower	33
Contractor's derrick	81
3-hp. Stow electric track grinder	352
24-ft., 500-lb. pile driver	141
No. 14 Ransome motor-driven concrete mixer	740

A point worthy of note in connection with the testing of cables having large thicknesses of dielectric is the difficulty of determining with certainty whether or not some water has entered through a flaw or other damage to the lead covering. The hydraulic test at 100 lb. per square inch reduces the risk, but the whole matter is one of degree. An amount of water that would ruin many yards of low-tension cable may be distributed among a few of the outer layers in a thick dielectric, and its path of least resistance will be longitudinal rather than radial. Under these conditions it is a matter of actual experience that electrical tests may entirely fail to indicate the presence of water, although this may exist in sufficient amounts to cause trouble when it has had time to distribute itself.

News of Electric Railways

COMMISSION INQUIRY TAKES NEW TURN

Story of Attempt to Influence Signal Contract Awards for the New Rapid Transit Lines

The Legislative investigating committee inquiring into the workings of the Public Service Commission for the First District of New York took up during the week ended Dec. 18 the connection of Commissioner Wood with the letting of the contracts for signals for some of the new rapid transit lines.

On Dec. 15 the investigation took an unexpected turn. On that day Walter D. Uptegraff, president of the Union Switch & Signal Company, of Swissvale, Pa., testified that the board of directors of his company had refused in July, 1914, to pay $5,000 to Sidney G. Johnson, vice-president, in charge of sales of the Union, which sum Mr. Johnson is said to have told Mr. Uptegraff he wanted to give to Commissioner Wood in order to induce Mr. Wood to vote for the Union system of signals on the Center Street loop of the new subway. Following this incident, Col. H. G. Prout, then president of the company, and Mr. Johnson resigned. Mr. Uptegraff also testified that shortly before Commissioner Wood became a member of the Public Service Commission the Union Switch & Signal Company, at Mr. Johnson's suggestion, paid him $1,500 for helping the company to secure a contract with the Kansas City, Clay County & St. Joseph Railroad. The cancelled check that figured in this transaction was entered in evidence.

On the same day Travis H. Whitney, secretary of the commission, testified as to the proceedings in the letting of the signal contracts, their dates, the conferences on the subject, etc., the questions asked Mr. Whitney being directed toward building up the case against the commissioner.

On Dec. 16 Mr. Johnson, who is now vice-president of the General Railway Signal Company, was a witness. He accused Mr. Wood of demanding $5,000 from the Union Switch & Signal Company for using his influence as commissioner to give that company the contract for installing the signal system in the Center Street Loop. Mr. Johnson said that he told Mr. Wood that he (Johnson) had no authority to talk with Mr. Wood on a matter of that kind and that on this account he could not say what could be done. Mr. Johnson said that he merely transmitted to the directors the proposal that had been made of a payment in the interest of Mr. Wood. The directors promptly rejected it. Mr. Johnson and Mr. Uptegraff have been supœnaed to appear before the grand jury and tell their stories.

Colonel Prout would not discuss the matters in anticipation of his appearance before the committee as a witness.

Commissioner Wood denied to the newspapers the story as told by Mr. Johnson. He said:

"Johnson's story is absolutely false. It is all news to me, and I know nothing about it."

MR. BAMBERGER'S TRIP EAST

Julian Bamberger, president Salt Lake & Ogden Railroad and vice-president Salt Lake Terminal Company, Salt Lake City, Utah, returned recently to Salt Lake from a visit of more than a month in the East. In anticipation of the erection in the near future of a joint terminal depot for the Orem and the Bamberger electric lines in Salt Lake, Mr. Bamberger spent a goodly portion of his time inspecting the terminal facilities of the interurban systems in the larger cities. His report will be considered by the directors of the terminal company.

While away Mr. Bamberger placed an order for six all-steel passenger coaches for the Salt Lake & Ogden Railroad, especially for the travel to the Lagoon summer resort, which is located on the line. These cars will have a seating capacity of eighty passengers. They are expected to be delivered not later than May 1.

Mr. Bamberger also made a study of block signal systems, as the company of which he is president expects some time during the coming summer to install automatic block signals on the sections of single track still remaining between Salt Lake and Ogden.

THREE-WIRE DISTRIBUTION FOR SPRINGFIELD

The Springfield (Mass.) Street Railway has decided to convert its present overhead trolley circuits to the three-wire system, following an investigation of electrolysis conditions in the city by the United States Bureau of Standards. The bureau advised the change and upon receipt of its report the company employed the Stone & Webster Engineering Corporation, Boston, Mass., to study the situation and discuss the recommendations of the government engineering experts. Stone & Webster agreed with the conclusions of the bureau. In announcing the company's plan to change over the system, Clark V. Wood, president, said:

"Instead of sending current out from the power station to the trolley wire and returning it through the tracks and negative return, that is, making the trolley positive and the track negative, the trolley is split up into insulated sections, connected alternately with the positive and negative side of the system. With this system the current is delivered from the power station to the positive sections of the trolley and returned through the negative sections of the trolley and the feeders to the power station. The main current does not return to the power station through the rail, the only current in the rail being from the rail in the positive trolley sections to the rail in the negative trolley sections, so that the only current returned to the power station through the rail would be a small one due to the load on the positive sections being greater than the negative, or vice versa. The effect of this arrangement is much the same as would be obtained by a large number of small substations. This system has been in operation for a number of years in Europe, especially in Germany. This work will be done in conjunction with the Bureau of Standards. Mr. McCollum of that bureau recently said before the Western Massachusetts Association of Electrical Inspectors that the three-wire system possesses some very attractive features."

Work on the reconstruction of the overhead system will begin immediately. The exact cost of making the change and the length of time that will be required to complete the work are not known.

I. C. C. REPORT PRESENTED

Commission Wants to Enlarge—Recommendation Renewed Regarding Control Over Capitalization

The annual report of the Interstate Commerce Commission, made public on Dec. 13, contains, in addition to complete details of decisions rendered and court cases involving its decisions during the year, a comprehensive statement on the progress being made in the work of valuation of railroads throughout the country. The commission, in its recommendations, calls attention to the fact that the variety and volume of work already devolved upon it necessitate early enlargement of its membership and express statutory power to act through subdivisions.

The commission renews its recommendations that there should be provided by law one period, preferably three years, for the beginning of all actions relating to transportation charges subject to the commission act; that the commission should have right of access to carriers' correspondence files; that there should be appropriate and adequate legislation upon the subject of control over railway capitalization; that the minimum penalty for violation of the hours of service act be fixed at $100, and that the use of steel cars in passenger service be required and the use in passenger trains of wooden cars between or in front of steel cars be prohibited.

The progress and character of the work of the commission on the valuation of railroads is dealt with exhaustively. The last report stated that eight roadway and track parties had been organized in each of the five districts into which the country has been divided for the purpose of valuation work and that the total mileage covered was from 1500 to 1700 miles per month. It was further stated that the number of parties would probably be increased to sixteen or twenty. It was believed that the overhead organization should handle approximately 50,000 miles per year and that this number of parties would be required to accomplish that mileage.

BALTIMORE COMPANY REPLIES TO COMMISSION

Letter of President House to Commission Discussing Wheelguards, Vestibules, Etc.

The United Railways & Electric Company, Baltimore, Md., through William A. House, the president, has addressed the Public Service Commission of Maryland with respect to the recent report of Bruce W. Duer and Charles E. Phelps, Jr., transportation expert and chief engineer, respectively, of the commission. Except for the salutation the letter of Mr. House follows in full:

"I wish to state that this company has given the fullest consideration to the recommendations made in the report of Messrs. Duer and Phelps. While we have endeavored to make clear the position heretofore taken by the company with respect to the wheelguards with which its cars have been equipped—this type of wheelguard being the best adaptable to the character of paving (cobblestone) prior to the operations of the paving commission, upon the streets traversed by its cars—we are now willing and prepared to install upon the cars one of the latest approved types of wheelguard, and will proceed with this installation at first upon those lines throughout which the improved pavement has been laid, completing the work by Dec. 31, 1916.

"With respect to the fenders, to which Messrs. Duer and Phelps refer, while the minor alteration suggested by them is considered by the company's officials as more or less of a refinement, we will be pleased to meet their wishes and make the changes suggested coincident with the work of installing the wheelguards.

"As to inclosing the platforms of the semi-convertible, open platform equipment, you, of course, are aware that this company purchased and placed in service, during the latter part of 1914, upon its St. Paul Street, Linden Avenue and West Arlington lines, the inclosed platform type of semi-convertible cars.

"You also doubtless recall my statement before your honorable commission, at the time this company obtained permission for the issuance of its $1,000,000 of 5 per cent notes, in June, 1914, that it was the company's purpose gradually to inclose the platforms of its cars, and that part of the proceeds of this note issue was to be used for this purpose, beginning in 1915.

"In view of the industrial, financial and commercial depression, however, which 'set in' in the fall of 1914, it was deemed advisable by the management to curtail any expenditures other than those necessary to maintain the physical condition of its property and equipment at the highest standard of efficiency. It, therefore, deferred taking any steps looking to the prosecution of this work.

"In view of the encouraging business outlook and as Messrs. Duer and Phelps, in their report above referred to, have recommended that these platforms be inclosed, and, further, as it is the desire of the management again to take this question up, the company will proceed to inclose all the vestibules of its semi-convertible, open platform cars.

"We regret, however, that we do not agree with Messrs. Duer and Phelps as to the time within which this work may be accomplished, particularly in view of the fact that it must be done at the company's shops in conjunction with the general maintenance and repair work of equipment, and we find, after most earnest and careful consideration of the matter, that it is impossible to make the alterations in these cars faster than twelve a month. Moreover, to comply with the recommendation of Messrs. Duer and Phelps would require the withdrawal of too many cars from the service at one time, with resultant inconvenience to the traveling public. We will, therefore, beginning April 1, 1916, the interval between the present time and the date named being necessary to organize shop forces, prepare patterns, and work out incidental details, take in hand the work of vestibuling all the semi-convertible, open platform cars and prosecute it at the rate per month above stated. We trust that the above will meet with your approval and that we shall be so advised."

HYDRO-RADIAL BY-LAW BEFORE TORONTO VOTERS ON JAN. 1

After discussing the subject for nine hours, the City Council of Toronto, Ont., on Dec. 8, by a vote of eighteen to four, decided to submit the hydro-radial by-law to the people on New Year's Day. If the taxpayers are content to allow the city to guarantee bonds to the amount of $4,240,000 and other municipalities do likewise for their respective share of the cost of the proposed undertaking, estimated at $13,734,155, the Hydro-Electric Power Commission of Ontario will proceed to construct an electric radial railway from Toronto through western Ontario.

The principal point at issue, so far as Toronto is concerned, according to the discussion, is whether that section of the radial line within the city limits should be under the control of Toronto or the Hydro Commission. This point became especially prominent owing to the fact that the proposals of the Hydro Commission conflicted with the recommendations made by the engineers who prepared the local Toronto transit report referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 11, page 1183. Works Commissioner Harris, in addressing the Council regarding the recommendations of the local traffic commission, said it was of paramount importance that the city should have absolute control over all electric railway lines within the limits of the city. If the hydro-radial plan were adopted the recommendations made by the local engineers would have to be considerably modified. Instead of the city having control over the radials entering its borders, that power would be in the hands of the Hydro Commission.

F. A. Gaby, the hydro engineer, explained that the Hydro Commission would secure a right-of-way along the water front sufficient for four tracks, and adequate for the accommodation of the civic lines. There would be absolutely no need for duplication. The only difference would be that the Hydro Commission would control the radial lines as trustees for the owners, the people residing in all municipalities served by the lines. So far as the initial cost was concerned, the estimates in both reports were identical. Toronto would have to pay the cost of the lines and terminals constructed within its borders and its proportionate share of the cost of the main lines. The only point of difference was that of control, and the Hydro Commission desired that Toronto should have absolute control over its own transportation system and leave the radials to the commission.

Regarding the existing radials, Sir Adam Beck stated that the owners of all of them, from Windsor on the west to Prescott on the east, had approached the Hydro Commission with reference to buying them out. If it was the desire of the people of Toronto to acquire the Toronto & York Radial Railway, Metropolitan Division, they should seek the co-operation of the outside municipalities and request the Hydro Commission to endeavor to acquire the line. He further stated that should the commission acquire the Guelph line of the Toronto Suburban Railway, there would be no necessity to construct the line along the water front at the present time, as the owners of that line had the right to enter the city by way of Bathurst Street. The commission, however, would have to build the water front line when it constructed a radial line to Hamilton.

During the discussion it was disclosed that the traffic report prepared by Messrs. Harris, Gaby and Couzens for Toronto would cost the city approximately $50,000. The decision of the Council to support the hydro-radial scheme means that this report will probably be shelved for some time. It was decided to refer the city report to the special committee on transportation, but in view of the fact that no action can be taken on any of the recommendations made until after January it is unlikely that anything more will be heard of the city report until some time next year.

Final details in connection with the hydro-radial by-law were dealt with at a special meeting of the Mimico Village Council on Dec. 7. Everything was explained to the satisfaction of the Council and the by-law was passed on second reading. In Stratford the by-law has had the first two readings and been sent on to the ratepayers. The Berlin City Council and Waterloo Town and Waterloo Township have voted in favor of submitting similar by-laws.

ALBANY ARBITRATION DECISION RENDERED

Arbitration Board Refers to Differences as Trivial and Condemns Strike as Unwise

The committee composed of Lynn J. Arnold, Cornelius F. Burns, Mayor of Troy, and William E. Woollard, which was appointed to settle the dispute between the United Traction Company, Albany, N. Y., and its employees, rendered its decision on Dec. 11. The committee declared unanimously that, under the disputed section of the agreement, the company had the right to dispose of complaints through a general superintendent or division superintendent; that the method of C. A. Coons, the general superintendent, did not violate the agreement, except that in cases involving suspension of employees it was established that the men had been denied the right of a personal hearing before the general superintendent.

The arbitrators concluded their finding as follows:

"We find from the agreement and from the evidence and statements before us:

"1. That under Sec. 6 of the agreement the company had the right to dispose of all complaints against its employees in the first instance, through a hearing and determination by the general superintendent or by a division superintendent.

"2. That the new method of procedure in discipline cases instituted by Mr. Coons did not violate the provisions of Sec. 6, except as stated in the third finding.

"3. That in the cases heard by a division superintendent, reported by him to the general superintendent and decided by the general superintendent, directing suspension, there was a violation of the provisions of Sec. 6 in that the employee was denied the right of a personal hearing before the general superintendent. In other words, we hold that each employee has the right to be heard in person and with counsel, by the official of the company who is to give judgment of suspension, before such judgment is passed.

"The public interests require that we should say this in conclusion:

"There was no necessity for a strike. The calling of a strike was unwise. It caused great inconvenience to the general public. If the trivial differences could not have been settled by conferences between the parties directly interested, they should have been settled by arbitration before calling a strike. Public service corporations and their employees must remember that they are not the only parties in interest. There is a third party to be considered, the public, who, by their nickels, support the transportation corporation, and thereby support the employees of such a corporation."

FASTER SCHEDULES IN BUFFALO—OTHER IMPROVEMENTS

As the result of a recent conference between E. G. Connette, president of the International Railway, Buffalo, N. Y.; E. J. Dickson, vice-president; N. H. Brown, general superintendent of transportation, and T. W. Connette, superintendent of the Buffalo city lines, a faster car schedule has been put into effect and seventy cars have been added to the various lines throughout the city.

Two new substations are now in course of construction, and $150,000 will be spent to increase the capacity of the five substations now in operation. In the spring three more plants will be added to the equipment of the International Railway, making ten substations located in widely separated parts of the citl.

A new heating system has already been installed in 360 cars. Heaters are being placed near the conductors, who stand just inside the car in the near-side type of pay-as-you-enter cars, and in the front vestibule. Since April 1 the company has spent more than $1,250,000 in bringing the service, roadway and equipment up to the highest possible standard of efficiency.

Commenting on the comprehensive plan for the improvement of the service, Mr. Dickson said:

"Between April 1 and Dec. 1 much track was reconstructed, new paving laid, single tracks made double and other improvements carried out. Service on these streets has been greatly improved: Linwood Avenue; Grider Street, new double tracks; Harvard Place; Delavan Avenue; Abbott Road; Niagara Street; West Ferry Street; Allen Street; Military Road, and Elmwood Avenue. Improvements have also been made at Niagara Falls, N. Y., and at Tonawanda, North Tonawanda and Lockport. In all we have spent more than $1,250,000 in bringing the service, roadway and equipment up to the highest possible standard of efficiency."

The company is seeking permission from the Council to construct an extension across the southerly half of Kenmore Avenue between Kenmore Avenue and Main Street.

PRESIDENT LILIENTHAL'S COMMANDMENTS

Jesse W. Lilienthal, president of United Railroads, San Francisco, Cal., has adopted five commandments which he says must rule dealings of himself and his employees with the public. They are:

Accept loyally and without reservation the now universally proclaimed doctrine that a public utility is the servant of the people. Our courts of last resort have so declared.

Give affairs of the public utility the widest publicity. The public is entitled to know what you are doing and how you are getting along.

Treat your employees fairly and, so far as your resources will permit, generously.

Keep out of politics. I realize how great the temptation is to do just the contrary, for the public utility is the target for the politician.

Appeal to the public for fairness and justice. Deem it your right and duty to influence public opinion. Complain of the wrongs done you. Expose the methods of corrupt or unfair politicians. Combat the arguments of muckrakers and pseudo-reformers. Never allow an untrue charge to remain unchallenged. Circularize the public.

STORM DELAYS TRAFFIC

New Haven's Electric Zone Prostrated—Many Suburban Trolleys Suspend

The storm which prevailed over the Central West and the Great Lakes district during the latter part of the week ended Dec. 12 moved eastward and extended over almost the entire Atlantic coast on Dec. 13 and 14. It seems to have spent its fury, however, in the Hudson River Valley between Albany and New York and in the New England States west of Springfield, Mass.

The storm was ushered in with rain and a falling temperature. Then followed snow and an increase in wind velocity so that very unusual conditions were presented. On Dec. 14 Albany reported 20 in. of snow. In New York the fall averaged only 7 in. On the morning of Dec. 14 New York, Brooklyn, Staten Island and suburban New York reported practically all lines in operation.

The most complete suspension of service in New York was on the lines of the New York, New Haven & Hartford Railroad. This company did not begin to return to normal conditions until after noon on Wednesday. The electric zone was practically out of business, the few trains that were run being hauled by steam locomotives. The storm seemed to be the most severe between New Rochelle and Stamford, or 20 to 25 miles along the electrified main line of the New Haven. Here many poles carrying telegraph and telephone wires were blown down. Heavy transmission lines for electric current and contact wires were either burned in two or grounded in five places. Signal wires at many places were down, requiring trains to move slowly. Between New Haven and Boston the storm was not quite as heavy and the line was more nearly in a normal condition. On the other hand the New York Central Railroad succeeded in keeping open its electric zone to Harmon, and the New York, Westchester & Boston Railway was affected only for a few hours through the failure of its power supply from the New Haven road.

In Albany trolley traffic was blocked during the rush hours on the evening of Dec. 13. Electric railway traffic from Albany to Troy was stopped shortly before midnight on Dec. 13. The Cohoes, Green Island and Lansingburg lines also were stalled. Traffic on the Schenectady-Albany line was intermittent. The Albany Southern Railway had to cancel several trains. In Rensselaer the cars were kept running but nowhere near schedule time.

Reports from Troy, Schenectady, Gloversville, Poughkeepsie, Glens Falls, Pittsfield and other cities indicate conditions in those places varying for the most part but slightly from those experienced in Greater New York and Albany.

TERMINAL IMPROVEMENT PLANS FOR LOS ANGELES COMPLETED

Plans for elevated tracks and terminal improvements for the Pacific Electric Railway have been completed and the scheme has been approved by the Board of Public Utilities, which had previously ordered the company to execute, on or before July 1, 1916, whatever work was deemed necessary to relieve congested interurban traffic. An elevated steel structure approximately 2000 ft. long, carrying three tracks, will be erected along Sixth Street from the station at Main Street to San Pedro Street. Elevated loading and unloading platforms will parallel these tracks for about 1100 ft. These will support steel and reinforced concrete umbrella sheds, will have reinforced concrete decks and will be connected to the elevated tracks by steel and reinforced concrete bridges. Extensive alterations to the passenger station will be necessary to carry out the scheme. Exclusive of signal systems and tracks the cost is estimated at $166,000. It has not been decided whether the general structural work will be done by contract, but bids for steel and other materials are now being taken. For immediate relief of the congestion of traffic temporary tracks and sheds to cost about $7,000 will be constructed near the station. Plans are also being prepared for an umbrella shed and rearrangement of tracks at the western division station on Hill Street near Fourth Street.

MORE PEACE TALK IN WILKES-BARRE

Continued efforts to arrive at some definite solution acceptable to both sides in the Wilkes-Barre (Pa.) Railway strike have marked the work of the peacemakers. No attempts at violence have been made recently, except an attack by twenty armed men on the power plant of the company which has been used as a barracks for the men replacing the strikers. The disturbance took place in the dark of early morning, and while a shower of lead was poured into the building no serious damage was done and no one was injured. A number of policemen were quickly on the scene and dispersed the mob. No arrests were made.

The latest development in the peace proposals was a conference of two hours between T. A. Wright, general manager of the Wilkes-Barre Railway, and W. D. Mahon, president of the Amalgamated Association. This meeting was later followed by two others, and it is said that much progress was made toward settling the strike. It is understood that the company insists that the legality of the repudiation of the wage award by the arbitrators be adjudicated by a court, a judge or a lawyer. The men in return are asking, it is said, for a discipline clause which will protect the strikers from discrimination if peace comes.

PHILADELPHIA TRANSIT LOAN ELECTION ON FEB. 8

Ninety million dollars will be borrowed by the city of Philadelphia, Pa., subject to the approval of the people, to finance municipal improvements and developments to be inaugurated or continued during the next two years, under the terms of a loan ordinance introduced into Councils recently and favorably reported by the finance committee. A special election will be held on Feb. 8, 1916, when the citizens will vote upon the proposed loan, which will greatly increase the city's indebtedness. Of the total amount to be borrowed, $45,000,000 will be applied to the construction of the Broad Street subway and the Frankford elevated line, "and the construction of such other subway and elevated railways as shall be authorized by Councils."

To expedite the passage of the loan bill Councils unanimously adopted resolutions calling for stated sessions each Thursday until the end of the present year. Should any change be decided upon, the bill will be amended at one of the meetings. It was expected that on Dec. 16 the loan bill would pass both chambers. It is expected that Mayor Blankenburg will sign it without delay, and the thirty-day period for advertising will be ended in time for the election. In a message to Councils, sent before the loan bill was reported, Mayor Blankenburg transmitted a request from Director of City Transit Taylor that a special election be held to consider a $50,000,000 transit loan. The incorporation of $45,000,000 in the $90,000,000 will be satisfactory, it is believed. A. Merritt Taylor, director of city transit, says that with the amount asked it will be possible to complete the Broad Street, Frankford, Woodland Avenue and Parkway lines.

TENTATIVE SUBWAY PLAN IN PITTSBURGH

The City Council of Pittsburgh, Pa., has adopted a tentative plan for proceeding with the proposed downtown subway loop. A committee of the Council, in conference with the city law department, has prepared the following suggestions which, in the form of a resolution, will be presented to the newly-organized Council early in January:

1. Shall the city treat first with private corporations with the view of having the project undertaken by private capital on the basis of giving the municipality reasonable compensation for the franchise?

2. Shall we have an act prepared for introduction in the Legislature in 1917 authorizing the municipal ownership plan, and in the meantime seek to unite sentiment upon a measure and get through with as many of the preliminaries as possible?

3. Shall we, in the event of deciding upon municipal ownership, proceed at once to hold conferences with private corporations which might lease the subway with the view of securing agreements as to rental, etc.?

This discloses that the city does not have sufficient law now to build the subway itself and that a year's time, at least, would be saved by the private enterprise plan. There is ample authority now, of course, for building the tube privately.

It has been estimated that the proposed subway would cost about $5,000,000. It is regarded as time for general recognition that the downtown subway is the first thing to be provided in any system for the relief of the traffic congestion. Differences over the plans for the building of a subway by the city resulted in the Governor vetoing two measures for that purpose passed at the last session of the Legislature.

CONVENTION OF AMERICAN ASSOCIATION OF ENGINEERS

At the first national convention of the American Association of Engineers held in Chicago, Dec. 10 and 11, 1915, Arthur Kneisel, secretary, reported that the membership had grown to 330 since the association's inception six months ago. F. H. Newell, professor of civil engineering, University of Illinois, and a former director of the United States Reclamation Service, addressed the association on the constructive work which an organization of all the engineers of this country could do. Other speakers were W. D. Wilcox, president of the association, G. Willard Rich of Rochester, N. Y., and J. H. Prior, chief engineer of the State Public Utilities Commission of Illinois. A banquet was held on the evening of Dec. 10.

FURTHER FRANCHISE DISCUSSION IN TOLEDO

Frank E. Seagraves, who has had forty years of experience in the construction and operation of city and suburban railways, spoke before the subcommittee of Mayor-elect Milroy's street railway committee at Toledo, Ohio, on Dec. 7. He declared that he had voted against the Dotson franchise because he believed it would have settled only one question, namely, the length of the grant. Mr. Seagraves urged that any franchise granted be put into language that can have but one interpretation, and that experienced railway builders be employed to make the valuation on which the fare shall be based. He urged a fair franchise for a term of twenty-five years, but expressed the opinion that the property was worth less than $14,000,000, for which it is bonded. He thought that seven tickets for a quarter would be adequate. The Central Labor Union has adopted a resolution not to act in the street railway matter until the Milroy committee makes its report. A committee has been appointed by the City Council to communicate with the State Public Utilities Commission in regard to making an appraisal of the street railway property for franchise purposes.

Operation Begun by Portland & Oregon City Railway.—Operation has been begun by the Portland & Oregon City Railway, Portland, Ore., between Milwaukee and Carver.

New Florida Line Opened.—The Miami (Fla.) Traction Company has placed in operation the first section of its line. The system as at present proposed provides for 3½ miles of line.

Can't Give Railway Away.—The voters of Port Vue, Pa., have rejected the proposal of Gilbert F. Myer, general manager of the Port Vue Street Railway, who offered the 1-mile line of the Port Vue Street Railway to the borough with all equipment if the borough would agree to operate the line for five years.

Appraisals for Rate Purposes Only in Ohio.—The Public Utilities Commission of Ohio will make no more appraisals of public utility properties unless it is necessary to do so in order to determine rate contests. Under a law enacted last winter the commission may use its judgment as to making appraisals.

Hearings Before Whole Commission in New York.—On motion of Commissioner William Hayward, hearings before the Public Service Commission for the First District of New York will hereafter be set down for conduct before the whole commission, instead of being assigned to individual commissioners.

Abandonment of Short Line Permitted.—On an opinion by Commissioner Frank Irvine the Public Service Commission for the Second District of New York has permitted the Binghamton Railway to abandon its line on Glenwood Avenue between the intersection of Downs and Glenwood Avenue and Prospect Street in Binghamton. The track to be abandoned is about 600 ft. long.

Lincoln Company Seeks to Suspend.—The Lincoln Railway & Heating Company, Lincoln, Ill., has applied to the State Public Utilities Commission for permission to discontinue all street railway service in the city, upon the grounds that it is working under a daily loss and that debt is accumulating. No date has been set as yet for the hearing of the case by the State Public Utilities Commission.

Strike on Depew Line Still in Progress.—U. L. Upson, superintendent of the Buffalo & Depew Railway, Buffalo, N. Y., is acting as motorman and conductor on a car operating over the line between certain hours of the day. As previously reported in the ELECTRIC RAILWAY JOURNAL, the employees of the company are on strike for increased wages. Traffic has been abandoned for several weeks. No disorder has been reported.

Extension of Time for Installing Signals on New York Elevated.—The Public Service Commission for the First District of New York has adopted an order extending the time during which the Interborough Rapid Transit Company is to make an experimental installation of a system of signaling on the elevated railroads operated by it. The order directs the company to make such an installation by Feb. 1, 1916, and to report the result of the test to the commission by Aug. 1, 1916.

Interurban Interested in Cincinnati Rapid Transit System.—The receivers of the Interurban Railway & Terminal Company have requested permission to study the plans and reports pertaining to the proposed rapid transit belt line in Cincinnati. On Dec. 10 City Engineer Krug replied to a criticism made by W. L. Woodward of the plans now under consideration. Mr. Woodward contended that persons in certain parts of the outskirts would be forced to go down-town in order to reach other outlying points. Mr. Krug said that the surface lines, which are to be a part of the belt, will take care of this matter.

Company Wins Brooklyn Third-Tracking Case.—A decision favorable to the Brooklyn (N. Y.) Rapid Transit Company was rendered on Dec. 9, by ex-Judge Charles F. Brown, who sat as referee in the Fulton Street elevated railway third-tracking case, which was brought before him on the protest of property owners along the line of upper Fulton Street. Under ex-Judge Brown's opinion the railroad's solid girder type of construction is entirely legal, and the way is thus opened for the Public Service Commission to approve the plans for the third-tracking of the Fulton Street elevated line of the company below Nostrand Avenue with the same type of construction as that used north of that point. All this work had been held up pending the decision of the referee.

Report on Cleveland Railway Funds Requested.—The Council of Cleveland, Ohio, has adopted Councilman Wood's resolution requesting a report from Street Railway Commissioner Peter Witt on the status of the Cleveland Railways operating, interest and maintenance funds, together with funds available for paying over-expenditures. According to the company the interest fund had shown an increase of $200,036 for the last ten months, and by Jan. 1, 1916, about $100,000 more will be added to it. Since March 1, 1913, a deficit of $558,876 has accumulated in the maintenance fund. This is in the shape of over-expenditure and will have to go over to the new administration.

Hot Springs Prosperity Week Celebration.—The celebration that attended Electrical Prosperity Week at Hot Springs, Ark., the national health and pleasure resort, was perhaps the most elaborate of its kind ever held there. Stephen Mather, assistant secretary of the Interior, and Dr. W. P. Parks, superintendent of the United States Reservation, represented the government. The Business Men's League, the Merchants Association and all lines of trade took part in the parade on the night of Dec. 2. One of the features of the parade was the exhibition of the Hot Springs Street Railway, which had in line a mule-drawn street car used thirty years ago followed by a modern, double-truck car brilliantly illuminated with colored electric lights and occupied by young girls who sang patriotic songs.

Seattle Litigation Ended by Court Decision.—Judge Charles E. Claypool, in the United States District Court, in Seattle, Wash., has found judgment of $41,700 against the city of Seattle, in favor of the Seattle, Renton & Southern Railway for the changing of the grades on Rainier Avenue. The plaintiffs, represented by William R. Crawford, former president of the Seattle, Renton & Southern Railway, claimed damages of more than $400,000 as a result of the regrading. Judge Claypool also finds that the company should be required to adjust its tracks to the new grades of Rainier Avenue, without further payment from the city, and that the company is not entitled to any judgment for the paving of the 18 ft. of the center of Rainier Avenue, from Jefferson Street to the south city limits, but that under the provisions of its franchise it may be required to pave that 18 ft., with the same material and at the same time that the city paves the remaining portions of the street. The court held further that the Seattle, Renton & Southern Railway has no right to the exclusive use of the right-of-way on Rainier Avenue, between Jackson Street and Ryan Street, with the exception of that portion lying between Kenyon and Thistle Streets. This decision ends litigation that has been in progress for six years.

Franchise Problems in San Francisco.—M. M. O'Shaughnessy, city engineer of San Francisco, Cal., in a statement to the Board of Supervisors on Dec. 9 declared that there is no probability of an agreement being reached between the city and the United Railroads for the use of upper Market Street by the proposed Church Street municipal car line. Mr. O'Shaughnessy recommends that litigation be started to compel the company to give the city line the right to use this thoroughfare, as in the event of a different routeing being necessary the additional cost will amount to approximately $110,000. The matter was taken up with the United Railroads by the Mayor and the city attorney early this year, but no satisfactory arrangement could be made. In response to an inquiry sent the United Railroads by the city on Nov. 3, it is reported that Jesse W. Lilienthal, president of the company, replied that the proposed method would mean a loss of $157,935.50 per annum to his company; that his company is advised that the franchise under which it is operating forbids the use of United Railroad tracks, or the construction of parallel tracks by a foreign company for a distance of more than five blocks on any street; and that the very life of his company depends on the correctness of this view. The same issue will be brought up again when the Twin Peaks Tunnel is completed, the city engineer points out. He proposes that the city purchase the lines of the United Railroads where future municipal extensions are planned.

Financial and Corporate

ANNUAL REPORTS

Chicago Elevated Railways Collateral Trust

The income statement of the Chicago (Ill.) Elevated Railways Collateral Trust for the year ended Dec. 31, 1914, follows:

Dividends	$1,109,798
Interest	718,250
Gross income	$1,828,049
Interest on notes and debentures	$1,310,000
General expense	33,350
Total disbursements	$1,343,350
Net income	$484,698
Dividends on preferred	480,000
Surplus income	$4,638

The report states that the $30,000,000 of the three-year 5 per cent notes of the trustees, issued under date of July 1, 1911, matured and were paid on July 1, 1914. In order to raise the funds to make this payment the trustees sold the following securities: (1) $12,500,000 of the first mortgage 5 per cent bonds of Northwestern Elevated Railroad, due in 1941, being part of the total issue of $25,000,000 held by the trustees; (2) $14,000,000 of two-year 5 per cent notes issued by the trustees under date of July 1, 1914, secured by a pledge of substantially all the capital stock of the Northwestern Elevated Railroad, the Metropolitan West Side Elevated Railway and the South Side Elevated Railroad; (3) $7,000,000 of ten-year 6 per cent debentures issued by the trustees under date of July 1, 1914.

In connection with the sale of $12,500,000 of bonds of the Northwestern Elevated Railroad above mentioned, the remainder of that issue ($12,500,000) was deposited in escrow with the Central Trust Company, New York, under an arrangement whereby they can be released only against permanent improvements upon the property of the Northwestern Elevated Railroad and that company is relieved from paying interest on them until released.

The refinancing of July 1, 1914, together with the decrease in net earnings of the subsidiary companies (caused largely by decreased traffic and increased operating expenses), resulted in a diminished income to the trustees, and they felt obliged to discontinue payment of dividends on the preferred participation shares until conditions should improve. No dividends have been paid on those shares since June 1, 1914.

During the year the trustees acquired the following securities (exclusive of bills receivable of the subsidiary companies), which are included among the current assets: $16,000 of Chicago & Oak Park Elevated Railroad equipment 6 per cent notes; $504,000 of Chicago & Oak Park Elevated Railroad receiver's certificates; $174,000 of Metropolitan West Side, Northwestern and South Side Elevated Railroad 5 per cent equipment trust certificates dated Aug. 1, 1914, Series "B," and $1,000 South Side Elevated Railroad 4½ per cent bond.

The income statement of the trust above submitted does not indicate the full amount of the net earnings of the subsidiary companies, but only that portion which was received by the trustees by way of dividends from those companies. The combined income statement of the Metropolitan West Side Elevated Railway, the South Side Elevated Railroad and the Northwestern Elevated Railroad was published in the ELECTRIC RAILWAY JOURNAL of Dec. 4. The Chicago & Oak Park Elevated Railroad continues to be operated by Samuel Insul, as receiver, for the United States District Court.

Eastern Pennsylvania Railways

According to the consolidated statement of income, profit and loss of the Eastern Pennsylvania Railways, Pottsville, Pa., and its subsidiary companies for the twelve months ended June 30, 1915, the gross earnings for the year were $825,455, and operating expenses and taxes, $486,570, leaving net earnings from operation, $338,885. Interest and rental charges were $227,783, giving a net profit for the year of $111,102.

Compared with the year ended June 30, 1914, the gross earnings showed a decrease of $960 or 0.12 per cent. The operating expenses decreased $16,917 or 3.36 per cent, and the net profit for the year increased $12,192 or 12.33 per cent. The earnings of the railway department decreased $26,469 or 4.84 per cent, which was caused by the general depressed business condition prevailing throughout the territory served by the company, curtailment of mining operations, and jitney competition. This decrease was slightly more than offset by an increase of $26,609 or 9.82 per cent in the earnings of the electric department, which is accounted for by an increased number of lighting and power contracts made during the year. The earnings of the gas department increased $99 or 1.56 per cent, while the revenue from the park department decreased $1,199 or 50.41 per cent.

During the year there was expended for maintenance $123,437, of which $82,485 was for the railway department, $39,896 for the electric department and $1,055 for the gas department. There was also charged to capital account during the year $107,376 for the railway department and $33,733 for the electric department, making a total of $141,110.

SECURITIES TO BE DISTRIBUTED

Bondholders' Protective Committee of Trenton, Bristol & Philadelphia Street Railway Will Divide Bonds and Stock Among Holders of Deposit Certificates

The bondholders' protective committee of the Trenton, Bristol & Philadelphia Street Railway, Philadephia, Pa., composed of John Redwood, Grier Hersh, S. C. Rowland, W. F. Sadler, Jr., C. N. Martin, W. A. House, C. T. Crane and Robert Toland, has concluded that the time has arrived to distribute the securities of the company among the holders of certificates of deposit representing bonds of the predecessor company. In August, 1909, the property and franchises of the Philadelphia, Bristol & Trenton Street Railway were purchased at public sale for the bondholders' committee. The committee then organized the Trenton, Bristol & Philadelphia Street Railway to take over the property, the members of the committee, with one or two exceptions, being the directors.

When the present company acquired the property it issued $350,000 of notes to the committee, to be later refunded by bonds. On March 1, 1913, an issue of $750,000 of first mortgage bonds having been authorized, $406,000 of bonds were issued in temporary form to the committee to refund the above-mentioned notes, together with $56,000 of accrued interest thereon to Jan. 1, 1913. The company further issued its note for $4,200 to refund the interest on the $350,000 of notes from Jan. 1, 1913, to March 1, 1913. Since that date no interest has been paid on the bonds or note, the earnings being required for improvements, and the interest has simply been carried on the company's books as a liability. It is proposed now to cancel this liability, exchange the $406,000 of temporary bonds for permanent engraved bonds, and issue $4,800 of additional bonds to refund the above-mentioned note and accrued interest to March 1, 1915. This will give the committee $410,800 of first mortgage bonds for distribution among those who are holding the certificates of deposit.

The present stock is $325,000 in $50 shares. Nearly $90,000 of earnings has been spent for new construction and permanent improvements. It is proposed to increase the authorized stock to $500,000 and to issue $85,800 of additional stock to capitalize a like amount expended for permanent improvements. This will give the committee $410,800 of stock for distribution among the holders of certificates of deposit.

Since there are outstanding $632,000 of certificates of deposit, the foregoing plan of distribution will entitle the holder of each $1,000 face amount of certificates of deposit to receive $650 in first mortgage bonds and $650 in stock of the present company. The new securities will be exchanged for the certificates of deposit on this basis at the Union Trust Company of Maryland, Baltimore, Md., on and after Dec. 15. Funds for the payment of the first semi-annual interest coupon on the new bonds, dated

Sept. 1, are now on deposit with this trust company.

When the present company first took over the property and franchises of the Philadelphia, Bristol & Trenton Street Railway, extensive repairs were necessary to keep the line going, and as the company had little or no credit of its own it was necessary to use all of the earnings for upkeep, new construction and permanent improvements. During the last five years the roadbed has been largely rebuilt with new ties and rail, the overhead line overhauled and power house additions made. Practically every bridge has been rebuilt, either by the company alone or in conjunction with the public authorities. The break in the line at the Borough of Bristol requiring the operation of two separate lines was connected about two years ago, which has resulted in increased traffic and a decrease in operating expenses. The earnings for the five years are said to show gratifying results.

Aberdeen (S. D.) Railroad.—The Aberdeen Railway, which was sold at receiver's sale last August, is now succeeded by the Aberdeen Railroad. Of authorized issues of $250,000 of stock and $100,000 of bonds, $100,000 and $12,000 respectively have been put out.

Barcelona Traction, Light & Power Company, Barcelona, Spain.—Arrangements have been made in Toronto and London to exchange interim certificates representing 5 per cent ten-year notes for the interest coupons of Dec. 1, 1914, and June 1, 1915, on the 5 per cent first mortgage bonds of the Barcelona Traction, Light & Power Company. The discharge of the interest in this manner is in accordance with a resolution previously adopted by the bondholders, as noted in the ELECTRIC RAILWAY JOURNAL of July 17.

Brooklyn (N. Y.) Rapid Transit Company.—The New York Stock Exchange has listed $20,000,000 of six-year 5 per cent secured gold notes of the Brooklyn Rapid Transit Company sold last October, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 9.

Central Park, North & East River Railroad, New York, N. Y.—Judge Dickinson, in the United States District Court at Philadelphia, on Dec. 1 dismissed the $2,000,000 suit of Richard B. Kelly, a minority stockholder, against George W. Elkins and the estates of P. A. B. Widener and Thomas Dolan, for alleged neglect of duty as directors of the defunct Central Park, North & East River Railroad in New York City. The court held that recovery was barred by the statute of limitations. Permission was granted the plaintiff, however, to move within thirty days to amend his statement in an effort to bring it within the six-year statutory period.

Chicago & Milwaukee Electric Railroad, Highwood, Ill.—Federal Judges Landis and Geiger have ordered the Chicago & Milwaukee Electric Railroad sold at receivers' sale on April 1. This company, which has been in the hands of receivers for several years, was sold in 1912, but a resale was ordered on account of the suppression of bids.

Detroit (Mich.) United Railway.—The Detroit United Railway has received authority from the Michigan Railroad Commission to issue $3,500,000 of 5 per cent collateral trust notes, dated Feb. 6, 1916, and maturing on May 5, 1918. A part of the proceeds will be used to retire $2,000,000 of collateral trust two-year notes due on Feb. 5, 1916, and for betterments and extensions. The notes had been sold to William A. Read & Company, subject to the approval of the commission.

Eastern Pennsylvania Railways, Pottsville, Pa.—The Pottsville Union Traction Company, which is owned and operated by the Eastern Pennsylvania Railways, recently filed with the Pennsylvania Public Service Commission a certificate of notification regarding the proposed issuance of $56,000 of second mortgage thirty-year 6 per cent gold bonds dated Feb. 1, 1913. The bonds will be delivered to the Eastern Pennsylvania Railways to reimburse that company for betterments and additions made by it to the lines of the subsidiary company.

Eastern Texas Electric Company, Beaumont, Tex.—The Eastern Texas Electric Company has called for payment on Jan. 1, at par and interest, its $500,000 of three-year 6 per cent notes due on July 1, 1916. The holders of these notes have taken the larger part of a new issue of $500,000 of three-year 6 per cent gold coupon notes dated Dec. 1, 1915, and due on Dec. 1, 1918, but callable as a whole at 100 and interest on thirty days' notice. Stone & Webster, Boston, Mass., are offering these new notes at 99 and interest, to yield 6.37 per cent.

Empire United Railways, Inc., Syracuse, N. Y.—A new committee representing holders of Rochester, Syracuse & Eastern Railroad first mortgage 5 per cent bonds has been formed to further the proposed reorganization plan described in the ELECTRIC RAILWAY JOURNAL of Dec. 11. The members are: W. L. Smith, A. N. Ellis, D. R. Cobb and E. F. Brown. The Central City Trust Company, Syracuse, and the Equitable Trust Company, New York, have been appointed depositaries for the bonds.

Fort Wayne & Springfield Railway, Decatur, Ind.—The property of the Fort Wayne & Springfield Railway was sold on Dec. 2 at receiver's sale to Charles H. Worden, trustee, Fort Wayne. Mr. Worden is vice-president of the First National Bank, Fort Wayne, and in his purchase represents his bank and other interests which held receiver's certificates of the company. For the present the road will continue operation on practically the same basis as when operated by the receiver, French Quinn, for the last three years. Just what will ultimately be done by the new owners has not yet been determined. The trustee has appointed Sam W. Greenland as general manager of the property, the road to be operated by Mr. Greenland in connection with his present office of general manager of the Fort Wayne & Northern Indiana Traction Company.

Illinois Traction System, Peoria, Ill.—It is reported that the board of directors of the Illinois Traction System has authorized the issuance of $257,000 of 5 per cent debentures, due in 1925, the proceeds being required for discharging obligations of the company. The Bloomington, Decatur & Champaign Railroad has applied to the Illinois Public Utilities Commission for an order authorizing the issue of $500,000 of its Series A preferred stock. The St. Louis, Springfield & Peoria Railroad has applied to the commission for an order authorizing the issue of $1,000,000 of its Series A preferred stock. Both companies are controlled by the Illinois Traction System.

Interborough Rapid Transit Company, New York, N. Y.—Lee, Higginson & Company and N. W. Harris & Company, Boston, and Kissel, Kinnicutt & Company, New York, are offering $25,000,000 of first and refunding mortgage 5 per cent gold bonds of the Interborough Rapid Transit Company, dated 1913 and due on Jan. 1, 1916. These bonds are callable at 110 and interest on any interest date in any amount for the sinking fund, or at the option of the company either as a whole or in blocks of not less than $500,000. It is estimated that about $32,000,000 of additional bonds will be issued to provide for the completion of the rapid transit construction authorized between the city and the company, and of these additional bonds $5,000,000 are included in the $25,000,000 now being offered.

Kansas Electric Utilities Company, Lawrence, Kan.—It is now announced that the Kansas Electric Utilities Company will take over in fee the properties owned and operated as the Parsons Railway & Light Company, the Emporia Railway & Light Company and the Lawrence Railway & Light Company, and these companies will be dissolved after the transfer of properties. A previous note referring to the amalgamation was published in the ELECTRIC RAILWAY JOURNAL of Nov. 27. The Kansas Electric Utilities Company has an authorized stock issue and an authorized bond issue of $1.750,000. This company will be controlled by the Consolidated Utilities Company, a holding company being organized under the laws of Delaware, and it will be operated by the Albert Emanuel Company, Dayton, Ohio, Mr. Emanuel being the new president.

Norton & Taunton Street Railway, Norton, Mass.—Pursuant to a decree of the Supreme Court of Massachusetts for the County of Suffolk the property of the Norton & Taunton Street Railway will be offered for sale under foreclosure on Jan. 7, 1916, at Norton to satisfy a first mortgage, under which the American Trust Company is trustee for the bondholders. The upset price is fixed at $75,000 and the purchase must be made subject to taxes, unpaid current liabilities of the receiver, etc.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—The Petaluma & Santa Rosa Railway has applied to the California Railroad Commission for authority to issue additional 6 per cent coupons to be attached to second mortgage bonds payable on April 1 and Oct. 1, 1916, and April 1, 1917. There are 250 of these bonds outstanding, of the denomination of $1,000 each.

Philadelphia Company, Pittsburgh, Pa.—The New York Stock Exchange has authorized the listing of an additional $1,400,000 of common stock whenever issued and paid for in full. The total amount listed is now $39,900,000. The stock in question has been sold for general purposes, since the notes for the conversion of which it was reserved have been paid.

Public Service Corporation of New Jersey, Newark, N. J.—The Bergen County Board of Freeholders having voted to take over the 7½-mile Bergen Turnpike between Hackensack and the Hudson County line, the Public Service Corporation of New Jersey has turned this over to the county for $1, and will give a bond to assure the payment of $1,000,000 of 5 per cent bonds issued in 1901 by the Bergen Turnpike Company. The Jersey City, Hoboken & Paterson Railway, now merged with the Public Service Corporation of New Jersey, owned a majority of the stock of the turnpike company and guaranteed its bond issue.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The July 2, 1915, coupons on the $2,134,000 of "Oakland Traction Consolidated" general consolidated mortgage gold 5 per cent bonds of 1905, due in 1933, of the San Francisco-Oakland Terminal Railways may be now cashed from funds deposited with the Wells Fargo Nevada National Bank, San Francisco, and the National Park Bank, New York. Previous items with reference to deferred coupon payments of this company appeared in the ELECTRIC RAILWAY JOURNAL of Sept. 11, Oct. 23 and Oct. 30. Funds for the payment of all matured coupons are now on deposit with the agents of the company, with the exception of those on the $3,177,000 of Oakland Traction Company general consolidated mortgage sinking fund 5 per cent bonds of 1907, due in 1935, and the $1,587,000 of San Francisco, Oakland & San José Consolidated Railway general consolidated mortgage sinking fund 5 per cent bonds of 1908, due in 1938. The company will continue as heretofore the accumulation of daily deposits to pay interest.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—The Cities Service Company has called for payment on Dec. 27 at par and accrued interest the outstanding $718,000 of St. Joseph Railway, Light, Heat & Power Company 6 per cent sinking fund stock trust certificates. On Dec. 1, 1914, $1,118,000 of these certificates were issued and sold, with the Guaranty Trust Company as trustee, a certain amount being retired each month by a sinking fund. The last of the certificates is due May 20, 1917.

Syracuse & South Bay Electric Railroad, Syracuse, N. Y.—The sale of the Syracuse & South Bay Electric Railroad and the Syracuse, Watertown & St. Lawrence River Railroad is to take place on Jan. 21. These two companies were placed in the hands of Ernest Gonzenbach as receiver earlier in the year, as noted in the ELECTRIC RAILWAY JOURNAL of May 29.

United Railroads of San Francisco, San Francisco, Cal.—The United Railroads of San Francisco has applied to the California Railroad Commission for authority to issue $1,800,000 of 6 per cent two-year promissory notes, and $2,250,000 of 5 per cent gold bonds to mature in 1924 as security for the notes. The notes are to redeem the balance due on the Market Street Cable Railway bonds issued in 1882 for $3,000,000, of which sum $1,200,000 has been paid.

Utah Securities Corporation, New York, N. Y.—The Utah Securities Corporation has deposited with the Guaranty Trust Company, New York, $3,000,000 to purchase for retirement as many of the company's ten-year 6 per cent notes as can be obtained with that sum. Tenders of the notes will be received up to Dec. 22. The deposited cash was secured by the sale of $3,000,000 of 7 per cent first preferred stock of the Utah Power & Light Company to the Electric Bond & Share Company. The tenders in the case of the $1,000,000 cash deposited for notes up to Dec. 2 ran as high as 93.5 and interest.

Vera Cruz Electric Light, Power & Traction Company, Vera Cruz, Mex.—The net earnings of the Vera Cruz Electric Light, Power & Traction Company for 1914, converted at the parity of exchange, leave a balance, after meeting all expenses and debenture interest, of £34,980. Owing to the heavy loss of £33,960 in exchange, however, the available balance of profit is reduced to £1,020, to which should be added the balance of £12,997 brought forward, making £14,017. This, owing to the present conditions in Mexico, the directors propose to carry forward. The directors report that, notwithstanding the continued political disturbance in Mexico, the property of the company has suffered no damage. The supply of power from the Puebla Tramway Light & Power Company commenced in January, 1915, and practically the whole of the company's power is now obtained from that company. The extension of the tramway system has now been completed and is working satisfactorily.

Wellsville & Buffalo Railroad, Buffalo, N. Y.—The Wellsville & Buffalo Railroad was incorporated on Dec. 10 with $850,000 of capital stock. Its purpose is stated to be the operation of 85 miles of steam, gasoline or electric railroad from Wellsville to Buffalo. The directors include C. A. Finnegan, Theodore Hofeller and Abraham Weber, who recently purchased the abandoned line of the Buffalo & Susquehanna Railway between Buffalo & Wellsville. This purchase was mentioned in the ELECTRIC RAILWAY JOURNAL of Dec. 11 as being made from the Buffalo & Susquehanna "Railroad," but this company has been reorganized as the Buffalo & Susquehanna Railroad Corporation and is quite distinct from the Buffalo & Susquehanna "Railway," which was the property sold to the syndicate above mentioned.

Winona Interurban Railway, Warsaw, Ind.—A protective committee composed of J. D. Mortimer, S. J. Straus, M. W. Babb and S. C. Hubbell is asking for deposits of the $750,000 of twenty-year first mortgage 5 per cent gold bonds of 1905 of the Goshen Division of the Winona Interurban Railway on or before Jan. 15 with the Central Trust Company of Illinois, Chicago, as depositary under an agreement dated Dec. 4, 1915. A plan for the readjustment of the bonded indebtedness of this company, so as to insure the payment of interest on the present income, was described in detail in the ELECTRIC RAILWAY JOURNAL of Oct. 9. Pending negotiations under this plan, the Oct. 1 interest on the $1,593,700 of bonds of the Peru Division was not paid.

York (Pa.) Railways.—The York Railways has issued a notice calling for the surrender of all dividend scrip on Jan. 30, 1916. Payment at par and accrued interest will be made by Brown Brothers & Company, New York. The company also has purchased, it is said, about all of its $500,000 of one-year 6 per cent notes maturing on Feb. 1, 1916 (renewed from Feb. 1, 1915), and after that date will be practically without debt except as to first mortgage bonds. The company has increased the number of directors from seven to nine and elected John E. Zimmermann and Charles H. Bean to the newly-created places.

DIVIDENDS DECLARED

American Cities Company, New York, N. Y., 1½ per cent, preferred.

Boston & Worcester Electric Companies, Boston, Mass., $1, preferred.

Capital Traction Company, Washington, D. C., quarterly, 1¼ per cent.

Cleveland (Ohio) Railway, quarterly, 1½ per cent.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred.

Eastern Power & Light Corporation, New York, N. Y., quarterly, 1½ per cent, preferred.

El Paso (Tex.) Electric Company, 3 per cent, preferred; quarterly, 2½ per cent, common.

Manila Electric Railroad & Light Corporation, Manila, P. I., quarterly, 1½ per cent.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred; one-half of 1 per cent, common.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Springfield Railway, Light & Power Company, Springfield, Mo., quarterly, 1¾ per cent, preferred.

Toronto (Ont.) Railway, quarterly, 2 per cent.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.

Union Traction Company, Philadelphia, Pa., $1.50.

West India Electric Company, Ltd., Kingston, Jamaica, quarterly, 1¼ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.						
1m., Oct.,	'15	$167,521	$102,399	$65,122	$41,277	$23,845
1 " "	'14	172,580	116,428	56,152	39,483	16,669
4 " "	'15	713,318	447,046	266,272	162,740	103,532
4 " "	'14	783,790	477,125	306,665	159,067	147,598
BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.						
1m., Oct.,	'15	$71,610	*$35,587	$36,023	$17,613	$18,410
1 " "	'14	69,422	*30,533	38,889	17,370	21,519
12 " "	'15	785,895	*392,726	393,169	212,211	180,958
12 " "	'14	778,690	*374,603	404,087	208,884	195,203
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.						
1m., Oct.,	'15	$98,155	*$62,535	$35,620	$30,240	$5,380
1 " "	'14	88,261	*58,067	30,194	28,655	1,539
12 " "	'15	1,057,096	*723,875	333,221	356,814	†23,593
12 " "	'14	1,108,598	*698,404	410,194	333,135	77,059
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO.						
1m., Oct.,	'15	$34,361	*$17,523	$16,838	$11,084	$5,754
1 " "	'14	33,347	*17,853	15,494	10,844	4,650
10 " "	'15	341,456	*185,541	155,915	109,842	46,073
10 " "	'14	349,420	*186,014	163,406	110,006	53,400
COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO.						
1m., Oct.,	'15	$272,152	*$155,914	$116,238	$40,189	$76,049
1 " "	'14	262,685	*146,703	115,982	38,934	77,048
12 " "	'15	3,076,070	*1,828,835	1,247,235	473,115	774,120
12 " "	'14	3,069,757	*1,918,374	1,151,383	473,642	677,741
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.						
1m., Oct.,	'15	$1,245,866	*$650,441	$595,425	$373,097	$222,328
1 " "	'14	1,184,387	*640,140	544,247	354,160	190,087
12 " "	'15	14,173,088	*7,532,353	6,640,735	4,385,885	2,254,850
12 " "	'14	14,097,324	*7,708,682	6,388,642	4,149,614	2,239,028
CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.						
1m., Oct.,	'15	$226,793	*$130,373	$96,420	$65,507	$30,918
1 " "	'14	214,808	*124,150	90,658	62,050	28,608
12 " "	'15	2,598,663	*1,482,210	1,116,453	785,452	331,001
12 " "	'14	2,514,508	*1,437,982	1,076,526	761,103	315,428
EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.						
1m., Oct.,	'15	$222,456	*$125,272	$97,184	$63,051	$34,133
1 " "	'14	216,801	*130,395	86,406	62,175	24,231
12 " "	'15	2,430,418	*1,436,389	994,029	760,804	233,225
12 " "	'14	2,686,595	*1,673,694	1,012,901	668,393	344,508
GRAND RAPIDS (MICH.) RAILWAY						
1m., Oct.,	'15	$97,125	*$71,592	$25,533	$14,061	$11,472
1 " "	'14	102,963	*70,443	32,520	13,990	18,530
12 " "	'15	1,189,541	*826,025	363,516	164,352	199,164
12 " "	'14	1,286,295	*834,409	451,886	160,123	291,763
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.						
1m., Oct.,	'15	$63,932	*$40,069	$23,863	$15,951	$7,912
1 " "	'14	57,309	*37,506	19,803	15,569	4,234
12 " "	'15	722,203	*469,777	252,426	189,242	63,184
12 " "	'14	679,626	*463,852	215,774	185,789	29.985
NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.						
1m., Oct.,	'15	$189,636	*$121,088	$68,548	$43,141	$25,407
1 " "	'14	191,814	*108,204	83,610	41,921	41,689
12 " "	'15	2,135,656	*1,299,749	835,907	497,717	338,190
12 " "	'14	2,246,484	*1,365,687	880,797	495,560	385,237
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO						
1m., Oct.,	'15	$339,599	$206,249	$133,350	$54,358	$78,992
1 " "	'14	304,413	190,988	113,425	50,858	62,567
10 " "	'15	3,168,960	1,954,982	1,213,978	521,028	692,950
10 " "	'14	3,032,972	1,854,005	1,178,967	506,104	672,863
PORTLAND (ME.) RAILROAD						
1m., Oct.,	'15	$92,502	*$56,739	$35,763	$21,115	$14,648
1 " "	'14	87,095	*53,623	33,472	19,193	14,279
12 " "	'15	1,055,527	*657,972	397,555	263,118	134,437
12 " "	'14	1,042,698	*643,206	399,492	254,031	145,461
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.						
1m., Oct.,	'15	$453,225	*$257,246	$195,979	$182,766	$13,213
1 " "	'14	510,812	*257,706	253,106	183,914	69,192
12 " "	'15	5,582,361	*3,080,788	2,501,573	2,209,207	292,366
12 " "	'14	6,447,772	*3,298,883	3,148,889	2,158,547	990,342

*Includes taxes. †Deficit.

Traffic and Transportation

COMPANY LOSES TRENTON FARE CASE

Commission Disapproves Withdrawal of Six-for-a-Quarter Tickets—Appeal to Supreme Court

The Board of Public Utility Commissioners of New Jersey on Dec. 14 handed down its decision in the case in which the city of Trenton sought to prevent the Trenton & Mercer County Traction Corporation from withdrawing from sale its six-for-a-quarter tickets. The board holds "that the proposed withdrawal of the sale of six tickets for 25 cents by the Trenton & Mercer County Traction Corporation, and the increase, change or alteration in charge, rate or classification which would result therefrom is not just and reasonable and disapproves the same."

Under date of Aug. 13, 1915, the company notified the board that it proposed to discontinue the sale of the tickets and charge a 5-cent fare, and in a later communication advised the board that the change would become effective on Aug. 20. On Aug. 17 the board entered an order suspending the increase. The company then appealed to the United States District Court for an injunction to restrain the commission and the city from interfering with the elimination of the six-for-a-quarter tickets. Meanwhile the commission on account of the court action continued its hearing without taking testimony. Subsequently the court recognized the jurisdiction of the commission in the case. The commission then proceeded with the hearings. These hearings were reviewed briefly in the ELECTRIC RAILWAY JOURNAL of Oct. 30, page 931, and Nov. 20, page 1058. The company expects to take the case to the Supreme Court for review.

CONTENTION THAT ILLINOIS UTILITIES ACT IS UNCONSTITUTIONAL

In a cross-bill filed in the Circuit Court in the suit commenced by the city of Chicago questioning the jurisdiction of the Illinois Public Utilities Commission, the attorneys for the surface railways in Chicago contend that the commission act is unconstitutional. The filing of this cross-bill puts the railway companies and the city in the position of complainants and the Public Utilities Commission as defendants. The complainants in the cross-bill include the Chicago City Railway, the Chicago Railways, the Calumet & South Chicago Street Railway and the Southern Street Railway. The bill sets forth that the provision of the utilities act giving the commission control over the street railways of Chicago, violates the section of the State constitution, which confers this jurisdiction upon cities. It also declares that the legislative, executive and judicial powers conferred upon the commission are contrary to the constitution. A question is also raised as to the validity of the provision which constitutes the Circuit Court of Sangamon County a court of appellate jurisdiction. The cross-bill states further that the enforcement of the commission's service order would prevent the companies from meeting traffic demands during the rush hours and would cause intolerable delay, annoyance and inconvenience to the traveling public. The bill finally asks the court to decree that the order of the commission is null and void.

The salient features of the order issued by the commission fixing service standards in Chicago were referred to in the ELECTRIC RAILWAY JOURNAL of Oct. 9, page 775.

WESTERN RAILROADS GRANTED RATE INCREASE

Substantial increases in the interstate passenger fares for the railroads operating in the western territory were granted by the Interstate Commerce Commission on Dec. 11, 1915. While this advance in rates does not entirely meet the formal application filed by the carriers, the increases range from 0.25 cent to 1 cent per mile. The railroads affected by this order were instructed to file new passenger tariffs on Jan. 15, 1916. The findings of the commission were as follows:

1. In the States of Illinois, Wisconsin, Michigan, Minne-

sota, Iowa, Nebraska, Missouri, north of the Missouri, and in Kansas north of the main line of the Union Pacific, a basis of 2.4 cents a mile for interstate fares is justified.

2. In Missouri south of the river and in Kansas south of the Union Pacific, a basis of 2.6 cents a mile is justified.

3. Increases in mileage prices of one-fourth of a cent a mile are allowed in the territory north of the Missouri River and the Union Pacific, and one-half of a cent south of the river and the railroad.

4. Proposed increases from Illinois, Michigan, Iowa, Minnesota, Wisconsin, Nebraska, Missouri and Kansas to points east are allowed.

5. Increases allowed on fares to far west from points in western territory.

OPERATING STATISTICS IN SAN FRANCISCO AND LOS ANGELES

A detailed comparison of street car traffic in San Francisco and in Los Angeles has recently been made by the California Railroad Commission. The figures for San Francisco railways include the United Railroads, Municipal Railway and the California Street Cable Railway, but those for Los Angeles do not include the Pacific Electric Railway, as that road handles interurban business almost exclusively and the comparison is intended to include local traffic only. The operating statistics for the two cities for the year ended June 30, 1915, are as follows:

	San Francisco	Los Angeles
Passenger car-miles	30,587,629	29,261,200
Passenger car-hours	3,591,611	3,128,042
Regular fare passengers	201,574,155	125,939,865
Revenue transfer passengers	1,517,360	....
Total revenue passengers	203,089,515	125,939,865
Free transfer passengers	79,234,452	42,965,583
Total all passengers	282,323,967	168,905,448
Passenger revenue	$10,044,930	$6,203,161
Average fare, revenue passengers	$0.04946	$0.04925
Average fare, all passengers	$0.03558	$0.03672
Revenue from transportation per car-mile	$0.32839	$0.21199
Revenue from transportation per car-hour	$2.79677	$1.98308

One-Man Car in North Ballard.—The Loyal Railway, operating a 2-mile street railway in North Ballard. Wash., has been authorized by the Public Service Commission to operate a one-man car.

Application to Charge 2 Cents a Mile.—After a hearing in Pittsburg, the Public Utilities Commission in Kansas gave the Joplin & Pittsburg Railway ten days in which to file an inventory of its physical property for use in determining rates. The company has asked permission to charge 2 cents a mile.

Proceed Signal by Whistle.—A new detail of the safety-first campaign of the Dallas (Tex.) Consolidated Electric Street Railway is the adoption of whistles for signals to be used by conductors when preceding cars across railroad crossings. The motorman has been signalled in the past by the conductor waving his arm.

Traffic Circulars in New York.—The Fifth Avenue Coach Company, New York, has published a guide to Central Park in New York. The important features of the park are described and many of them are illustrated. The booklet is being sold to the public for 10 cents and the net proceeds, so the company announces, will be turned over to the Public Schools Athletic League of New York City.

Skip-Stop Agitation in Richmond.—Many patrons of the Virginia Railway & Power Company, Richmond, Va., have written to the company recommending that the skip stop be tried in Richmond. In its publication, *Public Service News*, the company says that the adoption of the skip stop on Richmond lines serving residential sections would save passengers from five to ten minutes in either direction.

Ontario Board's Order Set Aside.—The Toronto & York Radial Railway's project of crossing the sidewalk on the west side of Yonge Street at Farnham Avenue, Toronto, Ont., so as to provide a southern terminal at this point has been decided in favor of the city of Toronto by the decision of the First Divisional Court delivered on Dec. 8, in which the Ontario Railway Board's order authorizing the deviation is set aside.

Electric Railways Reduce Fares for Holidays.—In order to stimulate holiday travel the Texas Traction Company, the Southern Traction Company and the North Texas Traction Company have put into effect a passenger tariff providing round-trip rates to the chief shopping centers of slightly less than one and one-third fare. This is the first time the electric railways have met the customary reduction of the steam roads during such rush seasons.

Commission Refuses Pittsburgh Transfer Request.—The renewed request of the Twenty-seventh Ward Progressive Club, Pittsburgh, Pa., that the Pittsburgh Railways be compelled to extend transfer privileges has been refused by the Public Service Commission of Pennsylvania on the ground that the transfers would do no more than save a walk of one or two city blocks, whereas granting the privilege asked might seriously congest traffic.

Auto Feeder in Hot Springs.—The Hot Springs (Ark.) Street Railway has established permanent auto-bus transportation between the city and the Golf and Country Club. Hot Springs has, perhaps, the finest full course golf links south of the Mason and Dixon line, and the increased patronage made it necessary to provide some permanent and satisfactory form of transportation. In a year or so the street railway will probably be extended to the links.

Chicago "Fresh-Air" Cars Off During Winter.—During the extremely cold weather of the winter months the "fresh-air" cars operated by the Chicago surface and elevated lines will be discontinued at the request of Commissioner of Health John Dill Robertson. The commissioner stated that the "fresh-air" cars had been a success; that they had stirred up public opinion in favor of fresh air, and that they had encouraged citizens to sleep out of doors. It is planned to restore the "fresh-air" car service next spring.

Municipal Railway-Bus Agreement Unsatisfactory.—According to reports the arrangement entered into by F. M. Peterson with the city of Seattle, Wash., for the operation of a motor bus 1.3 miles from the north terminus of Division "A" of the Municipal Railway to Ballard, a suburb of Seattle, has not proved a success. Mr. Peterson alleges that for the short period of operation from Nov. 4, his receipts have not exceeded $5 a day. The contract allowed the operator of the motor bus 3 cents on every transfer from the railway. The provisions of the contract were referred to at length in the ELECTRIC RAILWAY JOURNAL of Oct. 23, page 889. The agreement when drawn was regarded as very favorable to the bus operator.

Jitney Insurance Prospects.—The jitney insurance feature continues to be an important one. The hesitancy of the stock companies and the lack of State laws giving interinsurance exchanges the privilege of doing business, combine to prevent jitneys getting insurance in many cities. Ordinarily, too, the stock company rates are much beyond the reach of the jitney owners. The rates of the stock company which is said to be writing the largest number of jitneys are $35 to $85 above those of the interinsurance exchanges. The National Indemnity Exchange at Kansas City is accumulating much valuable experience in the operation of its contracts which, when it reaches a point justifying announcement, will probably shed much light on the jitney business and its prospects. The exchange insures jitneys in five States, covering fire and theft, passenger and public liability, and property damage.

Fare Complaint Settled.—The complaint against a proposed increase of fares by the Syracuse & Suburban Railroad, Syracuse, N. Y., has been settled. The company has agreed to provide in its new tariffs a coupon book, non-transferable, and containing eighty-three 5-cent coupons, to be sold for $2.50. It has also agreed that its $5 coupon book can be used by the purchaser or any member of his or her family. In addition the road has promised to decrease, if possible, the running time between the terminals of the main line, to install an automatic signal system to be approved by the Public Service Commission, and to stone ballast a portion of the roadbed, all of these changes to be effected during the coming spring and summer and to be completed by Jan. 1, 1917. The company has further agreed to rebuild or replace car No. 18 during 1916 and to provide another new car in 1917, and to widen the track centers on East Fayette Street, Syracuse, between Beech Street and Syracuse city line junction when that portion of East Fayette Street is being repaved.

Personal Mention

Mr. Safford K. Colby, formerly one of the vice-presidents of Allen & Peck, Inc., has been appointed assistant general sales manager of the Aluminum Company of America. Mr. Colby was previously associated with this company and has recently returned to it after a period of about ten years, during which time he was engaged in other capacities.

Mr. E. B. Katté, chief engineer electric traction with the New York Central & Hudson River Railroad, was announced as the speaker before the Worcester Polytechnic Institute branch of the American Institute of Electrical Engineers on Dec. 17. The subject upon which Mr. Katté spoke was "Electrification of the Grand Central Terminal," illustrated by lantern slides.

Mr. Sam W. Greenland, general manager of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has been appointed general manager of the Fort Wayne & Springfield Railway, Decatur, Ind., by Mr. Charles H. Worden, Fort Wayne, trustee of the latter railway, which was sold on Dec. 2 at receiver's sale to Mr. Worden. The road will be operated by Mr. Greenland in connection with his present position with the Fort Wayne & Northern Indiana Traction Company.

Mr. E. C. Ryder, who has been a director of the Bangor Railway & Electric Company, Bangor, Me., for several years and its general counsel, has been elected president of the company. Mr. Ryder is a well-known Maine attorney. He is general counsel in that State for the Canadian Pacific Railroad and the Eastern Trust & Banking Company. He has been closely associated with the growth and development of the Bangor Railway & Electric Company and its subsidiaries for nearly ten years. Mr. Ryder was born in Readfield, Me., in 1854, attended Colby College and was admitted to the practice of law in Maine in 1882. He has lived in Bangor since 1894. Mr. Ryder has served in the State Legislature and was elected to the House and the Senate. He served as solicitor for the city of Bangor for two terms. Mr. Ryder is a member of the law firm of Ryder & Simpson. He proposes to continue his law practice. Mr. Ryder succeeds the late John R. Graham as president of the company at Bangor.

Mr. Harry C. Kendall has resigned as traffic engineer with the Portland Railway, Light & Power Company, Portland, Ore., as noted briefly in the ELECTRIC RAILWAY JOURNAL of Dec. 4, to become efficiency and traffic engineer with the Denver (Col.) Tramway, a new position created by General Manager F. W. Hild, formerly of the Portland Company. Mr. Kendall was graduated in electrical engineering from the University of Missouri in 1904 and from the Massachusetts Institute of Technology in 1905. He was in the employ of the Westinghouse Electric & Manufacturing Company from 1905 to 1909, first as an engineering apprentice and later in the railway engineering department. For the following two years Mr. Kendall was instructor in electric railway engineering at the University of Illinois. Mr. Kendall was next engaged in making special engineering investigations for industrial concerns and for the Illinois Traction System. In 1912 he resigned his position with the Illinois Traction System to make a traffic survey and work out rerouteing plans for the Portland Railway, Light & Power Company.

Mr. J. Kappeyne, who has been appointed engineer to the Public Utilities Commission of the District of Columbia, was born in Amsterdam, Holland, in 1882, and was graduated as mechanical and electrical engineer from the Polytechnical School of Zurich, Switzerland. Immediately after completing his education, Mr. Kappeyne came to the United States and was naturalized as soon as the requirements of the law would permit. Before becoming connected with the Public Utilities Commission of the District of Columbia he was engaged with the New York State Public Service Commission for the First District, on the valuation of the street railways of greater New York. For the last year he has been connected with the valuation of the utilities in the District of Columbia ordered by Congress. Previous to this Mr. Kappeyne was employed on the design and installation of the equipment of the subaqueous tunnels of the Hudson & Manhattan Railroad between New York and New Jersey and of the subways now in course of construction in New York.

Mr. F. T. Loftus, auditor of the Indianapolis & Cincinnati Traction Company, was elected president of the Central Electric Railway Accountants' Association for the year 1916, at the recent meeting in Detroit. Mr. Loftus has been in the electric railway field since June, 1907. He was born at Anderson, Ind., in November, 1881, and attended the schools there until his family moved to Chicago, in 1898. After reaching Chicago, Mr. Loftus found it necessary to secure employment and attended night school, taking up a general business course but specializing in accounting with that in view as a future business. From 1899 to 1907 he held positions in the offices of photo-engraving, real estate and retail dry goods companies, but being impressed with the future which promised for the electric railway business, he secured employment as passenger and freight agent with the Indianapolis & Cincinnati Traction Company at Shelbyville, Ind., on June 1, 1907. In September, 1908, he was promoted to cashier of the company with headquarters at Rushville, Ind. He held this position until July, 1909, at which time he became general bookkeeper. On Aug. 1, 1910, he was appointed acting auditor of the company, continuing as bookkeeper until a year later. He was appointed auditor in October, 1911, and has held that position since. Mr. Loftus has been a member of the Central Electric Railway Accountants' Association since 1911. He has served on various committees of the association, as secretary for 1913 and 1914 and as first vice-president during 1915.

F. T. LOFTUS

Mr. Edward M. Graham, son of the late John R. Graham, Bangor, Me., has been elected vice-president and general manager of the Bangor Railway & Electric Company, the Bangor Power Company and the Orono Water Company and general manager of the Bar Harbor & Union River Power Company, succeeding his father in the active management of these properties, in which E. W. Clark & Company, Philadelphia, are interested. Mr. Graham is only twenty-six years old, and is one of the youngest general managers in charge of so extensive a property. Since his father's death last August, Mr. Edward M. Graham has been in active charge of the Bangor Railway & Electric Company properties, having been fitted for the position through an experience of several years under his father. He began his career with the Bay State Street Railway, Boston, which he served in various capacities. At the age of twenty-two he was made superintendent of the Portland & Brunswick Street Railway and after that was made assistant to the general manager of both the Lewiston, Augusta & Waterville Railway and the Cumberland County Power & Light Company, these being among the largest public service corporations in Maine. He went to Bangor in 1913 as assistant to his father, the president of the properties, and has been with the companies there since. The companies of which Mr. Graham is now vice-president and general manager provide sixteen municipalities with light and power, six with water and nine with street railway service, and own 65 miles of track.

E. M. GRAHAM

Mr. Delos Emmons Parsons has been appointed general manager of the East St. Louis & Suburban Railway, East St. Louis, Ill., a new office, the duties in connection with which have in the past been attended to by the vice-presidents and the general superintendent. Mr. Parsons will assume his office with the company on Jan. 1. His appointment is in no sense a substitute for any present officer of the company, but was made because the president of both the East St. Louis & Suburban Company and the president of the East St. Louis & Suburban Railway and the other properties at East St. Louis under the management of the E. W. Clark & Company Management Corporation decided that the best interest of both the public and the stockholders would be enhanced by the appointment of a general manager who would devote his entire time to the supervision of the heads of the various departments and of the work of each and make a constant study of means and methods of improving service to the public and of promoting co-operative efficiency among officers and employees. Mr. Parsons was born at Huntington, W. Va., on Oct. 29, 1882. In 1903 he received the degree of bachelor of science in mechanical enginering at West Virginia University. In 1904 he entered the technical two-year apprenticeship course in the works of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa. At the end of the two years he accepted a position in the sales department at the works of the company, and in 1906 he was promoted to the position of head of the export department at the company's works. In 1908 he represented the sales department of the Westinghouse Company in its branch office at Fairmont, W. Va., handling the sale of the company's product to the coal mining companies in that district. In 1909 he joined the sales force in the railway and lighting department of the company.

D. E. PARSONS

OBITUARY

William Andrew Conner died suddenly on Dec. 6. Mr. Conner was born in Baltimore on Sept. 12, 1859. He began his business career in 1876, in Pittsburgh, in the oil refining business. In 1885 he took charge of the first plant built by the Standard Underground Cable Company in Pittsburgh, and from then to the time of his death he was the head of the manufacturing business of that company. He was a director of the company for ten years, and had been first vice-president since 1909.

George W. Linch, receiver of the Second Avenue Railroad, New York, N. Y., died on Dec. 15. Mr. Linch was born on Nov. 27, 1847, in New York. After graduating from public school, he became a clerk in a New York wholesale house, of which he later became manager. Upon the retirement of his employer from business, Mr. Linch entered the furniture business, in which he continued until 1872. In that year the Christopher & Tenth Street Railroad, New York, was completed and Mr. Linch became general manager of the company and later secretary and treasurer, which position he held at the time of his death. About 1889 Mr. Linch became the general manager of the Dry Dock, East Broadway & Battery Railroad, New York, and remained as its general manager until about 1900, when the control of the company passed to the Metropolitan Street Railway. Mr. Linch then built and operated the Morton Stables in New York City. After this business had been sold Mr. Linch became general superintendent of the Varrick Realty Company. He was subsequently elected vice-president of the United States Casualty Company. On Aug. 1, 1908, Mr. Linch resigned from the Casualty Company to become general manager of the Central Park, North & East River Railroad, which position he held until he was appointed receiver of the company by the Supreme Court. He was acting as receiver of this company at the time of his death. On Sept. 19, 1908, he was appointed receiver of the Second Avenue Railroad.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Pocatello Traction & Interurban Company, Pocatello, Idaho.—Incorporated in Idaho to construct a line in Pocatello. Capital stock, $100,000. Officers: Richard Douglas, president; John Fraser, vice-president and Clark Gibson, secretary and treasurer. [Dec. 11, '15.]

***Wellsville & Buffalo Railroad, Buffalo,** N. Y.—Incorporated in New York to operate steam, gasoline or electric railroad from Wellsville to Buffalo. Capital stock, $850,000. The directors include C. A. Finnegan, Theodore Hofeller and Abraham Weber, who recently purchased the abandoned line of the Buffalo & Susquehanna Railroad between Buffalo and Wellsville, as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 2.

***East Tennessee Railroad, Benton, Tenn.**—Incorporated in Tennessee with a capital stock of $20,000. Incorporators: F. W. Hoover, Richard Stiles, Henry Crumbliss, Jr., George D. Lancaster and J. A. Longley.

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has asked the Council for permission to abandon a part of its elevated railway franchise from the rear of the Main Street station eastward to San Pedro Street, so that it may comply with the recent order of the Board of Public Utilities to improve its terminals. The request was referred to the Board of Public Utilities for investigation and report.

San Diego, Cal.—The San Diego Electric Railway has asked the Council for permission to abandon that portion of its line on University Boulevard from University Avenue to El Cajon Avenue as soon as the new line up Park Boulevard from University Avenue to El Cajon Avenue is in operation.

Buffalo, N. Y.—The Council has denied the application of the International Railway for a franchise to lay tracks and operate cars in Washington Street between Perry and Ohio Streets so as to loop cars around the new Lackawanna Railroad passenger terminal via Main, Perry, Washington and Ohio Streets. The company has modified this application and now seeks to operate cars through Illinois Street from Perry to Ohio Streets. The Council is favorable to this project and a hearing on this application will be held on Dec. 23. The company's application for a franchise on Ohio Street from Washington to Main Street to connect directly with the new Lackawanna Railroad terminal has been approved.

Dayton, Ohio.—The Dayton & Troy Electric Railway has received a twenty-year extension of its franchise in Dayton. The company agrees to build an extension on Clark Avenue, to improve its local service, to pave its freight yard and to pave within the rails and 18 in. outside when any street is ordered paved.

East Liverpool, Ohio.—The East Liverpool Traction & Light Company has received from the Council a ten-year extension of its franchise. The franchise, which was to have expired in 1930, now extends to 1940.

Dallas, Tex.—The Northern Texas Traction Company has accepted the franchise granted by the Council to construct an extension on Jefferson Street.

TRACK AND ROADWAY

Phoenix (Ariz.) Railway.—It is reported that this company will double track its line on West Washington Street to the Capitol.

Fresno (Cal.) Interurban Railroad.—A report from this company states that during 1916 it expects to build 18½ miles of new electric line between Fresno and Clovis and Fresno and Centerville.

Pacific Electric Railway, Los Angeles, Cal.—Plans for elevated tracks and terminal improvements for this company have been completed and the scheme has been approved by the Board of Public Utilities which had previously ordered the company to execute whatever work necessary to relieve congested interurban traffic on or before July 1, 1916. Further details regarding the plan are published on page 1231 of this issue.

Municipal Railways of San Francisco, San Francisco, Cal.—Now that the early commencement of construction of the Church Street branch of the Municipal Railway has been assured, the executive committee of the Mission Promotion Association is devoting its efforts to securing extensions to the rest of the Municipal Railway system. Property owners and improvement clubs in the various sections of the city have been submitting plans for proposed extensions. As yet, however, the association has taken no action upon the proposals, as its intention is to consider each of the applications individually and then to prepare a report which will be submitted to the Board of Supervisors in which the association will request extensions in various parts of the city.

Tidewater Southern Railway, Stockton, Cal.—Grading has been begun by A. G. Chatan on this company's extension from Modesto to Turlock.

Miami (Fla.) Traction Company.—Operation has been begun on this company's line in Miami. The cars are operated from Twelfth Street and Avenue O, Riverside Heights, to Twelfth Street and Avenue C. Track has been laid on Avenue C from Twelfth Street to Waddell Street, 1 mile, and this will soon be placed in operation. The entire line is 3½ miles long.

Alton, Granite & St. Louis Traction Company, Alton, Ill.—L. C. Haynes, president of this company, has answered the communication from the Mayor of Alton, in which the company, was asked to build an electric line from Alton to the State Hospital. President Haynes says the line will be built if Alton and Wood River Townships guarantee to adjust all possible claims for damages arising from the building of the line and make arrangements for such adjustments before the line is built.

Illinois Traction System, Peoria, Ill.—It is reported that this company plans to construct a line between Jefferson City and Columbia.

Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.—A movement is under way among residents of the south and southwest sections of Gary to urge this company to build a 4-mile loop through that portion of the city. The proposed route would extend south on St. Joseph Street to Twenty-first Avenue, east to Virginia Avenue, thence north to connect with the company's line just north of Fifth Avenue.

Iowa Railway & Light Company, Cedar Rapids, Ia.—The electric light plant at Zearing, owned by Belden & Son, has been purchased by this company. Next summer the system will be connected with the high-tension line being erected from Marshalltown to Colo and Ames.

Tri-City Railway Company, Davenport, Iowa.—This company is being urged to build an extension in the extreme southwestern part of the city, the line to be an extension of either the Third Avenue or the Fourth Avenue track.

Manhattan City & Interurban Railway, Manhattan City, Kan.—This company expects to build 1 mile of city line during 1916.

Kentucky Traction & Terminal Company, Lexington, Ky.—In order to obviate interruptions to service from storms or accidents, the Kentucky Traction & Terminal Company is completing arrangements for the construction of new high tension lines to connect all of the present termini by loop systems. The new lines will include power circuit construction from Georgetown to Frankfort, about 25 miles in an air line, and connecting up other high tension lines already completed. At present one line of power wires runs to Versailles and Frankfort and another to Georgetown. It is planned to manage the new construction so that in the event of a break at any point service can be continued by bringing in the power from another direction. There is now a loop between Georgetown and Paris. Rights-of-way have been secured for practically the entire construction which, it is believed, will be sufficient to prevent delays encountered heretofore on account of local storms.

Bar Harbor & Union River Power Company, Bangor, Me.—This company contemplates the construction of an electric railway from Bluehill Falls to Brookline and Sedgwick, 14 miles. C. M. Tolman, chief engineer.

Boston (Mass.) Elevated Railway.—Plans for a change of location of a portion of the proposed extension of the elevated road to Everett have been filed with the Public Service Commission by this company. The change affects the route between Mystic Street and Bernard Avenue, Everett. It is proposed to extend the elevated structure over the Mystic River and reach the grade of the street opposite Langdon Street and any further extension of the line will be through a subway.

Springfield (Mass.) Street Railway.—This company will change its present system to the three-wire plan to eliminate electrolysis. This is in accordance with the recommendations of the Bureau of Standards at Washington. The work of making the changes will be begun immediately.

***Detroit, Mich.**—Having obtained the necessary franchises shortly before the November annexation election, Robert Oakman, Detroit, is now preparing to build an electric line which will take care of the territory between Hamilton Boulevard and Grand River Avenue and between the old city limits and Highland Park. Mr. Oakman has announced that before the end of next summer he would complete a line from Oakman Boulevard south to the corner of Twelfth Street and Elmhurst Avenue. Plans are being made to extend this line south to the city limits to connect with the Trumbull, Fourteenth and Grand Belt lines when these are extended.

Minnesota-Northwestern Electric Railway, Thief River Falls, Minn.—A report from this company states that it expects to build 20 miles of new line during 1916.

St. Louis & Jennings Railway, St. Louis, Mo.—It is stated that this company's extension south on Helen Avenue from Florissant to Melrose Avenues, Edgewood, will be completed in about three weeks.

***Fort Benton, Mont.**—The Commercial Club of Fort Benton has appointed a committee consisting of L. D. Sharpe, C. O. Vowell, C. W. Hudson and D. G. Browne, to proceed to make investigations and secure data on the construction of a trolley line to the depot, a distance of more than a mile.

Brooklyn & Jamaica Bay Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has denied the application of the Brooklyn & Jamaica Bay Railway for a certificate of public convenience and necessity for the construction and operation of a proposed trolley line in Brooklyn, extending from a point at about the intersection of Montauk and Liberty Avenues and in a general southerly direction over numerous streets and avenues to a point where Montauk Avenue would end if extended to Jamaica Bay.

Southern Power Company, Charlotte, N. C.—It is reported that this company plans to construct an electric railway from Greensboro to Reidsville and Spray, about 30 miles. W. S. Lee, vice-president and chief engineer.

Durham (N. C.) Traction Company.—During 1916 this company expects to build 2.6 miles of single track in Durham.

Pictou County Electric Company, Ltd., Sellerton, N. S.—It is reported that this company will not build its proposed extension to Parkdale until next spring.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company expects to build 0.7 mile of city extension. The company also proposes to construct 9.4 miles of double track between Akron and Cleveland for cut-offs.

Dayton & St. Mary's Traction Company, Covington, Ohio.—Promoters of the Dayton & St. Mary's Traction Company held a meeting on Dec. 10 and appointed the following committee to consider plans of financing the company: H. S. Shelton, W. J. Focke, I. G. Kumler, C. E. Jones, O. B. Brown and J. W. Downer. Right-of-way in Miami County has been donated and much in Shelby. The plan provides for the purchase or lease of the 10 miles of Western Ohio Railroad tracks between St. Mary's and Minster, use of the 6-mile line between Minster and Fort Loramie and construction of 16.6 miles from Fort Loramie on. [Aug. 7, '15.]

Mount Vernon (Ohio) Railway.—A report from the company states that it expects to build 2 miles of city line during 1916.

Henryetta, Oklahoma & Western Railway, Henryetta, Okla.—The contract for grading this company's line has been awarded to Ally Brothers. The road is being built from Henryetta to Kusa, via Dewar, with a branch to Colton and Pleasant Valley and from Henryetta to Creek Mines, a total of about 10 miles. One bridge and one viaduct will be built. The contract for track laying has not yet been awarded. W. T. Croslen, Oklahoma City, president. [Nov. 13, '15.]

Southern Oregon Traction Company, Medford, Ore.—This company, which on July 1 purchased the Rogue River Valley Railway, consisting of about 6 miles of track, has built a connecting line of track about 1½ miles between the two railways, along the main street of Medford, and electrified it. About Jan. 1 the company expects to place in operation 6½ miles of electric railway extending from the Opp Mine through the cities of Jacksonville and Medford to the city reservoir. The company also expects to build 30 miles of extension southwest to the California-Oregon lines as soon as the project can be financed.

Portland & Oregon City Railway, Portland, Ore.—Operation has been begun by this company between Milwaukie and Carver, the present terminus of the line, which is near Baker's Bridge. It is expected that the line will be completed from Milwaukie to the North Bank Station, Portland, by Jan. 10.

Milford, Pa.—It is reported that announcement has been made by J. A. Vandergrift & Company, New York, the engineering firm which is to build the proposed railway between Port Jervis and Milford, that arrangements are so well advanced as to permit actual work to begin very shortly. [Nov. 6, '15.]

Philadelphia, Pa.—The two lowest bids received for the construction of concrete column foundations for the elevated railway on Frankford Avenue from Unity to Dyre Street were Edwin H. Vare at $17,700 and Peoples Brothers, Inc., $18,499.

West Chester (Pa.) Street Railway.—This company is considering the extension of its lines to accommodate the people at the Chester County Home, Mortonville and Modena.

Manila Electric Railroad & Light Company, Manila, P. I.—It is reported that this company has been awarded the contract for lighting the entire city of Manila, with the exception of the Paco district, for a period of ten years. The contract provides for ultimately increasing the street lighting units from the present total of 1300 to about 2400.

Charleston-Isle of Palms Traction Company, Charleston, S. C.—This company reports that during 1916 it expects to build 1½ miles of 60-lb. T-rail track.

Columbia Railway, Gas & Electric Company, Columbia, S. C.—Plans are being made by this company to extend operation to the Wales Gardens section in the near future. Tracks have already been laid.

Carolina, Greeneville & Northern Railroad, Greeneville, Tenn.—Announcement has been made by LeRoy Parks, field agent of this company, that plans have been perfected for the beginning of construction work on one section of the proposed railway from Bristol to Knoxville, via Kingsport and Newport. The project has been underwritten by New York financiers, it is stated, and work will be begun at an early date. [Oct. 16, '15.]

Abilene (Tex.) Street Railway.—Work has been begun by this company improving the north end of its line. As soon as the north end is repaired work will be begun on the south end. About $3,000 will be spent on these improvements.

***Buena Vista, Tex.**—Plans are being considered by the Pecos Valley Railroad Association for the construction of a gasoline-electric interurban railway from a connection with the Kansas City, Mexico & Orient Railway northwest via Buena Vista for 35 miles up the Pecos Valley.

Corpus Christi Railway & Light Company, Corpus Christi, Tex.—This company expects to build 1 mile of new track during 1916.

Houston, Richmond & Western Traction Company, Houston, Tex.—The contract for grading the first 100 miles of this company's line between San Antonio and Houston will be awarded within the next sixty days. A branch line will be built from Seguin to New Braunfels. A hydroelectric power plant will also be constructed. E. Kennedy, president. [Nov. 20, '15.]

Ogden, Logan & Idaho Railway, Ogden, Utah.—This company reports that during 1916 it expects to build 22 miles of new line from Ogden to Harrisville and from Hot Springs to Brigham City.

Appalachian Power Company, Bluefield, W. Va.—A report from this company states that it is contemplating the construction of a 1-mile extension to its line.

Merrill Railway & Lighting Company, Merrill, Wis.—Preparations are being made by this company for the erection of a high-tension transmission line from Merrill to Wausau. The plans provide for the development of the Trappe Rapids water-power, owned by the Wausau Street Railroad.

SHOPS AND BUILDINGS

International Railway, Buffalo, N. Y.—The city authorities of Lockport and the International Railway have come to an agreement for better passenger station facilities and have withdrawn their complaint from the Public Service Commission. The company will construct an additional story for the offices of the company and enlarge and otherwise improve the passenger waiting room.

New York, N. Y.—Plans are being made for the construction of a new amusement building to occupy the site of the carhouses of the New York Railways on Eighth Avenue between Forty-ninth and Fiftieth Streets. Negotiations for the property have been going on for more than a month between the Panama Canal Exhibition Company and Theodore P. Shonts, representing the railway. The property will be taken on a lease of twenty-one years, with an option of renewing the lease for an equal term of years. The walls of the present structure will be utilized and most of the work of reconstruction will consist of interior changes.

Eastern Pennsylvania Railways, Pottsville, Pa.—Work has been begun by this company on the construction of a new carhouse to be located at the rear of the Lansford ball park. The carhouse will be of steel and brick construction and fireproof throughout. It will be large enough to accommodate all the rolling stock on the division. A shop will also be connected with the carhouse.

Dallas, Tex.—As announced in the ELECTRIC RAILWAY JOURNAL for Dec. 11, construction will begin about Dec. 20 on the terminal station and office building at Wood, Browder and Jackson Streets, to be used by the Dallas Electric Light & Power Company, Texas Power & Light Company, Southern Traction Company, Texas Traction Company and Northern Texas Traction Company. The structure will be 210 ft. x 85 ft., eight stories, with provision for three additional stories. The building will be of reinforced concrete frame, faced with brick and terra-cotta. Concrete platforms from the waiting-room to the tracks with steel frame overhead coverings will be provided. The terminal yard will contain seven tracks arranged in three pairs with single track and loading platform between. An emergency loop will be constructed from Lane Street through Jackson and Browder Streets to Commerce Street.

POWER HOUSES AND SUBSTATIONS

Des Moines (Ia.) City Railway.—A contract has been placed with the Des Moines Bridge & Iron Company for the construction of a steel water tower for the powerhouse of this company. The tower will cost about $4,800.

International Railway, Buffalo, N. Y.—Two new substations are now in the course of construction by this company and $150,000 will be spent to increase the capacity of the five substations now in operation. In the spring three more plants will be added to the equipment of the International Railway, making ten substations located in widely separated parts of the city.

Reading Transit & Light Company, Reading, Pa.—Improvements are being planned by this company to its West Reading power plant at a cost of about $300,000.

Manufactures and Supplies

ROLLING STOCK

Water, Light & Transit Company, Carrollton, Mo., expects to purchase during 1916 one passenger car body.

Piedmont Railway & Electric Company, Charlotte, N. C., expects to purchase during 1916 two single-truck passenger cars.

Minnesota-Northwestern Electric Railway, Thief River Falls, Minn., expects to purchase during 1916 one 60-ton gas-electric locomotive.

Dominion Power & Transmission Company, Ltd., Hamilton, Ont., is reported as expecting to purchase twelve or more cars in the near future.

Des Moines (Iowa) City Railway, it is reported, will order at once forty front-entrance, center exit cars from the McGuire-Cumming Manufacturing Company, Chicago, Ill.

Charleston-Dunbar Traction Company, Charleston, W. Va., expects to purchase during 1916 one express car, two interurban cars and two pay-as-you-enter city cars.

Long Island Railroad, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Nov. 27, 1915, as having issued inquiries for twenty-five new trailer cars, has ordered this equipment from the Standard Steel Car Company.

Salt Lake & Ogden Railway Company, Salt Lake City, Utah, has ordered six large open steel trail cars from the Jewett Car Company, Newark, Ohio. The cars are being bought especially to provide service for the summer Lagoon excursion travel, and will have a seating capacity of eighty passengers.

Petersburg & Appomattox Railway, Petersburg, Va., R. H. Mann, president, has ordered through Stuart, James & Cooke, engineers, New York, ten second-hand motor cars and one work car which were formerly in operation on the system of the Cleveland Railway.

East Liverpool Traction & Light Company, East Liverpool, Ohio, is receiving fifteen center-entrance, low-level motor cars built by the G. C. Kuhlman Car Company, Cleveland, Ohio, which are being shipped on their own wheels and operated under their own power. The cars, eleven of which have been received by the railway, are sent from the plant of the Kuhlman Company at Collinwood, Ohio, over the lines of the Cleveland Railway to Miles Avenue and Broadway, Cleveland, thence over the Northern Ohio Traction & Light Company's property via Silver Lake Junction to Ravenna, Ohio, from there over the Stark Electric Railroad via Alliance to Salem, Ohio, and then over the Youngstown & Ohio River Railroad lines to East Liverpool, a total distance of 110 miles. The crews of the respective roads over which the cars are shipped handle the shipments en route.

TRADE NOTES

Signal Appliance Association, New York, N. Y., announces receipt of a letter from C. C. Rosenberg, secretary Railway Signal Association, extending thanks for the cooperation of the former association at the annual convention held at Salt Lake City on Sept. 16.

American Brake Shoe & Foundry Company, New York, N. Y., after Jan. 1, 1916, will have its Canadian business handled by the Dominion Brake Shoe Company, Ltd., the entire capital stock of which is owned by the American Malleable Company, a subsidiary of the American Brake Shoe & Foundry Company.

Pelton Water Wheel Company, San Francisco, Cal., announces that Benjamin B. Lawrence, a member of the class of 1878 of the Columbia School of Mines, has purchased the Pelton-Doble water wheel and the Pelton-Francis turbines which were exhibited by this company at the Panama-Pacific International Exposition and presented them to the school.

National Pneumatic Company, New York, N. Y., has received an order from the Interborough Rapid Transit Company for the pneumatic door control of the 311 recently ordered subway cars. This will include 1866 pneumatic door engines, six per car. They will be substantially the same as the engines for the previous lot of 418 cars now being put in service.

Pressed Steel Car Company, Pittsburgh, Pa., announces the following changes in its organization, effective Dec. 1: N. S. Reeder has been elected vice-president, with headquarters at New York. J. B. Rider has been elected vice-president, with headquarters at Pittsburgh, Pa., and will continue to perform the duties of general manager in charge of operations. J. F. MacEnulty, formerly general sales manager, has been elected second vice-president with headquarters at New York. C. E. Postlethwaite, formerly manager of sales, central district, at Pittsburgh, has been appointed general sales manager of the Pressed Steel Car Company and the Western Steel Car & Foundry Company, with headquarters at New York. H. F. Hoffstet has been appointed assistant manager of sales of the central district, with headquarters at Pittsburgh, Pa.

Western Electric Company, New York, N. Y., in outlining its various developments in telephones and telephone equipment made by this company during 1915, reports that further experimentation and development work on the loud-speaking telephones for railway train dispatching work have resulted in a loud speaker that is an unusual combination of distinct enunciation and large volume. A number of these instruments have been installed during the year on many of the lines of important railroad systems, where they are doing efficient work. An electro-magnetic circuit breaker, known as No. 12020, has been developed to replace the slower-acting fuses used on train dispatching circuits to limit the amount of battery current supplying the telephone and telegraph instruments. The quick-breaking action of the circuit breaker effectually prevents the burning of relay points. The point at which the circuit breaker operates is regulated by adjusting the air gap between the coil core in the armature. The operating range extends to 2 amp. A slate base is used instead of wood base instruments to prevent warping and arcing. A booth switch, No. 1-A, has been produced for use on telephone booths placed at railroad sidings. The switch is connected to the hasp of the booth lock so that it cuts out the siding telephone only when the door is locked. It does not cut out when the door is closed behind the man who is using the telephone. The switch is rugged in construction, has high insulation resistance and is provided with rubbing contacts which keeps the platinum contact points clean.

ADVERTISING LITERATURE

Newman Clock Company, New York, N. Y., has issued a catalog describing its Grille watch clock for watchmen. These clocks have a large number of users on the Pennsylvania Railroad, and many other railroads.

Railway & Industrial Engineering Company, Pittsburgh, Pa., has issued a folder describing and illustrating the Burke high-voltage horn gap switches and arrester, also its other types of electrical steel work and outdoor substations for all voltages and capacities.

Esterline Company, Indianapolis, Ind., has issued bulletin No. 365 describing an entirely new line of its graphic meters. These instruments are intended for checking up voltage and current on a.c. circuits and have been designed for use where the usual high price of graphic meters is prohibitive.

Kenneth H. MacArthur, Milwaukee, Wis., has issued a folder describing the Lake Superior wrench, which is especially adapted for working effectively in close corners or limited spaces. The jaws and teeth are made of extra hard steel, rendering it especially effective for handling badly disfigured nuts.

Canton Culvert & Silo Company, Canton, Ohio, has issued reproductions of letters of commendation and advertisements of "Acme" nestable culverts. Among the testimonial letters are included those from the Union Traction Company of Indiana, Kanawha Traction & Electric Company, and Cedar Rapids & Iowa City Railway.

Bryant Electric Company, Bridgeport, Conn., has issued a comprehensive and elaborate publication of 168 pages, describing and illustrating its large assortment and variety of wiring devices. The catalog is equipped with a special quick reference index, which is particularly useful in such a bulletin where so many materials and types are described.

Electric Railway Journal

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INVESTIGATING RAILWAY REGULATION

After a period for absorbing details a wise teacher gives a student an opportunity for reflecting on what he has learned, for getting a general bird's-eye view of his progress. 'Tis a simple pedagogical theory—that of absorption and reflection—but, like other simple theories, it can be of real service in problems more complex than that of youthful education. Take, for example, the elusive and complicated question of railway regulation in this country. For more than the last two decades the study of the regulatory power has been in reality one of details. Lawmakers and commissioners in each State and for the nation as a whole have been making great strides in regulatory requirements and practices, but the development of the idea of regulation and the increase in the size and importance of the public utility field have been so rapid that no time has been spent in reviewing the progress made up to any date. It is well, therefore, that there should now be a general review of the field, and for this reason we welcome the resolution by Senator Newlands for the appointment of a joint congressional committee to investigate the regulation of railways from the beginning. Too much legislation affecting transportation lines has been passed without a clear conception of the value of existing laws and the goal to be reached by future enactments, and the present administration will perform a most valuable and essential service if out of the present regulatory maze it can formulate a constructive summary for future guidance.

COMPANY SECTION PROGRAMS

The program committees of the American Electric Railway Association company sections have an intricate problem on their hands in providing for continuity of interest and enthusiasm in section activities. This problem is complicated rather than simplified by the reduction in dues, which will bring into the membership many more of the rank and file of the industry. The work must consist of one or more of the following components: instruction in the elements of the business, social intercourse and entertainment for general culture, and technical discussion of departmental topics. In planning the work the committees must have clearly in mind the purposes which they wish to accomplish and the preparation, needs and desires of their audiences. They must have the hearty co-operation of the local memberships in their plans. Our observation leads to the conclusion that the sections in general are not as yet very definite in their ideas and plans. There are now company sections in Milwaukee, Denver, Newark, Washington, Manila, Chicago and New Haven, while a new one will be formed in Washington in January and undoubtedly others will follow shortly. The older sections have had experience in conducting meetings, and this is available for the younger ones. The principal incentive to the formation of local sections of a national society rather than independent local clubs or associations is the expected stimulation from other sections. To obtain this stimulation in the present instance the sections must exert themselves to obtain the results of each other's experience. Why would it not be well for representatives of these sections to get together, say at the Chicago mid-winter meeting, for the purpose of discussing their program problems? "How Best to Serve the Local Section" would be a topic well worthy of the best thought.

CLEARING HOUSE FOR SAFETY LITERATURE

The statement made by H. A. Bullock elsewhere in this issue indicates that the National Safety Council has had a remarkable growth during the past four years and is even yet in the period of rapid acceleration. The time was ripe for some agency or other to gather the results of the large expenditures of energy and money which had been made by hundreds of corporations individually, and to make these results generally available. Electric railways have been individually very active in safety work as is indicated by a glance through the issues of the Electric Railway Journal for a few years past. The movement which has taken form in this council began in the manufacturing industries, but the transportation interests were not slow in "getting on the band wagon" where they now take an active part in the music. There are at least two elements in this organization which appeal to us as worthy of commendation. First, it represents a spontaneous effort to provide a clearing house for safety ideas. As soon as the plan was formulated the corporations and individuals possessed of such ideas and wanting more gravitated to it as the natural nucleus of safety publicity. In the second place, it is an economical device for accomplishing its purpose, for it acts primarily as a means of communication among its members. The council works in co-operation with other agencies for the conservation of human life and endeavors to avoid duplication of energy and money expenditure. The fact that the electric railways are now to have special service, the first special service to be furnished, is evidence enough of the attitude of the council to our industry and its desire to bring about effective co-operation among electric railway companies.

ORDERS FOR 1916 SUPPLIES

A prominent manufacturer of electric railway apparatus recently called our attention to the existence of a certain skepticism on the part of some electric railway managers as to the necessity for slow deliveries on 1916 orders. There is no doubt, however, that deliveries of electric railway apparatus will have to be slow, and in all probability they will tend to become even slower as 1916 progresses, so far as the manufacturers of railway apparatus have to depend for part of the equipment upon the producers in the iron, steel and zinc markets. In the general steel market, for instance, orders are now being booked for delivery in the third quarter of 1916, and iron cannot be more plentiful than steel because steel manufacturers are prepared to utilize all of the iron that they can get. Statistics indicate that the present rate of steel production in this country is about 39,000,000 tons per annum, and that it cannot be substantially increased. Under these conditions both steel and iron are bringing big prices. Copper is easier, but the export demand has taken on new life within a few weeks past and domestic consumption in general industries is rapidly increasing. The long depression permitted the accumulation of large stores of copper, hence, while the price is high, there is no prospect of immediate shortage. Zinc occupies a position midway between steel and copper. The munitions demand has been heavy, but the galvanizing business has not called for its usual supply. Zinc can therefore be had somewhat more promptly than steel. The lesson in all of this for the electric railways is that 1916 orders must be placed early if disappointment regarding deliveries is to be avoided. The best interests of the industry demand foresightedness.

SKIP-STOP SITUATION IN ST. LOUIS

The peculiar turn that has been taken by the skip-stop campaign in St. Louis, as outlined on another page of this issue, is by no means creditable to the principle of regulation. The plan of eliminating stops, after being overwhelmingly approved by the railway passengers, appears now to be held up by the regulatory body that exercises legal control over the operations of the railway, and though the riders obviously want the introduction of the improved method of operation, and the railway company is equally willing to put it in force, there is a possibility that the plan is not going through. The reason is, plainly enough, opposition on the part of storekeepers and real estate holders at street corners, who fear the effect of the change, notwithstanding the fact that any number of successful retail businesses have been established in the middle of a block, where the cars never stop anyway. However, the most illogical feature of the proceeding is that the influence of outsiders can be exerted in such a matter in opposition to the wishes of the railway and its patrons. If both the passengers and the railway company are satisfied with the skip stop, one would imagine that this should settle the matter. They are the interested parties, and that a body of storekeepers and others who may never use the cars at all should be able by protesting vehemently to interfere with their mutually satisfactory plans would be absurd if it were not so pathetic. Admittedly, the Public Service Commission is placed upon the horns of a dilemma. If the skip stop is not ordered the railway patrons will be angry, and if it is ordered the storekeepers claim that they will be peeved. No matter what is done some one will be displeased, and it takes a strong commission to act under those circumstances. But, incidentally, we wonder why the commission feels itself compelled to exert its jurisdiction in a matter that is so peculiarly one to be settled between the railway and its patrons. As a matter of fact, should it really have jurisdiction?

THE INDEX AS A SYNOPSIS

An index is undoubtedly a dry and most uninteresting looking piece of reading matter. Usually a person does not consult it except when searching for information on a definite and particular subject. For those periods of retrospection, however, which most of us use to mentally docket and arrange our ideas and conceptions, the hint is offered to pick up the half-yearly issues of this paper that contains the comprehensive indices of the preceding twenty-six numbers and go over the subjects listed therein.

The value of a review of any field of study is well known. In no other way can the salient points be fixed in their proper perspective, retained in the mind and the whole subject crystallized so effectually. The chief benefit from examinations in school and college is not the mere day-by-day study of the test nor the restoring temporarily to memory of a large volume of rules or facts or dates, but the real lasting benefit occurs from the broadened viewpoint and the crystallization in the student's mind of the essentials of the work done during the preceding year or half year. The formidable looking index of this paper (and to be of maximum value it must be complete and therefore voluminous) really performs this function. In this respect it is similar to the summary or digest that usually prefaces the detailed report of the expert on a problem in construction or finance or on an operating property, when submitted for the guidance of the man who must make the decision.

The electric railway industry is so many-sided and the problems before it are so numerous and varied that the hard-pressed official of a traction company can scarcely carry in his mind all phases of his chosen profession. We have been told by a busy man of this kind, active in railway work, that he has found the time well spent which is devoted to running over the index at the end of each half year and marking articles to be reread or noting subjects for further study. The relative importance and timeliness of the several topics will be indicated by the frequency of reference, and the geographical extent or distribution can also be determined to a degree. It happens at times also that owing to unusual demands of work some issues are not looked over completely. If there are such instances, a survey of the index will prevent important articles from being entirely overlooked. Again, a particular need or question may suddenly have assumed large proportions on a property and by referring to the ever-helpful index the busy manager can promptly get hold of recent data and the practices of other companies. This is indeed one of the points of superiority of the general paper in any field, as compared with the periodical which is devoted to recording the events in a part of the field only. It gives the broad survey which is always helpful and usually necessary to a comprehensive and complete understanding of all of the important events in any industry and their correlation with each other.

In the columns of this paper are recorded the essential facts and latest available information and data on the progress of the business, whether it is financial, legal, managerial, engineering, transportation or accounting, and the semi-annual index is the skeleton key to this fund of reading matter. Therefore, in addition to its direct use as an index, it is appropriate for us to call the attention of readers in this issue to its supplementary use as outlined.

IT PAYS TO ADVERTISE THE OTHER FELLOW

How to stimulate passenger traffic is a live topic these days among both city and interurban railway managers. This fact was most forcibly emphasized at the Indianapolis meeting of the Central Electric Railway Association, and as a result general advertising as a means of increasing passenger traffic is to be investigated. The experience of some companies along this line clearly indicates that it pays to advertise, not only one's own service but the other fellow's, when it will induce travel. The Detroit United Railway passenger department has pursued this plan very profitably. Through the constant display of banners and car cards steam road excursions from different points on this company's lines are announced; attractions at theaters in the important cities along the route, circuses and carnivals are also advertised. In fact, any and every form of entertainment in which the passenger department believes the public will be interested is called to its attention. This practice has tended to make new patrons and increase the traveling propensities of the regular riders.

In preparing advertising of this kind the entertainment is first announced and then the public is urged to use the cars to reach the point where the entertainment is to be given. One needs only to compare the attendance at a circus side show where there is a widely advertised two-headed calf with that at the unadvertised museums of natural history to determine whether this form of advertising pays. Recently the Detroit United Railway had an opportunity to test the public's interest even in this direction. It called attention to the existence and location of an art museum where the attendance had dwindled because no form of advertising had been used, and the result was most profitable to the company. Electric interurban and street railway companies usually announce the dates of county fairs, circuses and other important events, but they often fail to keep constantly before the public the permanent points of interest to which regular travel may be maintained. One phase of the Chicago Surface Lines' advertising campaign has been along this line, and the results indicate that the constant use of all forms of advertising is certain to kindle the public's desire to travel and thus aid in increasing revenue.

WHEEL AND RAIL CONTACT AFFECTS WEAR LIFE

Unequal contact between the wheel treads and the rail which concentrates an enormous pressure on a limited area, is one of the causes of rail corrugation and tends to shorten rail life. This is the main conclusion evolved from R. C. Cram's study of this phenomenon. Curved heads for girder rails as a remedy, as the author states in an article published elsewhere in this issue, is not a new idea, but is a departure from accepted American practice. Several tramway companies in England and on the European continent have had convex rail heads on girder rails in service for the past five years. On the Leeds Tramways, for instance, a 7-in. girder-grooved rail with a convex head inclined slightly toward the groove, was adopted after comparing several hundred gagings of partly worn rail and tire sections. More than 6000 tons of this section of rail have been laid in Leeds since January, 1910, and the service results, so far, indicate that extrusion of the metal on the rail head has been eliminated, or at least 500,000 cars over one section of track have failed to develop this difficulty which is common to the flat-head rail sections. Furthermore, rail wear was found to be uniform across the head, and after five years of service the head retained its convexity. The experience in Leeds substantiates Mr. Cram's findings and points a way to prolong both rail and wheel wear life.

The principal lesson to be learned from the results of such an important study is that rail heads and wheel contours should not be designed independently of each other. The wear life of each is so dependent upon the character of contact made that it is vital to maximum life to have a uniform wheel bearing across the rail head. It is also our opinion that the character of wear on steel wheels bears a very intimate relation to the rail-head sections over which they operate. In other words, a change from the flat head to the curved head section is quite certain to change the character of wheel wear. Doubtless the design of a wheel contour and a girder-grooved rail head which would provide full contact from the fillet at the gage line to the outside of the wheel tread would produce still different results. Moreover, it appears that the proper contact between new wheels and new rails would make both wear more uniformly. If this result could be obtained it would be of little moment whether new wheels were operating over old rails or whether old wheels were operating over new rails, because the line of contact in either case would give practically a full tread bearing. In conclusion we are strongly of the opinion that Mr. Cram is working along the right line. Whether it would be well to await the service results of this experiment or whether further tests should be conducted are questions worthy of the immediate consideration of the committee on way matters of the American Electric Railway Engineering Association.

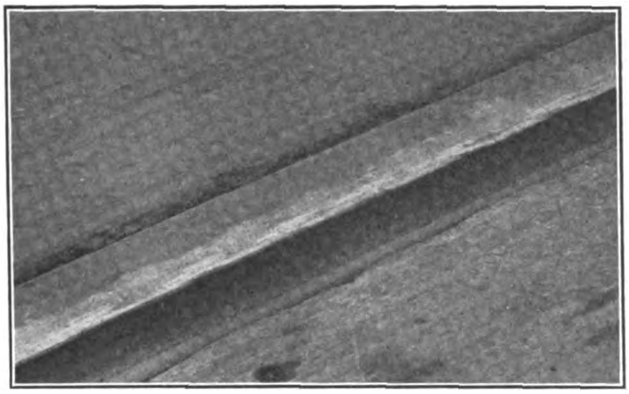
Curved Heads for Girder Rails in Brooklyn

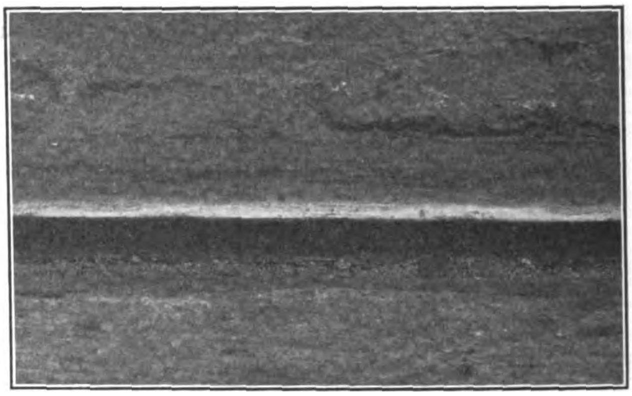
The Author Demonstrates That, as Corrugation Is Caused by Excessive Pressure or Force per Unit Area at the Wheel Tread, Increasing the Tread Area by Conforming the Rail-Head Contour to That of the Worn Wheel Reduces Corrugation

BY R. C. CRAM, ASSISTANT ENGINEER WAY AND STRUCTURE DEPARTMENT, BROOKLYN RAPID TRANSIT SYSTEM

Rail corrugation is a never-failing subject for argument and speculation. Many theories have been advanced as to what may be its cause, but to date there is no agreement upon any one particular factor as being the principal or controlling agent in producing the phenomenon.

The description in the issue of the ELECTRIC RAILWAY JOURNAL for July 3, 1915, page 26, of an experiment being made in England with a special differential gearing for car operation has created a renewal of interest in the study of the subject. In the meantime other study and experimentation has been going forward both in the United States and in Great Britain with respect to the design of the rail itself. Perhaps this has been induced, in the main, by the generally accepted fact that grooved and tram girder rails appear to be easy victims to corrugation while plain girder (high-T) and standard section rails do not.





CURVED RAIL HEADS—FIGS. 1 AND 2—TYPICAL RAIL CORRUGATIONS ON PLANE HEAD, DEPTH 0.001 IN. TO 0.005 IN.

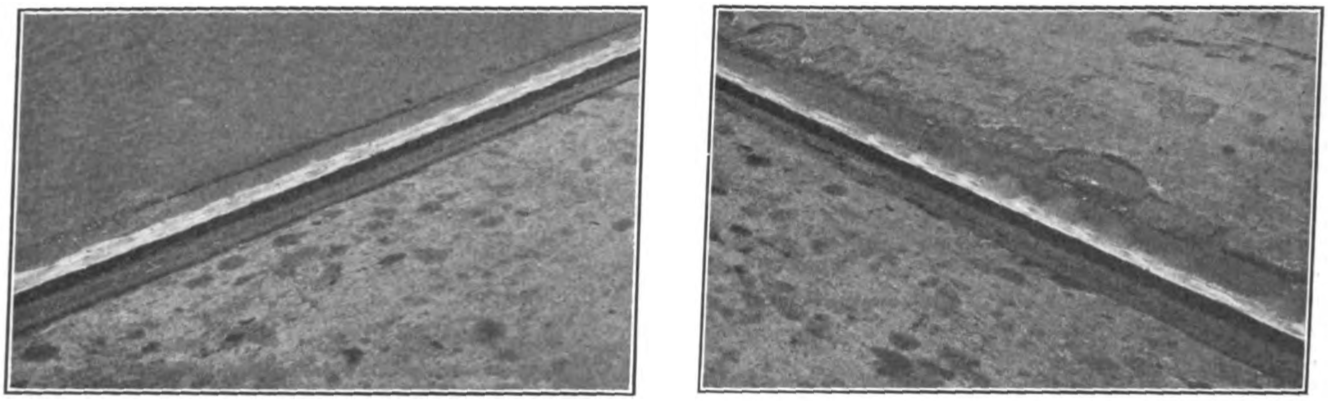
A study of the numerous designs of modern grooved and tram girder rails shows that there are several elements in their design which are common to the type and which are not found in plain girder rail designs. These elemental differences may be found in (a) the head contour; (b) the groove or tram; (c) the relative position of the gage line and the center line of the web, and (d) the comparative thinness (in older sections at least) of the webs of the tram and grooved rail designs.

The second element is undoubtedly the most obvious, and a study of its influence would be interesting, particularly with regard to the effect of the grooved or tram portion as a stiffener against lateral movement of the rail head. A comparatively simple experiment could be made by planing off the tram in varying amounts on different rails until it was entirely eliminated and placing these rails in line under traffic jointly with others not so treated.

AN EXTREME CASE OF CORRUGATION

It is with the first element, however, that this discussion has to do, and our attention was drawn to it as the result of a case of very rapid corrugation which developed in a period of about five months on track laid with our standard grooved girder section Lorain Steel Company's 105-433, the general head contour of which is shown in Fig. 14. The rails were laid with cast-weld joints on wood ties in natural soil ballast, and there was a general elevation in grade of about 6 in. over that of the old track which it replaced. The rails were of Class B grade (high carbon), treated with an alloy. The tracks were paved between outer rails with 5-in. granite, with cement-grouted joints on concrete base and with asphalt outside in the roadways and immediately in contact with the outer rails. As nearly as careful observation and inspection during installation could determine, there was no particular construction feature which differed from our standard as installed for the past three years. The street is wide, it has a grade between 1 per cent and 2 per cent and the car traffic is frequent and fast. The cars mainly are our new, comparatively light, center-entrance type.

Inasmuch as the development of corrugation to an equal degree had usually required from one to two years, it followed that more than ordinary interest in the matter was aroused. The surface and gage of the line were carefully checked and found to be as nearly perfect as could be expected. The mill inspection reports were examined for variations in chemical composition, and as the rails were located by heat numbers when installed this was a comparatively easy task. They were relocated and their positions in the track were indicated on the curbs of the street. The corrugation was found to be generally distributed over the entire section of track and was not confined to any particular line of rails nor to rails of any particular heat number. Other rails of the same heats were examined at the storage yard, and careful comparison was made with these and templet drawings of the rails. Figs. 1 and 2 illustrate the character of the corrugations, which, at the time the views were taken, had reached depths ranging from 0.001 in. to 0.005 in. Measurements taken in October at the same places now show depths averaging 0.01 in., which indicate a rate of increase in depth of about 0.001 in. per month. Figs. 3 and 4 illustrate the development five months later than Figs. 1 and 2 at the same places.



CURVED RAIL HEADS—FIGS. 3 AND 4—APPEARANCE OF CORRUGATION SHOWN IN FIGS. 1 AND 2, FIVE MONTHS LATER

The wave lengths are now fully defined at about 3 in. from crest to crest, and the corrugation has reached the depth at which we usually find it advisable to begin the work of removal by grinding. Figs. 5 and 6 are excellent views of the worst conditions at the present time.

MERITS OF CURVED RAIL HEADS

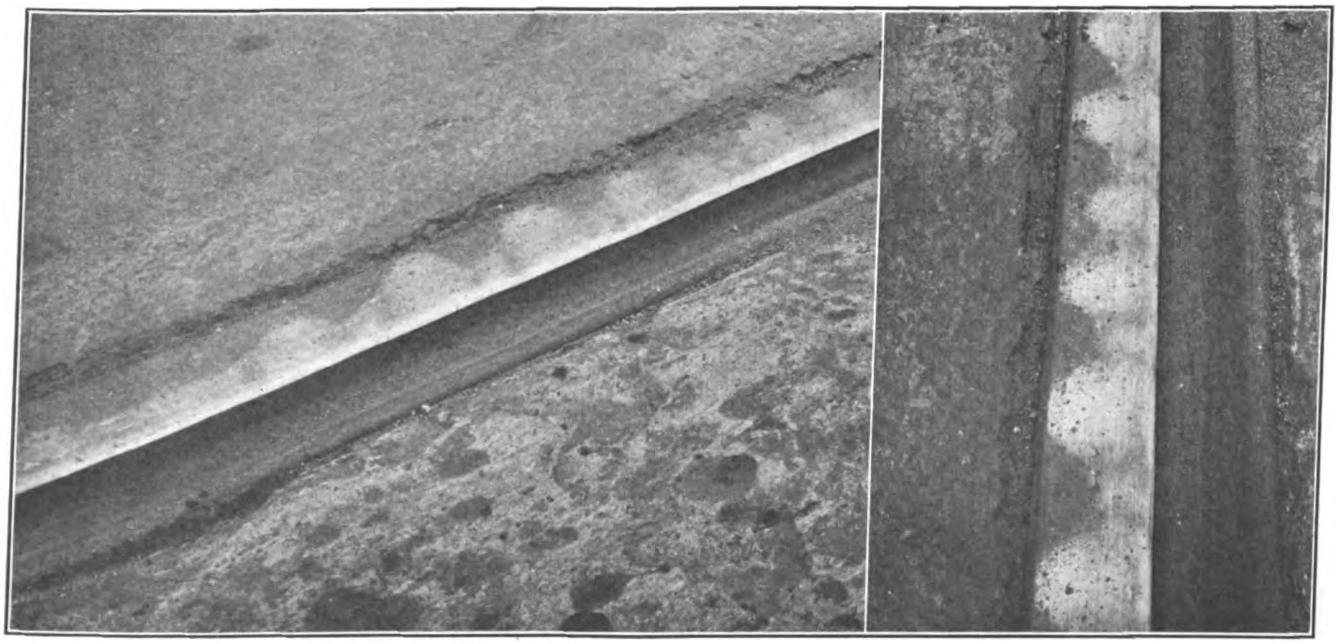
The investigation of the conditions found, along the lines mentioned, led to the discussion of the subject with the engineers of the rail manufacturers and the alloy manufacturers, and the whole matter was again gone over on the ground with them. The net result of these conferences was the suggestion made by the rail manufacturers that we investigate the merits of rails having curved heads, which they were prepared to roll without increase in cost provided the other features of our standard rails were kept as at present.

There was nothing novel in this suggestion, as such. An examination of rail catalogs shows that there have been some twenty-five girder rail sections rolled which had curved heads. In fact, most of the early stringer rails and succeeding shallow tram girder rails were so designed. Just what led to the general abandonment of this feature of girder rail design is not entirely clear, although it may be that when a depth of 9 in. was reached there were rolling troubles which were then hard to overcome in some mills without excessive costs. Another and probably the chief reason for the adoption of the inclined plane head may have been the desire to make the rail head suit the prevailing wheel coning in an effort to secure more wheel contact. In the meantime nearly all plain girder (high-T) rails have retained the curved head feature.

Furthermore, the advantages to be gained from the curved head design were pointed out by C. B. Voynow of Philadelphia in the "Analysis of Rail Section," which was a part of the report of the committee on way matters of the American Electric Railway Engineering Association, printed in the 1911 Proceedings under the heading "Girder Rail Sections." It is quoted as follows:

"(*b*) *Outline of the Tread.* The tread is made a plane, inclined to the gage. The wear of all mechanical parts indicates that straight lines and plane surfaces should be avoided. Worn rails show rounded heads. A flat head would get less work or compression in rolling, and therefore would be of less dense texture on the wearing surface. Worn rails show also the tread inclined at some angle to the gage. From the above it seems desirable to make the tread of a curve of some radius, but the difficulty of grinding joints on a rounded head and also the added difficulty in rolling, pointed out by the manufacturers, determined the design of the tread, as shown."

It will be noted that difficulties due to accurate joint grinding and added difficulty in rolling were the reasons assigned for the adoption of an inclined plane head in-



CURVED RAIL HEADS—FIGS. 5 AND 6—EXTREME CORRUGATION ON PLANE HEAD RAILS, SHOWING CLEARLY THE ACCOMPANYING PEENING EFFECT stead of a curved head, and the angle of inclination is the same as the coning of the standard wheel tread.

A STUDY OF WORN-WHEEL CONTOUR

Observations for the past three seasons have shown that the first wear area on the head of the company's standard L. S. Co. 105-433 section when new is confined to a width of about 3/8 in. and is very close to the fillet connecting the top with the gage side as indicated in Figs. 7, 12 and 19, and it requires about a year under average traffic for this width to increase to 1 in. It was concluded that there must be some peculiar wheel position or wear which would have this effect in view of the fact that our standard wheel contour when new has the same angular inclination below the horizontal (1 deg. 30 min.) as is found in our standard rail head when new. Hence if wheel heads were holding their correct contour, some evidence of nearly full contact over the new rail heads should be found.

It was thought that wheel contours should be studied, and the mechanical department of the company was requested to furnish molds showing wheel wears in various stages. These were secured and from them a composite worn tread and flange was derived, as shown in Fig. 7.

The tread of the wheel was found to assume a curve of about 16 in. radius inclined at an angle of about 4 deg. below the horizontal. The effect secured by plotting this tread on the company's standard rail is shown also in Fig. 7. The bearing is found to be confined to a small area very close to the fillet and it has a width of contact approximating 3/8 in., which is substantially the width of the first rail wear area. The increase in the inclination of the worn tread from 1 deg. 30 min. is thus seen to have the effect of making the wheel work close to the gage line, with a strong tendency to crowd the rail metal over the fillet. This is exactly what happens, as we find a peening at the fillet within a very few days after new rails are put in service. A piece of this peened metal may be seen clearly in Fig. 5.

The contrast between new and worn wheels in tread angularity is more fully shown in Fig. 11. Attention is also directed to the large wheel tread area not in contact with the rail head shown in Fig. 7.

It becomes a simple matter to determine approximately the amount of rail wear necessary to obtain full contact theoretically with such a worn wheel on a new rail head. This is accomplished by lowering the wheel outline vertically until such contact is made as in Fig. 8, which requires a displacement rail of head metal to a depth of about 0.06 in., and it will be noted that when this is reached the greatest wear area has extended back from the gage fillet about 1 1/8 in., which represents about the same width of contact usually found after about one year, and which is also about the usual greatest width of the crests of corrugations at the time it becomes necessary to grind them out.

EXCESSIVE RAIL WEAR DUE TO LOAD CONCENTRATION

The first inference to be drawn from these observations is that even under the heaviest car traffic conditions it is practically impossible to wear away such an amount of metal within so short a space of time as one year, and therefore the rail metal cannot act otherwise than to flow or cold roll under the extremely heavy concentrated loading produced by the condition obtaining, and some of the metal flows forward ahead of the wheels while some flows laterally over the gage line fillet where there is little or no support sidewise against such action. The side flow is also assisted by the increased coning of the curved wheel treads (about 4 deg.), which naturally tends to make the wheels seek to center themselves more rapidly than they would if the coning were kept nearer to the original inclination of 1 deg. 30 min. This also tends to increase the pushing effect of the wheel at the area of least support against such action by increasing wheel tread widths at the flanges, which in turn increases the permissible sidewise action allowable before being checked by the wheel fillets at the flange. Side flowing or peening is also the first evidence of movement of the rail metal, and the peening increases as corrugations increase in depth until such time as the peenings are cut off by the vertical movement of the wheel flanges in following the corrugated contour. Hence it seems that a considerable portion of the metal must disappear in this manner, which is confirmed by the fact that we continually find the peened metal cut off and lying in the groove.

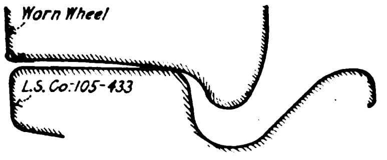


FIG. 7 - Average worn wheel - relative position on a new inclined plane rail head.

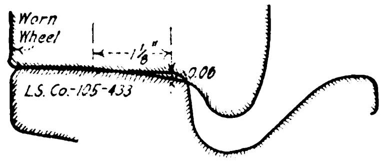


FIG. 8 - Amount of head wear required to secure full contact over head with worn wheel tread.

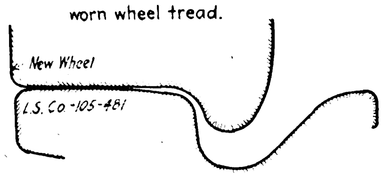


FIG. 9 - Approximate position assumed by a new wheel tread on new curved head.

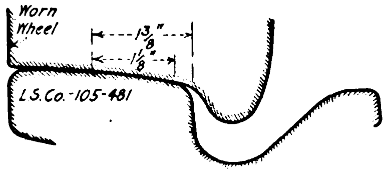


FIG. 10 - Approximate position of average worn wheel on new curved head.

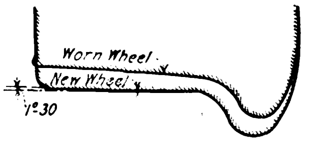


FIG. 11 - Comparison of a new wheel with average worn wheel.

CURVED RAIL HEADS—FIGS. 7 TO 14—CURVED HEADS FOR GIRDER RAILS. HEAD AND WHEEL CONTOURS SHOWING BENEFITS DERIVED FROM CURVING OF RAIL HEADS

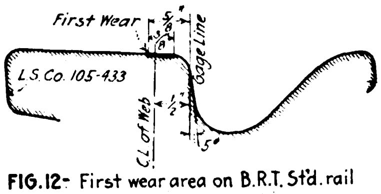


FIG. 12 - First wear area on B.R.T. St'd. rail indicated by heavy line.

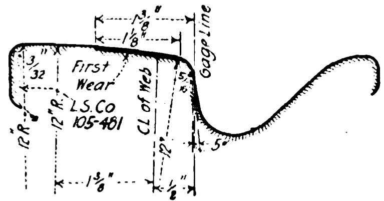


FIG. 13 - First wear area on experimental curved head rail indicated by heavy line. Effective contact secured is 3 times that shown in Fig. 12.

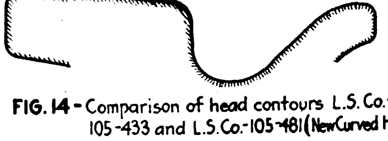
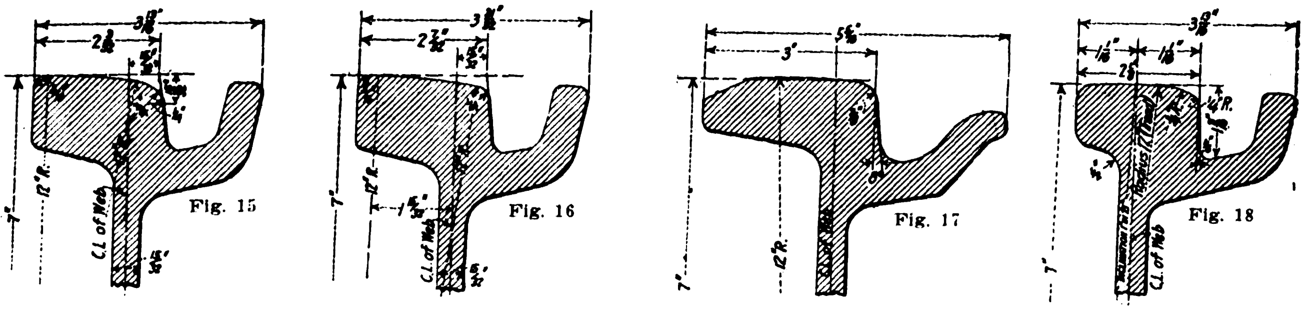


FIG. 14 - Comparison of head contours L.S. Co.-105-433 and L.S. Co.-105-481 (New Curved Head).



CURVED RAIL HEADS—FIGS. 15 TO 18—CURVED-HEAD RAILS IN EXPERIMENTAL USE IN DUBLIN, IRELAND, AND CALCUTTA, INDIA; IN GLASGOW, SCOTLAND; IN THE CENTRAL WEST, U. S. A., AND IN LEEDS, ENGLAND, RESPECTIVELY

The second inference to be drawn is that some effort should be made to counteract such injurious effects by trying to increase the load concentration area and shifting its position with respect to the gage line. Evidently the simplest way to do this is to attempt to secure a greater range in the area of contact between the wheel and the rail head from the very beginning of rail service. It follows that with wheels worn to a curve of some form, it will only be possible to accomplish this by conforming the rail head to a similar or nearly similar curved shape. In support of this it may not be out of place to note that, as previously stated, worn rails all show curved heads, and after reaching a certain fixed form of curve we seldom find corrugation. Also, corrugations do not very often reappear after grinding provided the grinding has conformed the head to an angle approximating the angle of inclination downward toward the gage line which the worn curved head has assumed.

COLD ROLLING BY THE LOAD DOES NOT PREVENT CORRUGATION

Furthermore, the idea that cold rolling alone, when not accompanied by corrugation, hardens the rail head to such a degree that it is impossible to form corrugations does not appear to be substantiated by the fact that corrugations appear on new grooved girder rails of the hardest composition, which latter should approximate, if it does not exceed, the degree of hardness produced by cold rolling. Corrugation also appears rather suddenly on old girder rails after they have been in service a number of years without previous evidence of a tendency to corrugate, and the rails have certainly received the benefit of cold rolling as a hardening agent. For these reasons we are forced to consider the design of the rails as being the more responsible and, as has been shown, there is evidence in the early service of new rails which tends to place the responsibility upon design. There is also considerable reason for the belief that old rails corrugate, finally, because of the same action of the worn wheels. This can be accomplished by any change in rail position, either through regaging, which brings a small head area under wheel contact, or through changed position, gradually accomplished by failure of ties and fastenings which produces similar results. In each case the worn wheels take a new position with highly concentrated loading on the rail head, and this factor alone would seem to explain why the rails corrugate under such apparently opposing conditions.

It may be asked why T-rails do not act similarly under the same conditions, and the answer appears to lie in the difference in design. The load, even when so heavily concentrated, is better distributed to the web both vertically and laterally, and there is no stiffening tram or groove to offset more free and uniform head movement laterally under the sidewise movement of the wheels caused by the excessive coning. Hence the corrugations, though tending to form to a somewhat lesser degree, are ground out by the wheels, which are more free to assume such varied positions on the head as to assist in the grinding. This point appears to be substantiated by the fact that we find the head metal of standard section (low T-rails) constantly peening or extruding on both sides upon examination of such rails in service on our elevated lines.

A STUDY OF WORN RAIL HEAD CONTOUR

Having studied the worn wheels and their possible effect on new rails, attention was then directed to worn rails. Advantage was taken of openings for joint repairs on three most important, heavy traffic lines, and a great many scribings were made from rail heads at points far enough away from joints to be free from excessive wear due to joint conditions. These scribings furnished a set of measurements from which it was possible to secure an average head contour of our standard 7-in. grooved girder rails worn in service for seven years on both steel and wood tie construction. This composite contour was found to have a curved head of a radius of about 12 in. with an angle of inclination toward the gage line of about 3 deg. below the horizontal.

It was decided that it would be worth while to experiment with the curved head rails and, therefore, a new head design was evolved, as shown in Fig. 13, which has been rolled by the Lorain Steel Company as section 105-481. It will be noted that there is no substantial change in weight. A comparison of the contours of the two rails 105-433 (plane head) and 105-481 (curved head) is shown in Fig. 14, while early wear is shown in Figs. 20 and 21.

RESULTS OBTAINED WITH CURVED HEAD RAILS

It was expected that new wheels might give some trouble on the new rail due to raising the flange slightly —and these were plotted as shown in Fig. 9. From this it was thought that the new wheels would work fairly well with little danger of derailment, which latter question was raised by the mechanical department. It appeared that comparatively few wheels in service are new, and derailments could be expected on worn rails for the same reasons if there were any particular danger from this point.

About 630 tons of this rail have been rolled and some 300 tons (approximately 9600 ft. of single track) have been installed this fall. In order to test the rail fully, about 700 ft. of single track has been laid on steel ties having 6 in. of concrete under them and a total of 10¼ in. of concrete under the base of the rail throughout. The new rails have also been laid in conjunction with our standard plane head rails in all cases, so as to secure a comparison under the same traffic.

It may be of interest to note by reference to Fig. 13 that a first contact width of about 1⅛ in. was predetermined, and this width was found actually in the markings under the first car wheels to pass over the rails. The attempt is also being made to secure careful records of the wear as it progresses, by means of plaster of Paris casts made at definitely located points.

The accompanying Figs. 15-18 illustrate similar curved head rail designs now being experimented with in Dublin, Ireland, and Calcutta, India; in Glasgow, Scotland; in the Central West, U. S. A., and in Leeds, England, respectively.

In closing it may be stated, from the experience already gained during installation, that the two principal objections to the curved head feature, viz., rolling and joint grinding difficulties, are really of very little moment and may be disregarded. The rail mills have had no trouble in turning out a satisfactory product, close to templet, with a marked similarity of head contours which has tended to reduce the amount of grinding at joints necessary to secure good head surface. The work of grinding the joints is not difficult and very satisfactory results have been obtained. This is true also with respect to the compromise joints where the plane head rails are joined to the curved head rails.

The performance of the new rail section under traffic shows that the desired increase in first contact area, with the incidental location of the load center at a greater distance back from the gage line, have been secured and no peening of metal at the gage line has been found after a service of about eight weeks. This peening may be found in our new plane head rails within five days after being placed in operation.

CONCLUSIONS

An attempt has been made in the foregoing discussion to present a statement of the main features which were considered before reaching a decision to give a service trial to the curved head design, together with some information obtained from trial installations which seem to warrant the following conclusions:

1. Rail corrugation has become so general that it is being accepted with more or less complacency, and the rapid improvement in rail-grinding apparatus has made the removal of corrugation quite an easy matter, which has tended to temporarily divert attention from the study of its causes.

2. The present general practice of eliminating corrugations by grinding, on new rails at least, is simply an expedient which is not only expensive but also wasteful —expensive in actual grinding cost and wasteful of otherwise useful rail head metal lost in the process.

3. A study of the now generally accepted theory of wheel and rail contact, and their resulting pressures, based on the experiments made by Professor Johnson and by G. L. Fowler, combined with a study of the actual conditions of rail head and wheel tread wears, lead to the belief that the inclined plane head design was based on a misconception of the theory of contact and was at variance with the requirements of correct design, as indicated by both wheel and rail wears.

4. The curved head design, on the other hand, by providing a range of contact over new heads about three times that presented by new plane heads and much further back from the unsupported metal near the gage line fillet, seems to satisfy the requirements of the theory of contacts as well as the conditions of wears found in service.

5. The curved head design practically eliminates the excessive amount of metal on inclined plane heads which must be removed in some manner before the heads can conform themselves to what may be called the accommodation wear curve found on all rails except those just installed. Such a curve of substantially uniform shape is found not only in the worn rails of any one system, but also in all groove and tram girder rails throughout the country.

6. The adoption of a curved head design involves a return to an early principle of grooved and tram girder rail design which has never been generally abandoned in T-rail designs. It presents no rolling mill or joint

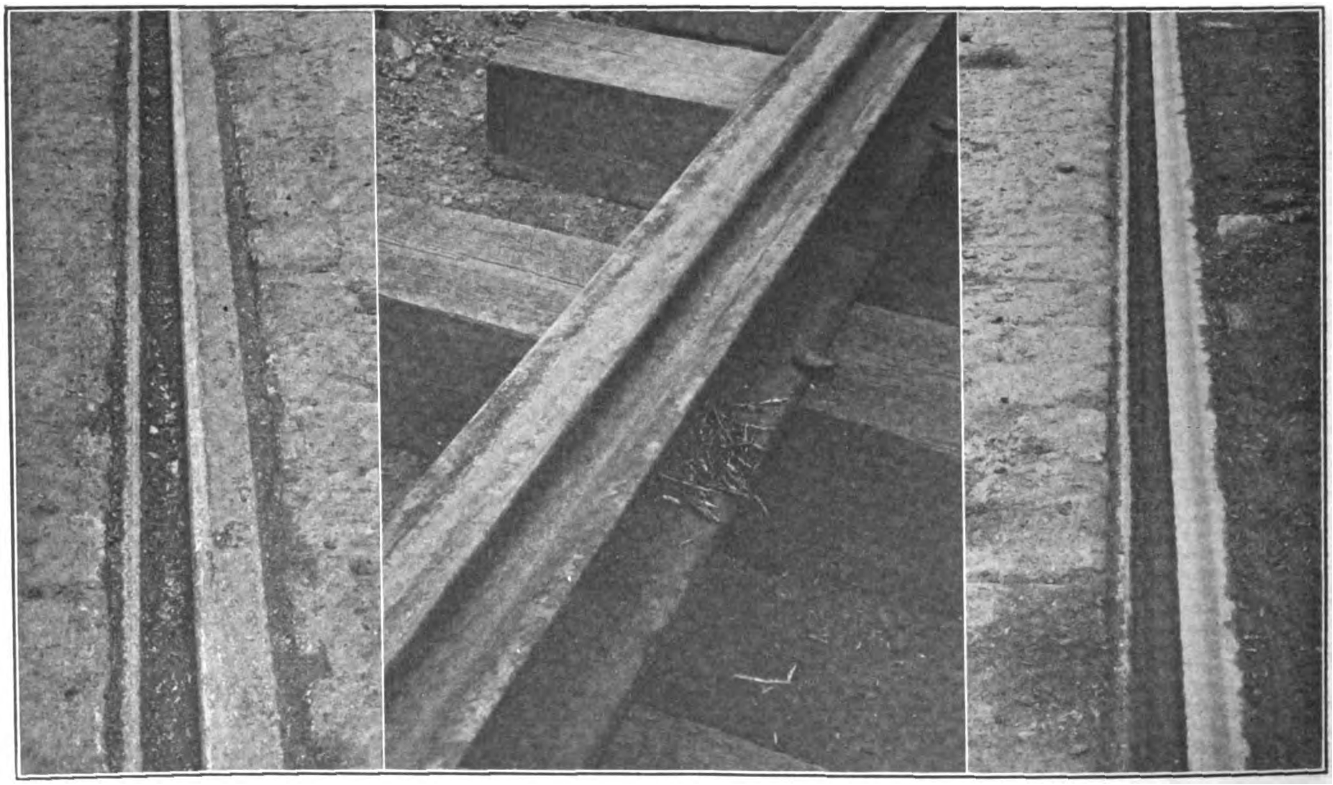


Fig. 19 Fig. 20 Fig. 21

CURVED RAIL HEADS—FIG. 19—FIRST WEAR ON STANDARD B. R. T. RAIL. FIGS. 20 AND 21—FIRST WEAR ON CURVED-HEAD RAIL grinding difficulties; there should be no increase in cost, and a curved head may be incorporated in practically all grooved or tram girder rails without altering any other features of the design.

7. In view of all these points in its favor it is thought that the curved head design merits the most careful investigation because of the potential value in tending to minimize the inherent tendency of all rails to corrugate.

8. An interesting point which arises is the question as to the desirability of providing wheels with curved treads also. It is not impractical from the manufacturing standpoint, as far as steel wheels are concerned, and a considerable saving in wheel wear could be anticipated. In any event, actual wheel wears show that the straight tread is very soon lost in service and that comparatively little attention is given to tread wear with respect to maintenance of straight contour because wheels are shopped only for turning required by flange wear. In view of the fact that the majority of wheels and rails which come in contact are worn to curved contours, it seems somewhat impractical to expect to get the best mechanical results by imposing curved wheel treads upon plane rail heads or vice versa, and it would appear to be more logical to have the two contours conform to nearly similar curvatures from the very beginning of their contact.

Electric Car Maintenance*

Appearance of Cars Reflects Grade of Service Rendered—Value of Charting Defects and Scientific Inspection of Equipment

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SCHENECTADY, N. Y.

In considering car maintenance it should be remembered that the general appearance and condition of the car is a direct indication of the grade of service that is being given. The underlying principle of keeping up the appearance and condition of the car is based upon inspection and overhauling. These are two distinct classes of work.

Inspection shows what work is necessary to do on a car to maintain it at the highest state of efficiency and at reasonable cost. There are two other very important indexes as to the states of efficiency, of workmanship and its direction. The first is the pull-in report, and the second is monthly segregated maintenance cost. These figures will be more readily appreciated provided they are charted. I have reviewed the pull-in report for the past year of a city system operating 800 cars, and by looking over this chart it can be seen in what months of the year the different classes of failures are experienced. These reports are divided under five different headings, which are: car bodies, trucks, electric equipments of cars, motors, air brakes.

Car bodies are further classified into car-body parts, sash or glass, ventilators, registers, gong signals, sand box, drawbars, fenders, trapdoors, seats, doors and operating mechanism, signs, heaters, headlights, light circuits, window shades.

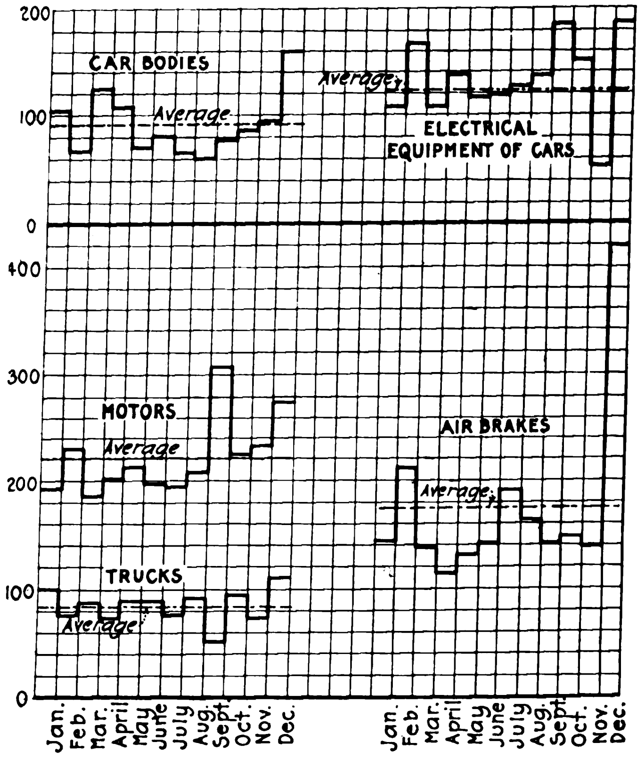
Under trucks the following defects have been classified: wheels, axles, journal bearings, truck frame, brake heads and shoes, brake rods, brake levers, bolster springs, loose brakes, tight brakes,

Under electric equipment of cars the following defects have been classified: trolley base, trolley pole or wheel, wiring, fuse box, circuit breaker, controller, grid resistance.

Under motors the following defects have been classified: field coils, armatures, brush-holders, gears, pinions, gear case, motor frame, motor leads.

Under air brakes the following defects have been classified: compressor, motor, governor, air brake parts frozen, engineer's valve, reservoir, piping or brake cylinder.

The chart shows, for instance, a large number of failures of air brakes during the winter months. Many of these defects were due to frozen air parts, and after the chart had been made the company realized that it had to give a general overhauling to the air piping and place additional reservoirs on the cars. Unless the defects are definitely classified and charted it is practically impossible to secure the proper perspective of troubles experienced. When the defects on a particular classification amount to too high a figure it is advisable to extend the charting of the individual items to determine what should be done on individual pieces of apparatus.



SUMMARY OF PULL-IN REPORTS

Scientific inspection will do more to promote efficient, dependable service than any other single thing. There are two general systems of inspection: the periodic basis and the mileage basis. Both can be worked out in many places to give equally dependable results, but there are some classes of work in which the mileage system is the only one which can logically be followed. For instance, on interurban lines, where there is relatively a small number of cars, with the rotational system of inspection, some cars would not receive attention in proportion to the work which they are performing. Cars of nearly every character should be inspected on a 1000-mile basis. Any rotational system based on approximately this mileage would be efficient.

At a typical carhouse with a force of fifteen men the day force would consist of a foreman, two controller men, two truck men, two truck men helpers, two air-equipment men, one car-body man and one terminal inspector, and the night force of three men, whose duties are to adjust brakes and look after small troubles reported by the motormen. From this it will be seen that all of the real work is done during the daytime. It has been found that night work is most inefficient. The best grade of men will refuse to work at night, as they can readily find more congenial employment. The car-cleaning force consists of six persons in the day and three at night. To inspect the 2000 cars on the line in question 150 employees are required. This is an average of 13.3 cars per inspector. The overhauling of these cars requires 250 employees, which is eight cars per employee. Where cars are inspected in rotation very little clerical work is involved and there will be a uniform amount in the shop at all times.

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*Abstract of paper presented at meeting of Pennsylvania Street Railway Association, Scranton, Pa., Dec. 14, 1915.

On motors the two principal things to consider are the condition of the bearings and the lubrication. Free oil around the motor is one of the most frequent sources of trouble that we have. Any point where the oil flows on the surface means that in a very short time there is an accumulation of dirt which will naturally cause insulation break-downs, and the oil will also cause the insulation to deteriorate rapidly. The other feature about motor inspection is the general condition of the commutation. If the brush-holders are well kept up and the insulating supports clean, there will be but few troubles from this source. By keeping up the brush-holders is meant uniform and proper tension on the brush springs, and that the shunts, hammers and brush-holder slots are kept up to practically the original standard. The motors should be blown out at regular intervals, depending, of course, upon the condition of the roadbed and general methods of operation.

The proper care of a controller consists of keeping the contact surfaces smooth and to replace tips when they are worn excessively. To secure the best operation, the adjustment of the fingers of platform controllers should be so made as to give a simultaneous break on all points that are in the same angle of contact. The next important feature in controller maintenance is proper lubrication and the keeping of all surfaces free of dirt. This especially includes the arc deflectors or, in the case of contactor control, the arc chute sides. It has been found that there is sometimes a tendency among the maintenance men to use insulating paints on controller surface parts that were insufficiently cleaned. The new paint makes the surface look clean, but the dirt is still suspended in the paint and is the cause of future troubles. The lubrication is very closely related to the work of keeping the controller clean. Excess oil means an accumulation of dirt, which causes insulation failures. Lubrication in controllers, as in motors, should be put only where it belongs.

Recently I visited a railway company that in the past had had a large amount of trolley troubles which were largely eliminated by the proper adjustment of the trolley spring tension. The height of the trolley wire was varied from 18 ft. to 20 ft. Standard gage ropes were used of such a length that when the end is placed on the rail head the trolley wheel would be at 18 ft. elevation. A spring balance constitutes a part of the gage rope, and the spring tension is then properly adjusted.

One of the most profitable methods of making savings on a good many systems is that of replacing old equipments. I know of one particular case where by an expenditure of approximately $400 the maintenance of motors would be reduced from $191 to $7.50 per year. This is only one instance of many where large savings can be made, and it must be remembered that a motor that is costing a large amount of money to maintain is a motor which causes a proportionate number of detentions to service, and that all the expenses which are directly charged as maintenance represent but a small portion of the general cost of a defective motor to the company's business.

Another feature which should be mentioned in connection with shop maintenance is that considerable benefit is derived from having monthly meetings of the maintenance men to review all of the troubles which have been experienced during the past month and see what can be done for their elimination. Successful maintenance means continually being on the job, and requires a large expenditure of careful thought and intelligence, not only on the part of the management but also of the men themselves.

Safety Appliances in Car Shops*

Suggestions for Stimulating Interest of Employees in Accident Prevention—Other Suggestions Covering Fire Hazard and Safety Devices on Equipment

BY H. P. MEGARGEE, ASSISTANT TO VICE-PRESIDENT
AMERICAN RAILWAYS, PHILADELPHIA, PA.

Most accidents are due to the human element, and their prevention is most difficult. Ignorance may be remedied to a degree by instruction, but carelessness, generally, is merely forgetfulness. The oldest and best workmen are often the ones injured. They become so familiar with danger that they forget its presence, with the inevitable result. At the congress of the National Safety Council last fall much of the discussion concerned this factor. It was the thought of that body that no pains should be spared in arousing the interest of the employees themselves in this matter of safety. The management should have permanent committees of the men appointed to meet and consider protection; suggestions for the elimination of risks by these committees and by individuals should be encouraged, passed upon and adopted if practicable; prizes should be offered for the best suggestion of the month or year, and safety-first literature distributed. In a word, every possible means should be employed to keep the safety-first idea always present in the minds of those exposed to danger.

The initial step in the production of a careful man is to provide him with a clean, healthful workplace and with safe tools and surroundings, and this brings us to the question of safety devices. The first principle to be observed is that every appliance should as nearly as possible automatically prevent accidents even though the workman is careless. To get a conception of the measures necessary to safeguard a representative railway shop, we shall examine one in detail.

First, we have the building itself, and here, probably, the most important consideration is the fire hazard, for a workman injured by fire while in the course of his employment is entitled to compensation to the same degree that he would be if injured in any other manner. We must see that proper fire fighting apparatus is installed and in place, that dangerous practices likely to cause fires are not indulged in, and that electrical and similar hazards are eliminated. Where doorways open upon tracks, they should have railings and warnings posted. Stairs should have slip-proof treads and proper spacing of steps. They, with hatchways, elevator shafts and other openings, should be inclosed or guarded with railings. Skylights should have wire mesh or insert wire glass in them. Ladders, when fixed, should be of steel with not less than 15 in. between stringers and 12 in. to 15 in. between rungs. Portable straight ladders should be supplied with adjustable non-slip shoes. Any stock and parts in process of construction should be placed upon racks or piled out of the way.

With regard to power transmission: Vertical belts should be guarded to a height of 6 ft. from the floor. All gears when power driven should be completely incased, or at least beyond the root of the teeth. Pulley and clutches within 36 in. of a bearing should be entirely incased on the side nearest the bearing, and collars, couplings and set screws on revolving machinery should be of the safety type.

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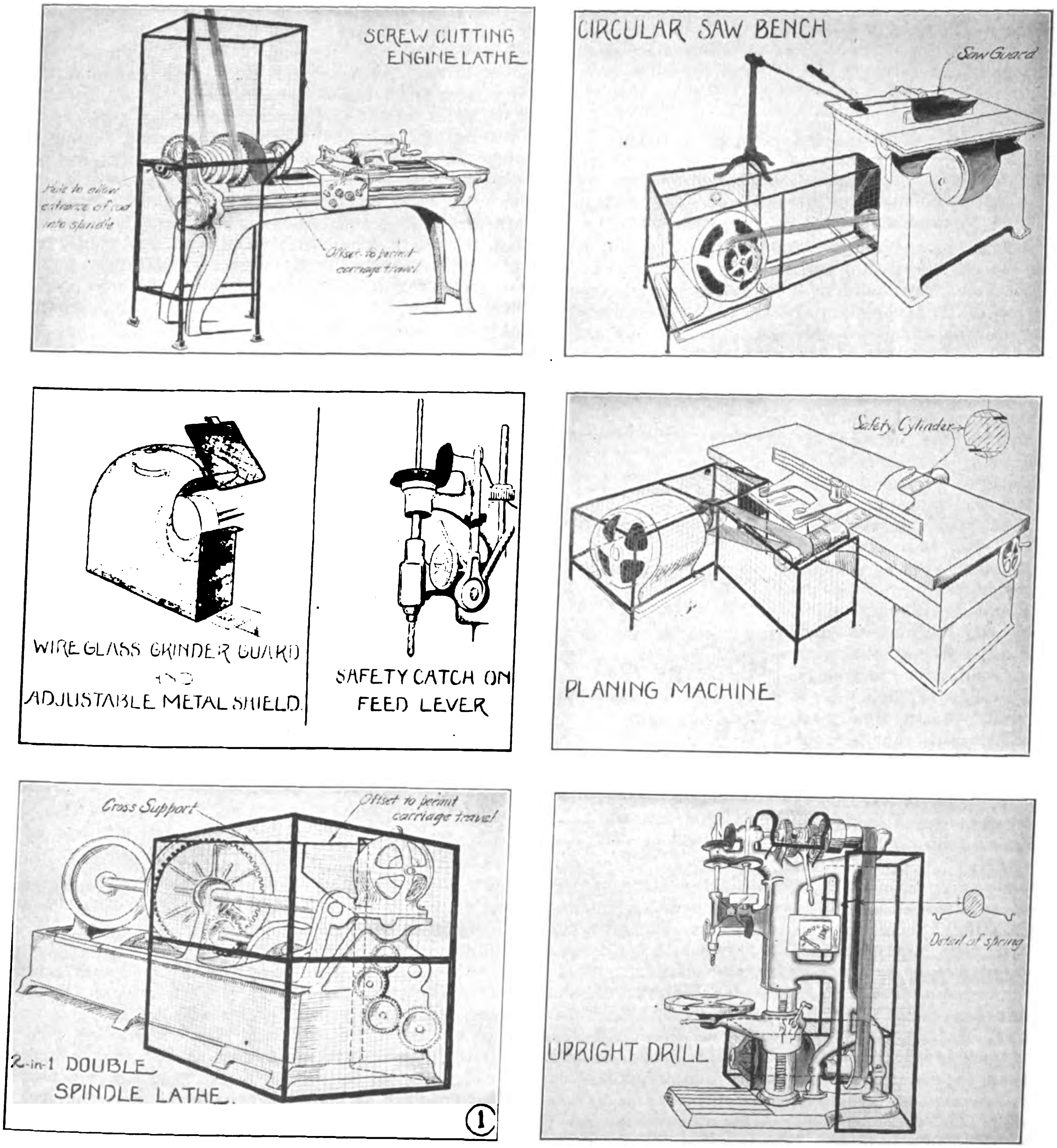
*Abstract of paper presented at meeting of Pennsylvania Street Railway Association at Scranton, Pa., Dec. 15, 1915.

Slings should be tested and tagged with the date tested, and the foreman should make a daily examination for cuts or crushed fibers.

As to the machines themselves, I would refer you to the requirements of a safeguard, from the "Universal Safety Standards of the Workmen's Compensation Bureau," a book which should be contained in every street railway company's library. This book says of a safeguard: (1) that it should afford all possible safety to the operator and surrounding workmen; (2) that it should be, if possible, automatic in its action, application or operation; (3) that it should be, if possible, an integral part of the machine itself, and (4) that it should not materially diminish the output or efficiency of the machine to which it is applied. If these principles are kept in mind and strictly adhered to, successful safeguarding is assured.

With regard to the type of guarding for individual machines, I have prepared drawings which show better than I can explain verbally how this is done. The sketches are taken directly from the machines in use in the Chicago & Joliet Electric Railway's plant and represent the best practice in safeguarding. I am of the opinion that, with this installation, a very successful attempt was made to use a single substantial screen


SCREW CUTTING ENGINE LATHE
Hole to allow entrance of rod into spindle
Offset to permit carriage travel
CIRCULAR SAW BENCH
Saw Guard
WIRE GLASS GRINDER GUARD AND ADJUSTABLE METAL SHIELD
SAFETY CATCH ON FEED LEVER
Safety Cylinder
PLANING MACHINE
Cross Support
Offset to permit carriage travel
2-in-1 DOUBLE SPINDLE LATHE
①
Detail of spring
UPRIGHT DRILL

SKETCHES SHOWING MACHINE TOOL SAFETY GUARDS, CHICAGO & JOLIET ELECTRIC RAILWAY or casing as far as it was possible and not to have a number of "gingerbread" guards stuck all over the machine. All parts to which access need not be had in the operation of the machine are grouped behind one guard.

A very interesting phase of the question is that of the expense involved, and in conclusion I give you the cost of protecting a typical plant. I have in mind one of our subsidiaries—a company operating about fifty cars and having shop facilities for that number. About fourteen machines were guarded in approved manner and several special safety devices were purchased, and the entire cost of labor and material was less than $400.

If you consider that a single workman receiving $12 a week in wages would have to be laid up only for a period of sixty-seven weeks to receive this amount—and should he be disabled by a permanent injury such as the loss of a hand he would be entitled to 50 per cent of his wages for 175 weeks, or $1,050, it is apparent that the question of the cost of installing a reasonable number of safety appliances is so slight as to be absolutely negligible.

Skip Stops Held Up in St. Louis

Plans for Faster Schedules Have Been Approved by a Four-to-One Popular Vote—Adoption Now Awaiting Approval of Public Service Commission

A somewhat remarkable situation in connection with the recently-tested skip-stop plan has arisen in the city of St. Louis, as the order for its establishment, after a period of trial operation that proved satisfactory to the railway company's patrons, is apparently being held in abeyance by the local authorities. This failure to act is presumably based upon protests that have been made by a few property owners at the points where stops have been eliminated, although the patrons of the line have expressed themselves strongly in favor of the change.

This vote is taken to determine the preference of passengers on this line.

If you desire repid transit, vote "YES."

If you do not wish rapid transit, vote "NO."

Tear off your ballot and deposit it in the box.

NO—Against Rapid Transit.

YES—For Rapid Transit.

ST. LOUIS SKIP-STOP—SAMPLE BALLOT FOR POPULAR VOTE

The skip-stop plan for St. Louis was conceived about one year ago, when the local railway company decided to take up with the city authorities and with the State Public Service Commission the savings in time that could be effected for passengers by reducing the number of stops. The city of St. Louis is rather irregularly built, some of the blocks being short and some long. Under the old custom which grew up with the horse cars, the cars had been making stops at every street intersection. With electric operation, however, the different conditions made it evident that, if certain stops were eliminated in a manner which could not be objected to by the passengers, at least 10 per cent in running time could be saved. The railway company, therefore, called the attention of the municipal department of public utilities and also of the State Public Service Commission to these facts, and both organizations were so much interested in the matter that each delegated engineers to go over the scheme to determine what could be done. After an investigation, the commission's engineers reported that 28 per cent of the present stops could be eliminated without hardship to any of the passengers and with great advantage to all of the riders, especially to those making the longer trips.

Although there seemed to be no question as to the advantage of the stop-elimination plan, both the municipal department of Public Utilities and the State Public Service Commission hesitated to issue an order in the matter. The railway company, therefore, made a formal petition to the State commission for the proposed elimination of stops, and a public hearing was held in St. Louis. At this hearing specific objection was made to the elimination of only twenty-eight stops out of a proposed total of 770. These objections came entirely from property owners and storekeepers at the proposed points where stops were to be cut out, these people fearing that their interests would be affected.

The State commission then took the matter under consideration and authorized a test to be made of the proposed plan on two of the railway company's lines, this test being of ninety days' duration. The commission, however, did not permit a test of the plan in the exact form which had been originally proposed, because in its order for the test certain stops were replaced in the schedule, and this reduced the possible saving in time. The selection of lines was also unfortunate because on some of the other lines of the system, where the blocks were shorter, a much better showing for the skip-stop scheme could have been made. In its order, also, the State commission incorporated a clause requiring the railway company to make application at the end of the test period to the municipal authorities for permission to eliminate the stops permanently, although the commission itself had several times held that the State public service law has removed from the municipal authorities all control over the service of public utilities.

The company proceeded, however, to make the test authorized by the State commission, and, near the end of the test, the passengers on the two lines concerned voted on the question as to whether or not the plan was acceptable to them. On one of the lines the vote showed approximately three to one in favor of the plan, and on the other line approximately four to one in favor of it, about half of the total number of riders on both lines having cast ballots. An attempt was made to have both the municipal department of Public Utilities and the State Public Service Commission assist in arranging this vote and supervise the counting, but neither body was willing to take any part in it. On Dec. 14, the company filed with the commission a report on the test and a petition for permission to install a modified alternate stop plan. This petition is now under consideration by the commission. An abstract of this document follows:

PETITION TO PUBLIC SERVICE COMMISSION FOR SKIP-STOP ORDER

The petition begins with a report outlining the conditions that led up to the test of the new plan, by stating that on Aug. 5, 1915, the Missouri Public Service Commission had issued an order authorizing the United Railways Company of St. Louis to make a test, beginning on Sept. 1. From this it was found that savings of 7 per cent on one line and 7½ per cent on the other were made in the running time without taking a single car out of service, although the commission did not allow the company to eliminate all the stops asked for in the original petition. However, the test was carried through with no more than the usual temporary confusion when any change in running conditions is made.

To determine the wishes of the passengers on the two lines in question, the railway company asked, on Nov.

22, for a vote on the question of rapid transit as brought about by the elimination of stops, invitations having been extended to the commission and to the director of public utilities in St. Louis to supervise the voting, but not being accepted. In order to bring the matter prominently to the attention of the passengers bulletins were displayed in all of the cars on the lines in question on Nov. 19-22, and advertisements were carried in four Sunday newspapers on Nov. 21. On Monday, Nov. 22, advertisements were carried in five English daily newspapers and two German daily newspapers.

Ballots were distributed by the conductors to all the passengers, including those paying cash fares and those offering transfers, and a ballot box, on the front of which was painted "Vote Here for Rapid Transit," was placed in a prominent position at the front end of each car near the exit.

On Nov. 22 a large sign reading "Vote To-day For or Against Rapid Transit" was carried on the front dashboard of each car on the lines in question. There was some newspaper criticism as to the wording of the ballot which asked the passengers to vote for or against rapid transit. However, rapid transit was the result achieved by the elimination of stops and there was no misunderstanding as to what the ballot meant. The petition added that the company would have been glad to have submitted the wording either to the commission or to a municipal director of public utilities had either shown interest in the matter, but as the company did not have the benefit of their advice it was decided that many of the passengers might have been confused as to what was meant by "Elimination," whereas all would know what was meant by "Rapid Transit." Voting was continued on Nov. 22 from the time when the cars went out in the morning until they were turned in at night, at which time the ballot boxes were sealed and deposited in the vaults of the railway company. The counting of the ballots, in the presence of representatives from four newspapers, was completed the following afternoon. The result of the votes on the different lines was as follows:

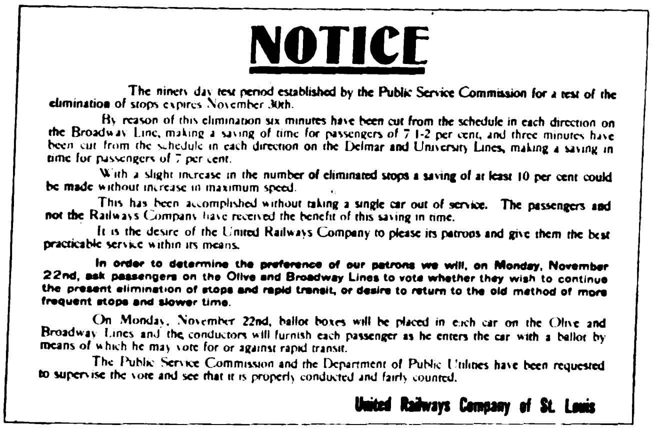
Olive lines—For rapid transit, 38,910. Against rapid transit, 9178.

Broadway lines—For rapid transit, 28,678. Against rapid transit, 12,217.

The petition continued by saying that ever since the tests had been in force the officers of the railway company had been studying the results and methods by which these results had been attained. There is no question but that the majority of passengers favor rapid transit obtained in any way, but any scheme of attaining it by the complete elimination of certain stops is likely at first to meet pronounced though often selfish opposition from two classes of persons. These are, first, the property owners and storekeepers who fear the depreciation of property located at the affected corners for business purposes, and, second, those living in the neighborhood who have to walk further to reach the cars.

To meet such objections as have been made to the original plan and to treat all impartially, the company proposes a modified alternate stop plan which has been in use in the city of Cleveland for about two years and is so popular with the passengers that, according to the city street railway commissioner, they would not be willing to return to the old methods of operation. By this plan, the stops which are eliminated in one direction of travel are retained as stops in the other direction. It is proposed that the minimum distance between stops shall be 300 ft. and that the maximum distance between stops shall be 800 ft., so that the maximum additional distance which any passenger will be obliged to walk on account of the readjustment of stops shall be 400 ft. At the rate of 4 m.p.h. a passenger may walk 350 ft. in one minute; therefore, the loss of time in walking will probably be made up several fold by the saving in time on the car. However, at all transfer points and track intersections, and within the congested area of the business district of the city, no stops shall be eliminated.

The petition closed with a request to the commission for an order making the proposed rearrangement of stops permanent.



NOTICE

The ninety day test period established by the Public Service Commission for a test of the elimination of stops expires November 30th.

By reason of this elimination six minutes have been cut from the schedule in each direction on the Broadway Line, making a saving of time for passengers of 7 1-2 per cent, and three minutes have been cut from the schedule in each direction on the Delmar and University Lines, making a saving in time for passengers of 7 per cent.

With a slight increase in the number of eliminated stops a saving of at least 10 per cent could be made without increase in maximum speed.

This has been accomplished without taking a single car out of service. The passengers and not the Railways Company have received the benefit of this saving in time.

It is the desire of the United Railways Company to please its patrons and give them the best practicable service within its means.

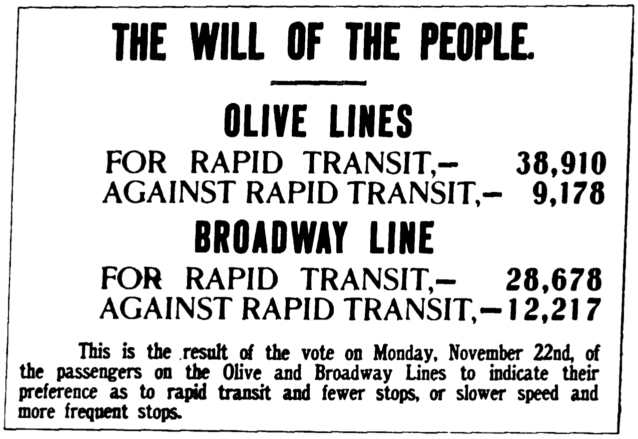
In order to determine the preference of our patrons we will, on Monday, November 22nd, ask passengers on the Olive and Broadway Lines to vote whether they wish to continue the present elimination of stops and rapid transit, or desire to return to the old method of more frequent stops and slower time.

On Monday, November 22nd, ballot boxes will be placed in each car on the Olive and Broadway Lines and the conductors will furnish each passenger as he enters the car with a ballot by means of which he may vote for or against rapid transit.

The Public Service Commission and the Department of Public Utilities have been requested to supervise the vote and see that it is properly conducted and fairly counted.

United Railways Company of St. Louis

ST. LOUIS SKIP-STOP—NOTICE POSTED IN CARS SEVERAL DAYS BEFORE VOTE



THE WILL OF THE PEOPLE.

OLIVE LINES

FOR RAPID TRANSIT,— 38,910
AGAINST RAPID TRANSIT,— 9,178

BROADWAY LINE

FOR RAPID TRANSIT,— 28,678
AGAINST RAPID TRANSIT,—12,217

This is the result of the vote on Monday, November 22nd, of the passengers on the Olive and Broadway Lines to indicate their preference as to rapid transit and fewer stops, or slower speed and more frequent stops.

ST. LOUIS SKIP-STOP—NOTICE POSTED IN CARS ON THE DAY AFTER VOTE

Service Conditions for Women Conductors in London

The Highways Committee of London, England, reports that the precise conditions under which the women will have to work on the London County Council Tramways can only be settled after some experience has been gained, and after it is seen how many men will be called up for service under the group system of Lord Derby's recruiting scheme. So far as possible, women will be engaged for full-time service and will then receive the same rate of pay as men. There might, however, be exceptional cases in which a long "spread over" occurs and one woman could hardly be expected to perform the full duty. It would probably be found convenient in these cases for one woman to take the early morning portion of the duties and another woman to take the late evening portion, and the full day's pay would be divided between the two women.

Massachusetts Northeastern Fare Hearing

Company Presents 6-Cent Fare Evidence Before Joint Session of Massachusetts and New Hampshire Commissions

The Massachusetts and New Hampshire Public Service Commissions at a joint session in Boston on Dec. 14 heard the contentions of the Massachusetts Northeastern Street Railway, Haverhill, Mass., for a general fare increase. John E. Benton, Keene, N. H., appeared as counsel for the company, and President David A. Belden filed a brief on behalf of the proposed changes. After the presentation of the company's evidence the hearing was adjourned to give the remonstrants an opportunity to prepare their case. Pending a finding the proposed changes have been suspended.

Mr. Benton urged that the road is entitled to a fair return upon the capital stock above fixed charges and operating expenses, pointing out that the Massachusetts commission has recently approved the outstanding capital stock. He said that every effort had been made to make the property yield some return to the stockholders, but that prior to the consolidation in 1913 under the present ownership, it was impossible to pay any dividend upon the stock of any of the ten companies then owning the properties. In 1915 the net operating revenue was about $40,000 less than in 1914. The current year thus far shows a loss in gross revenue, which, even if not continued through the year, will, together with an unavoidable increase in labor charges, make the net showing for the year $25,000 worse. The company desires to raise the cash fare from 5 to 6 cents, to increase the ticket-book rate 20 per cent, to introduce a new fare zone between Pelham Center and Hudson Center, to discontinue a lap-over privilege on the Merrimac Division and to make minor changes in fare limits. Mr. Benton said that these changes would yield less than a fair return.

POSITION OF THE COMPANY

The company is composed of seven Massachusetts and three New Hampshire street railways and the Canobie Lake Park Company, operating a pleasure resort in Salem, N. H. In general the lines connect Haverhill, Lowell, Lawrence and Newburyport, Mass., with the Hampton Beach district in southern New Hampshire while other lines connect Nashua and adjacent towns with the cities of the Merrimac Valley of Massachusetts and the seacoast. The system now comprises 126 miles of single track, 80 of which are in Massachusetts. Exclusive of the beach sections, where only summer service is offered, the average length of the fare sections is 4.04 miles, which on the basis of a 6-cent fare is 1.48 cents per passenger mile.

All but two lines were built for operation as a unit system, and the separate incorporation of the eight other companies was the result of the routes crossing the State boundary. Carhouses, repair shops and substations were located with reference to the combined mileage in both States, and with one exception no company could give practical service without the connections afforded by one or more of the companies in the adjoining State. Four of the Massachusetts companies owned no carhouses or shops, and only one in this group had a substation or power equipment of any kind.

Although the gross operating revenue of the system increased from $646,009 in 1911 to $674,818 in 1915, there was a loss of $24,290 in the latter year compared with 1914, so that the net increase for the five years was only 4.46 per cent. Operating expenses increased $50,346 or 10 per cent for the five years, and taxes increased 64.16 per cent. Prior to 1910 no depreciation reserves were included in the accounts of the constituent companies, but in the five years ended June 30, 1914, the combined charge was $561,500, as required by the equipment life conditions. While the profit and loss accounts were unable to meet these depreciation charges without creating large deficits, it seemed best at least to recognize the necessity of a reserve account.

Maintenance expenses for the five-year period ended in 1914 averaged 20.75 per cent of the gross operating revenue, and for 1915 the ratio was 23.93 per cent. Energy is supplied at 13,200 volts to six substations by the Rockingham County Light & Power Company, Portsmouth, N. H., at a rate of 1.4 cents per kilowatt-hour with a provision for slight increases following the price of coal. The cost of purchasing power for 1915 was $144,288, and the cost of substation operation was $14,317, of which maintenance required $2,562 wages $10,804, and supplies and expenses $950. The total power cost was therefore $158,605.

With the exception of the Citizen's Electric Street Railway, Newburyport, Mass., and the Haverhill & Amesbury Street Railway, none of the companies included in the Massachusetts Northeastern consolidation ever paid a dividend. In the eleven years ended June 30, 1911, the former company paid an average dividend of 5.6 per cent, accumulated a floating debt of $45,000 and made no provision for depreciation. The physical condition of the property was such that dividends were suspended in 1911, since which time $94,020 has been expended on repairs and replacements in addition to the regular maintenance outlays. The Haverhill & Amesbury Street Railway paid 4 per cent in three years and 3 per cent in 1897, no later dividends being declared. Since its purchase in 1909, $223,351 has been expended in rehabilitation. The Massachusetts Northeastern has paid one dividend on its preferred stock amounting to $16,825. Since 1914 earnings have not warranted the dividend, and it has been passed.

With the 1915 travel, the proposed rates, together with the additional fare section, would produce an increase of $147,479 in passenger revenue if the traffic held up to normal. Omitting depreciation charges but including $13,000 for wage increases effective on Oct. 1, 1915, and providing for additional taxes on the capital stock or franchise value which would result from a dividend return if one were earned, the company would have operating expenses and taxes of $595,000 or $17,811 more than for 1915. With 5 per cent interest on the funded and floating debt and 6 per cent dividends on the common and preferred stock, the total requirements would be:

Interest on $1,000,000 bonds at 5 per cent	$50,000
Interest on $475,000 floating debt at 5 per cent	23,750
Dividends on $665,000 preferred stock at 6 per cent	39,900
Dividends on $1,500,000 common stock at 6 per cent	90,000
Operating expenses and taxes (est.)	595,000
Total	$798,650
Gross earnings, July 30, 1915, year	683,953
Theoretical increase due to new rates	147,479
Total	$831,432
Excess	$32,782

No allowance for depreciation is included in this tabulation, and the floating indebtedness in large part cannot be capitalized because it represents operating deficits and money borrowed to pay interest. To retire this in ten years an addition of $47,500 per year is required out of earnings. Hence the proposed new schedule will fall far short of providing fully for the company's needs and paying a full fair return upon the investment, even as that investment is now represented by the outstanding securities. It is not expected that the new rates will enable the company to pay a 6 per cent dividend upon its common stock. While the stockholders are entitled to this moderate dividend, if it can be earned, it is believed that a higher fare than that proposed would tend to discourage travel to such an extent that the net increase in revenue would be less than under the proposed schedule. Jitney competition is another uncertain factor. Some of the increases proposed will yield no additional revenue unless corresponding increases are allowed upon competing lines of the Bay State Street Railway. If the rates upon competing street railway lines are not less than those fixed by the proposed schedule, it may be estimated that the revenues will be increased from 10 to 15 per cent the first year after the new rates are in effect, and that this percentage may thereafter be increased from year to year.

The National Safety Council and Its Electric Railway Section

BY H. A BULLOCK, CHAIRMAN MEMBERSHIP COMMITTEE ELECTRIC RAILWAY SECTION, SECRETARY NEW YORK MUNICIPAL RAILWAY CORPORATION

The executive committee of the electric railway section of the National Safety Council met in New York City on Dec. 17 to receive reports from the sub-committees, and plans were put under way for important work along several lines.

THE NATIONAL SAFETY COUNCIL

Before taking up in some detail the work of the electric railway section it may be well to review briefly the remarkable history of the council itself. It was organized in a preliminary way four years ago and formally two years ago, principally at first by the steel and steam railroad industries. The president is Arthur T. Morey of the Commonwealth Steel Company, and W. H. Cameron, Chicago, Ill., is secretary and treasurer. A board of about fifty directors manages the work of the council through an executive committee of sixteen members. The rapidly growing membership now comprises 1450 firms and corporations, including forty-eight electric railways, and more than 5000 individual representatives of these interests.

The work of the council is organized in sections, of which two of immediate interest are those on electric railways and public safety. George O. Smith, Doherty Operating Company, is chairman of the former, and Edward C. Spring, Lehigh Valley Transit Company, of the latter. These two will work in close co-operation, electric railways joining one being automatically enrolled in the other.

Among the important activities of the council are the following:

1. An annual congress with separate sessions devoted to the discussion of important safety problems peculiar to each section, and certain general sessions devoted to the safety problems common to all sections.

2. Local councils in industrial centers, automatically including in their membership the local members of the National Safety Council. These local councils provide facilities for the safety education of employees through public meetings and round-table discussions, and, in general, create facilities for the systematic handling of the public safety and other problems common to the various industries in their respective sections.

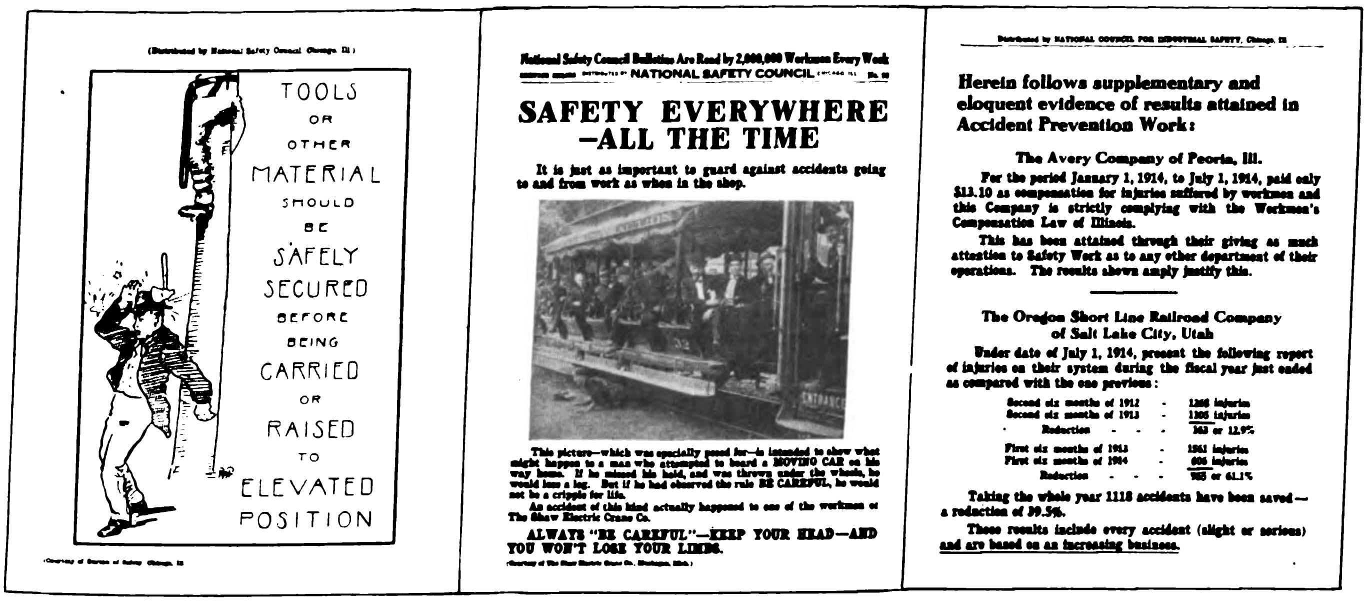
3. A weekly safety service, consisting of at least four bulletins distributed to all members every Monday. These bulletins represent the best information on safety topics and are directed to the stimulation of all those engaged in systematic safety work, and the education, particularly through pictures, posters, slogans, etc., of the rank and file of employees. The National Safety Council is, in large measure, the clearing house for the organized safety activities of the entire country.

4. Directive assistance in organizing and developing safety campaigns. The firms and corporations now belonging to the National Safety Council, particularly such companies in the transportation industry as the Boston Elevated Railway, the Brooklyn Rapid Transit Company, the New York Central lines, and the Delaware, Lackawanna & Western Railroad, have passed through the costly experimental stage in the safety education of their employees and the public. The National Safety Council is able to offer to others the results of the experience of these and hundreds of other concerns.

5. Information bureau service, involving answering, according to the most approved standards, the questions which are submitted by the members on safety problems in their respective fields.

6. The services of lecturers and safety experts, the council being able, through the co-operative activities of its members, to provide such services in connection with safety campaigns.

7. Motion picture and stereopticon slide service. The council maintains a collection of moving picture films and stereopticon slides which can be utilized by the members without charge.


(Distributed by National Safety Council Chicago Ill.)
TOOLS OR OTHER MATERIAL SHOULD BE SAFELY SECURED BEFORE BEING CARRIED OR RAISED TO ELEVATED POSITION
(Courtesy of Bureau of Safety Chicago Ill.)

National Safety Council Bulletins Are Read by 2,000,000 Workmen Every Week

DISTRIBUTED BY NATIONAL SAFETY COUNCIL CHICAGO ILL.

SAFETY EVERYWHERE —ALL THE TIME

It is just as important to guard against accidents going to and from work as when in the shop.

This picture—which was specially posed for—is intended to show what might happen to a man who attempted to board a MOVING CAR on his way home. If he missed his hold, and was thrown under the wheels, he would lose a leg. But if he had observed the rule BE CAREFUL, he would not be a cripple for life.

An accident of this kind actually happened to one of the workmen at The Shaw Electric Crane Co.

ALWAYS "BE CAREFUL"—KEEP YOUR HEAD—AND YOU WON'T LOSE YOUR LIMBS.

(Courtesy of The Shaw Electric Crane Co., Muskegon, Mich.)

Distributed by NATIONAL COUNCIL FOR INDUSTRIAL SAFETY, Chicago, Ill.

Herein follows supplementary and eloquent evidence of results attained in Accident Prevention Work:

The Avery Company of Peoria, Ill.

For the period January 1, 1914, to July 1, 1914, paid only $13.10 as compensation for injuries suffered by workmen and this Company is strictly complying with the Workmen's Compensation Law of Illinois.

This has been attained through their giving as much attention to Safety Work as to any other department of their operations. The results shown amply justify this.

The Oregon Short Line Railroad Company of Salt Lake City, Utah

Under date of July 1, 1914, present the following report of injuries on their system during the fiscal year just ended as compared with the one previous:

Second six months of 1912 - 1268 injuries
Second six months of 1913 - 1105 injuries
Reduction - - - 163 or 12.9%
First six months of 1913 - 1561 injuries
First six months of 1914 - 606 injuries
Reduction - - - 955 or 61.1%

Taking the whole year 1118 accidents have been saved—a reduction of 39.5%.

These results include every accident (slight or serious) and are based on an increasing business.

NATIONAL SAFETY COUNCIL—TYPICAL POSTERS FROM GENERAL WEEKLY SERVICE

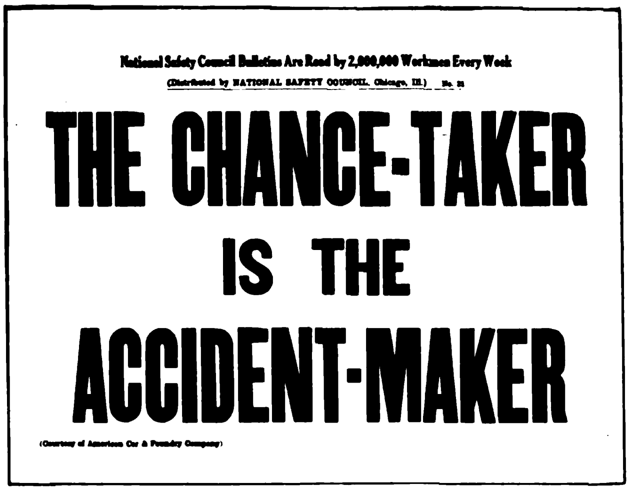
8. The services of the several technical committees which are at work standardizing and developing safety devices and practices.

9. Co-operation in sanitation, hygiene and general welfare matters. While the council is not primarily engaged in welfare work, nevertheless the subject of sanitation and hygiene is necessarily related to that of safety and it is able to give its members expert advice on plant hygiene, first aid instruction, the care of the injured, etc.

As the council is a co-operative organization, it is able to give the above service at a nominal membership payment, varying between $10 and $100 per year, the latter fee being that for employers of 10,000 or more persons.

THE ELECTRIC RAILWAY SECTION

Due to the size of the electric railway membership and to the satisfactory condition of the treasury special service to electric railway members will soon be inaugurated. Such members as the Boston Elevated Railway and the Brooklyn Rapid Transit Company have agreed to supply material for a weekly service.



National Safety Council Bulletins Are Read by 2,000,000 Workmen Every Week

(Distributed by NATIONAL SAFETY COUNCIL, Chicago, Ill.) No. [illegible]

THE CHANCE-TAKER
IS THE
ACCIDENT-MAKER

(Courtesy of American Car & Foundry Company)

NATIONAL SAFETY COUNCIL—AMERICAN CAR & FOUNDRY COMPANY'S POSTER

At the executive committee meeting already mentioned the committees reported in substance as follows:

The membership committee, of which the writer is chairman, stated that the enrollment has increased nearly 50 per cent since Oct. 1, and that printed matter will soon be sent out in an active campaign for new members.

The committee on standards, Henry B. Potter, Boston Elevated Railway, chairman, recommended that its work should be directed along these lines:

A standard code of principles underlying the forming of safety organizations in street railroad companies and methods of organization carrying out such principles should be prepared. While it was recognized that conditions in street railway organizations vary to such an extent that no single form of safety organization can be applied to all, the discussion developed the conviction that a clear statement of the principles underlying successful safety organizations already formed would be of great service.

Data on near-side stop practice should be compiled.

Uniform practices at grade crossings should be encouraged. In this particular the co-operation of the members of the steam railroad section will be solicited. Marcus A. Dow, New York Central lines, is chairman of the steam railroad section.

The committee on accident study and analysis, through Rex D. Billings, chairman, reported a plan for establishing for members of the electric railway section a special bulletin service of safety material. As already stated, the electric railway members have promised co-operation in this matter.

The details of the program for the sessions of the electric railway section at the next annual congress of the council, to be held in the fall of 1916, will be a special order of business at the February meeting of the sectional executive committee.

The executive committee of the electric railway section comprises the following: George O. Smith, Doherty Operating Company, chairman; Edward C. Spring, Lehigh Valley Transit Company, vice-chairman; C. B. Scott, Middle West Utilities Company, secretary; H. A. Bullock, Brooklyn Rapid Transit Company, chairman membership committee; Henry B. Potter, Boston Elevated Railway, chairman standardization committee; Rex D. Billings, Reading Transit & Light Company, chairman committee on accident study and analysis, and H. Irwin, Charlestown Consolidated Railway & Light Company, chairman program committee.

Trenton Fare Increase Denied

New Jersey Commission Refuses to Allow Trenton & Mercer County Traction Corporation to Withdraw Six-for-a-Quarter Tickets

The Board of Public Utility Commissioners of New Jersey in a recent decision disapproved the non-continuance of six-tickets-for-a-quarter by the Trenton & Mercer County Traction Corporation, Trenton, N. J., as announced in the ELECTRIC RAILWAY JOURNAL of Dec. 18. The following is an abstract of the salient points of the decision, which is now available in full.

DEVELOPMENT OF CASE

Under date of Aug. 13, 1915, the board received a communication from the Trenton & Mercer County Traction Corporation to the effect that the company and its lessors had many years past sold six tickets for 25 cents; that, owing to decreased revenue and increased cost of operation, the company intended to discontinue this practice and to withdraw the tickets from sale, and that it would charge a 5-cent fare for carrying each passenger over five years of age. The Trenton & Mercer County Traction Corporation operates as lessee the properties of the Trenton Street Railway and its subsidiaries, the Mercer County Traction Company, the Trenton, Pennington & Hopewell Street Railway and the Trenton, Hamilton & Ewing Traction Company. The tickets mentioned above were accepted as the equivalent of a 5-cent fare on all the leased lines.

On Aug. 17, 1915, the board suspended the increase as proposed by the company, and hearings were then held. The company contended that the board was without jurisdiction to inquire into the justice and reasonableness of the proposed change because the ordinances passed by the city of Trenton constituted inviolable contracts by which the rate of fare for each passenger over five years of age was fixed at 5 cents. In the board's opinion, however, neither the acts of incorporation nor the ordinances supported such a claim or prevented the exercise of the jurisdiction conferred by the regulatory act.

METHOD OF GETTING AT VALUATION

The question, in the board's opinion, therefore became one of the justice and reasonableness of the proposed change. In investigating along the primary subject of value, it was found that the books produced for the Trenton Street Railway and its subsidiaries were incomplete and did not disclose the actual cost of the properties. They gave some information as to the amounts of stock and bonds issued by the subsidiary companies, but such data were held to bear no necessary relation to reasonable cost or value.

There was in evidence a valuation made by the board's engineer, Mr. Betts, in the spring of 1911 in connection with the lease of the properties to a new operating company. There was also a general valuation by Rankin Johnson, president of the company, based upon an investigation made by him in 1910. In addition, there was a valuation compiled for the purpose of this case by engineers representing the city, Messrs. Rand and Brackenridge, and a fourth valuation made up practically as of the present time by Mr. Johnson. The board decided that the best estimate of value could be made up by taking the Betts report of 1911, deducting from the inventory in that report the items which had since disappeared, adjusting the values where the present testimony showed substantial error, and adding amounts found by the board's examiners to be properly chargeable to road and equipment from February, 1911, to the present time. The value placed upon the property in 1911 was $2,387,950, overhead charges being omitted, and after the deductions and additions mentioned were made, a reproduction value as of Sept. 30, 1915, was found to be $2,905,500. From this sum the board deducted $220,000 for accrued depreciation giving a present value of $2,685,500 as of Sept. 30, 1915. The board stated that the deduction made for accrued depreciation was based upon actual depreciation ascertained by inspection, and not upon theoretical depreciation.

OVERHEAD CHARGES

In the matter of overhead charges the board considered that an allowance of 15 per cent was sufficient to cover engineering, errors and omissions, contingencies, and interest during construction, in view of the piecemeal manner in which a number of the lines and extensions were constructed. Calculated upon the items subject to such charges, an amount of $324,000 was obtained. For organization expenses 2½ per cent upon the bare structural cost was allowed. This cost was assumed to be $2,500,000, giving an allowance of $62,500. The board allowed for contractor's profit the sum of $140,000, which it regarded as liberal in any circumstances.

Materials and supplies properly belong under working capital, but these items were included in the appraisal of the physical property, and in view of the facts testified the board did not deem proper any further allowances for working capital. The record contained no proof of development cost or of inadequacy of a fair return at any time upon fair value. No allowances for these items could therefore be made. Throughout the valuation, the board said, it gave full consideration to the fact that the property valued was a going concern in successful operation.

The board concluded that the value of the property, for the purpose of fixing rates, did not exceed $3,212,000, as follows: Present value, Sept. 30, 1915, $2,685,500; overhead charges, $324,000; organization expenses, $62,500; contractor's profit, $140,000; total, $3,212,000.

EARNINGS AND EXPENSES

The board found that the operating revenues had shown an increase each year from 1911 to 1914, the average for the four years being $736,840. The operating expenses had also increased each year, but not in the same proportion, the average for the four years being $389,923. Taxes had shown an increase each year, the average for the four years being $45,062. The net revenue had not shown the same increase as in the case of the gross revenue, the average net revenue being $301,855.

The commissioners said that the financial statements submitted by the company appeared to show a deficit, but in arriving at this deficit there had been included among the deductions the rentals which the Trenton & Mercer County Traction Corporation agreed to pay to the owners of the Trenton Street Railway. The board refused, therefore, to look upon these statements as showing the actual relation between net revenue and the value of the property, when the earnings of the last four years and the value of the property used in the production of these earnings were being considered.

Based upon the property value of $3,212,000, the average net revenue for the four years, $301,855, showed a net return of 9.4 per cent. The board said that it was quite clear that the value in each of the previous three years was less, so that if the average net revenue for the four years were set off against the average valuation for the same period, the net return would be higher than 9.4 per cent. If the company were allowed to earn upon its claim of value, including $1,139,952 of intangibles and making a total of $5,900,703, the average return would be 5.11 per cent.

It was asserted, stated the board, that the properties had not been maintained in a first-class manner, and it might be that a larger amount should be set aside for depreciation and expended upon the property each year. The amount expended in 1914 was approximately $70,000, and this included more than the average amount of replacement work. If, however, the allowance for depreciation were increased to $135,000, the amount said to be required, thus decreasing the average net revenue from $301,855 to $236,855, a net return of approximately 7.37 per cent would still be shown on the value allowed. For these reasons, therefore, the board maintained that the proposed withdrawal of the six-for-a-quarter tickets was unwarranted.

New Haven Tie-Up Not Due to Electric Equipment

Further information regarding the recent suspension of service on the electric zone of the New York, New Haven & Hartford Railroad which is now available shows that the interruption was due primarily to a complete failure of all means of communication along the lines and not to a breakdown of the catenary or feeder systems, as was originally reported. The storm that caused the trouble was an unusually severe one, alternate falls of rain and snow accompanied by a freezing temperature producing a coating of ice of unprecedented thickness on all overhead wires. In several places actual measurements showed that the coating of ice was 3¼ in. in diameter, and this, it may be said, is more than three times the load for which overhead construction is normally designed in the vicinity of New York City. Nevertheless, all of the feeder wires and contact system withstood the strain. The only power wires that did not stand up were the No. 3 gage control wires which, it may be said, do not affect electric operation directly, and the No. 3 gage signal lines. However, the entire telephone and telegraph pole line along the route between Woodlawn and New Haven was broken down, and these wires and others that parallel the tracks caused a number of grounds when they fell across the contact wires for sidings which branched off from the main line. This difficulty was easily remedied by opening the knife switches that are installed to separate the sidings from the main line, but the complete absence of communication between the various sections of the line prevented the prompt location and isolation of the grounded sections. At the same time the failure of both the signal wires and the means of communication with the dispatcher practically prevented the movement of trains even by steam locomotives.

COMMUNICATION

Accounting for Rents

CHICAGO ELEVATED RAILWAYS

CHICAGO, ILL., Dec. 6, 1915.

To the Editors:

In the ELECTRIC RAILWAY JOURNAL of Nov. 13 appears an editorial entitled "Accounting for Rents." Statement is made therein that "for steam railroads, only office and minor equipment rents are included in operating expenses." The I. C. C. classification for steam railroads provides joint facility accounts for each subdivision of operating expenses, except "traffic," and to these joint facility accounts the lessee company charges its proportion of operating expenses: maintenance of way and structures to "maintenance of way and structures," maintenance of equipment to "equipment," transportation to "transportation," and general to "general." The I. C. C. classification for electric lines, ignoring, in the opinion of the present writer, the foundations of an operating classification, charges every expense for joint facilities, irrespective of the nature of the expense, to the sub-accounts under "general and miscellaneous."

I agree that "the purpose to be attained by an accounting classification should be the controlling factor in its construction," and that "a classification should be so made as to indicate in the clearest and quickest way whether or not a utility is securing a reasonable return on the fair value of the property." I must take issue, however, with the statement that the "gross income" is "the actual return upon the fair value of property," "gross income" being "used in its official technical sense according to the I. C. C. classification." Gross income is the measure of the return upon the property only in a limited sense and under exceptional conditions. In determining such return, interest on unfunded debt and other analagous items are as proper a deduction from "net revenue" as taxes.

The assumption, moreover, is diametrically opposed to that of railway officials, who assert that a fair return in a valuation rate case or otherwise must be a fair return upon the capital stock. All valuation proceedings have this for their purpose. A utility may and often does have a large gross income and at the same time not have sufficient income to meet its interest and other fixed charges. For the purpose of clearly showing the return upon the investment, many income statements show "balance for funded debt and capital stock." The rates then should be sufficiently high to enable a railway to finance its capital expenditures upon a reasonable valuation and to pay dividends upon a reasonable investment. In railroad accounting this return is indicated by the "net income and corporate surplus." For the purpose of ascertaining whether or not a fair return upon the investment has been made, the distinction between "operating expenses" and "deductions from income" is purely artificial and may be disregarded altogether.

It further appears to me that the editorial fails to appreciate the accounting distinction between operating revenue and income. By operating earnings is to be understood income derived directly from the operation of the property, and by operating expenses, the cost of maintaining and operating such property. By "income" is meant such income and deductions therefrom as represent a return upon the total capital invested in the property. If this distinction is kept in mind the accounting for rents becomes a simple proposition. That portion of the rental which represents maintenance or operation is a proper charge to operating expenses: that portion of the rental that represents a return upon the investment should be charged to income. The I. C. C. classification for steam roads follows this method entirely, but the electric classification only partially.

Leased property may be divided into two general classes: Property operated solely by the lessee and property operated jointly with another or others. In both cases the rental factors are the same—all operating expenses in the first case (usually), a proportion thereof in the second, and in both, an amount which represents a return to the lessor upon his investment. In both cases the lessee, instead of purchasing the property and paying interest thereon, elects, for purposes of economy, to pay the interest of the lessor. In the present writer's opinion that portion of the rental which represents a return to the lessor upon his investment should be charged where the interest on such property if owned would be charged, *viz:* income.

The electric classification recognizes this distinction as to property operated solely by the lessee. All operating expenses assumed by the lessee are charged to the proper operating accounts, but that portion of the rental which represents a return upon the investment to Account No. 216, "rent for leased roads." As the official text states, "this account shall include amounts payable as rent for road, tracks or bridges (including equipment and other railway property covered by the contract) of other companies, held under lease or other agreement by the terms of which exclusive use and control for operating purposes are secured. The amount of rent payable by the lessee in accordance with the agreement shall be included in this account, whether paid to the lessor in cash, or disbursed by the lessee on behalf of the lessor, as interest on funded debt, guaranteed dividends on stocks, or otherwise." The charges are made upon the condition that the property leased shall be operated solely by the lessee, and no mention is made as to a long or short term lease.

It is for jointly operated property that electric lines differ from the steam. The steam roads charge all operating expenses to the proper joint facility accounts, and rent proper (return on the investment) to income. All rentals paid for such facilities by electric roads, whether they represent actual operating expenses or a return to the lessor upon his investment, are charged, not to the proper division of the operating accounts, but to "general and miscellaneous" account No. 97, "rent of track and facilities," or account No. 98, "rent of equipment." In the judgment of the present writer, this is an inconsistency that must, sooner or later, be corrected by conforming to the methods employed by steam railroads.

The main purpose of the present writer is not to indulge in "hair splitting," but to emphasize the principle, lost sight of by the electric classification, that "deductions from income" should include that portion of rents paid by the lessee which represent a return to the lessor on his investment, and the further principle that "income" is intended to reflect the return upon the property investment, and that "net income" is the true measure of such return.

T. B. MCRAE, Auditor.

[Mr. McRae's letter raises some interesting points which we shall discuss editorially in an early issue of this paper.—EDS.]

American Association News

Senator Oscar W. Underwood Will Speak at Mid-Winter Meeting—Details of Executive Committee Session, Including Resolution Recommending Affiliation of Manufacturers' Association with Parent Body —Meeting of Joint Committee on Block Signals—Company Section Activities

MID-YEAR MEETING PLANS

Rapid progress has been made this week on the program for the dinner to be held in Chicago on Feb. 4, 1916. Senator Oscar W. Underwood of Alabama has been secured as one of the two speakers from outside the association. He has chosen for his topic "Government Regulation and Our Transportation Systems." It is understood that Senator Underwood will go at some length into the subject, taken up in President Wilson's message, of the appointment of a federal commission to study the transportation industry. This is a matter to which the senator has devoted much attention and it is hoped that he will give the association the results of his study.

The program for the meeting aside from the dinner is being formulated by Chairman L. S. Storrs, who now plans to center the discussion around the subjects "Valuation" and "Rate of Return." Three papers will probably form the basis for the discussion, which will be participated in by leaders in the industry.

The meeting and the dinner will be held in the Congress Hotel and Annex.

AMERICAN ASSOCIATION EXECUTIVE COMMITTEE

The executive committee of the American Association was in session as last week's issue of the ELECTRIC RAILWAY JOURNAL went to press so that it was possible to mention only a few of the items of business which were considered. The full minutes are now available and a summary of the most important actions is given below.

A decision was reached to formally close the work of the bureau of fare research on Dec. 31.

A report was received from the committee on arrangements for the mid-year meeting dinner as to hotel accommodations, speakers, etc. It was decided to have but four addresses, one each by the presidents of the American and Manufacturers' Associations, and two by outside speakers. As announced above, Senator Oscar W. Underwood will be one of the latter.

A resolution was passed authorizing a special meeting on Feb. 4, 1916, to act upon amendments to the constitution and by-laws incorporating the suggestions of the special committee appointed to consider the recommendations contained in the presidential address delivered at San Francisco. For this committee Chairman Arthur W. Brady reported as follows:

"We have carefully considered the recommendations favoring an affiliation of the American Electric Railway Manufacturers' Association with the American Electric Railway Association, as are the Engineering and other affiliated associations, and in that connection have conferred with representatives of the Manufacturers' Association as well as with officers and others of the American Electric Railway Association.

"In our judgment, it is very desirable that there be a closer relationship than has heretofore existed between those who manufacture and sell the apparatus and material necessary to electric railway operation and the American Electric Railway Association, for the purpose of creating a clearer recognition of and of advancing the common interests of both. We do not believe that such closer relationship can be secured in the fullest degree as long as the American Electric Railway Association and the American Electric Railway Manufacturers' Association continue to be as they now are, wholly separate and independent organizations, but we regard it as necessary that the two associations be brought together into a common organization.

"We therefore recommend that the constitution and by-laws of the American Electric Railway Association be so amended that the membership of the association be composed of companies, firms and individuals engaged in the manufacture or sale of electric railway material and apparatus, as well as of electric railway companies, the membership of both to be upon a basis of equality; that a scale of dues for manufacturers and dealers be established upon such an equitable basis as may be approved by the executive committee, and that there be formed an affiliated association consisting either of the present American Electric Railway Manufacturers' Association or of a new association, as may seem best, with which those connected with the manufacturing and selling interests of the industry may affiliate, if they so desire, without, however, diminishing the right of affiliation, if preferred, with any other of the affiliated associations as now."

W. J. Harvie, who represented the association in conferences with the National Bureau of Standards, reported regarding these conferences, which have been described in the ELECTRIC RAILWAY JOURNAL as they occurred.

The standards and recommendations approved at the 1915 convention together with the revisions were approved by the executive committee, which also approved changes in the interurban code of rules of the Transportation & Traffic Association.

The subject of safety organizations was then discussed and the president was directed to appoint a special committee on street traffic to make recommendations regarding the relation of the association to the several safety movements.

The board of accident prevention was abolished as being too cumbersome, as it was considered that the joint committee of the T. & T. and Claims Associations can now handle the work which the board was organized to accomplish.

The executive committee assigned for study to the committee on motor vehicles the topic "Handling Freight Business with Motor Trucks—the Proper Limits of Such Service."

The secretary was instructed to secure and compile for reference full information regarding costs, objects, methods of publication, etc., of company publications.

A special committee, consisting of H. A. Nicholl, president of the T. & T. Association, and John Lindall, president of the Engineering Association, was appointed to confer with the American Railway Association on the matter of block signal rules.

Appropriations were made to the affiliated associations as follows: Accountants', $1,500; Engineering, $4,000; Claims, $1,200, and T. & T., $2,750.

The special committee appointed to consider a recommendation originating with the T. & T. Association, to the effect that the number of vice-presidents in each association be reduced to one, reported adversely on the recommendation and the report was approved.

JOINT COMMITTEE ON BLOCK SIGNALS

A meeting of the joint Engineering and T. & T. Association committee on block signals was held on Dec. 17, 1915, at the offices of the Public Service Railway, Newark, N. J. The members present were as follows: J. M. Waldron, New York, N. Y., and J. W. Brown, Newark, N. J., co-chairmen; G. N. Brown, Syracuse, N. Y.; F. W. Coen, Sandusky, Ohio; J. J. Doyle, Baltimore, Md.; G. K. Jeffries, Indianapolis, Ind., and J. B. Stewart, Jr., Youngstown, Ohio. There were also present H. W. Griffin, Union Switch & Signal Company, S. M. Day, General Railway Signal Company, and H. H. Norris, ELECTRIC RAILWAY JOURNAL. Mr. Waldron presided over the meeting, and after discussion assigned the year's work to the following sub-committees:

Review of the Association's existing standards and recommendations, J. Leisenring, Springfield, Ill., and Mr. Coen. Consideration of A. I. E. E. standardization rules, G. N. Brown. Bibliography of block signal installations, Mr. Norris. Design of block signal apparatus, G. N. Brown and Messrs. Waldron, Griffin and Day. Clearance diagram for semaphore signals, Mr. Leisenring and G. N. Brown. Block signal rules, Messrs. Waldron, Jeffries, Coen, Doyle and Stewart. A special committee was also appointed on this subject, consisting of J. W. Brown and Mr. Coen, to confer with the president of the Transportation & Traffic Association on the matter of co-operation with the American Railway Association on the question of considering block signal rules jointly. Study of block signal operation, J. W. Brown, G. N. Brown and Mr. Jeffries. Highway crossing and drawbridge protection, Messrs. Leisenring, Jeffries, Coen, Day and Griffin. Light signals for interurban railways, Messrs. Leisrenring, Jeffries, Stewart, Day and Griffin. Tests for contactor-type recording signals, Messrs. Stewart and Collins, and H. R. Stadelman, Electric Service Supplies Company; C. P. Nachod, Nachod Signal Company, and W. M. Chapman, Electric Railway Signal Company. Consideration of the tentative code of safety rules of the National Bureau of Standards, G. N. Brown. Co-ordination of past work of the committee, Mr. Norris. Form of contract for signal installation, J. W. Brown and Messrs. Coen, Doyle, Jeffries, Day and Griffen.

After the appointment of the sub-committees there was a general discussion of the work of each so that the members of these sub-committees might have the benefit of the advice of the main committee. The subject of clearance diagrams is to be considered in conjunction with the committees on heavy electric traction and power distribution. Nothing will be done with the block signal rules until information is received as to the results of a conference between the American Electric Railway Association and the American Railway Association. The sub-committee on block signal operation will send out forms to secure data, in an effort to segregate the several causes of failure. In connection with highway crossing protection, G. N. Brown reported on a recent conference of automobile and railway interests held in New York State under the auspices of the Public Service Commission. The automobile people favored light and semaphore indications but not bells. Mr. Brown will supply full information regarding this conference to his sub-committee. After discussion on the placing of warning signs, the committee was instructed to look over available data and to express an opinion as to the best apparatus for protecting grade crossings. Recommendations for possible adoption later as standards will be prepared. In a discussion on light signals it was pointed out that the size of the lens is important not in determining the distance at which the light can be seen, but in distinguishing from other lights.

It was recommended that the next joint meeting of the committee be held in Chicago about the middle of March at the time of the convention of the Railway Signal Association, and that meetings of the sub-committees on rules, signal operation, highway crossing protection, light signals and signal contracts be held in Cleveland about Feb. 1.

CAPITAL TRACTION SECTION COMING

On Jan. 13, 1916, a new section will be organized by the Capital Traction Company in Washington. There are good prospects of an initial membership of from seventy-five to 100. The association will be fully represented at the inauguration by officers and members of the committee on company sections and individual membership.

PUBLIC SERVICE SECTION

As was announced last week the annual smoker of the section was held on Dec. 16. Vice-President R. H. Harrison presided and the amusement features were in charge of T. J. Manning, chairman of the entertainment committee. The entertainment was provided by the Knickerbocker Theatrical Enterprises of New York, and was excellent. Two hundred or more members were in attendance.

Thirty-three new members were taken in and the membership committee under P. F. Maguire, last year's president, expects during 1916 to double last year's membership. The secretary announced that a suggestion contest, open to all employees, will be inaugurated on Jan. 1. Each month, excepting July and August, the company will award a prize of $5 for the best suggestion received. At the end of the year $25 will be given for the best suggestion of the year, whether it is used or not and $50 will be awarded for the suggestion which, of those adopted, produces the best results. The committee in charge of the contest comprises J. J. Burleigh, vice-president; R. E. Danforth, general manager; Dudley Farrand, general manager Public Service Electric Company; H. C. Donecker, assistant general manager, and J. L. O'Toole, publicity agent.

DENVER TRAMWAY SECTION

The thirty-first regular monthly session of the section was held on Dec. 16 with an attendance of seventy-five.

R. W. Toll, chief engineer, spoke upon the subject, "Traction Travelogs, or Notes on the Street Railway Systems of San Francisco, Portland and Seattle." He had recently returned from an extended tour of inspection including these cities. A lively discussion on the future work of the section followed, some of the topics taken up being as follows: Verbatim printing of the monthly proceedings, open meetings, increase in attendance at meetings, nature of meeting programs, and general welfare of the section.

CHICAGO ELEVATED SECTION

There is space available here merely to state that the Christmas meeting of the Chicago Elevated section was held on Dec. 14 with a very large attendance. G. T. Seely, assistant general manager, was the principal speaker. The balance of the program consisted of entertainment features. A large Christmas tree furnished an appropriate decoration. Details of the meeting will be given in a later issue.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical
Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Anti-Friction Bearings on Main Car Journals

BY GAYLOR M. CAMERON, MASTER MECHANIC NEW YORK STATE RAILWAYS, ROCHESTER, N. Y.

The use of ball and roller bearings on the main car journals of electrically propelled cars has been investigated and tried out experimentally, at least, by a number of railways during the last four or five years. Some tests have proved fairly satisfactory and have shown an economy in the use of such bearings; others have failed. However, it is only fair to state that, during the time of these tests, the manufacturers of bearings have made wonderful improvements in both design and materials, and the bearings which are obtainable to-day are much more reliable than were those used in the earlier tests. Likewise, there has been a reduction in the price of anti-friction bearings. In view of these facts it is not surprising that at the present time railway men are taking a greater interest in these bearings than ever before, and it is becoming quite common to see them specified in connection with the purchase of new equipment.

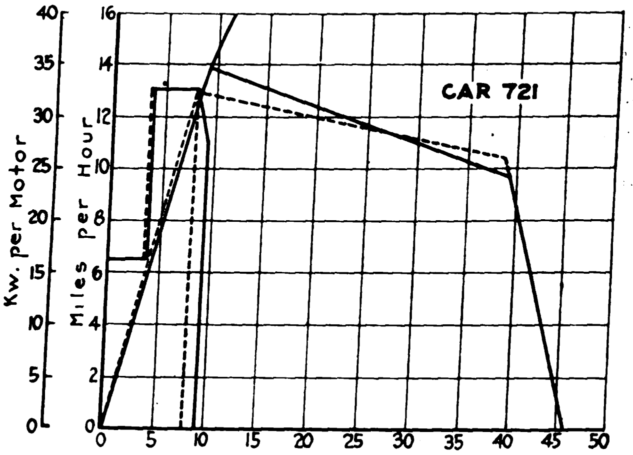
The economies to be obtained by the use of anti-friction bearings are dependent upon so many variables that a very careful analysis is necessary to determine the advisability of using them. Among the earlier tests widely divergent results were found. This was due, in part, to the difficulty of obtaining accurate power measurements on the car and the lack of sufficient data for making proper comparisons. By far the greater part of the difference was attributable to the varying service conditions under which the bearings were used. It is to be regretted that more accurate information is not obtainable regarding the different factors which make up the car resistance values which are so necessary in predetermining car performance. The ability to calculate accurately the total car resistance values for any particular set of conditions, and to separate therefrom that part which represents the friction on the main car journals, is necessary for making a proper investigation to predetermine whether or not sufficient economy can be obtained to justify the greater expenditure for anti-friction bearings.

On comparing the values of car resistance, for a given set of conditions, obtained by the use of several of the more common formulas, it is found that for the lower speeds, as in typical city runs, there is a considerable disagreement, but for the higher speeds, as in interurban runs, there is a very close agreement. We have, therefore, no reliable formula for use in making an investigation of the advisability of using anti-friction bearings on city cars. It would seem to be an opportune time for experimental work along this line, the experiments to be made in such a way that values can be obtained for the separate items such as journal friction, motor-bearing friction, windage, track resistance (based upon some standard condition), and especially flange friction, when running on grooved rail. With accurate data on these items one could predetermine, with a fair degree of accuracy, the results to be obtained from the use of anti-friction bearings.

The Rochester Lines of the New York State Railways have been experimenting with anti-friction bearings on car journals for the past four years. Early in the year 1911 city passenger car No. 721 was equipped with ball bearings. The following data were used for purchasing the bearings.

	Pounds
Weight of car complete without passengers	48,600
Weight of maximum passenger load (seating capacity, forty-two)	11,250
Weight of car with maximum passenger load	59,850
One-half weight of four motors, with gear cases	5,310
Weight of eight cast-iron wheels	3,200
Weight of four axles	1,400
Weight of four gears	928
Total weight not on journals	10,838
Maximum weight on journals	49,012
Total weight per journal	6,126
Total weight per bearing (two to a journal)	3,063

An attempt was made to predetermine the power saving to be obtained by using these bearings. The following data and graphs show the result.



ANTI-FRICTION BEARINGS — TIME-SPEED GRAPHS WITH PLAIN AND ANTI-FRICTION BEARINGS RESPECTIVELY

The car was to be used on a line having no appreciable grades and no sharp curves except at the terminal loops. The service conditions were:

Average line voltage	525
Schedule speed, miles per hour	8.62
Stops per mile	8
Duration of average stop, seconds	7

From these figures a typical run graph was plotted, using 1.5 m.p.h.p.s. for accelerating and braking rates. This is shown in full lines in the diagram together with the corresponding power graph. It will be noted in the shape of the graph that the car is over-equipped. This car is now used to draw a trailer having a seated capacity of sixty, as well as to carry its own passenger load. The preliminary calculations here shown, however, were based on its operation without trailer and all tests were made with the single motor car. The car resistance values were obtained by use of the following formula:

$$R = 12.67 + 0.03M + 0.0052M^2$$

Where R is the resistance in pounds per ton, M is the speed in miles per hour. This formula is the same as the one given in the "Standard Handbook for Electrical Engineers" with the exception that the constant term of the second member is larger. This larger figure is believed by the writer to give more accurate results for the lower city speeds. Table I shows the calculated values of *R*.

In making up the typical run curve, the average car and passenger weight was obtained by adding to the car weight 75 per cent of 140 times the seating capacity. This made a total of 53,010 lb. or 6.63 tons per motor. Table II shows the figures from which the run and power graphs were plotted.

After these graphs had been plotted, an effort was made to determine the exact values of journal bearing friction. These values were expressed in terms of the tractive effort required to overcome them, that is, in pounds per ton. The car resistance was taken as uniform during the straight-line acceleration. The value obtained from the use of a formula for 12.75 m.p.h. was used. At this speed the acceleration rate begins to grow smaller. For a speed of 12.75 m.p.h. the corresponding journal speed was calculated and a coefficient of friction of 0.033 determined. The average weight per journal was taken as 5272 lb. As there are two journals per motor this would be twice 5272 or 10,544 lb. per motor. Applying the coefficient 0.033 to this figure, it is found that to overcome this journal friction requires a force of 348 lb., applied at the surface of the journal. As the journal is 3¾ in. in diameter and the car is equipped with 33-in. wheels, the force reduced to tractive effort is 3.75/33 × 348 or 39.6 lb., and dividing this by 6.63, the weight per motor (expressed in tons), we obtain 5.97 as the equivalent number of pounds per ton tractive effort to overcome journal friction. The coefficient of friction for the ball bearings was taken as 0.0012. The corresponding tractive effort value is (0.0012/0.033) × 5.97 or 0.21 lb. per ton. Substituting this for the 5.97 value in the total car resistance of 13.89 lb. per ton, we obtain 8.13 as the value of car resistance for a speed of 12.75 m.p.h. with ball journal bearings. This brings the total car resistance up to 54 lb. per motor. In order to give every advantage possible to the showing to be made by anti-friction bearings in power saving, it was assumed that the entire reduction in car resistance was utilized in increasing the rate of acceleration. This rate was determined as follows: Tractive effort, 1087 lb.; car resistance, 54 lb.; net tractive effort, 1087 — 54 = 1033 lb.; 6.63 tons require 663 lb. to accelerate at the rate of 1 m.p.h.p.s. in addition to car resistance, 1033 ÷ 663 = 1.56 m.p.h.p.s. = new rate of acceleration. With this figure a new run graph was plotted, together with its corresponding power graph. These are shown as broken lines in the figure. The area of the power graph for plain bearings is 2.142 sq. in. and that for anti-friction bearings is 1.822 sq. in. This indicates a power saving of 14.9 per cent.

Before the ball bearings were installed, a watt-hour meter was placed in the car and a series of readings taken with the car in regular service. Table III shows the readings taken and results calculated therefrom for a typical day's run. A corresponding set of readings was taken with the car equipped with ball bearings. Table IV shows a recapitulation of both sets of readings and a comparison of the average results. It will be noted that the power saving as shown by the tests was 14.1 per cent while the predetermined figure was 14.9 per cent. This is an agreement much closer than could ordinarily be expected, considering the lack of exact knowledge of car resistance values. The method outlined will, undoubtedly, prove sufficiently accurate for any preliminary investigation.

It will be evident by studying the curves that the power saving to be obtained will vary with the service conditions and motor characteristics. For this reason, the results shown in this investigation are not general

TABLE I

M	$0.03M$	$0.0052M^2$	*R*
12	0.36	0.75	13.78
12.75	0.38	0.84	13.89
13	0.39	0.88	13.94
14	0.42	1.02	14.11

TABLE II

M.p.h.	Tractive Effort, Lb.	Car Resistance, Lb.	Net Tractive Effort, Lb.	Acceleration M.p.h.p.s.	ΔT, Sec.	Elapsed Time Sec.	Amp. per Motor	Volts per Motor	Kw. per Motor	Kw. per Car
0-5.7	1087	92	995	1.5	..	3.8	62.0	262.5	16.27	65.10
5.7-12.75	1087	92	995	1.5	4.7	8.5	62.0	525.0	32.55	130.20
13.00	....	..	...	..	...	..	59.0	525.0	30.97	123.90
13.50	....	..	...	..	..	..	55.0	525.0	28.87	115.50
14.00	850	93	757	1.14	0.9	9.4	52.5	525.0	27.56	110.25

TABLE IV—RECAPITULATION OF ENERGY CONSUMPTION TESTS ON CAR 721

Date of Test	Type of Bearings	Average Kw.-Hr. per Car-Mile
May 11, 1911	Plain	3.40
Dec. 12, 1911	Plain	3.50
Dec. 15, 1911	Plain	3.16
Dec. 18, 1911	Plain	3.26
Average		3.33
May 25, 1911	Ball	2.80
Oct. 6, 1911	Ball	2.92
Nov. 27, 1911	Ball	2.84
Nov. 28, 1911	Ball	2.88
Average		2.86

Per cent energy saving in favor of ball bearings as compared with plain bearings = 14.1.

Rail conditions—Slippery until 11 a.m.
Good 11 a.m. to 6.55 p.m.

Taken Dec. 12, 1911
Final reading...1,060,500
Initial reading.. 691,000
369,500

TABLE III—POWER TESTS ON CAR 721—PLAIN BEARINGS—METER 123,726—TRAIN 207

Trip	Trip Limits Start	Trip Limits Finish	Time Start	Time Finish	Psgrs. Carried	Stops	Miles	Energy Consumption, Watt-Hours	Watt-Hours per Car-Mile	Watt-Hours per Ton-Mile	Remarks
1	East Main Station	Lincoln Park	6.35 a.m.	7.10 a.m.	80	38	4.30	16,000	3,721	133	Motorman No. 376
2	Lincoln Park	East Main Loop	7.10 a.m.	7.44 a.m.	81	46	4.86	18,000	3,786	135	
3	East Main Loop	Lincoln Park	7.44 a.m.	8.23 a.m.	73	49	4.86	21,000	4,321	156	
4	Lincoln Park	Blossom Road	8.23 a.m.	9.05 a.m.	28	32	6.79	17,000	2,504	96	
5	Blossom Road	Lincoln Park	9.10 a.m.	9.55 a.m.	48	42	6.79	23,000	3,387	126	
6	Lincoln Park	East Main Loop	9.56 a.m.	10.30 a.m.	25	32	4.86	14,000	2,880	111	
7	East Main Loop	Lincoln Park	10.32 a.m.	11.07 a.m.	23	29	4.86	15,250	3,190	127	
8	Lincoln Park	Blossom Road	11.08 a.m.	11.51 a.m.	64	44	6.79	22,950	3,380	127	Motorman No. 948
9	Blossom Road	Lincoln Park	11.53 a.m.	12.37 p.m.	57	39	6.79	22,800	3,360	126	
10	Lincoln Park	Blossom Road	12.37 p.m.	1.20 p.m.	55	37	6.79	21,500	3,160	117	
11	Blossom Road	Lincoln Park	1.23 p.m.	2.07 p.m.	101	51	6.79	28,250	4,160	145	
12	Lincoln Park	Blossom Road	2.07 p.m.	2.52 p.m.	75	50	6.79	26,250	3,860	139	Motorman No. 376
13	Blossom Road	Lincoln Park	2.53 p.m.	3.37 p.m.	47	43	6.79	22,500	3,320	124	
14	Lincoln Park	Blossom Road	3.37 p.m.	4.22 p.m.	49	48	6.79	20,500	2,950	110	
15	Blossom Road	Lincoln Park	4.22 p.m.	5.06 p.m.	98	60	6.79	26,000	3,820	133	
16	Lincoln Park	East Main Loop	5.07 p.m.	5.45 p.m.	90	58	4.86	21,250	4,370	154	
17	East Main Loop	Lincoln Park	5.45 p.m.	6.23 p.m.	78	46	4.86	17,750	3,660	131	
18	Lincoln Park	East Main Station	6.23 p.m.	6.55 p.m.	28	34	4.30	15,500	3,190	122	
						778	105.66	369,500	3,501 Average	128 Average	

Average 7.37 stops per mile.

and each case should be investigated separately before any conclusions are drawn. After the probable power saving has been determined, calculations should be made to determine the economy, if any, which will result from the use of anti-friction bearings.

One very important item, as yet rather indeterminate, is the average life of the ball bearings. The following calculations were made to cover the previously described conditions.

ECONOMY CALCULATION, CAR 721

The average yearly mileage for cars of this type was checked and found to be 33,000 per car. The power consumption with plain bearings was 3.33 kw.-hr. per car-mile. Using the 14.1 per cent saving, determined by the tests, the saving per car-mile amounts to 0.47 kw.-hr. The yearly saving is 15,510 kw.-hr.

15,510 kw.-hr. at 1 cent = $155.10 annual power cost saving per car.

Total cost of ball bearing equipment	$606.00
Annual Expense—Ball Bearings Based on an estimated life of five years	
Interest at 5 per cent	$30.30
Amortization at 5 per cent compounded	108.22
Lubrication (special lubricant used)	4.20
Maintenance	4.00
Total	$146.72
Total cost of plain bearing equipment	$42.24
Annual Expense—Plain Bearings Based on an estimated life of box of five years	
Interest at 5 per cent	$2.11
Amortization at 5 per cent compounded	7.54
Lubrication	6.00
Maintenance, including brass renewals	9.36
Total	$25.01

The total annual expense of ball-bearing equipment exceeds that for plain bearings by ($146.72 — $25.01) $121.71. As the annual power cost saving obtained from the use of ball bearings is $155.10, the net annual saving resulting from the use of ball bearings is $155.10 — $121.71 or $33.39.

The preceding figures were based upon the cost of a ball-bearing equipment nearly five years ago. Recent quotations received show that a similar and perhaps better equipment could be purchased and installed at the present time in a car of this type for $482. Substituting this for the $606 in the calculation for ball bearings, the result is as follows:

Interest at 5 per cent	$24.10
Amortization at 5 per cent compounded	86.07
Lubrication	4.20
Maintenance	4.00
Total	$118.37

Excess over corresponding plain bearing costs, $118.37 — $25.01 or $93.36. Net annual saving per car in favor of ball bearings is $155.10 — $93.36 or $61.74.

It is evident from the test that the serviceable life of the bearings, without heavy maintenance, will exceed five years. As the bearings now manufactured are improved over those used in the test, it is a safe estimate that with equipment properly adapted to the service, an average life of seven years can be obtained (33,000 miles per year). Allowing a seven-year life for the plain bearing journal boxes, the following calculations were made up:

Cost of ball bearing equipment	$482.00
Annual Expense—Ball Bearings Based on an estimated life of seven years	
Interest at 5 per cent	$24.10
Amortization at 5 per cent compounded	58.78
Lubrication	4.20
Maintenance	4.00
Total	$91.08
Cost of plain bearing equipment	$42.24
Annual Expense—Plain Bearings Based on an estimated life of seven years	
Interest at 5 per cent	$2.11
Amortization at 5 per cent compounded	5.14
Lubrication	6.00
Maintenance, including brass renewals	9.36
Total	$22.61

Excess annual expense of ball over plain bearing equipment = $91.08 — $22.61 or $68.47.

Annual power cost saving (as before) = $155.10.

Net annual saving, under these conditions, in favor of ball bearings is $155.10 — $68.47 or $86.63.

The tests described were made upon a comparatively heavy car for city service. It has been found, in the past, that the cost of anti-friction bearings does not vary directly with the weight of car. In fact, quotations on bearing equipment for a car nearly 6 tons lighter were found to be little lower than those for this car. The present trend toward lighter and more efficient cars makes it evident that with the same percentage of power saving the value of the annual saving would become less, and for the same net saving a lower initial investment will have to obtain. It is reasonable to believe that with proper standardization, so as to limit the number of sizes of bearings used, and with a more general application so as to increase the demand, the price would drop so that an annual saving on the lighter car can be obtained which will be equal to or even greater than the figures shown.

The general adoption of ball journal bearings will entail a greater investment where extra axles are kept for making necessary wheel and axle changes at operating carhouses. This is due to the fact that all such axles must be equipped with anti-friction bearings and boxes on account of the non-interchangeable feature of such bearings. Where standardization exists and a considerable number of similar cars are equipped with anti-friction bearings, the additional investment required for such extra parts can be kept very small.

Steel Tie Spacing Can Be Too Great

BY L. A. MITCHELL, SUPERINTENDENT OF ROADWAY UNION TRACTION COMPANY OF INDIANA, ANDERSON, IND.

The description of steel tie track construction at Circleville, Ohio, in the issue of Oct. 30, 1915, is of a type which for certain tonnage may prove satisfactory. It would seem, however, that the rail is expected to do more work as a beam than it has been the custom to require of it in other types of concrete track foundations, or in open track construction where a certain amount of flexibility is expected to exist. Some engineers have assumed that where steel ties were used on a concrete foundation the spacing could be increased because the concrete would carry a portion of the load and thus prevent deflection of the rail between ties. This probably is the reasoning which leads to the conclusion that greater space between ties warrants the use of the more expensive ties because the cost per foot of track is not increased proportionately.

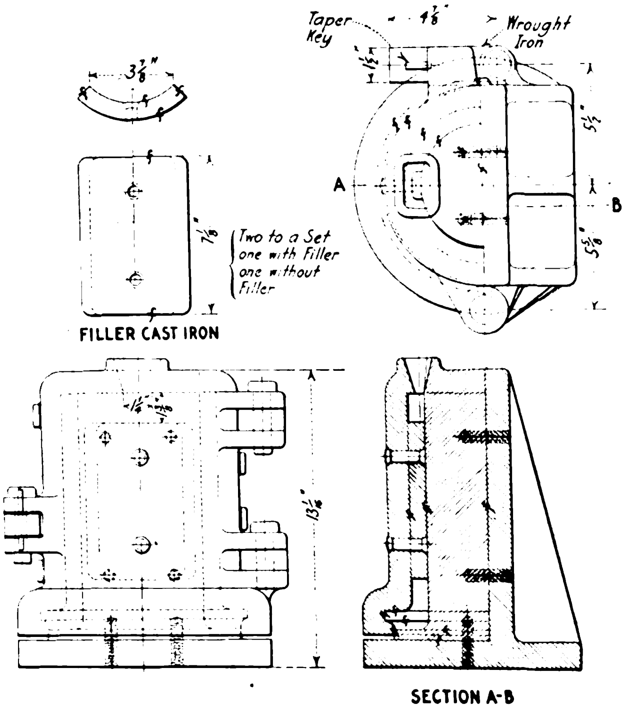
Prior to the advent of the steel tie, so-called solid concrete construction was used quite extensively, but the spacing of the wooden ties was maintained the same as that adopted for ordinary ballasted track construction, or the ties were eliminated altogether. The latter is the concrete beam construction which is still being used in some localities. In the beam construction, anchor bolts were used to fasten down the rail, and tie rods, placed three or four to the rail length, were employed to hold the rail to gage. In making repairs to this type of construction, it was often found that the rail had loosened from the concrete beam and that the concrete beneath the rail was worn away by abrasion. This indicated that the bond between the concrete and the rail could not be maintained where the rail was supported directly on the concrete. Moreover, the area of distribution for track loads afforded by the rail base was insufficient to prevent the ultimate wearing away of the concrete under the vibration of passing car wheels. Concrete failures of this kind decrease with the number of rail supports, and particularly when these supports present a comparatively large area to transmit the vibration from the rail to the concrete and thence to the subgrade.

If the distance between supports is such that the rail deflection is appreciable, the concrete is certain to wear away where it comes in contact with the rail. This deflection in rail sections generally used in paved streets can only be obviated by making the steel tie spacing the same as that adopted for wooden ties. The experience of the last few years has shown, however, that the heavier rail sections will permit a greater distance between tie supports. This interval can also be increased when wood ties are used, but the limit of spacing would be somewhat less than that for steel ties due to the difference in the crushing strengths of the wood and steel. Where 7-in. rail is used the probable maximum clear span between ties is 3 ft. Many of the failures of steel-tie, solid-concrete construction can be attributed to a spacing greater than this. Engineers have tried to make the cost of steel-tie construction as near that of wooden ties as possible. This has been accomplished by increasing the tie spacing and thereby decreasing the number of ties necessary. In doing this they have neglected the consideration of other factors which may ultimately prove to be more costly than an additional number of ties.

Mandrel for Babbitting Motor Axle Bearings

BY F. G. LISTER, MECHANICAL ENGINEER SPOKANE, PORTLAND & SEATTLE RAILWAY, PORTLAND, ORE.

A mandrel for use in babbitting motor axle bearings which has saved a great amount of labor and material is being used by the Oregon Electric Railway in its Portland shops.



MANDREL FOR USE IN BABBITTING AXLE BEARINGS

It has always been the practice to babbitt the bearings a little below size and then to bore them out in a lathe or boring mill to the exact size of the bearing. This process took a great deal of time and additional material, and when the bearings were bored to the exact size the toughened surface or skin was necessarily removed. The bearings thus lost much of their wearing qualities. By the use of the mandrel of the type shown in the illustration, which gives details of one made for the GE-205 motor, it is possible to get along without doing any work on the bearing after taking it from the mandrel. It has a clean, smooth surface and is ready for service immediately. Similar mandrels are also used for the other types of motors on this system. Bearings babbitted in these mandrels have been in use for more than a year with very little wear. A hot axle bearing is unknown on the Oregon Electric Railway.

Economies with New Bedford & Onset Signals

The New Bedford & Onset Street Railway, New Bedford, Mass., has lately installed automatic block signals on 10 miles of its single-track line between Fairhaven and Wareham, and one set of signals between Onset and Ramsdell's, to facilitate handling traffic under the diversified conditions associated with the system. The signals are of the United States Electric Signal Company's K-2 type, and through their use not only has traffic been accelerated but the expense of dispatching has been reduced.

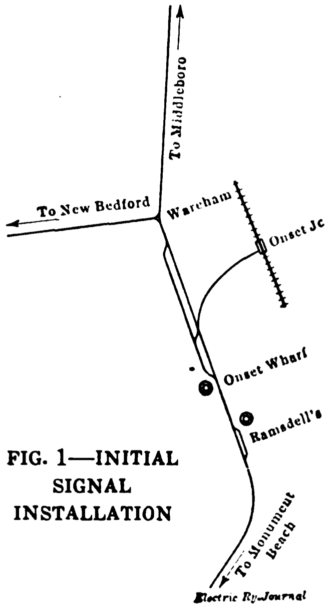
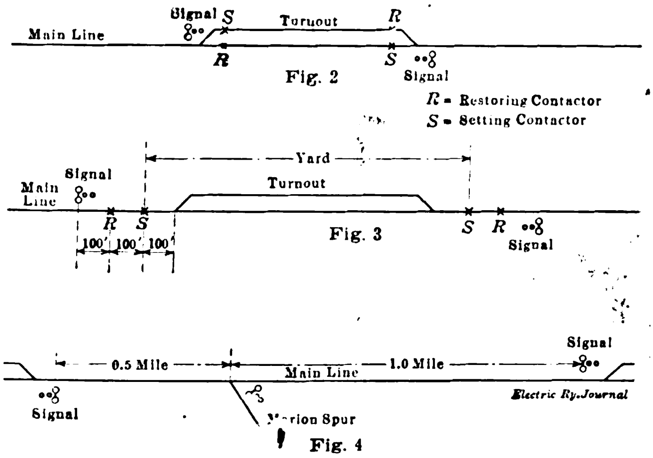


FIG. 1—INITIAL SIGNAL INSTALLATION

On the line between the Fairhaven - Mattapoisett boundary and Wareham there are ten sidings, including a spur for express cars at Marion; from Wareham to Onset Wharf 4 miles of double track are in service, and from Onset Wharf to Monument Beach the line is single track with three turnouts, including that at Ramsdell's. Through service is operated over this route between New Bedford and Monument Beach, the summer headway being thirty minutes. A single-track branch, not signaled, extends from Wareham to Middleboro, the headway being sixty minutes on weekdays and thirty minutes on Sundays for service between Middleboro and Ramsdell's. Between Wareham and Onset Wharf a short spur track branches from the main line to the Onset Junction station of the New York, New Haven & Hartford Railroad, and between this station and Ramsdell's a shuttle service varying in volume and headway is operated, the length of the one-way route being 3 miles. Wareham is 16 miles from New Bedford, Onset Wharf being 21 miles and Monument Beach 27 miles distant from this point.

The restrictions of topography between Onset and Ramsdell's, making the cost of double-tracking prohibitive and the location of the Onset Junction station out of sight of the main line, as well as the varying demands of local and through service, regular and extra cars, passenger and freight traffic, render the rapid movement of cars a problem of some complexity. Under the original method of operation, crews were required to report by telephone at each siding to receive orders from the dispatcher located at Wareham. This made it necessary to maintain an extra dispatcher to handle car movements on the section between Onset Junction and Ramsdell's during five hours every summer afternoon. The fluctuations of traffic are considerable, and the necessity for making connections with the New Haven trains at all times at Onset Junction resulted in a puzzling operating problem, there being no check on the car movements except by memory and telephone. Four or five cars were frequently run in a group under ten-minute headway in either direction, the running time being about four minutes for the block between Onset Wharf and Ramsdell's. However, the installation of one pair of signals at this point, as shown in Fig. 1, dispensed with the need of the extra dispatcher, and this led to the equipment of the Fairhaven-Wareham line with seven two-point blocks and one three-point block.

The turnouts on the main line average about a quarter of a mile in length, the total length of the seven sidings between Fairhaven and Wareham being about 2 miles. Instead of placing the setting and restoring trolley contact switches as shown in Fig. 2, which is a common practice, the contacts are located in the main line, as shown in Fig. 3. In the New Bedford & Onset arrangement, the first or setting contactor is located 100 ft. from the switch, the restoring contactor being 100 ft. beyond the setting contactor and the signal 100 ft. from the latter, making the signal 300 ft. from the switch at either end of the block. All signals carry a red semaphore in addition to the lamp indication, and are of the counting-in type. The three-point block on the road is installed in connection with an express car spur at Marion, as shown in Fig. 4, and protects car movements through the main line, also controlling the movement of cars on the spur upon the main line. The block is 1.5 miles long. A car clearing the main line also clears the signal at the spur, and an express car entering the main line from the spur sets the signals at the ends of the block; and conversely, when entering the spur from the main line, an express car clears the main line signals, provided no car is behind it on the main line. The signal at the spur is visible only from cars on the spur.



FIGS. 2 TO 4—DIAGRAM SHOWING SIGNAL ARRANGEMENT AND THAT USED ON NEW BEDFORD & ONSET RAILWAY, AND ARRANGEMENT OF THREE-POINT BLOCK

The local advantages of the contact arrangement employed, according to J. E. Marvelle, assistant superintendent New Bedford & Onset Street Railway, are that this plan provides for the operation of cars within the siding and for 100 ft. at either end with no relation to the signals, making this trackage in effect a railway yard. It allows operation in winter, when an hourly schedule instead of a thirty-minute schedule is maintained, without reference to sidings except those necessary for the cars to pass, which may be cleared of snow while the rest of the turnouts are left until convenient. The saving in snowplow work and in shoveling is thus a considerable item. With the line contacts placed outside the turnout, either track may be utilized, as convenient. Regular cars may pass extras on either side, without reference to right-handed operation, which is a marked advantage when cars on sidings are being loaded with logs or other heavy materials.

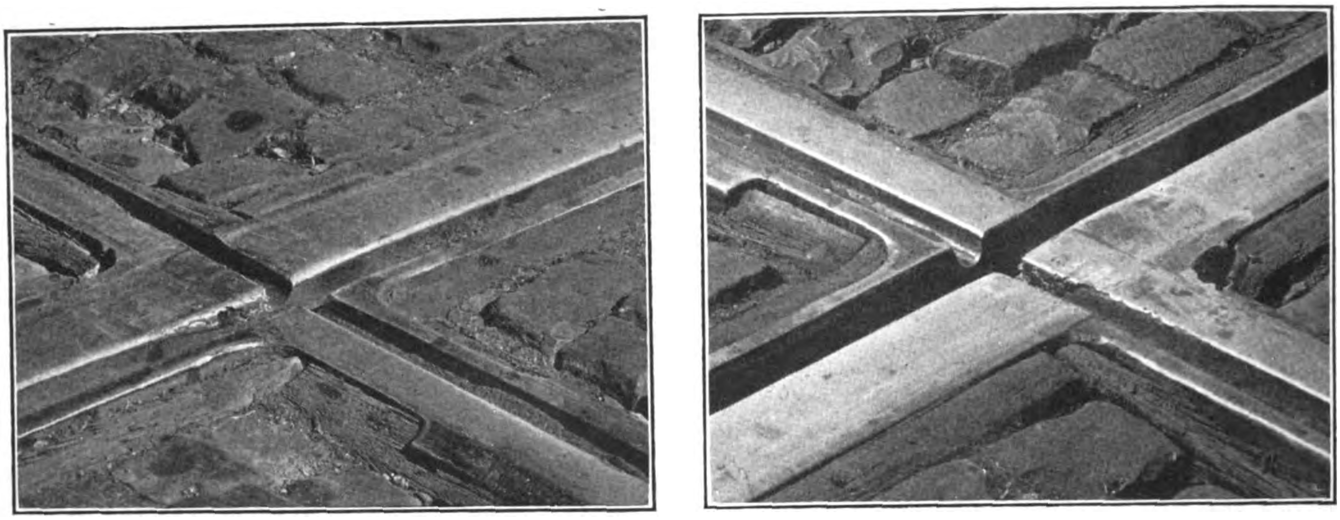
Only about half the snow-fighting equipment is needed, compared with the plan of using all the sidings. If a trip is terminated at a certain siding short of the usual destination, the location of the overhead trolley contact 100 ft. beyond the switch enables the trolley to be changed and the direction of travel reversed without interfering in any way with traffic or setting signals not intended. The usual arrangement of contacts in the trolley wire on the siding and in the main line is satisfactory if every car passes through every turnout at all times, without turning back at intermediate points, but the New Bedford & Onset arrangement, according to Mr. Marvelle, is more flexible. It saves slowing down and passing through all sidings; enables portions of sidings to be used, as in snowy weather; does away with the probability of setting signals unintentionally against opposing cars in turning back, and permits setting off crippled cars, construction trains, and cars to be loaded or unloaded without interfering with through traffic.

Severe tests have been given the signal system since its installation, but no failures that could conflict "rights of track" have resulted. On rare occasions a car has to go back upon the line a short distance after passing the siding switch because of receiving a stop signal at the entrance of the block, due to the opposing car's reaching the line contact first; but this is seldom experienced and simply requires that the car back a few feet to the siding, on account of the clearance between the switch points and the setting contact.

Sponge Impurities

Some railway companies have found that sponges bought by the bale sometimes contain as much as 50 per cent of impurities. Those familiar with the natural impurity-retaining qualities of the sponge state that this should not be more than 25 per cent. Tests for impurities are made by first weighing, then thoroughly washing the sponges, and after they are perfectly dry the weight is again determined. If the shrinkage is as much as 50 per cent it represents quite an item, especially when the average price for good sponges is about $3.50 per pound. One railway company, in order to obtain the maximum results with the sponges employed in washing cars, has prepared a specification under which the cost per pound is reduced in proportion to the increase in impurities over 25 per cent. The manner of testing the amount of impurities is also specified, and only sponges procured from certain waters are acceptable.

In the annual report of W. W. Hoy, general manager of the South African Railways & Harbors, it is stated that the administration had in contemplation the electrification of certain sections of the railway, and a decision had been arrived at to obtain the services of an eminent consulting engineer to study the local problems and conditions on the spot, and thereafter submit a comprehensive report. Unfortunately, the condition of affairs in Europe and in South Africa necessitated a postponement of the proposals, but the matter is one which should receive early attention after the cessation of hostilities.



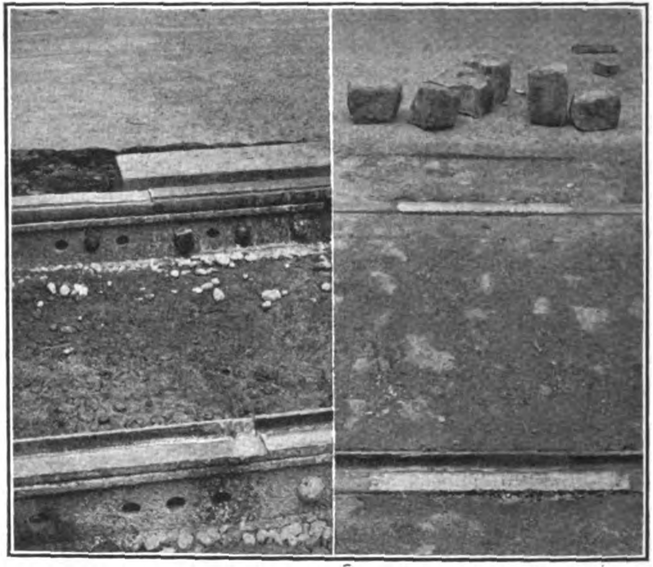
MANGANESE CROSSING REPAIRED WITH GAGE LINE SIDE LEFT UNGROUND

Electric Welded Special Work and Joints at Portland, Ore.

Through the courtesy of Thomas Pumfrey, engineer maintenance of way the Portland Railway, Light & Power Company, Portland, Ore., the accompanying interesting photographs of work done with an Indianapolis portable electric welder have been made available. Two pairs of the illustrations show the conditions before and after at a steam crossing of solid manganese steel. Here a point on the running rail had broken down. The pictures of the completed work do not show a very even finish on the gage line, but this is due to the fact that the Portland company does not consider it necessary to grind the gage line side of the rail. This practice, of course, does not diminish the usefulness of the crossing, while helping to produce an effective repair at very low cost.

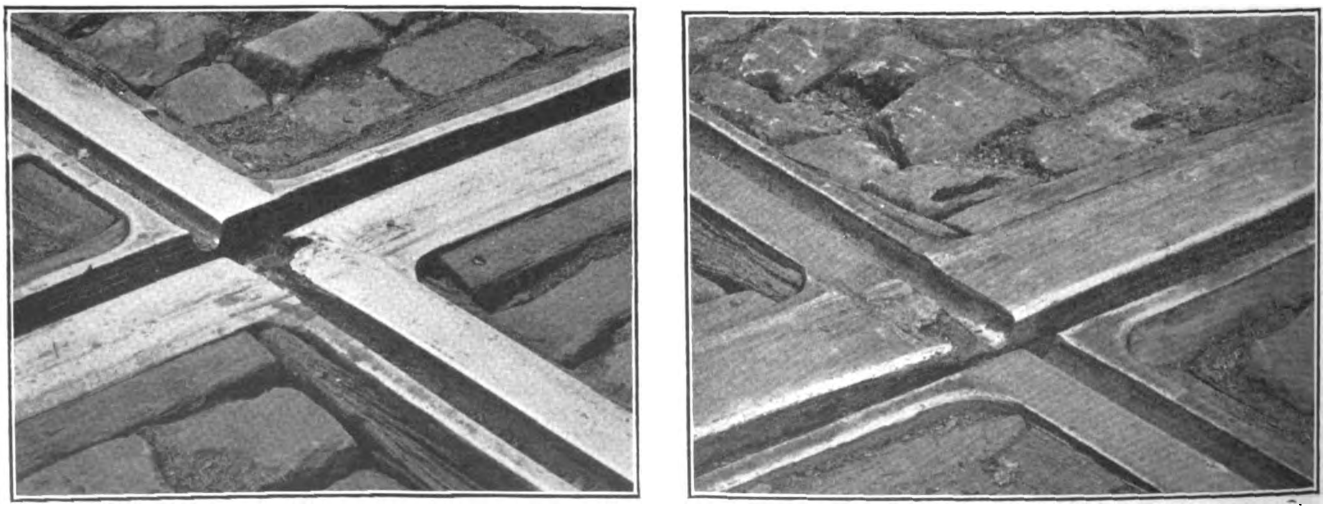
Another pair of illustrations shows the ability of the portable electric welder to build up a battered joint.

It is apparent from the work done at Portland that the success of the weld is not only a matter of careful workmanship, but also of employing the proper fluxated metal. Thus for welding manganese crossings, the company uses one kind of special fluxated steel, while for the building up of cups in joints, it employs a second grade of steel whose chemical properties resemble as closely as possible the chemical content of the rails. The steel used for manganese work must differ in melting point and other qualities because the greater resistance offered by manganese diminishes the effectiveness of the electric arc as compared with welding on steels of higher conductivity.



THE WELDING OF A BATTERED JOINT—BEFORE AND AFTER

Finally, all welding must be made on solid metal. Hence if the top of a broken piece of special work is to be welded, the structure should be carefully examined for traces of honeycombing.

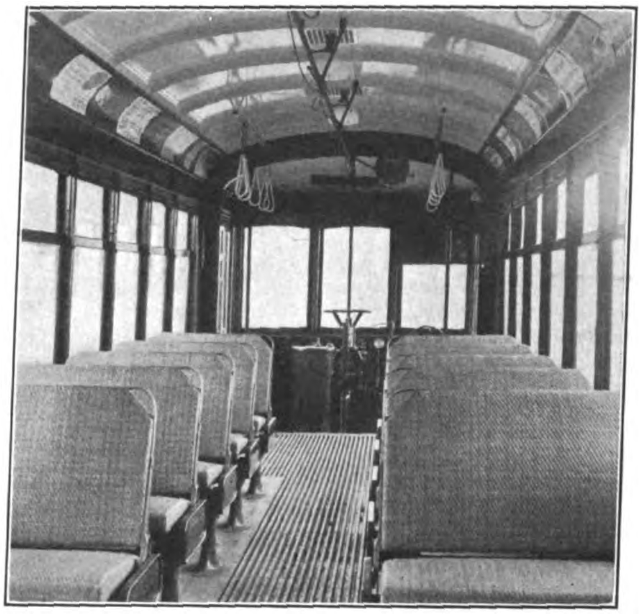


MANGANESE CROSSINGS WITH BROKEN RAIL BEFORE ELECTRIC WELDING AT PORTLAND, ORE.

All-Steel Cars for Binghamton Railway

The Binghamton (N. Y.) Railway Company has recently placed in operation thirteen new all-steel cars for use in city service on the Binghamton lines. The general dimensions of the cars, which were built by the Cincinnati Car Company, are given in the following table:

Length over all	37 ft.
Length of car body	25 ft.
Extreme width	8 ft. 6 in.
Rail to first step	15 in.
First step to platform floor	13 in.
Platform to car floor	11 in.
Post centers	30 in.
Width of aisle	24 in.
Truck centers	12 ft. 6 in
Size of wheels	34 in.
Seating capacity	42



INTERIOR VIEW, BINGHAMTON CAR

The entire bottom framing, the body and the roof are of steel construction, the body bolsters being of the steel-plate type with cast-iron spacing members. The underframing is covered with sheet steel, upon which are laid 13/16-in. yellow pine boards, forming the floor, and this is finished with tapered floor-mat strips screwed to the floor with bronze screws, which reach the entire length of the car floor except a space of 2 in. at each end to allow for sweeping. The floor strips are jointed 2 ft. from the end of the car so that they are easily renewable, and the side floors are raised flush with strips in the aisle.

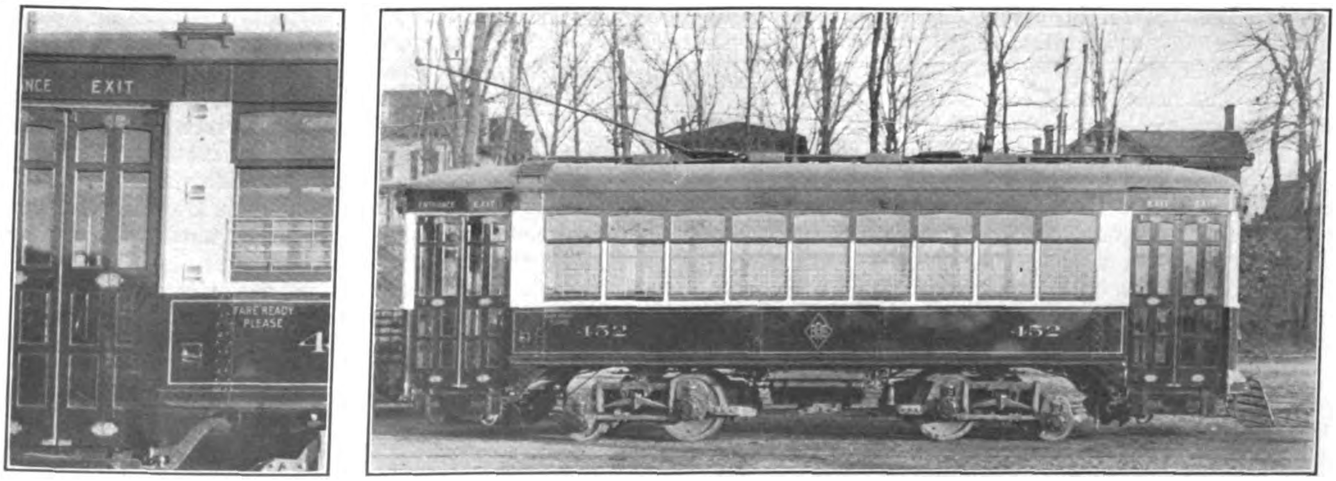
The bumpers are formed of 5-in. steel channels, which are protected with No. 16 gage sheet steel to prevent anyone from riding on them. The vestibules are arranged for pay-within operation, and are provided with double folding doors operated in conjunction with the folding steps. The outside of the vestibule below the sash rest is sheathed with 1/8-in. steel, and there are three drop sash above this, the center sash having stops so that it can be lowered part way to give the motorman clear vision during stormy weather. The front sash is fitted with a sleet cleaner manufactured by the Standard Accessories Company, 505 Fifth Avenue, New York City.

The vestibule steps are of the folding type, the edges of which are covered with a 3-in. strip of safety tread, which is also provided on the platform edge over the steps. The roof is plain arch pattern. It is covered with No. 18 gage sheet steel and is insulated on the outside with 1-in. compressed cork, this being covered with No. 8 canvas.

The interior trim, including sash, moldings, etc., with the exception of the folding doors, is finished with Sherwin-Williams green. The wainscoting below the windows is formed of 1-in. compressed cork covered with No. 18 gage sheet steel. The side-post cappings are made of pressed steel and are readily removable. The ceiling is carline finish, except for that portion on either side which is provided with moldings to receive 11-in. advertising cards, and it is finished with Sherwin-Williams flat white enamel.

There are nine windows on each side of the car which have double AA quality glass set in rubber and held in place by moldings screwed in position. The lower sash raise, and are fitted with flush barrel sash locks engaging with holes in T-bar posts to hold the sash at various heights. The upper sash are stationary with arched heads. The side windows are provided with Fabrikoid curtains, Curtain Supply Company's ring-type fixtures and Rex rollers. Curtains are also provided back of the motorman for his protection. Consolidated Car Company's heaters with deflectors are used, ten coils being connected in series with the switch on the trolley side. The heater manufacturer's thermostatic control has been installed. There are also ten Hale & Kilburn 37-in. cross-type seats having 19-in. backs and bronze grab handles on the aisle side. Longitudinal seats are provided in each corner of the car, these occupying the space of two windows. All seats are upholstered with canvas-backed rattan.

Each end of the car is equipped with a Peacock staffless brake manufactured by the National Brake Company. Consolidated buzzers connected with push buttons in each side post are provided, these being operated



VIEWS OF VESTIBULE DOORS AND SIDE, BINGHAMTON CAR from the trolley circuit, and the Ohio Brass Company's Style D signal system is installed. A 14-in. gong is provided under each platform.

The steel window guards are of the five-bar, ¼-in. hard-drawn removable type, spaced 2½-in. centers. One sand box operated by a Westinghouse air sander is located under the longitudinal seat at each end of the car, this being provided with Johns-Manville sand hose and Ohio Brass Company's air traps. The trolley boards are formed of two 6-in. x 1¼-in. oak planks extending the full length of the car, and arranged to receive two Nuttall No. 14 trolley bases. Earll trolley catchers are provided. Each end of the car is equipped with one cast-steel drawhead, and in addition a pull bar 4 ft. long is hung on hooks under the side of the car. Each end of the car also has one Golden Glow headlight with a 23-watt lamps, one Dayton Model DB fare box and one Sterling single register, arranged so that it can be operated from either end and from any part of the car, are also provided, as well as a sheet-steel transfer box, having a glass face and door with staple and padlock. A hand-strap pole is installed over each corner longitudinal seat, this being fitted with five Rico sanitary straps, 5 ft. 10 in. from the floor.

Each end of the car is equipped with a Berg fender and Root air-operated track scrapers, and a Hunter route and destination sign is provided in each right-hand vestibule wing sash. Ventilation and illumination are provided by four Utility, honeycomb, combination ventilators and registers, and light fixtures of the Dayton Manufacturing Company's type, complete with Alba shades and 94-watt lamps. The light circuit is supplied with one extra lamp fixture, controlled by a Nichols-Lintern selector switch. The sign lights, headlights, platform lights and extra light are wired for 23-watt lamps.

The mechanism to operate the folding doors and steps is of the car builder's standard design, and the doors are connected to the main switch through the contactor line relay so that the car cannot start when the doors are open. To protect the car against side-swiping by vehicles an angle iron fastened to the side sill on each side projects 1½-in. from the side sheathing.

The car is equipped with a Westinghouse A-3 compressor, having a displacement of 1½ cu. ft. of air at 90 lb. pressure, a Westinghouse S-6-A governor, ½-in. PV motorman's valve, Type C sander valves and Type S brake cylinders. Type E American Automatic slack adjusters are provided. There is a 25-ft. cooling coil between the compressor and the main reservoir, and the necessary splash guards are provided to protect the slack adjuster, compressor and resistance from wheel wash.

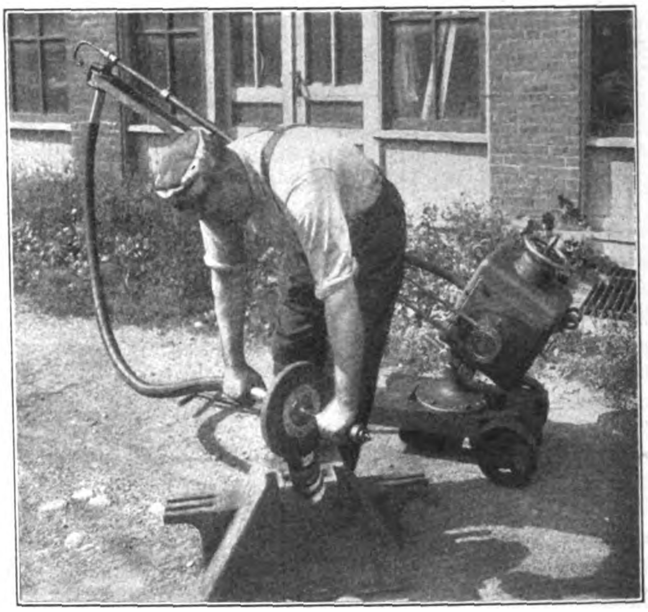
Two Westinghouse 323 V motors, rated at 33 hp. at 500 volts and 40 hp. at 600 volts, are installed, together with double-end K-36-K control. The car is mounted on one pair of Baldwin maximum traction trucks with 21-in. steel trail wheels and 34-in. steel drive wheels, 54-in. centers. American Brake Shoe & Foundry brakeshoes and brakeshoe heads are installed, and S. K. F. ball bearings are used on both driver and trailer axles.

All wiring is installed in conduit, and special junction boxes and condulets at motor leads and resistance leads are provided. Light, heat and air brake compressor switches are placed on an enamel slate base, installed in a cabinet that has a swing door and is lined with asbestos lumber or transite. This switch cabinet is located on the inside of the car body at the corner post.

One of the especially interesting features is found in the novel form of motorman's steps which are installed. Heretofore the steps used by the motorman to reach the roof have projected beyond the side of the car, and if the car was side-swiped by a wagon or otherwise these steps were broken off and were a continual source of annoyance. The form of depressed step shown in the accompanying illustration was therefore devised by C. S. Banghart, vice-president Binghamton Railway, as an improvement over the old method.

Convenient Portable Grinder

The Stow Manufacturing Company, inventor and builder of the well-known Stow flexible shaft, has placed on the market an application of the device that is especially advantageous for use in connection with the grinding of cumbersome, inaccessible or irregularly shaped pieces which cannot conveniently be brought to an emery wheel or set in a machine tool in the customary manner. The apparatus consists of an emery wheel mounted on a length of flexible shafting, which in turn is supported by an arm attached to a small motor. The motor is mounted upon a truck, thus making it easily transportable to any part of the shop and eliminating the necessity for taking work to the tool, with a resultant saving in time and cost of cutting.



PORTABLE GRINDING MACHINE

The motor is ruggedly built, being totally inclosed and having the starting equipment incorporated within the motor frame, to give a compact construction. Variation in motor speed is secured by means of a plunger in the pole piece which changes the reluctance of the magnetic circuit. No power is lost through this operation, as is the case in most variable speed motors, and the full-load efficiency remains practically the same at all speeds. The speed variation is provided so that worn emery wheels may be consumed down to the minimum size, a proper cutting speed being insured regardless of size, and the maximum grinding efficiency being obtained in all cases. A motor for alternating current is also furnished if required, but this does not have a variable speed, although it may be used with power of any frequency, single or polyphase.

The tool is built in several sizes, according to the capacity of the emery wheel desired. The motor is so balanced on the truck that it may be adjusted to the proper angle for all purposes and to meet all grinding conditions, the extended arm taking the weight of the flexible shaft from the operator. If desired, the emery wheel at the driven end of the shaft may be interchanged with a scratch brush in case the work demands this.

News of Electric Railways

CINCINNATI RAPID TRANSIT ROUTE ADOPTED

Rapid Transit Commission Decides on Construction of Line to Cost $6,000,000.

What is known as modified plan No. 4 for a rapid transit loop about Cincinnati, Ohio, has been adopted by the rapid transit commission recently appointed by Mayor Spiegel. The commission, however, has reserved the right to make such further modifications as may be found advisable before the question of issuing $6,000,000 of bonds for the construction of the road is submitted to a vote of the electors at the presidential primaries in April. This is the plan favored by the former commission, after an examination of several others submitted by different engineers.

The route as proposed begins as an elevated structure at Third and Walnut Streets in the business section of the city. It enters a subway between Fourth and Fifth Streets and continues as such until it reaches the canal, in the bed of which it runs as a subway to Brighton, stations being located at convenient intervals along the subway route. With the exception of occasional short distances the route is located in an open cut from Brighton to Carthage Pike in St. Bernard. From Carthage Pike to Smith Road and Duck Creek, in Oakley, the route lies along the surface. In the original plan this section was to be in an open cut, but because of excessive cost the plan was modified. Until the road is on a paying basis this section will be operated as a fast surface line. At Duck Creek the route becomes a subway and, after passing under Walnut Hills and Owl's Nest Park, it comes to the surface at Columbia Avenue and runs on an elevated structure to the point of starting at Third and Walnut Streets.

The proposed West End Rapid Transit Company, which will build an extension to the Cincinnati, Lawrenceburg & Aurora Electric Street Railway, has planned to connect with the municipal route at its terminal at Third and Walnut Streets. The Indianapolis & Cincinnati Traction Company, if built to the city, will connect with the rapid transit line at Brighton station.

The Ohio Electric Railway line between Cincinnati and Dayton will enter the subway at Crawford station and the Millcreek Valley line will form a connection at Carthage Pike in St. Bernard. All the lines of the Interurban Railway & Terminal Company except the Georgetown division will intersect the rapid transit line at Smith Road and Montgomery Pike. This latter division and the Cincinnati, Georgetown & Portsmouth Railroad will connect at Elmhurst viaduct and Madison Road.

E. W. Edwards, president of the rapid transit commission, insists that the cost of the road must be kept within $6,000,000. He said, however, that this amount of money will not provide for a generating plant and rolling stock nor pay for interurban connections. The leasing company will have to furnish its own plant or purchase power from the proposed new station of the Union Gas & Electric Company. Mr. Edwards regards it as out of the question to attempt to advance money to the interurban companies with which to build connections with the amount at the committee's disposal. He believes that with the advantages the rapid transit entrance to the city will offer to the interurban roads, the banks will furnish funds for making these connections.

The regular sessions of the commission will be held on the afternoons of the first and third Fridays of each month. Frank Krug, city engineer, has been authorized to confer with the interurban railways with a view to estimating the cost and planning connections with the rapid transit line.

Delegations from Price Hill and Hyde Park appeared before the rapid transit commission at Cincinnati at its first regular meeting on Dec. 17 and urged that the route accepted by the commission be so modified as to bring the line closer to these two suburbs or that route No. 5, as suggested by Engineer Bion J. Arnold, be substituted. Mr. Edwards, chairman, explained that either suggestion would mean the expenditure of more money than is allowed the commission under the law for the purpose of constructing the loop. He said the first thing to be considered is a line that will bring the interurban roads to the heart of the city.

DES MOINES REHABILITATION PLANS UNDER WAY

Plans for forty new street cars, to cost approximately $240,000, have been submited to the City Council by the Des Moines (Ia.) City Railway. The Council has approved the plans and the company is asking for bids. The cars will be all steel, center entrance, with a seating capacity of fifty-four, and there will be no smoking compartment or platform on which smoking will be permitted. Emil G. Schmidt, president of the company, told the Council that he expects the new cars will begin to arrive within four months. More new cars will be added later. The new equipment is a part of the general scheme of rehabilitation which will be carried out in accordance with the conditions of the new franchise to the company. Mr. Schmidt has also announced that the building of a network of interurban lines will follow the rehabilitation of the city lines. The Des Moines City Railway controls and operates interurban lines to Perry and Colfax. The Colfax line is to be extended 11 miles to Newton, and new interurban lines are planned to Indianola, Winterest, Red Oak, and eventually to Omaha through a territory not now served by any railroad.

PLANS PRESENTED FOR SUBWAY APPROACHES TO NEW CLEVELAND BRIDGE

Engineer Frederick Law Olmsted on Dec. 9 presented to Director of Public Service Sidlo of Cleveland, Ohio, two plans for subway approaches to the new bridge across the Cuyahoga River at Superior Avenue. For the east side he suggested that the subway extend under Superior Avenue to West Sixth Street where the cars could be brought to the surface, with subway wells at some point between the bridge and West Sixth Street. He said that the tube could be extended from West Sixth Street to the Public Square. An easy grade connection between the bridge and the old viaduct is also provided in his plan, although Mr. Olmstead suggested that the approach to the viaduct be moved to St. Clair Avenue.

On the west side of the river he suggested that the West Twenty-fifth Street cars be brought to the surface at a point between Church Avenue and Franklin Avenue and that the Detroit Avenue cars be brought to the surface at West Twenty-eighth Street. His second plan for this side would place the subways under West Twenty-fifth Street, and the Detroit Avenue cars would reach the surface at the junction of this street and Detroit Avenue. The Twenty-fifth Street cars would emerge from the surface at the same point as suggested in the first plan. Mr. Olmsted believes these plans would obviate congestion at the approaches. Under his second plan an extension of the Detroit Avenue subway beyond Twenty-fifth Street could be built if it becomes necessary. County Engineer Stinchcomb feels that the plan of having cars on the Detroit Avenue line come to the surface at West Twenty-fifth Street will result in congestion.

The city plan commission at Cleveland, on Dec. 15, approved the plans of County Engineer Stinchcomb for subway approaches to the high-level bridge across the Cuyahoga River in preference to those of Frederick Law Olmsted. The vote was informal.

Peter Witt, street railway commissioner of Cleveland, did not make a report on the status of the various funds of the Cleveland Railway at the meeting of the City Council on the evening of Dec. 13, as directed by the Woods resolution adopted a week previously. Councilman Wood made no comment on Mr. Witt's failure to comply with Council's orders.

Under a resolution introduced by Councilman E. A. Meyers, a committee of five members was appointed to study traffic conditions in the congested business district of the city and at other points where trouble is frequent.

Councilman J. J. McGinty has introduced an amendment to the franchise of the Cleveland & Youngstown Railway. Under the amendment the electrification clause agreed upon some time ago will be inserted in the franchise.

W. F. M. GOSS DISCUSSES CHICAGO ELECTRIFICATION REPORT

That phase of the smoke abatement and electrification of railway terminals report dealing with the problem of electrifying Chicago's terminals was discussed at a meeting of the Western Society of Engineers Dec. 20, by W. F. M. Goss, chief engineer of the committee of the Association of Commerce which made this investigation. His address consisted largely of an abstract of the report which he divided into six subjects, namely, existing installations of electrified steam railroads, the Chicago problem, the electric load requirements, the cost, the operating results and the benefits to be derived. Dean Goss made the interesting statement in connection with the question of utilizing the electrified railroad right-of-way for building purposes, that property obtained by the right of eminent domain could not legally be used for commercial purposes. He also said that it was conceivable that the Chicago terminal situation could be unscrambled and the problem of electrification greatly simplified, but that was not within the province of the committee. Dean Goss illustrated his talk with lantern slides, and in the brief discussion which followed, it was suggested that the benefits to be derived from electrification would principally accrue to the city, therefore, it should contribute to the cost of electrification. In response to this question, Dean Goss stated that electrification undertaken as a public improvement could not be financed under the present State constitution, which specifically prohibits city aid in this respect.

MOTION TO DISMISS SEATTLE CASE DENIED

Outline of Contention of Counsel in Case in Which Company Seeks Relief from Franchise Burdens

The Public Service Commission of the State of Washington has denied the motion to dismiss the case of the Public Service Commission on the relation of the Puget Sound Traction, Light & Power Company against the city of Seattle. The action is the one in which the company asks that the city of Seattle be restrained from enforcing certain franchise provisions.

Ralph Pierce, assistant corporation counsel for the city of Seattle, appeared for the city. He contended that the commission must necessarily dismiss the case on the grounds, first, that the law gives no authority for filing such complaint, and, second, that the commission is without power to grant the relief sought. He said that the company seeks relief from all of the terms and conditions the city imposes, but offers to give up none of the rights. Mr. Pierce insisted that the franchise is a contract, and that the only way to break it or to get relief from any of its provisions, is for the court to grant a writ of mandate, stating that when the city seeks to make the company live up to any part of the franchise, the matter goes into the courts. He contended that so far as paving is concerned, the only jurisdiction the commission has is to say that the pavement between the tracks shall be safe, but that it cannot specify the kind of paving under the franchise agreement. He referred to the fact that acting upon the advice of Attorney General Von Tanner, the commission had ruled it had no jurisdiction over streets, having announced in a previous case that it could not force the company to make certain extensions.

Mr. Pierce, in his argument before the commission, stated that instead of trying to avoid the requirements imposed in the franchise, the company should seek relief by raising its passenger rates. He contended that the city, by 1934, the date of expiration of company's franchises, would lose $1,500,000 if the 2 per cent gross earnings tax provision of the franchise should be eliminated.

J. B. Howe, attorney for the company, contended that the commission has jurisdiction to supersede franchise provisions laid down by a city if the commission finds the provisions are unjust. Mr. Howe cited as evidence that certain provisions of the franchise of the company are unjust, the requirement to pave between the tracks and to a width 18 in. beyond the tracks, to pay part of the maintenance of the paving, and the clause under which the City Council can arbitrarily map out an extensive improvement district. He said further that the franchise provision which stipulates that 2 per cent of the gross earnings be paid to the city is unjust. He also cited several court rulings which he contended gave the State authorities power to abrogate or supersede franchise provisions originally laid down by a city.

Charles C. Reynolds, chairman of the commission, following the conclusion of the arguments, announced that the commission would deny the motion of the city with the proviso, however, that the motion may be renewed when the case comes up for a hearing on its merits. The city of Seattle has five days to file an answer to the complaint. The date of hearing on this petition has been set by the commission for Feb. 16, 1916. James E. Bradford, corporation counsel of the city, recently asked the Council for an appropriation of $10,000 in order to prepare for the hearing before the commission.

MR. HARRIS EXPLAINS TORONTO TRANSIT PLANS

R. C. Harris, Works Commission of Toronto, Ont., who, with E. L. Cousins, engineer of the Toronto Harbor Board, and F. A. Gaby, chief engineer of the Hydro-Electric Power Commission of Ontario, prepared for the city the comprehensive report recommending a system of semi-rapid transit with radial entrances, explained the plans to the Board of Trade at a meeting on Dec. 18.

Mr. Harris said that rapid transit in the strict sense of the word had never been adopted in cities of less than 1,000,000 people, except, perhaps, in the case of Boston, where conditions were peculiar. The city of Toronto was not ripe for rapid transit, but semi-rapid transit could be attained by the construction of radial lines, east, west and northeast, provided they were controlled by the city within the city limts.

The commissioner said further that in so far as the city itself as at present constituted was concerned, when the city in 1921 acquired the Toronto Railway franchise, with its consequent rehabilitation and the building of new civic lines, the proper placing of new surface lines in the interim would bring about a passage from the remotest limit to King and Queen Streets in thirty-five minutes. The commissioner then dealt with the radial entrances. He dwelt on the recommendation for a transportation commission that would control all the electric transportation within the city, assume control of the civic car lines, lay out and build new lines and arrange for the acquisition of the Toronto Railway in 1921, the city to control the railways within the city limits.

The City Council will at its next meeting declare its policy in reference to taking over the Toronto Railway at the expiration of its franchise. The Mayor said: "The present Board of Control has tacitly declared in favor of the policy, but at the next meeting we will send on a resolution in favor of taking it over."

EFFORTS TO SETTLE WILKES-BARRE STRIKE FAIL

Efforts of Federal and State mediators and the pleas of the united business men have gone for naught in the attempt to settle the strike of the carmen on the system of the Wilkes-Barre (Pa.) Railway. The merchants of the city have made the most substantial and practical endeavor to end the strike by appealing to the striking employees in a declaration that business is paralyzed and that unless the strike is ended at once several hundred clerks and other store employees will be thrown out of work. All admitted that business is the poorest ever known for the Christmas season and that to save themselves it will be necessary to cut down expenses by discharging clerks and other help. The carmen rejected the offer of a peace proposal made by the merchants of the city, declaring that it contained nothing new.

It has been announced by the company that night service will be started in a few days. Since the strike started cars have only been run until dusk on account of the possibility of riots, but an adequate police force has now been provided and the militant temper of the mobs has materially subsided. Considerably more traveling is being done by the general public, especially since the recent inclement weather, and it is expected conditions will be restored to normal in a short time.

MANY WITNESSES EXAMINED IN NEW YORK INQUIRY

The inquiry by the legislative committee into the workings of the Public Service Commission for the First District of New York was continued during the week. Four witnesses were before the Grand Jury on Dec. 17. They were Sidney G. Johnson of the General Railway Signal Company; Walter D. Uptegraff, president of the Union Switch & Signal Company; S. O. Levinson, general counsel of the Union Switch & Signal Company, and John R. McCune, a director of that company. On Dec. 21 the Grand Jury had before it Col. H. G. Prout, formerly president of the Union Switch & Signal Company. The proceedings before this body are secret, but the opinion seems to prevail that no action will be taken by the jury until the committee from the Legislature has exhausted its inquiry.

Col. Prout was the principal witness before the committee on Dec. 17. Col. Prout said that he could not tell of any specific occasion when he talked with Mr. Johnson, who was formerly vice-president in charge of sales of the Union Switch & Signal Company, with respect to the Center Street loop signal contract. He did say, however, that Mr. Johnson had come to him more than once with the subject of his (Mr. Johnson) being approached by Commissioner Wood. Col. Prout said that he advised Mr. Johnson that it was the duty of the company to keep a watch on the commissioner, to "tow" him along, but to make no promises. He had then spoken about the matter to various members of his board of directors and it was formally put before the board. They rejected the idea of making any propositions of payment to Mr. Wood.

On Dec. 18 Alfred Renshaw, president of the Federal Signal Company, Albany, N. Y., said that Vice-President Cade of that company had told him that Commissioner Wood had invited him (Cade) to his (Wood's) office and Mr. Renshaw got the impression that Mr. Cade said that Mr. Wood gave Mr. Cade an opportunity to make a proposition in connection with the signal contract for the Fourth Avenue line. Mr. Renshaw also testified on Dec. 21. Another witness was Clifton W. Wilder, electrical engineer for the commission.

William G. Banks, a former associate of Commissioner Wood, was examined on Dec. 21. He went over meetings which he said he had with both Mr. Cade and Mr. Wood. The only influence he brought to bear on Mr. Wood was to try to get some of the signal equipment business. The witness was excused by Senator Thompson, chairman of the legislative committee, with the advice that he "come back here in the morning and tell us everything you have forgotten to tell us."

OSCAR S. STRAUS ON HIS IDEALS

Oscar S. Straus, who was appointed on Dec. 9 by Governor Whitman of New York to succeed Edward E. McCall, removed by the Governor as chairman and member of the Public Service Commission for the First District, said in an interview prior to his being sworn in as a member of the commission:

"I have not given any attention to transportation problems or the regulation of corporations. I make no claim to be an expert. But I was head of the Department of Commerce and Labor, a great department which has since been divided into two, and I shall use the advice of experts with common sense and a fearless determination to serve the public interest. I may go in as a student at first, but I am determined to give the city a square deal. I shall not be afraid to do the unpopular thing if I believe it to be right.

"The decisions of the commission in the railroad arbitration of 1912, of which I was chairman, did not quite satisfy either side, but worked out well. I suppose the same may be the result of my work in the Public Service Commission. Then there was another reason why I hesitated to accept: the hostile criticism I must expect. That is one of the most difficult things in public affairs, especially municipal affairs, even if one be as pure as ice and chaste as snow. So, for a man of my time of life, with a fair record behind him, it is taking quite a chance to accept office with no object but to serve the public. Only recently I have become a member of a committee in that great beneficent neutral work of feeding and clothing the Belgians and the French within the German lines. I must stay on that, and if the commission work conflicted with it, I should have to drop the commission. So the public must not be surprised to see me get out. My controlling idea is that I believe in the efficacy of commissions as a development of the highest value to municipal government. I believe that value would be lost and the commission system discredited unless public-spirited men were willing to devote themselves to the work. As the Governor put it to me, I regard this as a call for public service. I regret that I have been selected. It takes from me the leisure that I have earned in twenty-eight years of public service, off and on, but I could not refuse the summons when it came to me."

CHICAGO TRACTION COMMISSION ORDINANCE PASSED

The employment of three engineers to study the entire local transportation problem of Chicago, Ill., was authorized by the passage of an ordinance at the meeting of the Chicago City Council on Dec. 20. A number of amendments were submitted, but after two hours' debate the ordinance was approved essentially as it was recommended by the local transportation committee. The ordinance authorizes the employment of three engineers, one from Chicago and two who have had experience in connection with the efforts to solve the transportation problems of New York, Philadelphia or Boston. The local transportation committee now has full authority to negotiate for the employment of the engineers, but their appointment must be confirmed by the City Council. Henry B. Capitain, the chairman of the committee, has been asked by the committee, to submit the names of qualified engineers with their records and his recommendations.

New Rules of Procedure for District Commission.—The Public Utilities Commission of the District of Columbia has adopted new rules of procedure to facilitate the transaction of matters coming before the commission. The new rules went into effect on Dec. 1.

Cincinnati Officials Appointed.—Mayor-Elect George Puchta of Cincinnati, Ohio, announced on Dec. 16 that he had selected Charles F. Hornberger as director of public service and Walter J. Friedlander as director of public safety. Charles Groom will succeed Walter M. Schoenle as city solicitor and Harry Barnes will be his first assistant.

Plea to Dismiss New Haven Case.—Judge Hunt listened all of Dec. 20 in the Federal District Court at New York while counsel for the eleven ex-directors of the New York, New Haven & Hartford Railroad tried to show that he should dismiss the complaint of the government against them for alleged conspiracy to monopolize trade in New England.

Acquisition of Part of Toronto Line Recommended.—The City Council of Toronto, Ont., at a special meeting on Dec. 17 unanimously adopted the recommendation of the Board of Control that the Hydro-Electric Power Commission of Ontario be requested to enter into negotiations with the Toronto & York Radial Railway for the acquisition of the Metropolitan line on Yonge Street. The question of taking over that portion of the line within the city limits to make it part of the civic system will be arranged with the Hydro-Electric Commission after it has secured possession of the line.

Interborough Men as Entertainers.—At the annual smoker and entertainment of the New York Railroad Club, held at the Waldorf-Astoria on Dec. 17, all of the entertainment was provided by talent from the force of the Interborough Rapid Transit Company, New York. The features on the program included instrumental music from the Subway Orchestra, songs from the Interborough Quartette, a ventriloquist, monologues, etc. The entertainment was fully up to those given by professionals in past years, and the members of the club present were greatly appreciative of the opportunity of learning what the Interborough force could do.

Plea for Retention of Transit Experts in Philadelphia.—A. Merritt Taylor, director of the department of city transit of Philadelphia, Pa., appeared before the Councilmanic finance committee recently and urged that an appropriation of $60,000 for consulting engineers be included in the amount made available for 1916. Director Taylor, in urging that Councils make the same provision regarding consulting engineers for 1916 as was made in 1914 and the present year, declared that it would be a great misfortune to do away with the services of valuable experts who have been stationed almost constantly in his office since the development of the transit plan was begun.

Resolution for Congressional Inquiry Into Railroads.—Senator Newlands has introduced a resolution for a Congressional investigation of the railroad situation along the lines advocated by President Wilson in his message. The Senator is chairman of the committee on interstate commerce, and his resolution has been referred to that committee. He has expressed the view that the Interstate Commerce Commission should be enlarged, that there should be a section for the Eastern roads, another for the Middle Western roads, and a third for the Far Western roads. He has also raised the question of incorporating the railroads under a federal charter.

Action on Philadelphia Transit Loan Put Over.—Action on the $95,000,000 loan for Philadelphia, which is to include $45,000,000 for rapid transit work, has been halted at the request of Mayor-elect Thomas B. Smith. The Mayor-elect says that no steps on the project will be taken until after the first of the year. He was quoted recently in part as follows: "The loan was held up at my request. I want it to come up under the new Councils. The city solicitor called my attention to several legal points that are involved, and I asked Mr. Connelly to sidetrack the loan until these matters are straightened out. I went to be sure of my ground. The loan will go through, however, and all of the improvements planned will be amply provided for." It was expected that on Dec. 16 the loan bill would pass both chambers of Councils, that Mayor Blankenburg would sign it promptly and that the thirty-day period for advertising would be ended in time to hold a special election on Feb. 8.

Lehigh Valley Transit Company Increases Wages.—Announcement has been made that the board of directors of the Lehigh Valley Transit Company, Allentown, Pa., has granted an increase of wages to the trainmen in the employ of the company, effective on Jan. 1, 1916. The new schedule rate of wages will be as follows: Twenty-four cents an hour for first year men, 25 cents and hour for second year men, 26 cents an hour for third year men, 27 cents and hour for fourth year men, 28 cents an hour for the fifth year and thereafter to the fifteenth year and 29 cents an hour for the fifteenth year and thereafter. The old rate of pay ranged from 23 cents to 27 cents an hour, so that under the new schedule the men receive an increase of 1 cent an hour up to the fifteen year men, who are advanced 2 cents an hour. The increase also applies to the men on the Easton, Pa., and Phillipsburg, N. J., branches of the company, as well as on the Philadelphia division and the lines directly connecting these points. More than 300 men will share in the advance.

Charleston Arbitration Findings.—The board of arbitration selected to settle differences existing between the Charleston Consolidated Railway & Lighting Company, Charleston, S. C., and its trainmen relative to a new contract and increased wages has reached a decision. The old contract expired on Nov. 16. Representatives of the company and men were unable to agree on the terms of a new contract and the matter was submitted to a board of arbitrators consisting of B. F. McLeod, representing the company, and Frank Simmons, representing the carmen. R. G. Rhett was chosen as the third arbiter. By the terms of the new contract, some forty men in the employ of the company four or more years receive an increase of 3 cents an hour, getting 24 cents. Another forty men, who have been employed more than two years and less than four years, get an increase of 2 cents an hour, their pay being 22 cents. The men who have been with the company less than two years, are granted an increase of 1 cent an hour, their pay being 20 cents an hour. They number about sixty. Some thirty extra men employed as motormen and conductors also get an increase of 1 cent an hour, or 18 cents an hour. All are employed on a contract based on a nine-hour day. The decision of the board was unanimous.

PROGRAMS OF ASSOCIATION MEETINGS

Railway Business Association

The annual meeting of the Railway Business Association will be held at the Waldorf-Astoria Hotel, New York, N. Y., on Jan. 27, 1916. The sessions will be a business meeting at 11 a. m., election of officers 1.30 p. m. and dinner at 7 p. m. The program of speakers will be announced later.

American Economic Association

The twenty-eighth annual meeting of the American Economic Association to be held at Washington, D. C., Dec. 27-30. Among the many papers to be presented, the following are perhaps of greatest interest to readers of the ELECTRIC RAILWAY JOURNAL:

"Probable Changes in Foreign Trade of the United States Resulting from the European War," by Emory R. Johnson of the University of Pennsylvania.

"The Requisites for the Encouragement of the Investment of Foreign Capital," by William Straight, New York.

At the session on the afternoon of Dec. 29, Balthasar H. Mayer of the Interstate Commerce Commission will preside. The subject will be "Some Recent Tendencies in Economic Theory."

National Civic Federation

The annual meeting of the National Civic Federation will be held in Washington, D. C., on Jan. [illegible] 18 and 19, 1916. The annual dinner will take place at Hotel New Willard on Jan. 18. The general topics for discussion will be:

"The legal and moral obligations resting upon foreign-born citizens of the United States—those who have become naturalized citizens, and those who have taken steps to become citizens, as well as those engaged in labor or business here, but not intending to take out citizen's papers."

"The present and prospective effects of the war upon immigration to the United States, as it relates (1) to the wage-earner, (2) to industry, and (3) to the body politic; and what, if any, new legislation is required to deal with this problem."

Among the reports which will be made by special committees will be one giving an analysis of more than 100 profit-sharing plans now in operation in this country, as well as a description of many abandoned ones and the causes of their failure. A plan will be presented for the organization of a commission to study the question, "How far shall government in this country enter into private industry?" The industrial economics department will make a preliminary report on its survey of the social and industrial changes that have taken place in the United States during the last generation.

Pan-American Scientific Congress

The program of Section V, or that on engineering, of the Second Pan-American Scientific Congress, has just been published by the government. This congress will begin on Monday, Dec. 27, 1915, and will continue until Saturday, Jan. 8, 1916, and will be held in Washington, D. C. The engineering section is divided into six subsections, namely: civil engineering; marine engineering; electrical engineering; reclamation, sewage, and municipal water supply; mechanical engineering; standard surveys, parks, building, nomenclature. Among the papers of electric railway interest already announced are the following, all of which will be presented on Jan. 3:

"Electric Power Transmission and Distribution Systems," by Percy H. Thomas.

"Aluminum Conductors for Electric Transmission Lines," by Theodore Varney.

"Underground Cables," by H. W. Fisher.

"Electrification of Transportation Lines," by N. W. Storer.

On Jan. 4, Dr. E. B. Rosa, of the National Bureau of Standards, will present a paper on "Electrical Codes and Standards." On the evening of Jan. 6 it is expected that the president of the United States will address the members of the congress, and on the following evening there will be a reception to the members at the White House. On the evening of Jan. 8 a banquet will be extended to the members of the congress by the Secretary of State and by the United States delegates.

Financial and Corporate

ANNUAL REPORT

New York, New Haven & Hartford Railroad

The annual report of the New York, New Haven & Hartford Railroad for the year ended June 30, 1915, contains comparative statements of income, profit and loss for the various affiliated electric railways, as shown in the accompanying table. In the New York, Westchester & Boston Railway, which is held directly through the ownership of 98.4 per cent of the capital stock, the New York, New Haven & Hartford Railroad has an investment of $13,910,703, book value. The operating expenses and taxes of this electric line for the year ended June 30, 1915, were 109.93 per cent of the total operating revenues, a decrease of 29.80 per cent. The deficit in the profit and loss account as of June 30, 1915, was $4,257,874. The volume of business handled by this company is said to be increasing steadily, and it is expected that the earnings for the current fiscal year will be sufficient to pay operating expenses and taxes.

Other electric lines which are held directly through ownership of the entire capital stock by the railroad, but which under decree of the federal court must be disposed of on or before July 1, 1919, include the following: The Berkshire Street Railway, with a New Haven investment of $9,936,156; the Rhode Island Company, with a New Haven investment of $27,582,337; the New York & Stamford Railway, with a New Haven investment of $1,420,395, and the Westchester Street Railroad, with a New Haven investment of $1,237,426. The operating expenses and taxes of the Berkshire Street Railway for the last fiscal year were 90.88 per cent of the total operating revenues, an increase of 3.94 per cent. The deficit in the profit and loss account as of June 30, 1915, was $364,050. In the case of the Rhode Island company the operating expenses and taxes were 76.93 per cent of the total operating revenues, an increase of 4.49 per cent, and the credit to the profit and loss account was $1,360,932. For the New York & Stamford Railway the operating expenses and taxes were 80.71 per cent of the total operating revenues, an increase of 4.12 per cent, and the deficit in the profit and loss account amounted to $67,839. The operating expenses and taxes of the remaining company directly held, the Westchester Street Railroad, were 102.86 per cent of the total operating revenues, an increase of 10.07 per cent. The deficit in the profit and loss account totaled $56,798.

The New York, New Haven & Hartford Railroad also controls, though indirectly, the Connecticut Company, the entire capital stock being held by the New England Navigation Company. The entire investment of the railroad in this property amounts to $42,025,000. The company is likewise to be disposed of before July 1, 1919. The operating expenses and taxes of this railway during the year were 71.94 per cent of the total operating revenues, an increase of 0.61 per cent, and the credit to the profit and loss account as of June 30, 1915, was $1,016,886.

The report states that it will be necessary for the railroad to spend in the next few years $1,500,000 for electric equipment and facilities to get full benefit of the electrification between New York and New Haven.

TABLE SHOWING COMPARATIVE STATEMENTS OF INCOME, PROFIT AND LOSS FOR AFFILIATED ELECTRIC RAILWAYS OF NEW YORK, NEW HAVEN & HARTFORD RAILROAD FOR YEAR ENDED JUNE 30, 1915

	NEW YORK, WESTCHESTER & BOSTON RAILWAY		BERKSHIRE STREET RAILWAY		RHODE ISLAND COMPANY		NEW YORK & STAMFORD RAILWAY		WESTCHESTER STREET RAILROAD		CONNECTICUT COMPANY	
	1915	Change	1915	Change	1915	Change	1915	Change	1915	Change	1915	Change
Total operating revenues	$449,879	+$49,199	$951,196	−$43,269	$5,084,137	−$295,011	$376,083	+$4,621	$258,151	+$5,964	$7,960,820	−$124,578
Total operating expenses	379,034	−51,800	802,759	−8,683	3,438,274	−985	286,919	+19,630	254,387	+31,800	5,204,654	+18,774
Net operating revenue	$70,845	+$100,999	$148,437	−$34,586	$1,645,863	−$204,025	$89,164	−$15,009	$3,763	−$25,835	$2,756,166	−$143,352
Taxes	115,528	−13,523	61,679	+8,544	472,709	+15,171	16,616	−610	11,153	−272	522,228	−59,280
Operating income	†$44,683	+$114,522	$86,758	−$43,130	$1,173,153	−$309,196	$72,548	−$14,399	†$7,389	−$25,562	$2,233,937	−$84,072
Non-operating income	19,348	—10,808	1,671	−677	121,755	−22,903	460	+3	152	−53	275,503	+14,980
Gross income	†$25,335	+$103,714	$88,430	−$43,808	$1,294,909	−$332,099	$73,009	−$14,395	†$7,237	−$25,615	$2,509,441	−$69,091
Deductions from income	*1,424,362	+55,307	*206,520	+1,774	*1,410,337	+130,971	*95,051	+1,823	*16,106	+2,611	1,185,984	+108,524
Net income	†$1,449,697	+$48,407	†$118,090	−$45,583	†$115,428	−$463,071	†$22,042	−$16,218	†$23,343	−$28,227	‡$1,323,457	−$177,615

*1915 deductions from gross income include $1,368,065 and the 1914 figures include $1,298,396 for interest accruing to the New York, New Haven & Hartford Railroad, which was not included in the income account of that company. Similar items included for the other companies are as follows: Berkshire Street Railway, $118,000; Rhode Island Company, $199,617; New York & Stamford Railway, $22,000; and Westchester Street Railroad, $14,855.

†Deficit.

‡The Connecticut Company paid dividends of $400,000, a decrease of $1,100,000, and had a surplus of $923,457 for the year, an increase of $922,384.

CONNECTICUT COMMISSION REPORT

$416,418 Decrease in Electric Railway Operating Revenues for Year Ended June 30—Only One Operating Company Paid Dividend

According to the report of the Connecticut Public Utilities Commission for the year ended June 30, 1915, the total operating revenue of all street railways was $15,240,174, a decrease of $416,418. Every source of revenue showed a decrease for the year. Passenger revenue decreased $33,166, owing, it is thought, largely to the introduction of the jitney. While operating expenses increased $60,618, there was a decrease in expenses of conducting transportation of $111,113. The results of operation showed a decrease of $477,037 in operating income. These figures cover all companies reporting to the commission, including the Rhode Island Company, which operates largely outside the State. Of the total decrease in passenger revenue of $333,166 the decrease of the Rhode Island Company was $266,793, and of the total decrease of $416,418 in all operating revenue, that of the Rhode Island Company was $295,011.

By eliminating from the calculations the operating expense and revenue of the Rhode Island Company, there was a decrease in operating revenue of $121,407, an increase in operating expense of $59,632 and a net decrease in operating income of $181,039, applicable to the companies in Connecticut. There were 7,788,863 fewer fare passengers carried during the year than the previous year. Of these 5,222,029 passengers represent the decrease in those carried by the Rhode Island Company.

The total amount paid in dividends was $740,804, a decrease from the amount paid the year previous of $1,507,500. With the exception of the Bristol & Plainville Tramway the only companies that paid dividends were the ones that leased their lines and did not engage in street railway operation. Without the addition to its net earnings of $50,486 operating profit from its electric light and gas departments, this company would not have been able to pay a dividend from the result of its railway operation.

There was during the year a net addition to the investment in road and equipment, by all street railways, of $805,526, and a total addition on leased properties of $813,841. Of this latter amount $296,328 was expended by the Connecticut Company and the Shore Line Electric Railway, the balance being expended by the Rhode Island Company on its properties outside of Connecticut. At June 30, 1915, the total amount of capital stock issued and outstanding was $73,270,985, an increase of $137,600 for the year. The funded debt was $22,033,113, an increase of $980,034 for the year.

On June 30, 1915, the total mileage of single track operated in Connecticut was 828.18, and outside of Connecticut, 341.6. The total amount paid in salaries and wages to employees of street railways for the year was $6,403,696, and of this amount $4,099,463 was paid to employees of companies in Connecticut. For the same period the total number of employees was 5,390.

There are twenty-two street railways in Connecticut, nine of which are non-operating companies. During the year the Lordship Park Association, which operates a short line in Bridgeport, began service operation. On Nov. 11, 1914, The Danbury & Bethel Street Railway voted to acquire all the property, rights and contracts of the Bridgeport & Danbury Electric Railway, which was operating 5 miles of single track. Since that date this line has been operated by the former company.

UNITED RAILROADS NEW FINANCING

Commission Authorizes New Secured Notes to Redeem Bonds, but Company Must Produce Missing Books or Satisfy the Commission With Its Efforts

The California Railroad Commission has issued an order authorizing the United Railroads of San Francisco to issue $1,800,000 of 6 per cent promissory notes, and the subsidiary Market Street Railway to issue $1,800,000 of 5 per cent first mortgage bonds as security for the notes. The notes mature two years from date and may be sold any time before Oct. 15, 1916. The bonds are secured by a deed of trust, dated July 12, 1894, from the Market Street Railway to the Union Trust Company of San Francisco. The application to the commission was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 18.

The proceeds from the notes may be used only to buy and cancel not more than $1,800,000 of the remaining outstanding bonds of the Market Street Cable Railway. The original issue of the first mortgage 6 per cent gold bonds of this company in 1882 was $3,000,000, maturing in 1913. All but $1,800,000 of the issue has been paid, and the owners of the bonds to the latter amount have been demanding payment. The United Railroads of San Francisco said that it could postpone this payment until Oct. 15, 1916, by the promissory notes asked for, secured as above.

Neither bonds nor notes now authorized, however, may be issued until the United Railroads of San Francisco has produced the missing books of that company for 1907, 1908, 1909, 1910 and 1911, or has taken the necessary legal and other steps to secure the books to the satisfaction of the commission. Moreover, a stipulation must be filed with the commission that the net income of the company shall be applied or held to pay off the notes, as directed by the commission, and the commission will fix the selling price of the notes before the bonds are issued.

Authority was asked to issue bonds for $2,250,000, but the commission said that in view of the financial condition of the company insofar as it could be determined in the absence of the original books of account, it could not authorize an issue of bonds of the Market Street Railway in excess of the face of the notes. The commission drew attention to the fact that a number of additional obligations will shortly be payable. On Feb. 1, 1916, ten-year gold notes of the United Railroads of San Francisco of the face value of $1,000,000 will become due. On Dec. 31, 1916, $400,000 of bonds of the Ferries & Cliff House Railway are payable. The United Railroads of San Francisco owes the United Railway Investment Company $740,000, of which $555,000 was due in 1913. It was stated at the hearing before the commission that no arrangement had been made to pay these obligations or to pay the notes now authorized by the commission. B. S. Guiness, a New York banker representing the controlling interest in the properties, stated that he assumed a reorganization would be necessary to take care of the maturing obligations.

Referring to the absence of the books of the United Railroads of San Francisco, Mr. Guiness said that he had been for years a director of the United Railroads of San Francisco and allied companies and a partner of Ladenberg, Thalmann & Company, New York. He testified that he and those interested with him were unable to get the books from Patrick Calhoun. The commission stated, however, that these books were the property of the United Railroads of San Francisco and not Mr. Calhoun, and that it was not satisfied that the eastern owners of the company had made reasonable efforts to secure them. While it was not the function of the commission to indicate the precise means to secure these books, it expected the stockholders to use every effort in their power, both legal and otherwise, to procure the books and return them to California.

It is reported that as a result of later action the commission changed the order that the United Railroads of San Francisco take "necessary" steps to secure the missing books to an order that it make a "reasonable" effort to produce these books. Thereupon a syndicate composed of E. H. Rollins & Sons, Boston, the Anglo & London Paris National Bank, San Francisco, and Ladenburg, Thalmann & Company, New York, gave out that a satisfactory arrangement had been made with the company for the payment of $1,800,000 of bonds due on Dec. 15 or for a ten months' extension of the bonds, optional with the bondholder. The changed wording, it is reported, will make possible the issuance of notes totaling $1,800,000 at any time within the next ten months. Within that time, it is presumed, the company will make a "reasonable" effort to produce the missing books. In view of the short time intervening between the issuance of the commission's order and the maturity of the bonds now due, it was decided by the syndicate to extend the time for payment to Oct. 15, 1916, semi-annual interest at the coupon rate to be paid meanwhile.

POLICY OF EMPIRE UNITED RECEIVERS

Will Run Line at Lowest Cost Consistent with Safety—Announcements by Bondholders' Committee Regarding Deposits and Reorganization Plan

H. S. Holden and C. Loomis Allen, receivers of the Empire United Railways, Inc., Syracuse, N. Y., have issued a formal statement in response to requests concerning their policy and the future of the property after receivership. This follows in part:

"With reference to the operation we desire to say that it will be the policy of the receivers to operate the property for the lowest cost possible, consistent with safe and convenient service to the people who are dependent upon the company for transportation.

"It is not possible to answer the second query at this time. Information has been asked and is being prepared in reference to the last five years' history of operation. This includes a statement of earnings and payments from earnings for salaries, labor and materials used in operating the railways, taxes and interest upon bonds, notes and other obligations. As soon as we have received this information, a careful study of this history will be made, and with this history in mind, as a guide, a conservative estimate of the earnings as well as the cost of operating the property in the future will be formed.

"Until this study has been made the receivers ask the traveling public and the owners of all securities to suspend their judgment and withhold action, with the assurance on the part of the receivers that there is but one motive actuating them in the management of the property, namely, to render the necessary service as economically as possible and to conserve to the utmost degree the interests of all parties who put cash into the enterprise and make the enterprise possible."

The committee for first mortgage 5 per cent. bonds of the Rochester, Syracuse & Eastern Railroad has announced that more than a majority of the outstanding bonds have been deposited, and that after Dec. 31 bonds will be received only upon compliance with such additional conditions as may be imposed by the committee. Arthur W. Loasby, president Trust & Deposit Company of Onondaga, Syracuse, a depositary, is chairman of the committee.

It has also been announced that the committee is not inclined to favor any plan of reorganization or of readjustment which contemplates, as the proposed plan does, not only a sacrifice of the interests of the first mortgage bondholders, but a continuance of the present management of the property. It is said that the committee has been and is of the opinion that no plan which would in any way change the status or obligation of the Rochester, Syracuse & Eastern Railroad bonds can be intelligently considered until definite information as to the receipts and disbursements of the property covered by the mortgage has been secured. The committee says that it has requested C. Loomis Allen as co-receiver to institute a system of bookkeeping which will show exactly the earning capacity of the Rochester, Syracuse & Eastern property, and that he has agreed. When this information is furnished, the preparation of plans of readjustment may be considered, if readjustment is shown to be necessary. The proposed plan above referred to was published in the ELECTRIC RAILWAY JOURNAL of Dec. 11.

American Cities Company, New York, N. Y.—Francis T. Homer and T. H. Tutwiler have been elected directors of the American Cities Company.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—George D. Crofts, Buffalo, N. Y., has been appointed referee in the foreclosure action brought by the New York Trust Company, New York, against the Buffalo & Lake Erie Traction Company and its leased lines. The appointment of a receiver for the company was noted in the ELECTRIC RAILWAY JOURNAL of July 17. Referee Crofts has been directed to compute the amount due on the mortgage sought to be foreclosed, together with the amount of interest unpaid; to take proof of all property covered by the mortgage and subject to its lien and to take proof whether the property should be sold in one parcel or in separate parcels. The company defaulted the Nov. 1, 1912, interest payment on the $7,066,000 of first and refunding mortgage twenty-year 5 per cent bonds outstanding under its $12,000,000 mortgage to the New York Trust Company, dated Nov. 1, 1906, and it has continued to default up to and including Nov. 1, 1915. The present proceedings and the appointment of the referee to take testimony are said to mark the beginning of the end of the foreclosure action.

Choctaw Railway & Lighting Company, McAlester, Okla.—C. N. Mason, chairman of the bondholders' committee of the Choctaw Railway & Lighting Company, has announced that 90 per cent of the bondholders are prepared to begin foreclosure of the mortgage securing the first mortgage bonds and that the same percentage of bonds has been deposited with the Guaranty Trust Company, New York. The appointment of receivers for this company was mentioned in the ELECTRIC RAILWAY JOURNAL of Oct. 30.

Detroit (Mich.) United Railway.—William A. Read & Company, New York, has sold at 100 and accrued interest the $3,500,000 of collateral trust 5 per cent gold notes of the Detroit United Railway recently authorized by the Michigan Railroad Commission, as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 18.

Northampton Traction Company, Easton, Pa.—The Pennsylvania Public Service Commission has approved the merger of the Northampton Traction Company and the Bangor & Portland Traction Company, Bangor, Pa., under the name of the former. The Northampton Traction Company operates 25 miles of single track between Easton and Bangor, with direct connection for the Delaware Water Gap and Stroudsburg, while the Bangor & Portland Traction Company has 8.75 miles of single track between Bangor and Portland. As a result of the present merger a new line will be run from Wind Gap to the Delaware Water Gap, and Saylor's Lake will be purchased and turned into a summer resort, the sum of $500,000 being involved. The new line will connect at Stroudsburg with the Stroudsburg Passenger Railway, which, it is said, will be absorbed, and will be built through Kellersville to Saylor's Lake, thence to Saylorsburg and over to Wind Gap. It is hoped to begin work by June 1.

Portland & Oregon City Railway, Portland, Ore.—The Portland & Oregon City Railway recently received permission from the City Council to give a mortgage to the Security Savings & Trust Company for $350,000 to cover the 16-mile line being built between Oregon City and Portland. This permission was required by the terms of the company's franchise. As noted in the ELECTRIC RAILWAY JOURNAL of Dec. 18, this company has begun operations between Milwaukee and Carver, and it is expected that the line will be completed to Portland by Jan. 10.

Public Service Corporation of New Jersey, Newark, N. J.—The directors of the Public Service Corporation of New Jersey have voted to put the stock of the corporation on a 7 per cent basis instead of 6 per cent as it has been for several years. A dividend of 1¾ per cent for the quarter ending Dec. 31 was declared, this action having been taken after it was shown that the amounts set aside for amortization were very liberal, and the surplus account was in a very satisfactory condition.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The California Railroad Commission has authorized the San Francisco-Oakland Terminal Railways to issue one-day six per cent promissory notes for not more than $218,459, and general lien bonds of a face value of $337,000 as collateral security therefor.

Second Avenue Railroad, New York, N. Y.—Justice Whitaker of the Supreme Court on Dec. 21 signed an order permitting settlement of the claims of the Second Avenue Railroad against the old Metropolitan Street Railway on the basis of an agreement reached between the late George W. Linch, receiver of the former company, and the New York Railways, successor to the latter company. The agreement has been concurred in by John Beaver, the new receiver, and the New York Railways. The agreement provides for the payment of $548,352 to the Second Avenue Railroad, the money to be turned over to the court and used in paying off the company's indebtedness. The payments cover three claims: damages of $111,737 for a breach of lease, the amount being fixed by the federal courts; a similar claim for $594,727, which was compromised for $267,627 or 45 per cent of the claim, and a claim of $168,988, based on an inter-receivership accounting. It was said that the money to be paid would enable the Second Avenue Railroad to clear off all indebtedness and assist it in developing the property. Individual damage claims against the corporation have been settled for a total of $66,000.

Springfield & Xenia Railway, Springfield, Ohio.—The Springfield & Xenia Railway has declared a dividend of 3 per cent on common stock, payable on Dec. 20 to holders of record on Dec. 15. This payment is the same as that made in 1914, but is an increase of 1 per cent over the 1913 payment.

Toronto (Ont.) Railway.—William A. Read & Company, New York, recently purchased and sold on a 4.875 basis $500,000 of 6 per cent gold notes of 1914 of the Toronto Railway, due on Dec. 1, 1916, and on a 5.5 basis $250,000 of the notes due on Dec. 1, 1917. These $750,000 of notes are redeemable at 102½ and interest on any interest date on thirty days' notice. They are part of an authorized issue limited to $2,000,000, and are issued for refunding a like amount due on Dec. 1, 1915, which, together with $750,000 due in 1916, were originally issued in 1914 for financing extensions and improvements of the business and properties of the Toronto Power Company, Ltd., which indorses them. The Toronto Railway covenants not to issue any bonds or other funded debt while any of these notes remain unpaid, without applying the proceeds to their redemption.

York (Pa.) Railways.—The Philadelphia Stock Exchange has listed $546,000 of additional first mortgage thirty-year 5 per cent gold bonds, due in 1937, of the York Railways, making the total $4,271,000. The added bonds cover the following: $94,000 for railway extensions, improvements and equipment; $137,000 for acquiring or building a power plant, and $315,000 for purchasing $124,500 out of $150,000 bonds and the entire 100 shares of stock of the Merchants' Electric Light, Heat & Power Company. This company last July was consolidated with the Edison Light & Power Company, which had previously been formed to take over the lighting and power subsidiaries of the York Railways and several other similar properties. Of the $1,301,000 of capital stock of the Edison Light & Power Company, $1,300,950 is owned by the York Railways and deposited as collateral under its mortgage.

DIVIDENDS DECLARED

Asheville Power & Light Company, Asheville, N. C., quarterly, 1¾ per cent, preferred.

Bangor Railway & Electric Company, Bangor, Me., quarterly, 1¾ per cent, preferred.

California Railway & Power Company, San Francisco, Cal., quarterly, 1¾ per cent, prior preferred.

Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred.

Charlottesville & Albermarle Railway, Charlottesville, Va., semi-annual, 3½ per cent, preferred.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Columbus (Ga.) Electric Company, 3 per cent, preferred.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1 per cent, prior preference; quarterly, 1½ per cent, preferred, Series A.

Consolidated Traction Company of New Jersey, Newark, N. J., 2 per cent.

Eastern Texas Electric Company, Beaumont, Tex., 3 per cent, preferred.

Germantown Passenger Railway, Philadelphia, Pa., quarterly, $1.31¾.

Illinois Traction System, Peoria, Ill., quarterly, 1½ per cent, preferred.

Monongahela Valley Traction Company, Fairmont, W. Va., 1 per cent, common.

New England Investment & Security Company, Springfield, Mass., $2, preferred.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., quarterly, 1½ per cent, common.

Reading (Pa.) Traction Company, 1½ per cent.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, $3.

Springfield & Xenia Railway, Springfield, Ohio, 3 per cent, common.

Stark Electric Railroad, Alliance, Ohio, quarterly, three-fourths of 1 per cent.

Union Passenger Railway, Philadelphia, Pa., $4.75.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., quarterly, 1½ per cent, preferred.

Washington Water Power Company, Spokane, Wash., quarterly, 1¼ per cent.

West Philadelphia (Pa.) Passenger Railway, $5.

Youngstown & Ohio River Railroad, Leetonia, Ohio, quarterly, 1¼ per cent, preferred; extra, one-fourth of 1 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct.,	'15	$18,097	*$9,670	$8,426	$2,204	$6,222
1 " "	'14	15,609	*9,066	6,543	2,058	4,485
12 " "	'15	187,957	*109,873	78,084	25,674	52,410
12 " "	'14	177,859	*114,230	63,629	25,115	38,514

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., Oct.,	'15	$9,406	*$7,856	$1,520	$1,106	$444
1 " "	'14	9,825	*9,074	751	1,143	†392
12 " "	'15	115,317	*97,163	18,154	13,563	4,591
12 " "	'14	120,990	*101,274	19,716	12,963	6,753

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., Oct.,	'15	$34,152	*$16,891	$17,261	$6,505	$10,656
1 " "	'14	30,751	*18,524	12,227	6,513	5,714
12 " "	'15	347,773	*205,637	142,136	79,289	62,847
12 " "	'14	361,073	*210,207	150,866	76,649	74,217

COLUMBUS (GA.) ELECTRIC COMPANY

1m., Oct.,	'15	$67,215	*$28,136	$39,079	$28,730	$10,349
1 " "	'14	63,890	*27,901	35,989	28,849	7,140
12 " "	'15	706,911	*324,245	382,666	344,769	37,897
12 " "	'14	674,156	*285,260	388,896	317,111	71,785

DALLAS (TEX.) ELECTRIC COMPANY

1m., Oct.,	'15	$185,200	*$104,825	$80,375	$33,923	$46,452
1 " "	'14	200,503	*105,502	95,001	33,355	61,646
12 " "	'15	1,865,517	*1,112,210	753,307	401,412	351,895
12 " "	'14	2,244,336	*1,330,124	914,212	357,555	556,657

EASTERN TEXAS TRACTION COMPANY, DALLAS, TEX.

1m., Oct.,	'15	$71,665	*$35,193	$36,472	$8,716	$27,756
1 " "	'14	56,351	*34,272	22,079	8,601	13,478
12 " "	'15	694,754	*380,106	314,648	105,055	209,593
12 " "	'14	660,661	*401,919	258,742	100,747	‡166,198

EL PASO (TEX.) ELECTRIC COMPANY

1m., Oct.,	'15	$84,808	*$43,932	$40,876	$4,202	$36,674
1 " "	'14	88,976	*49,184	39,792	4,186	35,606
12 " "	'15	967,036	*515,683	451,353	50,371	400,982
12 " "	'14	1,030,175	*578,331	451,844	51,492	400,352

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m., Oct.,	'15	$174,259	*$103,652	$70,607	$36,124	$34,483
1 " "	'14	189,702	*106,339	83,363	36,208	47,155
12 " "	'15	1,992,280	*1,199,804	792,476	432,962	359,514
12 " "	'14	2,451,767	*1,342,982	1,108,785	441,278	667,507

JACKSONVILLE (FLA.) TRACTION COMPANY

1m., Oct.,	'15	$51,338	*$35,895	$15,443	$14,735	$708
1 " "	'14	56,745	*39,062	17,683	12,561	5,122
12 " "	'15	617,723	*431,913	185,810	174,676	11,134
12 " "	'14	728,952	*476,284	252,668	152,498	100,170

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*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

MR. BRUSH ON BOSTON TRANSFER ABUSES

He Discusses the Transfer Problem in Its More Important Phases for the Massachusetts Commission

Matthew C. Brush, second vice-president of the Boston (Mass.) Elevated Railway, addressed the Massachusetts Public Service Commission at a hearing on Dec. 20, upon transfer abuses in Boston. Mr. Brush was before the board relative to the petition of the Roxbury Board of Trade for the institution of transfer checks at Dudley Street station. The company opposed the extension of the paper transfer system now in use on the ground that it is subject to enormous abuses, and pointed out that contemplated changes at Egleston Square station should be given a trial before changing the practice at Dudley Street.

Mr. Brush's discussion of the general transfer situation at Boston resulted from a request by Commissioner Meany that the larger phases of the question be set forth. Mr. Brush said that the company had 109 free transfer points where checks were used; that about 100,000,000 free transfers were issued annually, and that the number issued was growing at the rate of 10 per cent a year. Many transfers were issued improperly and used fraudulently daily. The company held that it had no more right to accept these transfers as fares than it had to honor lead nickels, but that it is absolutely helpless before the mass of transfers received. Mr. Brush considered it impossible to design a satisfactory transfer check for a large city system. An immense additional staff of employees would be required merely to examine the checks issued daily to see if they were correctly used. All the company could do was to take the checks and pocket the loss.

Describing the prevailing transfer abuses, Mr. Brush said that in one recent case it was found that a transfer was issued in a saloon with every drink, and in another case a passenger on the station platform at Northampton Street mingled with the crowd and secured five checks which he sold to confederates on the street below at 1 cent apiece. Faults in issuing and punching checks and many other evils in their train were outlined. One hundred and thirty boys have been arrested recently at the Dover Street elevated station for the fraudulent use of transfers. It had been impossible to tabulate the losses, but in a recent study of transfers issued and received in one day 64 per cent were found to be incorrect as to destination. On Nov. 29 the company received 340,000 checks. At Central Square, Cambridge, 4808 outward checks were received from surface cars to subway trains. Only 36 per cent of these were correctly punched as to destination. There were 11,554 free transfers accepted that day at the same station for transportation in the opposite direction, and of these only 9564 would legally entitle the holders to ride on toward Boston, had they been carefully inspected. On this date 5049 of the Central Square transfers were not properly acceptable as fare on account of the destination punched, and how many were fraudulent or otherwise inaccurate the company had not determined. How many were improper as to hour of usage, with the possibility of being accepted on the homeward trip at night though issued in the morning could never be determined. Some conductors were issuing transfers to persons not entitled to receive them; some issued for illegal trips, but whether they were issuing them in ignorance, carelessness or with intent the company could not attempt to prove in all cases. Conductors who accepted the slips did not have sufficient time to determine their legality.

At Central Square, in Cambridge, 14,000,000 transfers were made yearly; at Northampton Street station, 7,400,000; at Dover Street, 7,000,000; at Brookline Village, 5,082,000; at Massachusetts Avenue, Boston, 4,800,000; at Kendall Square, 4,800,000; at Dorchester Avenue, 4,703,000, and at Dudley Street, 57,000,000. To get away from the transfer difficulty the company has established a considerable number of prepayment areas where checks were not required, and where transfers could be effected with far greater safety than in congested streets. In conclusion, Mr. Brush said that if twenty such areas could be established the company could do away with about 70,000,000 of the checks at present annually used, and the remaining 30,000,000 could be handled with fair accuracy. Larger checks could be issued, with less reading matter, thus facilitating checking.

Chairman McLeod closed the hearing with the statement that while the commission in general favored the system of transferring without checks, each case must be considered on its merits.

MASSACHUSETTS COMMISSION DECLARES ITS JURISDICTION IN BAY STATE FARE CASE

The full board of the Massachusetts Public Service Commission has ruled that it has jurisdiction in the Bay State Street Railway fare case and has decided to admit the testimony of the company's witness, Robert M. Feustel, of Sloan, Huddle, Feustel & Freeman, Madison, Wis., relative to the valuation of the company's property, presented at recent hearings. Mayor William M. Blakeley, of Walden, Mass., president of the Massachusetts Municipal Officers' Association, had asked the commission to dismiss the Feustel testimony. He raised the point that the board had no jurisdiction in view of the interstate service performed on certain of the company's lines. The commission points out that it would not be in the public interest at this time to restrict the scope of the inquiry by prescribing narrow and arbitrary rules regulating the methods of valuation, as a basis for the presentation of evidence. It states that the proposed changes in passenger fares and fare limits are intended, with certain possible and unimportant exceptions, to apply to transportation services to be performed by the carrier exclusively within the State, and that the board therefore considers it has jurisdiction in the case.

REMOVAL OF STANDING VEHICLES URGED

In an advertisement appearing in all the local newspapers on Dec. 9, 1915, the Chicago (Ill.) Surface Lines urged the discontinuance of the storage of vehicles along the streets in the loop district. The advertisement was published under the title, "For Storage or for Service?" The text of the advertisement was as follows:

"A large part of the area of the loop streets is now used for the storage of automobiles. This practice is a survival of the old 'hitching post' days. It forces heavy trucks and other vehicles to use the car tracks, and causes congestion and confusion. The entire width of narrow streets should be used for traffic purposes. This would be of special benefit to the hundreds of thousands who use the street cars every day. These hundreds of thousands are delayed and often seriously inconvenienced by the congestion caused by the storing of vehicles in narrow streets. Present conditions are out of date and should be corrected. This problem can best be solved by those who drive automobiles. Their slight personal convenience causes the serious inconvenience of the great majority who do not drive automobiles. The narrow loop streets should be reserved for service, not for storage."

DECISION IN COVINGTON OVERCROWDING CASE

Judge Harbeson in the Kenton Circuit Court at Covington has upheld the ordinance authorizing the chief of police of the city to "arrest" street cars which are overcrowded. The ordinance was enacted in 1910 and has been in litigation since. The course of the case has taken the measure through the Kentucky courts and on to the Supreme Court and back again to the Kenton Court for final judgment. The ordinance provides that each overcrowded car constitutes an offense, punishable by a fine of not less than $50 nor more than $100, each day's overcrowding to constitute a separate offense. The entrance and exit platforms must be kept free and open so that passengers can pass in or out without crowding, while persons refusing to vacate these spaces may be found guilty of misdemeanors and fined from $5 to $50.

The City Commission has instructed the safety commissioner to enforce all the valid provisions of the ordinance and calls on citizens to assist in assembling data for use in prosecutions. It is provided that any police officer guilty of ignoring violations of the ordinance, or who is reported to the safety commissioner for having done so, shall be suspended for thirty days on the first offense and dismissed from the service for the second. Four plain clothes men were immediately detailed by Chief of Police Schuler and the result of the first day's observations was eight cases of alleged overcrowding of cars of the South Covington & Cincinnati Traction Company.

These eight cases, however, were continued when the company stated that it would immediately comply with the terms of the ordinance and that it had not been advised of the final step in the case in time to get ready before proceedings were begun. Extra cars will be put on during rush hours and other provisions made to live up to the letter of the ordinance.

One-Man Cars and Near Side Stops in Pine Bluff.—The Pine Bluff (Ark.) Company has increased the number of cars in operation and has gone over to the one-man system. Stops are now made on the near side.

Passaic Fare Hearing on Jan. 19.—The Board of Public Utility Commissioners of New Jersey had set Jan. 19, at Newark, as the time for hearing the appeal of the city of Passaic against the Public Service Railway. The city wants a 5-cent fare from the Garfield bridge to the Essex County line.

Crusade Against Spitters.—An extra force of inspectors of the Louisville health office, armed with pink cards which contain statements as to the penalty for spitting in public places, has been assigned to duty and is paying special attention to the evil on the street cars. Volunteer inspectors have been supplied with the cards. The pink cards are in the way of warning. It is believed that they are accomplishing results.

Supreme Court Upholds Wichita Jitney Ordinance.—The Supreme Court of Kansas has upheld the ordinance of Wichita taxing jitneys. This measure contains a section which assesses an excess license of $300 to $400 a year on motor buses that operate on designated streets. The streets designated were those on which there are street railway lines. The court said that the requirement of an additional license from motor buses using specified streets was a valid exercise of municipal control, and that conferring a benefit on the street railway by such regulations did not constitute a reason against such right.

Trial Before County Court for Failure to Meet Commission Requirement.—John J. Dempsey, superintendent of transportation of the elevated lines of the Brooklyn (N. Y.) Rapid Transit Company, will be tried in the County Court on the charge of failing to obey an order issued by the Public Service Commission. Justice Aspinall denied his motion to have the case removed to the Supreme Court for trial. The court said: "The offense charged is a simple misdemeanor, and while the questions of law which will undoubtedly be raised at the trial by counsel for the defendant may be new and novel, I have been unable to find any sufficient reason to magnify the importance of this case so as to justify its removal."

Increase in Fare Denied in New Jersey.—The Board of Public Utility Commissioners of New Jersey has refused the request of the New Jersey & Pennsylvania Traction Company for permission to substitute a 25-cent fare for the present rate of 15 cents between Trenton and Princeton. About two years ago the board permitted the company to increase the fare from 10 to 15 cents between the terminals with corresponding increases for travel between intervening points. About a year ago the company inaugurated an improved service which, while increasing platform expense, has resulted in an increase of revenue. The board said it had not yet been demonstrated whether this added revenue will not afford the company the additional returns to which it is reasonably entitled.

Municipal Railway Exposition Service Withdrawn.—Fifty crews have been taken from service on the San Francisco (Cal.) Municipal Railway as a result of the closing of the exposition, and the running schedules of six of the eight lines have been cut down to comply with reduced traffic demands. The only line actually discontinued is the "D" blue line route, turning from Van Ness Avenue west in Chestnut Street. The "D" red line cars will continue to run from Van Ness Avenue in Vallejo, Franklin, Union, Steiner,, Greenwich and Scott Streets, returning over the same route. A. J. Cashin, superintendent of the railway, has announced that the "J" line, running from the Ferry out Columbus Avenue to Van Ness Avenue and thence along Chestnut Street to Scott Street, will be continued so long as it will pay operating expenses.

Decrease in Fatal Accidents in New York.—The Public Service Commission for the First District of New York has prepared a summary of the reports of accidents on railroads and street railroads for the month of November, 1915. It shows a total of 5046 accidents against 4726 in November, 1914. The number of serious accidents, however, decreased from 184 in November, 1914, to 134. The fatalities were twenty-two in November of this year against eighteen in November of last year. The total number of passengers injured was 2087 against 1954 in November last year; employees, 896 against 757; all other persons, 374 against 442—a total of persons injured of 3357 against 3153 in the same month last year. Of the total number of accidents, namely, 5046, 3430 took place on surface lines; 1011 on subway and elevated lines; 582 on railroad trunk lines; eighteen on railroad terminal lines, and five on omnibus lines.

Illinois Traction Makes New Agreement.—Negotiations leading to a new two-year contract with its trainmen have been consummated by the Illinois Traction System, Peoria, Ill. Effective on Dec. 1, 1915, a nine-hour minimum day, or 200 miles was fixed for passenger crews. Runs in excess of 200 miles are to be figured at the rate of 22.2 miles per hour, for which 1¼ cents per mile of excess will be paid the first year of the contract and 1½ cents per mile of excess will be paid the second year of the contract. Trainmen in order to obtain any excess pay or be paid on a mileage basis, must run at a speed to exceed 22.2 miles per hour while on duty. In other words, a train crew running 250 miles in ten hours will be paid for ten hours at 33 cents, or 222 miles, and in addition will receive 1¼ cents per mile for the additional 28 miles. In reality, under the new agreement, this gives an increase in the rates paid.

Near-Side Stops in Atlanta.—The traffic ordinance recently passed by the City Council of Atlanta, Ga., prohibits street cars from stopping on the far side of street crossings. This means that in the downtown section, where cars heretofore have been stopping on both the near and far sides of the street, they will hereafter stop only on the near side. The only exception which the ordinance makes to this general rule is that north-bound cars on Peachtree Street shall stop at the northeast corner of Peachtree Street and Edgewood Avenue, and shall not stop on Peachtree Street between Decatur Street and Edgewood Avenue. The ordinance further provides that the north-bound cars on Peachtree Street shall not stop at Walton Street. Where cars turn from one street into another, they will stop at the beginning of the curve, but not at the end of the curve, as they have been accustomed to do in some instances heretofore. The changes are being explained to its patrons by the Georgia Railway & Power Company in advertisements displayed prominently in the local papers in Atlanta.

Report to Commission on Storm Service.—The Public Service Commission for the Second District of New York on Dec. 16 made public the report of Charles R. Barnes, its electric railway inspector, on the manner in which some of the electric railways in Albany and vicinity met the storm of Dec. 13 and 14. The report is complimentary to most of the companies, especially to the United Traction Company, Albany, where the heavier plows and sweepers, ordered by the commission last year, kept the lines open throughout the storm with one or two slight exceptions. Mr. Barnes said that the Schenectady Railway lines, both urban and interurban, were all open to traffic by 9 a. m. on Dec. 14, though some of the service was very irregular. Some of the lines were closed from 4 a. m. to 9 by the drifts. The Albany Southern Railway got its last car through on the night of Dec. 13, but the first car from Hudson on the morning of Dec. 14 did not arrive at Albany until 10 a. m. Mr. Barnes says the Albany Southern Railway used modern and efficient snow-fighting apparatus in reasonable amount. The Hudson Valley Railway kept all its lines open. All of the lines of the Syracuse-Utica division of the New York State Railways were kept open.

Personal Mention

Mr. Bion J. Arnold, Chicago, has been decided upon by the Syracuse Grade Crossing Commission as an expert to examine, criticise and report on the plans adopted by the commission for the elimination of grade crossings in Syracuse, N. Y.

Mr. Clinton L. Rossiter, formerly president of the Brooklyn (N. Y.) Rapid Transit Company, has been elected a director and vice-president of the Underwood Typewriter Company to succeed the late Charles W. Hand. Mr. Rossiter, who has been vice-president of the Brooklyn Trust Company, has resigned as an official of that company, but will continue to serve as a trustee.

Mr. Oliver H. Hughes has resigned as a member of the Public Utilities Commission of Ohio. Mr. Hughes has been a member of the Utilities Commission, or the Railroad Commission, its predecessor, for ten years. He was appointed on the Railroad Commission by Governor Harris in 1905, after he had served about six months as adjutant general as an appointee of Governor Pattison.

Mr. G. B. Powell, superintendent of the employment department of the Louisville (Ky.) Railway, who attended the Panama-Pacific Exposition at San Francisco and visited other cities of the West, is relating his experiences in a continued story in *Trolley Topics*, which is published by the company. Of special interest is his reference frequently to electric railway conditions in the cities he visited and his presentation of the handicaps under which trainmen in these cities work.

Mr. A. W. Brohman has been appointed division superintendent to handle both the Kentucky and the Twenty-fourth and Utah divisions of the United Railroads, San Francisco, Cal., succeeding the late A. J. Reglin on the Twenty-fourth and Utah Division. Mr. Brohman entered street railway work in 1891. His first service was with the North Jersey Street Railway, now included in the system of the Public Service Railway, Newark, N. J., but his main activity has been in San Francisco, where he has risen from the platform to the position that he now holds.

T. A. WRIGHT

Mr. Thomas Allen Wright, who was elected president of the Pennsylvania Street Railway Association at the recent meeting in Scranton, has been general manager of the Wilkes-Barre & Wyoming Valley Traction Company since 1899 and of the Wilkes-Barre Railway since its lease of the former. Mr. Wright was born in 1863 in Quakertown, Pa., of Quaker parentage. His mother died when Mr. Wright was three years of age. In 1869 he went to Wilkes-Barre with his father. Later he returned to Quakertown and lived on a farm. In 1880 he entered Wyoming Seminary and Business College to study engineering. After he completed his schooling Mr. Wright turned his attention to railroad work and assisted in the survey of the Harvey's Lake Branch Railway at Wilkes-Barre. In 1892 he entered upon the survey of the present street railway system of Wilkes-Barre. In 1897 he was made manager of the maintenance of way department, and two years later was appointed general manager of the entire street railway system at Wilkes-Barre, consisting of nearly 100 miles of track, all of which was surveyed, constructed and brought to its present high standard of excellence under his immediate direction. When local interests in Wilkes-Barre took over the Wilkes-Barre & Wyoming Valley Traction Company in 1910 under the name of the Wilkes-Barre Railway, Mr. Wright was elected vice-president in addition to general manager. In all he has been identified with the upbuilding and development of the Wyoming Valley for more than thirty years.

Mr. O. H. Simonds, the new president of the Mississippi Electric Association, is the manager of the Vicksburg Light & Traction Company. Mr. Simonds was graduated from Cornell University in 1908, and was connected with the Duluth office of the General Electric Company on construction work, and later with the Great Northern Power Company, Duluth. He then went to the Chicago office of the General Electric Company and made a special study of central station design and operation, and later entered the engineering department of Elston, Clifford & Company, Chicago. In April of this year he was appointed general manager of the Vicksburg Light & Traction Company. While in Vicksburg he has devoted considerable interest to work along local civic lines, and last summer he was elected president of the Young Men's Business Clb of Vicksburg.

OBITUARY

Jacob Mandelbaum, of the firm of Mandelbaum, Wolf & Lang, Cleveland, Ohio, died in Cleveland on Dec. 16. Through this firm Mr. Mandelbaum was interested in the Western Ohio Railway and a number of other electric railways. He was well known in Cleveland for his philanthropic work. Mr. Mandelbaum was born in Bavaria more than eighty years ago. He had been a resident of Cleveland more than sixty-two years. His family consists of one son, M. J. Mandelbaum, and two daughters.

William C. Andrews, advertising manager of the Edison Storage Battery Company, Orange, N. J., died suddenly in New York on Dec. 21 from an overdose of strychnine taken by mistake. Mr. Andrews was forty-two years old. He was graduated from Columbia University and was an instructor there for a time. He was subsequently connected with the editorial staff of the ELECTRIC RAILWAY JOURNAL and later was with the Stanley Electrical Instrument Company, first at Schenectady, N. Y., and then at Harrison, N. J. He is survived by his widow and two children.

Charles D. McKelvey, chief inspector of the railroad division of the Board of Public Utilities Commissioners of New Jersey and for many years superintendent of the New York, Susquehanna & Western Railroad, is dead. Mr. McKelvey was born in Orange County, N. Y., seventy years ago. He entered railroad service as a brakeman. After his retirement from the New York, Susquehanna & Western Railroad he became a member of the finance committee of Paterson, N. J., and still later a member of the Board of Public Works for that city. In 1910 he became connected with the Public Utilities Commission.

Robert Coddington Brewster, connected for many years with the street railways of Philadelphia, Pa., died on Nov. 13, 1915, in his eighty-first year. Mr. Brewster was born in Rahway, N. J., and was prominent in banking and other business circles there for many years. In 1885 he became connected with the banking firm of L. H. Taylor & Company, Philadelphia, Pa., and soon after that was made secretary and treasurer of the Frankford & Southwark Passenger Railway, known as the Fifth and Sixth Streets line. As the Fifth and Sixth Streets line and the other lines with which he was associated were absorbed by the Philadelphia Electric Traction Company, the Union Traction Company and the Philadelphia Rapid Transit Company, Mr. Brewster's services and intimate knowledge of the early history of railroading in Philadelphia continued to be in demand until his voluntary withdrawal from the companies three years ago on account of advancing age.

Calvin G. Goodrich, president of the Twin City Rapid Transit Company, Minneapolis, Minn., and the Duluth-Superior Traction Company and the Duluth (Minn.) Street Railway, died on Dec. 21. He had been connected with the Minneapolis system for thirty-eight years. Mr. Goodrich was born in Oxford, Ohio, on March 12, 1856. When twenty-one years of age, on the invitation of the late Thomas Lowry, long president of the Twin City Rapid Transit Company, Mr. Goodrich entered the service of the Minneapolis Street Railway as auditor, and for a long time he was the only man in the accounting offices. On July 2, 1878, he was elected secretary of the company, and on July 10, 1880, a director. On Aug. 14, 1883, Mr. Goodrich was appointed superintendent of the company, and shortly afterward, general manager. On June 12, 1886, he was elected vice-president and general manager of the company, resigning the office of secretary. Later, with Mr. Lowry and Mr. Clinton Morrison, he secured control of the St. Paul City Railway, and assumed the management of the property. When the Minneapolis and the St. Paul systems were merged as the Twin City Rapid Transit Company, on June 5, 1891, Mr. Goodrich retained the title of vice-president and general manager of the consolidated company. Later he was elected vice-president and managing director of the company. In March, 1909, after the death of Mr. Lowry he was elected president of the company to succeed Mr. Lowry. Mr. Goodrich was elected president of the American Street & Interurban Railway Association, now the American Electric Railway Association, in 1908, and previously had served as first and second vice-president.

John Graham, formerly connected with the electric railways in Wilkes-Barre, Pa., Bloomington, Ill., and Huntington, W. Va., died at the Johns Hopkins Hospital in Baltimore, Md., on Dec. 15. Mr. Graham was born near Newville, Pa., on Aug. 4, 1843. He was educated in the country schools and at the Eastman Business College at Poughkeepsie, N. Y. He served as a bookkeeper in the First National Bank, Newville, from 1870 to 1876, when he resigned to engage in the tanning business in Newville. In 1882 he was elected to the Pennsylvania Legislature by the Democrats and was reelected in 1884. Later he became interested in the street railways at Bloomington, Ill. In the fall of 1890 Mr. Graham organized a syndicate which consolidated the electric railways in Wilkes-Barre as the Wilkes-Barre & Wyoming Valley Traction Company. He was manager of this company until the sale of the property in 1899 to the United Power & Transportation Company. He again became interested in the properties at Bloomington, but disposed of his interests there in 1902 and secured control of the Camden Interstate Railway at Huntington, W. Va. He disposed of this road to the Ohio Valley Electric Railway in 1906. In 1908 and 1909 Mr. Graham assisted in organizing the Cumberland Railway, Carlisle, Pa. He was the first president of this company and at the time of his death was a director of the company.

W. W. Cole, of Cole, Ives & Davison, New York, died suddenly on Dec. 20 at Poughkeepsie, N. Y., after conferring with Mr. H. M. Beugler, operating manager of the Central Hudson Gas & Electric Company. Mr. Cole was widely known in electric railway and electric lighting circles as an engineer and operator. He was born in Medford, Mass., and was graduated from the Worcester Polytechnic Institute in 1887. He began his career as construction engineer for George H. Norman, Boston, and the New England Construction Company. Subsequently Mr. Cole became connected with the Toledo, St. Louis & Kansas City Railroad as construction engineer. Mr. Cole next entered the expert course of the Thomson-Houston Company at Lynn, Mass., and was superintendent of electrical installation of the Allston division of the West End Street Railway, Boston, Mass. After completing this work Mr. Cole became manager of the Utica (N. Y.) Belt Line. From Utica he went to Elmira in 1893 and constructed the West Side Railroad there. He was personally interested in the consolidation of all the utilities in Elmira and became vice-president and general manager of the Elmira Water, Light & Railroad Company. On account of the increase in his consulting practice Mr. Cole resigned from the company at Elmira in 1908 to become general manager of the public utilities department of Dodge & Day, Philadelphia. For a long while Mr. Cole was located at Oil City, Pa., for Dodge & Day, with the Oil City Traction Company. In March, 1914, he resigned from Dodge & Day to open an office for himself in New York as an independent consulting engineer. In February of this year the firm of Cole, Ives & Davidson was formed to give special attention to public utility problems of all kinds. Mr. Cole was the first president of the Empire State Gas & Electric Association, being elected in 1905. He was also second vice-president of the New York Street Railway Association in 1894 and was first vice-president of the association in 1895 and 1896. He was treasurer of the association for three years from 1903 and was secretary and treasurer of the association for two years from 1903. Mr. Cole was forty-eight years old. He is survived by his widow and two sons.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

Mattoon, Ill.—The Decatur, Sullivan & Mattoon Traction Company has asked the Council for a new franchise to extend from Dec. 3, 1915, to Dec. 3, 1920, the old one having expired. This is a proposed line to connect Sullivan, Decatur and Mattoon. The project has been suspended until the close of the European war. [Nov. 28, '14.]

Peoria, Ill.—The Peoria & Chillicothe Electric Railway has asked the Council for a franchise in Peoria.

Chicopee Falls, Mass.—The Springfield Street Railway has received a franchise from the Council to construct tracks on Church Street and Broadway.

Tonawanda, N. Y.—The Council of Tonawanda has granted the Frontier Electric Railway a number of amendments to its franchise. Under the changes the company will not have to pay 2½ per cent on the revenue derived from switching charges in Tonawanda, nor will it have to maintain more than one station should it have a passenger service through Tonawanda. The Aldermen granted the company an extension of time in which to begin the construction of the new road to Dec. 31, 1916, and for the completion of the line until Dec. 31, 1919.

Cincinnati, Ohio.—The Cincinnati, Newport & Covington Street Railway will again ask the Council for a franchise for its loop in Cincinnati some time next spring, according to an announcement recently made. It has been operating for some time without a franchise.

Pittsburgh, Pa.—Twenty-one ordinances granting new franchises to the Pittsburgh Railways and looking to the establishment of a system of transfers from all lines to a loop between North Avenue and the Court House have been introduced in City Council.

Dallas, Tex.—The Dallas Standard Traction Company has asked the Council for a franchise to construct a line through Mount Auburn to Parkview Place, both additions recently opened to Dallas.

San Angelo, Tex.—The City Commissioners of San Angelo have declared the franchise of the San Angelo Power & Street Railway void because of the company's failure to construct extensions as called for.

TRACK AND ROADWAY

Edmonton (Alta.) Power Company, Ltd.—This company is planning to build a solid concrete dam, 1500 ft. long and 100 ft. high, on the Saskatchewan River, above Rocky Rapids, making an artificial lake about 60 square miles in area. This development will cost approximately $6,000,000, not including an electric railway, which, as a separate scheme, will be built from Edmonton to the proposed power site.

Municipal Railways of San Francisco, San Francisco, Cal.—The contract for the construction of a section of the Church Street municipal railway between Eighteenth and Twenty-second Streets has been awarded by the Board of Public Works to the Contra Costa Construction Company for $120,500. Bids are being received for the construction of two more units of the Church Street line, one extending from Sixteenth to Eighteenth Street and one from Twenty-second to Thirtieth Street.

Connecticut Company, New Haven, Conn.—Plans are being made by the North End Improvement Association of Waterbury to petition the Connecticut Company to extend its line to Pearsallville.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—Many changes in the track of the Wilmington & Philadelphia Traction Company in various parts of Wilmington are now being made by the company, either to connect the tracks of the old Peoples Railway with the Wilmington & Philadelphia Traction Company system or to provide a means of maintaining the schedule in a more effective manner.

Clearwater, Fla.—Surveys have been made for an electric railway from Tampa to Clearwater on the west coast, about 30 miles. A bridge consisting of 160-ft. steel draw span and about 2 miles of wood approaches will be built in connection with the line. E. W. Parker, Curry Building, Clearwater, is interested. [July 31, '15.]

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.—At a recent meeting of the stockholders of this company it was decided that electric cars be substituted for the present motor cars, the change to be made at the earliest possible moment.

Hawkinsville & Florida Southern Railway, Macon, Ga.—Operation has been begun with a gasoline-electric car on this company's line between Hawkinsville and Camilla. The steam train will continue for the present without change.

Illinois Traction System, Peoria, Ill.—This company has recently placed in service four small cabin type mechanical interlocking plants on the division between Springfield, Ill., and St. Louis, Mo. These plants vary in size from eight to twelve levers and are for the control of traffic at crossings of the main line of the Illinois Traction System, with switch tracks leading from the Wabash and Chicago & Northwestern Railroads to coal mines. The contract for the material and installation was let to the Union Switch & Signal Company.

Springfield (Ill.) Consolidated Railway.—It is reported that this company is considering the extension of its line east to Bergen Park.

Kankakee & Urbana Traction Company, Urbana, Ill.—The contract for the construction of a 90-ft. span north of Ludlow on this company's line has been awarded to the Central State Bridge Company of Indianapolis.

Des Moines (Iowa) City Railway.—In connection with the rehabilitation of its city lines, this company has announced that it will construct an 11-mile extension of its Colfax line to Newton. New interurban lines are also planned to Indianola, Winterest, Red Oak and eventually to Omaha through a territory not now served by any railroad.

Cumberland & Manchester Railroad, Barbourville, Ky.—It is reported that A. B. Furnish, Mount Vernon, has received a contract to complete the grading on a section of this company's line which is being built between Barbourville and Manchester. The Read Construction Company, Philadelphia and Hazelton, has the general contract. [Dec. 11, '15.]

Rockland, South Thomaston & St. George Railway, St. George, Me.—This company states that it will build 1 mile of new track during 1916.

Springfield (Mass.) Street Railway.—Operation has been begun by this company on its new East Street line into Chicopee Falls.

Albion-Charlotte Northern Railway, Lansing, Mich.—Construction will be begun in the spring on this company's line from Albion to Lansing. The company will use a roadbed made twenty years ago for a railroad between Albion and Charlotte. The proposed route will pass through some of the richest farming country in Michigan, most of which is not served by any railway. Among the places through which it will pass are Brookfield, Charlotte, Potterville and Grand Ledge. It will also be tributary to the region around Duck Lake, a summer resort 10 miles north of Albion. Arthur B. Wood, Coruna, president. [Dec. 12, '14.]

Duluth (Minn.) Street Railway.—This company reports that during 1916 it expects to build 4 miles of new track.

Meridian Light & Railway Company, Meridian, Miss.—This company expects to build about 1¾ miles of new track during 1916.

Kansas City & Tiffany Springs Railway, Kansas City, Mo.—A report from this company, which was incorporated in November, states that surveys are being made and rights-of-way being secured for its proposed line between Kansas City and Tiffany Springs. Construction will be begun early in the spring of 1916 and it is expected that about 2½ miles will be in operation by summer. An amusement park will be established by the company at Tiffany Springs. The company may build a power plant at Tiffany Springs later, and the repair shops will be located at North Kansas City, Mo. Willard E. Winner, Kansas City, will receive the contract for constructing the line. The officers are as follows: H. G. Pert, president; J. N. Baird, secretary; Charles J. Smith, treasurer, and W. M. Spratt, chief engineer. The offices of the company are located at 310 Dwight Building, Kansas City, Mo. [Nov. 13, '15.]

Municipal Railway, Brooklyn, N. Y.—Information has been received by the Queens Chamber of Commerce from the Public Service Commission for the First District of New York that the engineering plans for the construction of the subway under the East River at Sixtieth Street are practically completed, and it is expected that the advertising for bids will be started shortly after Jan. 1.

Buffalo & Depew Railway, Buffalo, N. Y.—This company reports that during 1916 it expects to build 2 miles or 2½ miles of new line.

International Railway, Buffalo, N. Y.—New double tracks have been laid on Bailey Avenue between Winspear and Kensington Avenues, Buffalo, by this company, and the Kensington car line is now routed through this street. A one-car stub line was formerly operated in this section to handle the traffic during the morning and late afternoon. A new steel bridge has been placed over Ellicott Creek in Tonawanda, by the company, replacing the wooden structure that has been used for years. During the few days the bridge was being moved into place, passengers on the Buffalo & Niagara Falls and Buffalo, Tonawanda and Gratwick interurban lines were transferred from car to car over the waterway by automobiles over the regular vehicle bridge. The bridge connects Tonawanda and North Tonawanda.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has approved this company's plans for the construction of an extension of its Third Avenue elevated line from near its terminus to Gun Hill Road. The extension will leave the existing line a little south of its present terminus at Bronx Park, and will turn up Webster Avenue to Gun Hill Road, about 1½ miles south of Yonkers, where it will effect a junction with the new White Plains Road elevated line which extends almost to Mount Vernon. It is expected that the line will be in operation by the end of 1917.

Goldsboro (N. C.) Street Railway.—This company expects to build 1 mile of new track during 1916.

***Kansas-Oklahoma Electric Company, Caney, Okla.**—Plans are being considered by this company to build a line between Caney and Dewey, where connection would be made with the Bartlesville Interurban Railway. Col. S. M. Porter, Caney, is interested.

Sarnia (Ont.) Street Railway.—This company expects to build ½ mile of new line during 1916.

Northampton Traction Company, Easton, Pa.—This company, which has been merged with the Bangor & Portland Traction Company, as noted elsewhere in this issue, plans to construct a new line from Wind Gap to the Delaware Water Gap. The new line will connect at Stroudsburg with the Stroudsburg Passenger Railway, which it is said will be absorbed, and will be built through Kellersville to Saylor's Lake, thence to Saylorsburg and Wind Gap. Saylor's Lake will be purchased and turned into a summer resort. It is expected that construction of the line will be begun by June 1.

Philadelphia, Pa.—The contract for the structural steel to be used in the extension of the elevated railway on Frankford Avenue between Unity and Dyre Streets, will be awarded to the American Bridge Company, the lowest bidder, for $249,000.

West Penn Traction Company, Pittsburgh, Pa.—Surveys are being made by this company for the extension of its lines in the Butler district. It is expected that the lines will be extended to the McFetridge coal mines, 7 miles north of Butler.

Scranton & Binghamton Railroad, Scranton, Pa.—This company reports that its 10-mile extension to Montrose will be completed and placed in operation about July 1, 1916. During the next year the company expects to build about 20 miles of track between Heart Lake, New Milford and Hallstead.

Montreal (Que.) Tramways.—This company will begin work at once on the construction of an extension of its line on Park Avenue from Van Horne Avenue to Atlantic Avenue.

Three Rivers (Que.) Traction Company.—Operation has been begun by the Three Rivers Traction Company, a subsidiary of the Shawinigan Water & Power Company, on its new 3-mile line in Three Rivers. Plans are being made to construct a 5-mile extension to Cap de la Madeleine in the spring. Thomas McDougall, president. [Oct. 9, '15.]

Dallas (Tex.) Consolidated Electric Street Railway.—Paving and reconstruction of tracks and roadbed on Commerce Street from Houston & Texas Railroad to Exposition Avenue, will be begun by Jan. 1, involving an outlay of $70,000.

Northern Texas Traction Company, Fort Worth, Tex.—In accordance with requirements made by the city of Polytechnic, the Northern Texas Traction Company is moving its tracks on Nashville Street from Vickery Boulevard to Avenue E and on Avenue E to Annis Street from the side to the middle of the street. Much double track also will be installed on Nashville Street. The line already has been double-tracked on Vickery Boulevard.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—A report from this company states that during 1916 it expects to build 10 miles of line between Provo, Springville and Spanish Fork.

***Leavenworth, Wash.**—It is reported that preliminary surveys have been made and a part of the right-of-way secured for a railway from Leavenworth to Icicle, 25 miles. A. Van Eppes, Leavenworth, is interested.

Grafton Light & Power Company, Grafton, W. Va.—This company reports that during 1916 it will construct 1 mile of new line.

Charleston-Dunbar Traction Company, Charleston, W. Va.—During 1916 this company expects to build 20 miles of new line.

Morgantown & Wheeling Railway, Morgantown, W. Va.—This company reports that it expects to build 7.45 miles of new interurban line from Price to Blacksville during 1916.

Green Bay & Eastern Railway, Manitowoc, Wis.—This company reports that the engineering work for the construction of its line from Green Bay to Sheboygan via Manitowoc is now being arranged and it is expected that work will be begun early in the spring. The following officers have been elected: William M. Willinger, Manitowoc, president; George Frosch, Wayside, vice-president; Rude Stockinger, Manitowoc, secretary, and Charles Frazier, Manitowoc, treasurer. [Dec. 11, '15.]

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company's station on Santa Monica Boulevard, near Sixth Street, Sawtelle, is being moved to make way for the new McClellan brick business block upon which construction has begun. The old station will occupy a site at the northwest corner of the grounds. The railway offices will have space in a building just east of the postoffice until the new business block is completed, when new quarters will be found for it in the McClellan structure.

Boston, Mass.—The contract for laying 1760 sq. yd. of terrazzo finish on walls of South Station of the Dorchester Tunnel has been awarded by the Boston Transit Commission to Galassi Mosaic & Tile Company, Boston, at $8,160.

Metropolitan Street Railway, Kansas City, Mo.—Bids will be received by this company until Jan. 1 for the construction of a shelter station at Twenty-third and Main Streets. The structure will be 12 ft. x 44 ft., of Bedford limestone and tile roof.

Lincoln (Neb.) Traction Company.—The contract for the construction of this company's ten-story terminal building at Lincoln has been awarded to the Selden Breck Construction Company, St. Louis, at $500,000.

Brantford & Hamilton Electric Railway, Hamilton, Ont.—Arrangements are practically completed for the erection of a union radial station in Brantford, to be used jointly by the Brantford & Hamilton Electric Railway and the Lake Erie & Northern Railway. It will be a brick structure, costing approximately $30,000.

Manufactures and Supplies

ROLLING STOCK

Central Railroad of Oregon, Union, Ore., expects to purchase during 1916 one closed motor car.

Chattanooga (Tenn.) Traction Company expects to purchase during 1916 two double end combination express and passenger cars, also one work car.

London & Port Stanley Railway, London, Ont., expects to purchase during 1916 three trail cars and one motor car, equipped with four 125-hp., 1500-volt motors, for its new electrified line.

Des Moines (Iowa) City Railway, which was mentioned last week as being in the market for forty cars, has not yet placed its order for these cars, but will probably do so in the near future.

Pittsburgh (Pa.) Railways, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 21 as having ordered seventy-five steel city cars from the Cincinnati Car Company, has increased this order to 100 cars.

Inter-Urban Railway, Des Moines, Iowa, has purchased a 60-ton electric locomotive, the mechanical equipment and construction of which will be done by the McGuire-Cummings Manufacturing Company. The electrical equipment, which includes 165-hp., 600-1200-volt motors and control, will be furnished by the Westinghouse Electric & Manufacturing Company.

Louisville (Ky.) Railway is rebuilding one of its old open cars in its shops into a closed car, with exit door at the front and entrance and exit doors at the rear, the bulkheads at the ends being removed altogether. There will be no platforms front or back and the conductor will stand in the car at the rear and the motorman in a railed-off portion at the front. It is stated that if the experiment proves a success, probably the remainder of these old cars will be similarly remodeled.

TRADE NOTES

Hensley Trolley & Manufacturing Company, Detroit, Mich., has recently doubled the capacity of its factory and office accommodations. This company reports that several large companies have recently adopted as standard the Hensley hollow-hub type of wheel.

Root Spring Scraper Company, Kalamazoo, Mich., has just finished delivering to the Michigan Railways its No. 3 air-operated snow scraper equipment for eighteen large high-speed cars. These are being mounted directly on the trucks. When this installation is completed every car on the Michigan United Railway and the Michigan Railway will be equipped with Root snow scrapers.

Barney & Smith Car Company, Dayton, Ohio, on December 15 lifted its receivership. Through the issuance of debenture notes to the amount of $600,000 the company was able to straighten out its affairs in a manner satisfactory to the court. In his application for discharge Receiver H. M. Estabrook stated that 67½ per cent of the claims of unsecured creditors had been paid. It is stated that there are sufficient orders on hand and work under way to meet all debts and obligations. The organization will remain as it was before the receiver took charge in June, 1913. The plan of reorganization announced some months ago has been abandoned.

St. Louis Railway Supply Company, St. Louis, Mo., will be reorganized at once into a new company under Joseph C. Reed as president. Mr. Reed was formerly a director of the Shapleigh Hardware Company. W. D. Achuff, vice-president, and Ephron Catlin, Jr., secretary and treasurer of the Southern Company, will have similar positions with the new company. The new company, the name of which has not yet been determined, in addition to carrying in stock a full line of miscellaneous supplies for railroads, mines, mills and industrial corporations, will specialize and represent exclusively in the Southwestern territory such well-known firms as the Buda Company, the E. F. Houghton Company, and the Verona Tool Works. It also has the exclusive sales agency in the United States for the Saunders corrugated car stopper.

ADVERTISING LITERATURE

Salomon Brothers & Hutzler, New York, N. Y., have issued a 64-page pamphlet showing a number of short term securities, of various classes, arranged according to maturities and indexed alphabetically. A detailed description is published for each issue.

Lisbon Falls Manufacturing Company, Boston, Mass., has issued a folder illustrating the "Economy" snow remover, a horse-driven device said to be used by some of the largest street railways in the New England States, for removing snow from city or town streets.

George H. Davis of Ford, Bacon & Davis, engineers, New York, N. Y., has issued a reprint of an address entitled "Economic Advantages Resulting from Port Development," delivered before the League of American Municipalities on Sept. 28, 1915, and an address entitled "Business Opportunities of Louisiana and Adjacent States" delivered before the College of Commerce and Business Administration of the Tulane University of Louisiana on Oct. 29, 1915.

Ohmer Fare Register Company, Dayton, Ohio, has issued a bulletin entitled "An Element of Success," describing its fare register system, which quotes statements of commendation from the Inter-Urban Railway, Des Moines, Iowa, and the Southern Public Utilities Company, Charlotte, N. C., in regard to its system. The bulletin also reproduces some figures taken from the merit record grades of conductors on the Denver Tramways and the Chicago & West Towns Railway, illustrating the consistent improvement in efficiency shown.

NEW PUBLICATIONS

Thirty-Third Annual Report of the New York Electric Railway Association.—Published by the Association from the Office of the Secretary, Schenectady, N. Y.; 246 pages.

The thirty-third annual report of the New York Electric Railway Association, or that for the fiscal year ending June 30, 1915, is issued in the same attractive form and regard for typographical appearance which have characterized previous reports of the association during recent years. The association meets twice during the year, one its annual convention, which was held this year at Manhattan Beach, on June 29-30, and the "quarterly" meeting which was held this year at Lake George on March 3. The reports of both meetings are published, and both will warrant reading, even by those who were in attendance at the convention, because the questions considered were all live topics of the day, and the New York association has the ability to attract to its meetings men who have something worth while to say.

Railway Maintenance Engineering. By William H. Sellew, A.S.M.E. D. Van Nostrand Company, New York. 360 pages. $2.50.

This book presents the subject from the viewpoint of the student, but is of a sufficiently advanced character to be of reference value to steam and, to some extent, to electric interurban railway engineers. The contents were prepared from notes used by the author in his classroom lectures at the University of Michigan. Information concerning major bridges, yards and terminals is not included because the author believed these subjects were so important as to require special treatment. As indicated by the title, the subject matter is treated largely from a maintenance standpoint with a view to studying improvement of existing lines of railways. The scope of the work is shown by the following chapter headings: Engineering; land; grading; bridges, trestles and culverts; ties; rails; other track material; ballast; maintaining track and right-of-way; station and roadway buildings; water stations; fuel stations; shops and engine houses; icing stations; signals and interlockers. Each chapter is followed by a bibliography of the author's references.

The traffic department records of the Puget Sound Traction, Light & Power Company, Seattle, Wash., show that at the present time there are 130 traimen on the payrolls of the company who have been in this company's service for ten years or longer. This is exclusive of the employees in other lines of work who have been ten years or more with the company.

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